

Watershed Connections



Water Resources of Boone County, Indiana

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Introduction

Water is a vital resource for all citizens of Boone County. Water is essential for agriculture and industry, as well as for recreation and drinking. A healthy environment and economy requires clean water and healthy watersheds. Boone County is located in central

Indiana and has an area of 423 square miles or 270,880 acres. Elevation in the county ranges from 775 feet to 985 feet above sea level, and the population is approximately 45,300 (2000 estimate.) The Boone County climate is temperate, with average monthly temperatures ranging from 24.9°F in January to 74.3°F in July.

This publication gives basic information about the surface and ground water resources of Boone County, and discusses human activities that may be affecting those water resources. Many sources of information were used in preparing this publication. All sources, along with dates for the statistics and numbers presented, are listed on p. 11, under "Sources of Information." Please refer to these sources for further information.

Boone County Streams and Watersheds

A watershed is the land that drains into a lake, stream, or river. All land is contained in a watershed. Watersheds are important because everything that is done on the land can affect the lake or river into which it drains. The quality of our water is affected not only by what is discharged into the river, but by everything we do on the land in the watershed. Watersheds of Indiana are shown in Figure 1, while detailed information on streams and watersheds of Boone County are shown in Figure 2.

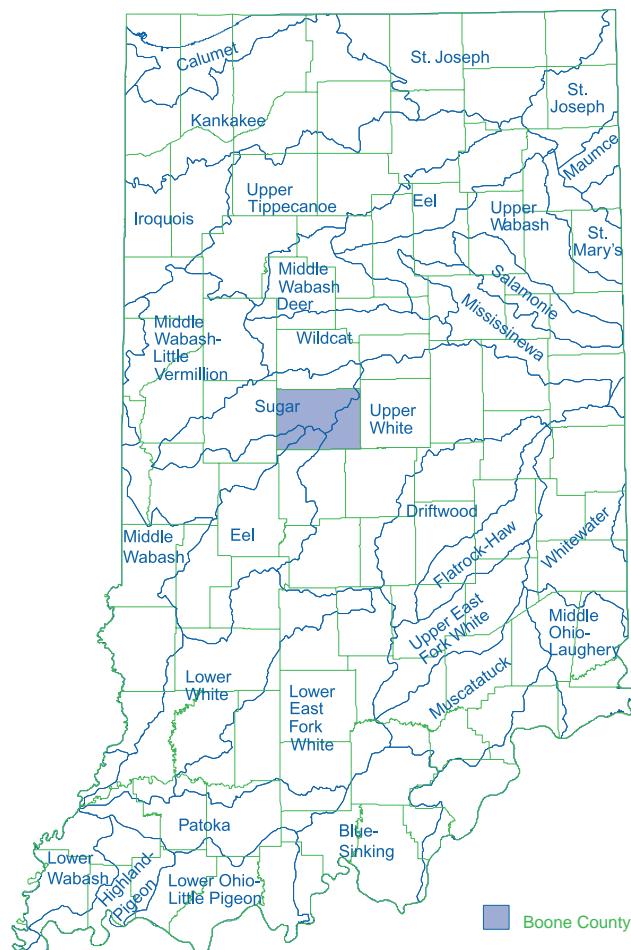


Figure 1. Boundaries of the major watersheds of Indiana. Boone County is mainly in the Sugar Creek and Upper White watersheds.

Boone County lies completely within the Wabash River Basin. The Wabash flows into the Ohio River, which flows into the Mississippi and eventually to the Gulf of Mexico. In general, streams and rivers in Boone County radiate outward from the center of the county in nearly all directions. The central and northwest part of Boone County drains north and west into Sugar Creek. The southwest part of the county drains into Big Raccoon Creek. Both Sugar Creek and Big Raccoon Creek flow west into Montgomery County. Big Walnut Creek, which flows through Hendricks County into the Eel River in Putnam County, drains a small south-central portion of the county. The eastern part of the county drains into Eagle Creek, which flows into the Eagle Creek Reservoir and is used for drinking by Indianapolis and other cities. Since all these streams originate in Boone County, many downstream counties are affected by actions taken by people in Boone County.

There are no natural lakes in Boone County, although there are several ponds, artificial lakes, and gravel pits. The absence of lakes underscores the need to protect Boone County's streams.

