The Youngs Creek Watershed:

A Plan for the Future

Prepared by

The Youngs Creek Advisory Group

October 2003

Sponsored by

The Johnson County

Soil and Water Conservation District

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Project Mission Statement

Adopted by the

Youngs Creek Advisory Group

To assess the water quality of the Youngs Creek Watershed and promote watershed health for the benefit of its residents.

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Glossary of Terms

303(d) List – a list identifying waterbodies that are impaired by one or more water quality elements thereby limiting the performance of designated beneficial uses.

Aquifer – any geologic formation containing water, especially one that supplies water for wells, springs, etc.

Best Management Practice (BMP) – practices implemented to control or reduce nonpoint source pollution.

Canopy Cover – the overhanging vegetation over a given area.

Channelization – straightening of a stream; often the result of human activity.

Coliform – intestinal waterborne bacteria that indicates fecal contamination. Exposure may lead to human health risks.

Designated Uses – state established uses that waters should support (e.g. fishing, swimming, aquatic life).

Detention Pond – a basin designed to slow down stormwater run-off by temporarily storing the run-off and releasing it at a specific rate.

Dissolved Oxygen – oxygen dissolved in water that is available for aquatic organisms.

Downstream – in the direction of a stream's current.

Dredge – to clean, deepen, or widen a waterbody using a scoop, usually done to remove sediment from a streambed.

Easement – a right, such as a right of way, afforded an entity to make limited use of another's real property.

Ecoregion – a geographic area characterized by climate, soils, geology, and vegetation.

Ecosystem – a community of living organisms and their interrelated physical and chemical environment.

Erosion – the removal of soil particles by the action of water, wind, ice, or other agent.

Escherichia coli (*E.coli*) – a type of coliform bacteria found in the intestines of warm-blooded organisms, including humans.

Glide (Run) – a stretch of fast, smooth current, deeper than a riffle, with little or no turbulence on the surface.

Gradient – measure of a degree of incline; the steepness of a slope.

Groundwater – water that flows or seeps downward and saturates soil or rock.

Headwater – the origins of a stream.

Hydrologic Unit Code (HUC) – unique numerical code created by the U.S. Geological Survey to indicate the size and location of a watershed within the United States.

Impervious Surface – any material covering the ground that does not allow water to pass through or infiltrate (e.g. roads, driveways, roofs).

Infiltration – downward movement of water through the uppermost layer of soil.

Macroinvertebrates – animals lacking a backbone that are large enough to see without a microscope.

Maximum Contaminant Level (MCL) – the highest level of a contaminant that is allowed in drinking water.

National Pollutant Discharge Elimination System (NPDES) – national program in which pollutant dischargers such as factories and treatment plants are given permits with set limits of discharge allowable.

Nonpoint Source Pollution (NPS) – pollution generated from large areas with no identifiable source (e.g., stormwater run-off from streets, development, commercial and residential areas).

Permeable – capable of conveying water (e.g., soil, porous materials).

Point Source Pollution – pollution originating from a "point," such as a pipe, vent, or culvert.

Pollutant – as defined by the Clean Water Act (Section 502(6)): "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water."

Pool – an area of relatively deep, slow moving water in a stream.

Retention Pond – A basin designed to retain stormwater run-off so that a permanent pool is established.

Riffle – an area of shallow, swift moving water in a stream.

Riparian Zone – an area, adjacent to a waterbody, which is often vegetated and constitutes a buffer zone between the nearby land and water.

Run – see Glide.

Run-off – water from precipitation, snowmelt, or irrigation that flows over the ground to a waterbody. Run-off can pick up pollutants from the air or land and carry them into streams, lakes, and rivers.

Sediment – soil, sand, and minerals washed from the land into a waterbody.

Sedimentation – the process by which soil particles (sediment) enter, accumulate, and settle to the bottom of a waterbody.

Soil Association – a landscape that has a distinctive pattern of soils in defined proportions. Typically named for the major soils.

Storm Drain – constructed opening in a road system through which run-off from the road surface flows on its way to a waterbody.

Stormwater – the surface water run-off resulting from precipitation falling within a watershed.

Substrate – the material that makes up the bottom layer of a stream.

Topographic Map – map that marks variations in elevation across a landscape.

Total Maximum Daily Load (TMDL) – calculation of the maximum amount of a pollutant that a waterbody can receive before becoming unsafe and a plan to lower pollution to that identified safe level.

Tributary – a stream that contributes its water to another stream or waterbody.

Turbidity – presence of sediment or other particles in water, making it unclear, murky, or opaque.

Upstream – against the current.

Water quality – the condition of water with regard to the presence or absence of pollution.

Water quality standard – recommended or enforceable maximum contaminant levels of chemicals or materials in water.

Watershed – the area of land that water flows over or under on its way to a common waterbody.

Wetlands – lands where water saturation is the dominant factor in determining the nature of soil development and the types of plant and animal communities.

Zoning – to designate, by ordinance, areas of land reserved and regulated for specific uses, such as residential, industrial, or open space.

Acronyms

BMP	Best Management Practice
BOD	Biological (or Biochemical) Oxygen Demand
CRP	Conservation Reserve Program
CTIC	Conservation Technology Information Center
CWA	Clean Water Act
CWP	Center for Watershed Protection
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
GAP	Gap Analysis Program
GIS	Geographic Information System
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IAC	Indiana Administrative Code
ICM	Impervious Cover Model
IBRC	Indiana Business Research Center
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
ISU	Indiana State University
MRCC	Midwestern Regional Climate Center
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint source
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
PCB	Polychlorinated Biphenyls
QHEI	Qualitative Habitat Evaluation Index
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWA	Unified Watershed Assessment
WHIP	Wildlife Habitat Incentives Program
WWTP	Wastewater Treatment Plant
YCAG	Youngs Creek Advisory Group

Project Introduction

The Johnson County Soil and Water Conservation District (SWCD) successfully submitted an application in 2000 for a Clean Water Act Section 319 grant for the Youngs Creek Watershed Assessment Program. The Assessment Program, which began in September of 2001, enabled the SWCD to identify water quality, landuse, and natural resource characteristics within the Youngs Creek Watershed. In addition, the Assessment Program was designed to involve local stakeholders in identifying threats to local water quality resources and developing strategies to protect them. The Assessment Program culminated in October 2003 with the completion of this management Plan.

The design of the Assessment Program was based strongly on the watershed approach for environmental management. The watershed approach is a coordinating framework that focuses public and private sector efforts to address water quality concerns within a watershed. This type of management approach integrates four major features: 1) targeting priority problems, 2) involving stakeholders, 3) developing integrated solutions, and 4) measuring success (USEPA 1995). Since watersheds often include large areas with varied landuses, a watershed management approach integrates planning for both hydrological and ecological functions. This approach also ensures that diverse interests are represented in the planning process, and it helps to form lasting partnerships to achieve success.

The Assessment Program provided the first thorough examination of concerns and issues facing residents of this watershed. This resulting plan is a living document and is intended as a guide to be used by local decision makers for outreach, education, implementation, and assistance efforts. Further, it is to be used by landowners and citizens of the watershed to increase their understanding of water quality issues. The suggestions made under this management plan do not establish legal requirements, but instead provide a framework to coordinate voluntary efforts to improve and maintain water quality.

Designating the Study Area

A watershed is an area of land that water flows over or under on the way to a particular waterbody. In the United States, watersheds are identified using a hierarchical coding system, Hydrologic Unit Codes (HUC), developed in the mid-1970s by the U.S. Geological Survey (USGS). Based on topographical surface features, this system divided the country into regions, sub-regions, accounting units, and cataloging units. A unique number was assigned to identify each level. The resulting system provides a watershed coding system organized in a nested hierarchy by size – the more digits contained in the code, the smaller the watershed. The Youngs Creek Watershed Assessment Program chose to focus planning efforts in the Youngs Creek Watershed (HUC

05120204090). This hydrological unit contains the area of land drained by Youngs Creek as well as a section of land drained by Sugar Creek. However, for the purposes of this Plan, the entire area will be referred to as the Youngs Creek Watershed. This watershed is part of the larger Driftwood River Watershed (HUC 05120204), and is located entirely within Johnson County in the central portion of Indiana, south of Indianapolis. In total, the 124 square-mile Youngs Creek Watershed spans approximately 40% of the county's land area (Figure 1).