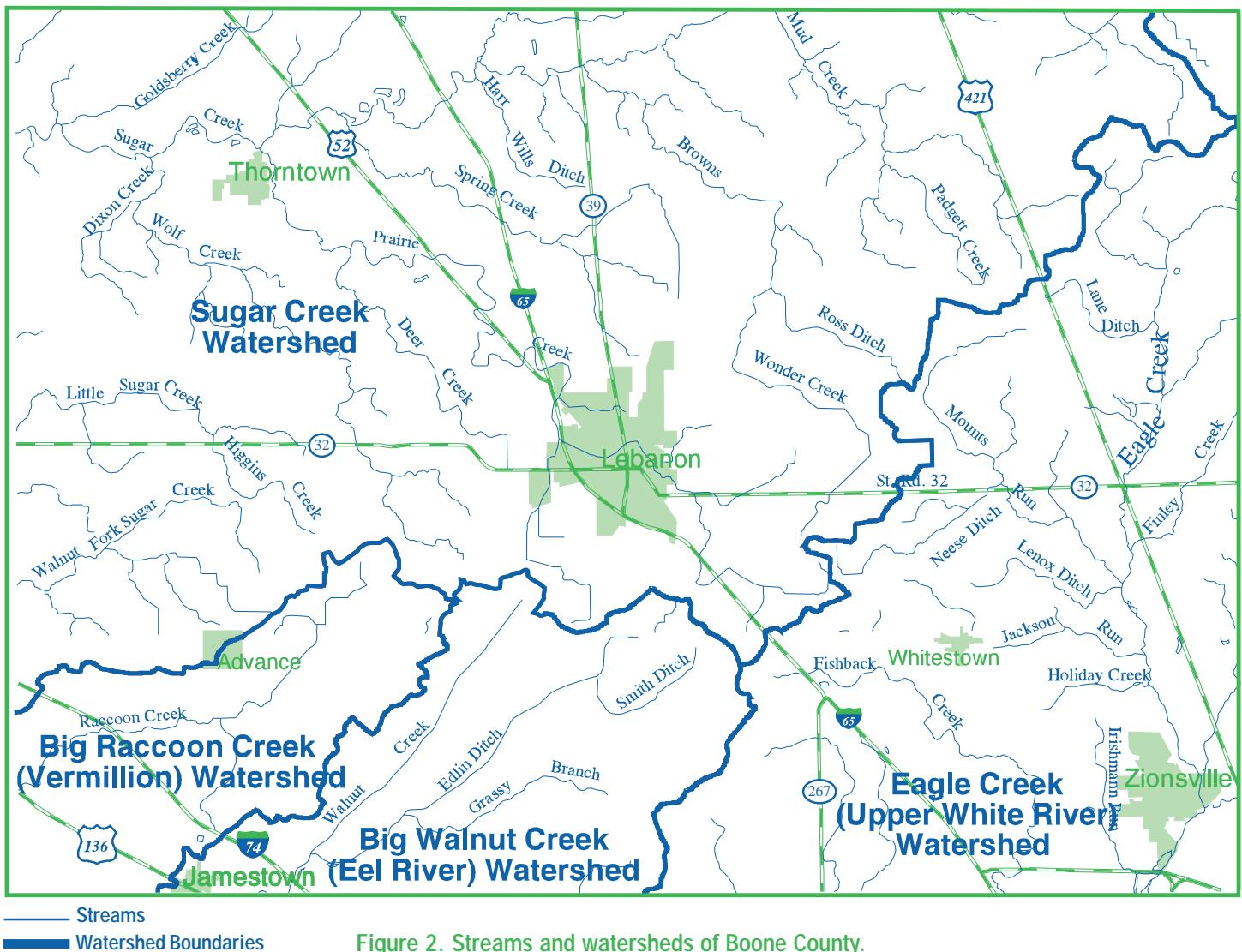


Figure 2. Streams and watersheds of Boone County.

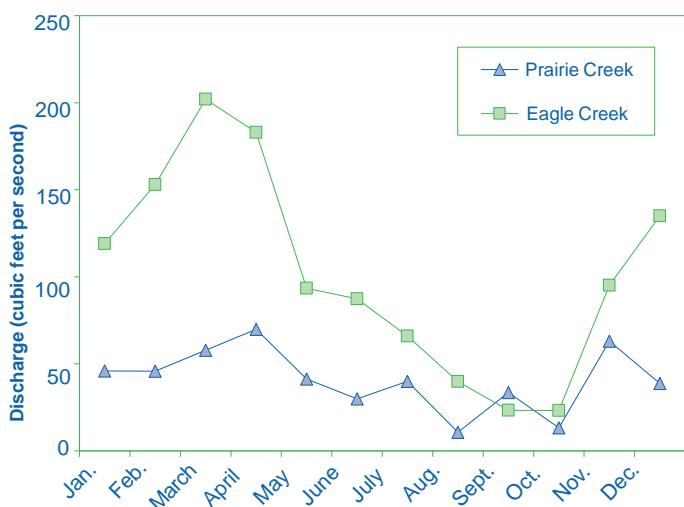


Figure 3. Average monthly discharge for Boone County streams.