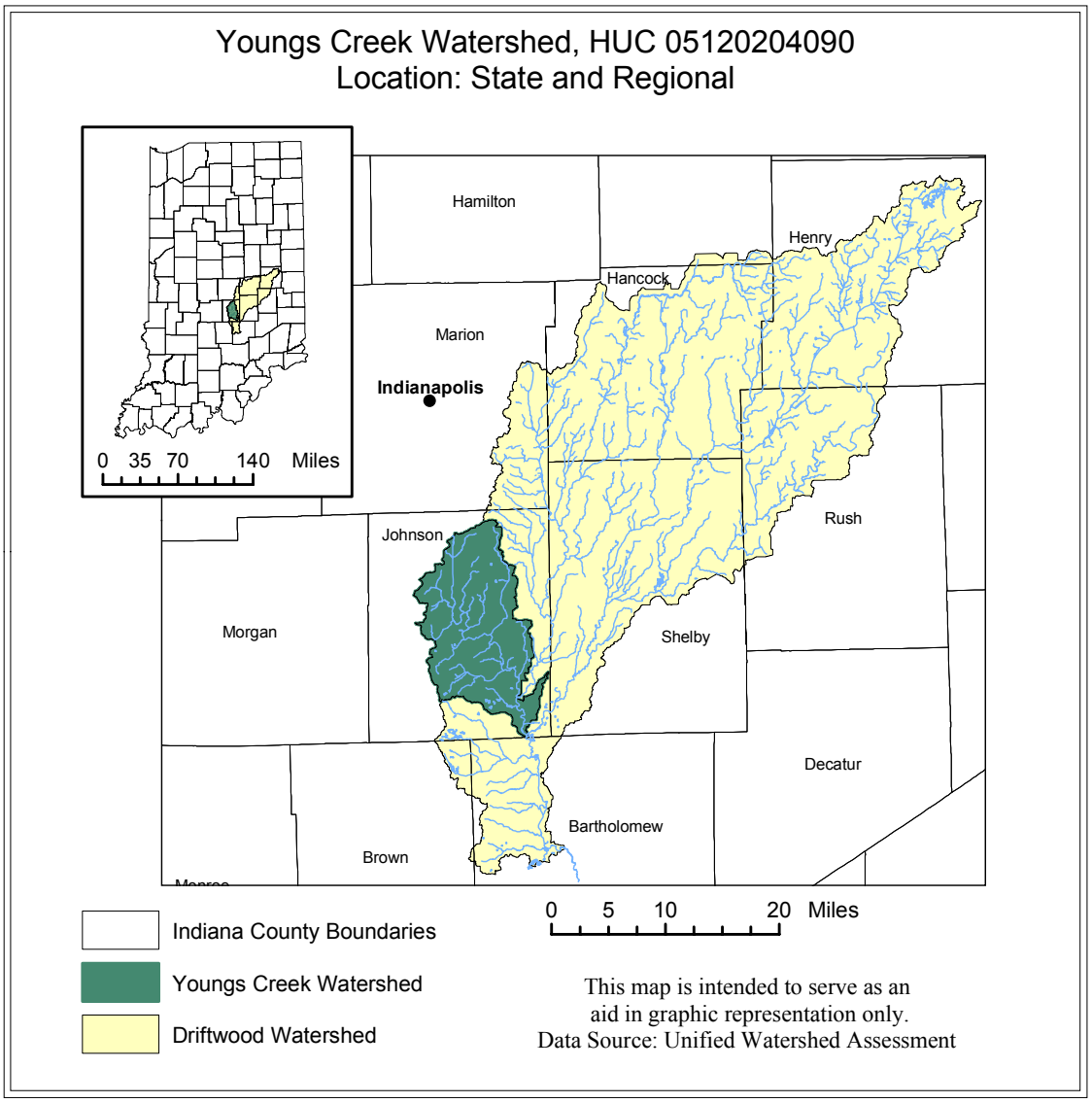

Figure 1. Youngs Creek Watershed: state and regional location

This watershed includes the county seat of Franklin, the cities of Whiteland and New Whiteland, and portions of Trafalgar, Bargersville, Greenwood, and the Atterbury State Fish and Wildlife Area. The major roadways of US 31 and I-65 also pass through portions of the watershed (Figure 2). This watershed is unique for its size because it is entirely contained within Johnson

County's boundaries. Management efforts for watersheds that span several counties or states involve coordinating efforts of many different stakeholders. The Youngs Creek Program was fortunate to be able to focus efforts on building strong partnerships among stakeholders within Johnson County.

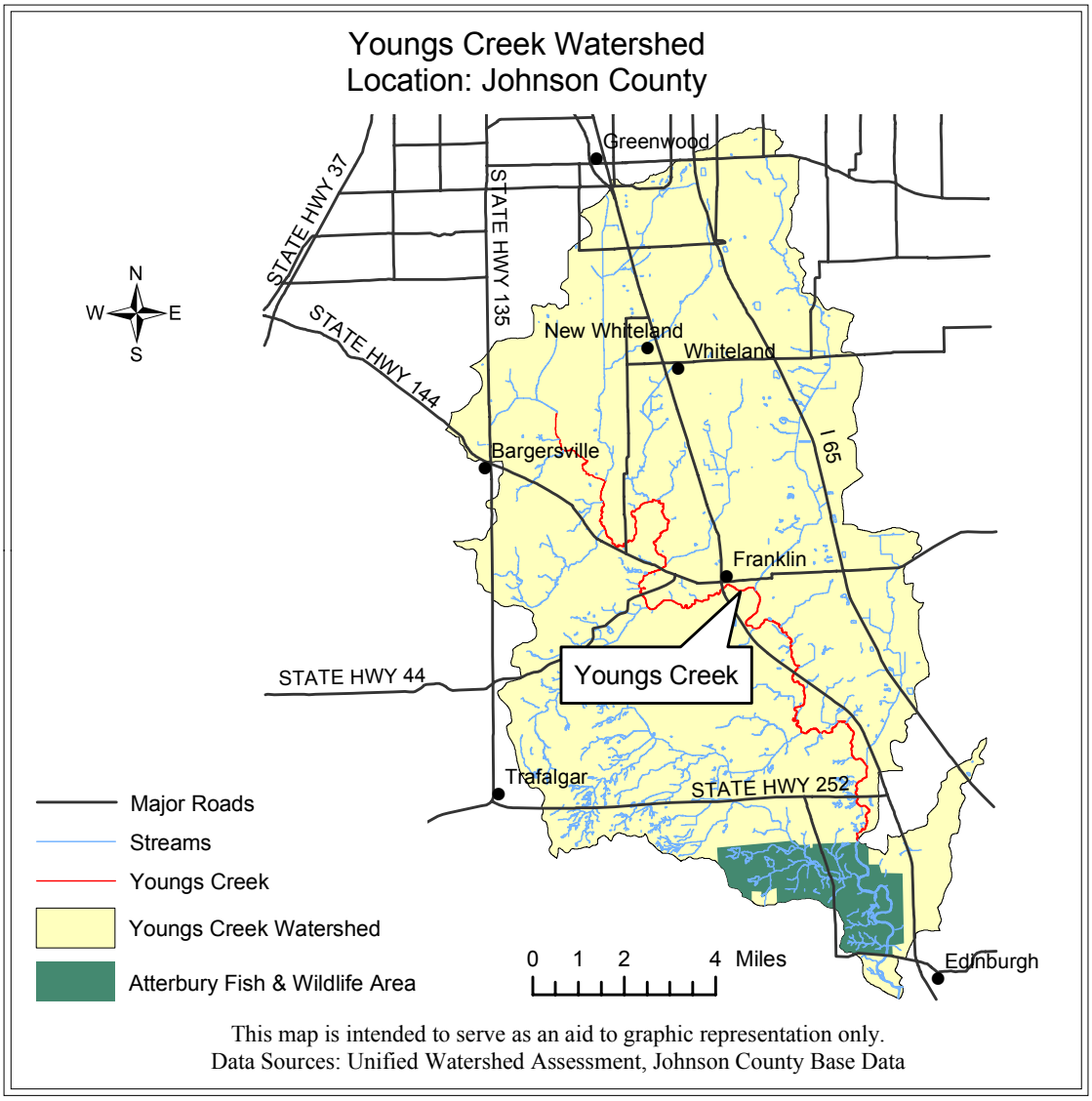

Figure 2. Youngs Creek Watershed: county location

Building Partnerships

The Assessment's organizational structure is shown in Figure 3. Assessment efforts were sponsored by the SWCD Board of Supervisors, who hired two watershed planning staff members, the Watershed Coordinator and Watershed Educator. The SWCD and watershed planning staff led efforts to develop the Advisory Group. Once established, the Advisory Group determined the direction of planning efforts. During the project, the Advisory Group broke into three sub-groups to

research specific issues. These sub-groups were called Research Teams. The SWCD, along with watershed planning staff, assisted the Advisory Group and subsequent Research Teams in analyzing concerns and developing the management plan.

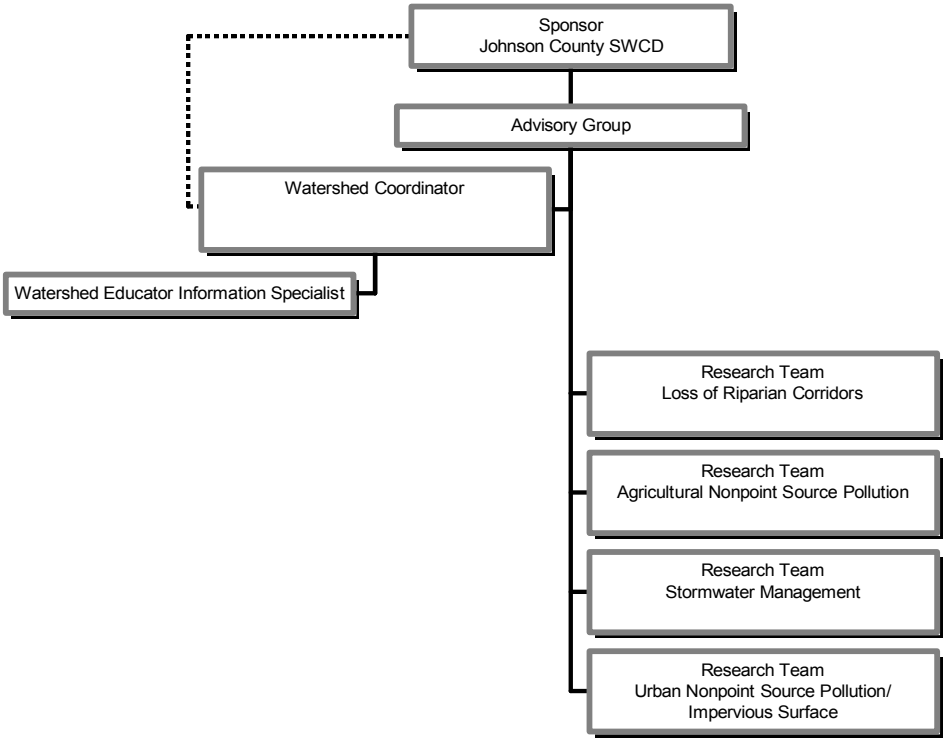

Figure 3. Organizational structure of the Youngs Creek Watershed Assessment Program

The SWCD's planning efforts began with the formation of a watershed Advisory Group (Figure 4). In November of 2001, an initial meeting was held to introduce the Youngs Creek Watershed Assessment Program to the public and to form the Youngs Creek Advisory Group (YCAG). Citizens were encouraged to attend this meeting through press releases in the *Daily Journal* and the *Ag Report*, and individual invitations were mailed to a list of stakeholders composed by the Johnson County SWCD Board of Supervisors. The members of the YCAG represent diverse interests and backgrounds within the watershed, and include government officials, educators, farmers, planners, scientists, and concerned citizens. Appendix A lists the members who were participated in developing the management plan. This group was responsible for ensuring local values were taken into account during plan development, carrying out planning activities, and coordinating plan implementation. The mission statement adopted by the Youngs Creek Advisory Group is as follows:

To assess the water quality of the Youngs Creek Watershed and promote watershed health for the benefit of its residents.