Discharge for a stream or river is the amount of water flowing per unit of time. A typical unit for measuring discharge is cubic feet per second (cfs). Two *gaging stations*, where discharge is measured continuously in a stream or river, are run by the U.S. Geological Survey in Boone County. These two stations are located in Prairie Creek northwest of Lebanon and Eagle Creek at Zionsville. The monthly average discharge for these two streams is shown in Figure 3. Highest flows generally occur February to April while low flows usually occur in August to October, a pattern that is typical for most streams in Indiana. These represent longterm averages; maximum daily flows during floods can be much higher, and low flows during droughts can be much lower.

Boone County Floodplains

Floodplains are low areas adjacent to river or stream channels. These areas have flooded in the past and will flood again in the future. Floodplains exist because river channels are rarely large enough to contain major floods. Floodplains have been delineated for Boone County by the Federal Emergency Management Agency. A general map of floodplains is shown in Figure 4. The Boone County Area Plan Commission and some individual towns have maps that show detailed boundaries of floodplains, which should be viewed before planning any development that may coincide with a floodplain.

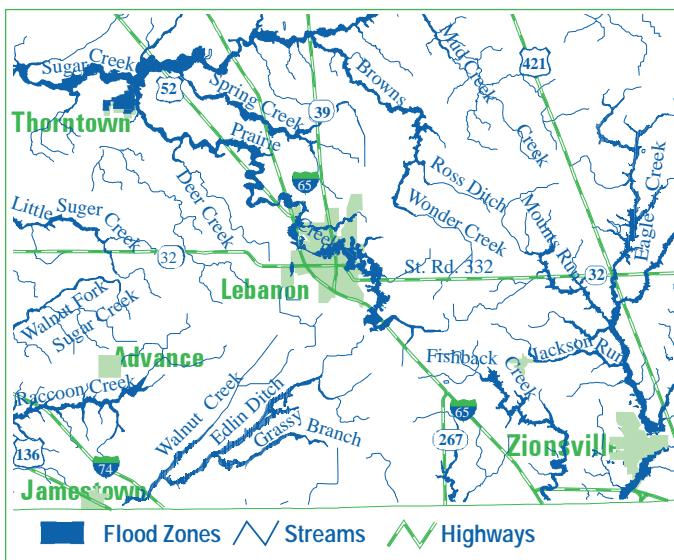


Figure 4. Floodplains of Boone County.

Boone County Wetlands

Boone County has 4,985 acres of wetlands, according to the National Wetlands Inventory carried out in the 1980s. This is equal to 1.8 % of the total area in the county. Wetlands help maintain the quality of surface and ground water by removing potential pollutants such as sediment, nutrients, and pesticides from the water. Wetlands have many other benefits including providing habitat for wetland flora and fauna, providing services to humans such as aesthetics, hunting, fishing, and recreation, and storing water which reduces peak flood flows. Approximately 85 percent of Indiana wetlands have been lost since the 1700s.

Boone County Precipitation

The average yearly precipitation (rain, snow, sleet, and hail) in Boone County is 38.8 inches. Precipitation is relatively constant throughout the year, as shown in Figure 5. Average monthly precipitation is about 3.4 inches, but monthly highs and lows can vary considerably. The bars show average monthly precipitation. In 80% of the years, rainfall will be between the two lines (greater than the amount shown by the triangles and less than the amount shown by the squares).

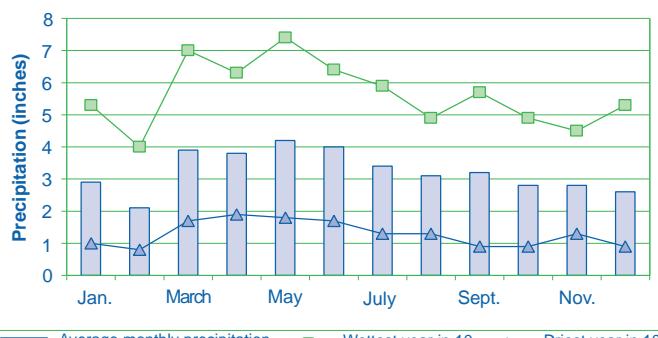


Figure 5. Average monthly precipitation, and the 10th and 90th percentile (dry and wet) years in Boone County.