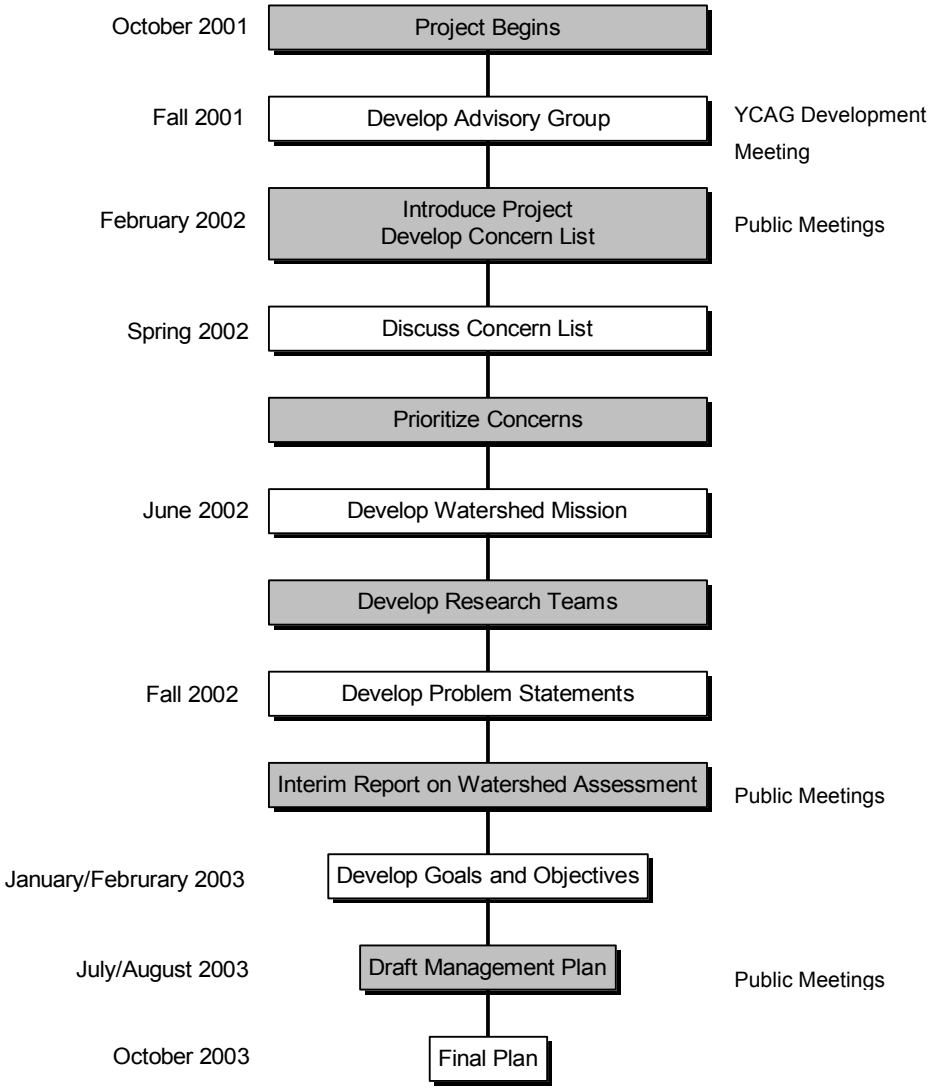

Figure 4. Youngs Creek Watershed planning process

In order to identify issues of concern among residents in the watershed, a series of public meetings were held in February of 2002 at public libraries in White River Township, Franklin, and Edinburgh. These meetings introduced the watershed project and provided residents with a forum to express their concerns. In addition, a questionnaire was published on the SWCD website and mailed to creekside residents in the watershed to gather additional input. The concerns from these activities were compiled and distributed to the YCAG (Appendix B). The YCAG participants spent several months discussing this list to establish a foundation of common knowledge, to determine the scope of each concern, to combine similar concerns, and to decide if additional information was needed.