In addition to monthly precipitation amounts, the precipitation from a single storm can be important in causing flooding. Precipitation records over many years have been analyzed to assess the probability of various storms occurring. Precipitation probability for a single storm is generally expressed in terms of a return period, which means the expected number of years between storms of a given size.



Figure 6. Rainfall expected in 24 hours for low probability storm events.

A “5-year storm” has a 20% chance of occurring in any one year, so it is likely to occur about every 5 years on the average. However, it is possible for a 5-year storm to occur many years in a row or even several times in a single year. A 100-year storm has a 1% chance of occurring in any year. Figure 6 shows the expected 24 hour rainfall for Boone County for various return periods.

Boone County Ground Water

The present-day land surface of Boone County is primarily the result of the effects of the continental ice sheets that covered the county. Great quantities of earth materials associated with ice masses were moved about and deposited by various glacial processes. Most of the deposits were derived from nearby areas, but some came from as far away as Canada. The pre-glacial bedrock formations were covered by as much as 350 feet of these glacial materials, and it is within this layer of deposited silt, sand, and gravel that the major aquifers of the county are located.

Ground water is highly variable in Boone County because of the variations in geology. The most productive wells are along Eagle Creek and Sugar Creek. In many areas “dry holes” and limited well supplies have been noted, especially in the southeastern part of the county. It is not uncommon, however, to encounter wells with above average yields next door to a lot where numerous “dry holes” have been reported.

Contact the Indiana Department of Natural Resources or the Boone County Health Department for information about well depths, including the well logs for nearby wells, and ease of obtaining water in your neighborhood.

Boone County Water Use

Boone County citizens and industry use water for many purposes. The largest water use in Boone County is for domestic water supply, which includes water in homes for washing, drinking, flushing toilets, and watering gardens. Industry is the second largest water user. Water use in Boone County is tracked by the Indiana Department of Natural Resources and is shown in Figure 7.

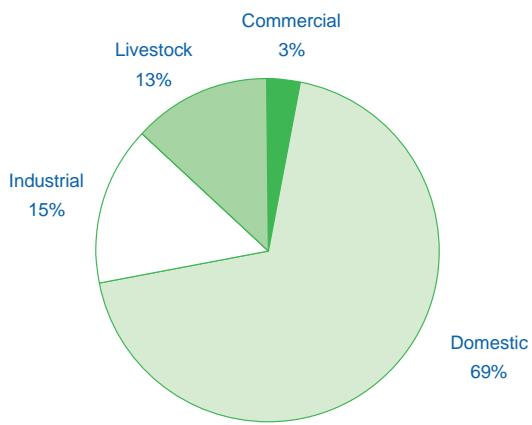


Figure 7. Water use in Boone County

Boone County Drinking Water

Drinking water can be supplied either by public water supplies or by private wells. Approximately 57% of Boone County households use water supplied by a public water system. Seven public water systems are located in the county (Advance Water Works, Lear's Mobile Home Park, City of Lebanon Water Department, Pine Ridge Mobile Home Park, Thorntown Utilities, Whitestown Water Works, and Jamestown Municipal Water), while Zionsville and other areas in the southeast part of the county use water supplied by the Indianapolis Water Company. The Indianapolis Water Company uses surface water from the Eagle Creek Reservoir, Fall Creek, and the White River and ground water primarily from wells outside of Boone County.

The seven public water supply systems located within the county use ground water, or wells, for a water source. These systems must develop a *wellhead protection program*, identifying the recharge area and describing a management plan to protect the ground water. Each system must identify the area overlying ground water that can travel to the well in 5 years or less (the wellhead protection area), identify potential sources of contamination within this area, and develop a management plan to minimize risk from these sources. Some examples of potential contaminant sources include fuel storage tanks, fertilizers and pesticides, septic systems, landfills, and industrial chemicals. A contingency plan must also be developed to cope with possible emergencies. Community involvement is an important component of this plan. Contact your public water supply, the Indiana Department of Environmental Management, or Purdue Extension for more information (See "Sources of Information").

The Safe Drinking Water Act requires that all public water supplies test at least annually for a number of contaminants including the following:

- volatile organic compounds such as gasoline or solvents
- pesticides and other synthetic organic compounds
- lead, copper, nitrate, and other inorganic substances
- microbial contaminants such as bacteria

Information on contaminant levels in your tap water is available

from your water supply system. Starting in 1999, all systems are required to send out an annual report on the quality of tap water they supply. This report provides all citizens the opportunity to know what is in the water they drink. Be sure to read yours, and contact your water system if you have any questions.

Citizens using private water supplies (43% of the population) must make a greater effort to monitor their own well water quality. No regular testing of existing private wells is required, or carried out, by government agencies. The Boone County Well Ordinance requires homeowners planning to drill a new well, or repair or replace an existing well, to obtain a permit from the health department. They must use a well driller who is licensed by the State and registered with the Health Department, and the well must be tested for bacteria and inspected by the Health Department.

Boone County Water Quality

Surface Water Quality

Surface water quality in the United States has greatly improved since enactment of the Clean Water Act in 1972. Sewage treatment plants and industries, which previously discharged minimally-treated pollution into streams, are now required to have permits for all discharges. Although much remains to be done, many rivers that once barely supported fish are now fully supportive of a variety of aquatic life.

The Indiana Department of Environmental Management (IDEM) monitors rivers and streams around Indiana and reports the results every two years. At the time of the most recent survey, Big Raccoon Creek and Walnut Fork were fully-supportive of aquatic life and recreational use. Wolf Creek, near Colfax, and Eagle Creek were fully supportive of aquatic life but not supportive of recreational use because of contamination by the bacteria *E. coli*, which indicates the possible presence of other pathogenic microorganisms. Eagle Creek is on a list of water bodies for which IDEM will develop a Total Maximum Daily Load, or TMDL, by the year 2005, due to high levels of *E. coli*. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards.

The Indiana State Department of Health (ISDH) issues "fish consumption advisories" for rivers or streams where fish are not safe to eat. Although no fish consumption advisories are in place specifically for Boone County, carp anywhere in Indiana can be contaminated with both PCBs and mercury and should be consumed rarely. These recommendations are particularly important for women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15. For more information, consult the most recent Indiana Fish Consumption Advisory (See "Sources of Information" section).

Ground Water Quality

Information on ground water quality in Boone County is limited. In Indiana, the most common pollutants in ground water are volatile organic compounds (gasoline and other petroleum products) and nitrate. Many private wells may be contaminated by bacteria or nitrate, often from nearby septic systems.

One of the few sources of information on ground water in Boone County is a voluntary private well testing program carried out in 1994 by the Farm Bureau, the Purdue Cooperative Extension Service, and other agencies. Nitrate, which has adverse effects on infants, was not found at levels above the drinking water standard (10 parts per million) in any of the 306 wells tested. If households do find levels above the standard, the water should be treated or bottled water should be used, particularly if an infant is present or expected in the household. Screening was also done for two pesticide groups. Triazine herbicides include atrazine (Aatrex), cyanazine (Bladex), and simazine (Princep). Acetanilide herbicides include alachlor (Lasso), metolachlor (Dual), or the breakdown products of these herbicides. Only very low levels were detected in a few wells, and none of the 300 wells tested exceeded the drinking water standard for either of these herbicide groups.

	Number of Wells tested	Number exceeding the drinking water standard
Nitrate	306	0
Triazine Herbicides	300	0
Aacetanilide Herbicides	303	0

Well testing results in Boone County, 1994 (Source: Nitrate and Pesticides in Private Wells of Indiana)

The vast majority of wells in Boone County can therefore be assumed to provide safe, clean water for drinking. Testing of all private wells should continue every few years, however, to be sure that water remains safe. The Boone County Health Department recommends yearly testing of residential wells for bacteria, especially if any changes are noticed in taste, odor, or appearance. Call the Health Department for information on tests that homeowners may be interested in, a list of certified labs, forms to mail to the ISDH for testing kits, bottles for two different labs, and courier pickup. A list of certified laboratories can also be found in the Purdue Extension publication "Water Testing Labs." (See "Sources of Information" section)

Once contaminated, ground water is difficult to clean up, often requiring many years and great expense. Protecting ground water from possible pollution sources makes more sense.

Potential Sources of Pollution in Boone County

Pollutants can be separated into two categories, point source and nonpoint source, depending on how they get into the water. *Point source pollution* refers to contaminants that enter the water directly, usually through a pipe. Examples are sewage treatment plants and industrial facilities which have permits to discharge prescribed quantities of potential contaminants into a specific stream. *Nonpoint source pollution*, by contrast, originates across the watershed and enters the water at location that cannot be easily identified. Examples of nonpoint source pollution include sediments, nutrients, pesticides, oil, and other chemicals. Point and nonpoint source pollution are illustrated in Figure 8. Nonpoint source pollution, which is not regulated, is currently the primary cause of water quality degradation in the U.S.

Potential Point Source Pollution

Because point source discharges require permits, excellent information is available about point sources discharging in Boone County. Eighteen facilities (municipal sewage treatment plants, factories, schools, packing plants, etc.) were permitted to discharge wastes in Boone County's water in 1996. The largest surface water discharger in Boone County is the Lebanon Municipal Sewage Treatment Plant.

Boone County has three sites in the Superfund Program in various active stages of investigation and remediation. They are: Northside Sanitary Landfill, Enviro-Chem Corporation, and the "Third Site."

The **Northside Sanitary Landfill** is an inactive facility that covers approximately 65 acres six miles north of Zionsville. Over 16 million gallons of hazardous wastes were deposited in the landfill. The State issued a notice of violation and ordered the owner to stop accepting hazardous waste in 1983. Approximately 50 residences are located within one mile of the site, and 1,750 residences located within three miles of the site use wells for drinking water. An unnamed ditch runs along the east side of the site into Finley Creek, which flows into Eagle Creek and Eagle Creek Reservoir.

Remedial construction activities that took place during 1994 through 1996 include the following: an engineered cap to prevent additional rainwater infiltration; a hydraulic isolation wall on the south and west sides of the landfill; a leachate and on-site groundwater collection system and a transfer station for trucking it for disposal to an off-site treatment plant; a site fence; and a ground water and leachate monitoring program. Cleanup at the site is finished, but monitoring will continue for the next 30 years.

The 6 1/2 acre **Enviro-Chem Corporation** site located north of Zionsville processed and reclaimed solvents from 1977 until 1982, when the State closed the site. Wastes such as resins, paint sludges, waste oils, and flammable solvents were received and stored on site in drums and storage tanks. Poor management of drum inventory and storm water, unapproved burning of chlorinated hydrocarbons and other solvents, and several spills led the State and U.S. Environmental Protection Agency to investigate. Approximately 50 people live within one mile of the site.

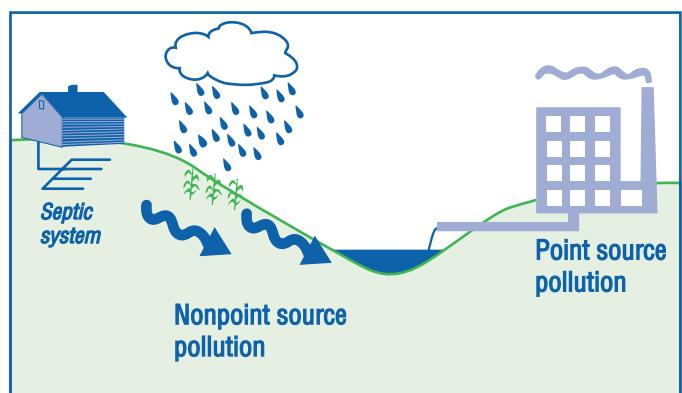


Figure 8. Point source and nonpoint source pollution.

In 1983 and 1984, waste from on-site storage tanks as well as 5,650 cubic yards of contaminated soils were removed and treated. Bulk tanks and treating water from cooling ponds were removed, in addition to over 3,000 drums of waste and 167,000 gallons of liquid waste from tanks. A soil vapor extraction system was constructed in 1998 to remove additional volatile organic compounds (VOCs) which will need to operate for approximately 2 years before soil cleanup standards are met.

The “**Third Site**” is a new federally-led pollution abatement site that is located near the Enviro-chem and Northside Sanitary Landfill Superfund Sites off Michigan Road, about a mile south of State Road 32. The site consists of a pond constructed on a former truck parking area owned by Enviro-chem. According to the EPA, the direction of run-off from the site and the quality of groundwater are a significant concern. The run-off eventually flows into Eagle Creek and subsequently into Eagle Creek Reservoir, which supplies drinking water to Indianapolis Water Company customers. Studies conducted in 1999 indicate that soil and ground water are contaminated with elevated levels of VOCs, and low levels of VOCs were detected in adjacent waters of Finley Creek. Additional testing will be conducted to determine the extent of contamination and outline potential remedies.

Potential Nonpoint Source Pollution

Potential nonpoint source pollution exists everywhere in the watershed. Nutrients, such as phosphorus or nitrogen, are potential pollutants in either ground or surface water. Nutrients can come from urban or rural areas, and result from normal home and farm operations as well as accidents or spills. Major sources of nutrients include septic systems, fertilizers, and livestock manure.

Urban and Residential Nonpoint Sources

Septic systems have the potential of leaching nutrients into the ground water and can contaminate the surface water if the system is not functioning properly. Approximately 43% of Boone County households use a septic system for waste disposal. Little information is available on how well the more than 6,000 septic systems in the county are performing, although many Boone County soils (covering about 87% of the county) have severe restrictions for conventional septic systems because of slow permeability and seasonal high water tables. A high percentage of older homes located in rural or agricultural zones may have septic tanks hooked directly to field drain tiles. This practice is illegal and contributes to the contamination of surface waters.

The other 57% of the housing units in the country are connected to the public sewer system, which treats and then discharges treated wastewater into a river or lake as a point source. Residues are removed from the wastewater that are then treated. These treated residues are known as biosolids – formerly referred to as “sludge.” Biosolids contain water as well as other substances such as nitrogen, phosphorus, potassium, zinc, calcium, magnesium, and iron. Organic matter and bacteria are major components of biosolids. There are five active permits for land application of municipal biosolids in Boone County. For more information, contact the sewage treatment plants or the Boone County Health Department.

Salt, oil, trash, fertilizers for lawns, and antifreeze are other examples of urban pollutants that can be washed off by rain and enter the water system as pollutants. No figures are available on urban lawn chemicals and runoff, which may be significant sources of pollution from residential areas.



Agricultural Nonpoint Sources

Agriculture can also contribute to nonpoint source pollution. Sediment, nutrients and pesticides can be transported by water from cropped fields. Roughly 220,000 acres, or more than 80% of Boone County, is used for planting crops. About 108,000 acres of soybeans and 106,000 acres of corn were planted in 1998, with the remainder mainly in wheat.

Information on fertilizer sales from the Office of the Indiana State Chemist shows that more than 30,000 tons of fertilizer are sold annually in Boone County. Manure from livestock may also contribute nutrients and pathogens to ground and surface water. The Indiana Department of Environmental Management requires manure management plans for confined feeding operations of at least 300 cattle, 600 swine or sheep, and 30,000 fowl. According to IDEM Office of Land Quality, Boone County has 20 swine farms with more than 600 animals each. Total swine production is 43,455 animals for an average of 2,173 animals per farm in 2000. These numbers vary as operations expand, reduce their size, or go out of business. Two turkey farms are permitted to have 47,000 birds each. There were no other livestock species at the minimum numbers requiring a permit. Smaller farms do not require permits but are still liable for spills or discharges that may affect water quality.

No specific statistics are available for pesticide use or runoff in Boone County. Indiana Agricultural Statistics tracks pesticide use statewide and this information could be assumed to represent Boone County. In Indiana the most widely used pesticides are the herbicides atrazine, alachlor, and metolachlor. Based on statistics of the Indiana Agricultural Statistics Service, approximately 300,000 pounds of a variety of herbicides and other pesticides may be applied to Boone County crops. The potential to impact ground water and surface water resources if improperly managed may be significant. Large-scale studies carried out in Indiana and elsewhere have shown that typically about 1% of applied pesticides end up in lakes or rivers. In any given year, then, approximately 3,000 pounds of pesticides may end up in Boone County waterways.

Many farmers are changing their practices to protect water resources. Erosion and chemical runoff from fields can often be reduced by using conservation tillage, defined as any tillage or planting system that covers 30 percent or more of the soil surface with crop residue. Conservation tillage is used on about half of the cropland of Boone County. Most farmers test their soils to ensure that crops only receive the amount of fertilizer that is needed, and many have installed grass waterways and buffer strips to protect water quality and provide habitat for wildlife.

Protecting the Water

There are many things you can do to protect surface and ground water quality.

1. Be Informed

This publication gives you a start in becoming familiar with water issues that affect Boone County. You can obtain further information such as the Water Quality series of publications from the Boone County Purdue Extension Office at 765-482-0750. The **Boone County Soil and Water Conservation District, Natural Resources Conservation Service, and Indiana Department of Natural Resources - Soil Conservation** can provide information and technical assistance to any Boone County resident (765- 482-6355.) The **Boone County Health Department** (765-483-4458) provides information on wells and well testing and responds to complaints concerning water quality. The **Boone County Solid Waste Management District** (765-483-0687 or E-mail: bcswmd@tds.net) can provide information on recycling, tox-away days, and trash questions. Many Web sites listed in the "Sources of Information" section can provide additional information.

2. Be Responsible

You can take actions in your own home and yard to protect water quality. For example, keep litter, pet waste, leaves, and grass clippings out of gutters and storm drains. In your yard, determine whether additional nutrients are needed before you apply fertilizers. If you own or manage land through which a stream flows, protect the stream banks by planting buffer strips of native vegetation. Never dispose of any household, automotive, or gardening wastes in a storm drain. Have your septic system inspected and pumped every 3 to 5 years. Always follow directions on labels for use and disposal of household chemicals.

Take used motor oil, paints, and other hazardous household materials to proper disposal sites such as approved service stations or designated landfills. The Boone County Solid Waste Management District (BCSWMD) hosts an annual one day tox-away event. Since 1995, approximately 73,500 pounds of household hazardous wastes have been collected and directed to proper recycling and disposal. In addition to the Boone County events, household hazardous wastes may be taken to the Marion County "tox drop" locations the first and third Saturdays of every month. Contact the BCSWMD for additional information and a schedule of these activities.

Utilize the Recycling List maintained and published by the BCSWMD to find recycling opportunities in the county. Recycling and other information may also be found on the District Web site at <http://www.bccn.boone.in.us/bcswm>. It is the goal of the District to reduce the amount of solid waste destined for final disposal. For the years 1997, 1998, and 1999, the District has been able to divert approximately 33,000 tons of paper, cardboard, scrap metal, and plastics directly to commodity markets for reuse. This has been accomplished by utilizing private sector municipal waste service providers. In addition, there are other opportunities for retail-level recycling within the District which have not been counted in the above totals.

3. Be Involved

As a citizen, one of the most important things you can do is find out how your community protects water quality, and speak out if you see problems. Boone County's water resources are plentiful, of generally good quality, and are critical for health and prosperity. Everyone's help is needed to protect these vital water resources.

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Printing of this publication was funded by the Boone County Solid Waste Management District.

Sources of Information

Introduction

- *Area:* Boone County GIS Department
- *Elevation:* [Soil Survey of Boone County](#), U.S. Department of Agriculture, Soil Conservation Service (now Natural Resources Conservation Service), 1974.
- *Population:* Boone county 2000 estimate from the Indiana Business Research Center, Indiana University Kelley School of Business (<http://www.iupui.edu/it/ibrc>)
- *Temperatures:* Indiana Climate Page at <http://shadow.agry.purdue.edu/sc.norm-geog.html>

Boone County Streams and Watersheds

- *Description of drainage:* [Soil Survey of Boone County](#).
- *Gauging stations and discharge:* [Water Resources Data - Indiana](#), Water Year 1994. U.S. Geological Survey Water - Data Report IN-94-1.

Boone County Floods and Floodplains

- *Floodplains:* [The Indiana Water Resource: Availability, Uses, and Needs](#). Governor's Water Resource Study Commission, State of Indiana, G.D. Clark, Editor, 1980.

Boone County Wetlands

- [Indiana 305\(b\) Report](#), Indiana Department of Environmental Management, Office of Water Management. 1994-1995.

Boone County Precipitation

- *Amount of Precipitation:* [Soil Survey of Boone County](#).
- *Storm Information:* [Rainfall Frequency for Indiana](#). Department of Natural Resources, Division of Water. Sept. 1994.

Boone County Ground Water

- [Soil Survey of Boone County](#)

Boone County Water Use

- U.S. Geological Survey Water Web page at: <http://water.usgs.gov/public/watuse>

Boone County Drinking Water

- U.S. Geological Survey Water Use Web page
- IDEM Office of Water Management, Drinking Water Branch

Boone County Water Quality

- *Indiana 305(b) Report*, Indiana Department of Environmental Management, Office of Water Management. 1994-1995.
- [1997 Indiana Fish Consumption Advisory](#). Indiana State Department of Health, Environmental Epidemiology Section. Obtain a copy at (317) 233-7808 or at <http://www.state.in.us/isdh> (under "Data and Statistics")
- [Nitrate and Pesticides in Private Wells of Indiana](#). The Water Quality Laboratory, Heidelberg College and Indiana Farm Bureau Inc., 1994.

Potential Sources of Pollution in Boone County

- *Point Source Pollution:* "Envirofacts" Permit Compliance System of the U.S. Environmental Protection Agency at: <http://www.epa.gov/enviro> Superfund information at <http://www.epa.gov/superfund/sites/npl/in.htm>
- *Septic Systems:* The U.S. Housing Census at site <http://sasquatch.kerr.orst.edu/stateis.html>
- *Crops and Tillage:* Crop Residue Management Survey results from Conservation Technology Information Center at <http://www.ctic.purdue.edu/CRM/CRMOptions.html>
- *Fertilizer:* [Indiana Fertilizer Tonnage Report](#). Office of Indiana State Chemist, Purdue University, 1996.
- *Livestock:* Indiana Agricultural Statistics, 1998-9, and IDEM Office of Land Quality

Please contact the Boone County Purdue Extension office for information on obtaining other Extension publications.

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