After discussing each concern in detail, Advisory Group members prioritized the list based upon the following criteria (1) feasibility of accomplishing tasks given the resources available; (2) time-effectiveness; and (3) advancement of the group's mission.

A weighted ranking system was used to calculate results for prioritized concerns. Each member ranked his/her top three concerns and categorized them as high, medium, or low. Concerns ranked as high were given three points, concerns ranked as medium were given two points, and concerns ranked as low were given one point. Both the total of the ranking and the total number of voters were recorded. For example, "Need for education" scored 22/10. Twenty-two represents the total number of points this concern received, and ten represents the number of voters ranking this concern. The higher the percent of voters ranking the issue, the higher the degree of consensus among group members. Table 1 shows the results of the prioritization activity. The top five concerns, listed in order by the ranking sum, were "Need for Education," "Agricultural Nonpoint Source Pollution," "Increased Impervious Surface," "Urban Nonpoint Source Pollution," and "Loss of Riparian Corridors."

Table 1. Concern Prioritization

Concern	Total Votes	% of Voters (n=16)	Sum of Rank
Need for Education	10	62.5%	22
Ag Nonpoint Source Pollution	9	56.3%	17
Increased Impervious Surface	4	25.0%	12
Urban Nonpoint Source Pollution	6	37.5%	12
Loss of Riparian Corridors	4	25.0%	8
Stormwater Management	4	25.0%	7
Effects of Septic	2	12.5%	5
Loss of Forest/Farmland	4	25.0%	5
Legal Drain	2	12.5%	4
Point Source Pollution	2	12.5%	3
Flooding	1	6.3%	1

During this phase of the planning process, the YCAG chose to focus time and energy planning strategies to address the top five concerns on the concern list. The top ranked concern, the need for education, was deemed as a fundamental part of the other four concerns, so educational strategies were integrated into the plan to address each concern.

In June of 2002, members of the Advisory Group split into three Research Teams: (1) agricultural nonpoint source (NPS) pollution, (2) urban NPS pollution/increased impervious surfaces, and (3) loss of riparian corridors. Each Research Team was charged with researching information about that team's specific concern and developing goals, objectives, and actions to address each

concern. The similar concerns of urban NPS pollution and increased impervious surfaces were combined for one Research Team to address. The three research teams met regularly from August of 2002 through the end of the project.

Two public meetings were held in November 2002 to highlight the data collected at that point in the assessment, preliminary analysis of the data, and planning progress. Additionally, it provided an opportunity for local citizens to expand upon the information needed to develop goals and strategies to address the concerns.

Upon draft completion, plans were made available via the Johnson County SWCD website (www.swcd.org), the county fair, at public meetings, and at public libraries. A review and comment period was held to gather feedback regarding the strategies and recommendations. Comments were recorded and integrated into subsequent drafts, when applicable (Appendix C).

Throughout the project, a bi-monthly newsletter, *Youngs Creek Connections*, provided community leaders, local agencies, government personnel, interested citizens, and local library patrons with updates on activities, programs, and progress of the assessment project. At the end of the project, the newsletter mailing list had grown to include over 200 recipients.

Physical Description of the Watershed

This section provides an understanding of the physical setting of the watershed. This background information includes descriptions of the area's geologic history, physiography, water supply, soils, hydrologic features and governing organizations, Johnson County's legal drain system, local climatic information, existing wetlands, and natural history of the watershed.

Geologic History

Johnson County lies in the region of gray-brown podzolic soils of the east-central portion of the United States. These soils developed under a heavy forest cover of deciduous trees, with sufficient rainfall to maintain a moist condition throughout the soil, except for short periods of time.

Johnson County's southern border marks the approximate southern edge of the Wisconsin glacial deposits, which advanced through Indiana 20,000 years ago. These glaciers deposited glacial till, scattered sand and gravel deposits, silt, lake clays, and alluvial materials on the land surface. These deposits helped to create soil that is rich in minerals and nutrients.

Beneath these glacial deposits, the Youngs Creek Watershed is comprised of three different bedrock geology groups: the Mascatatuck Group, New Albany Shale, and the Borden Group (Figure 5).

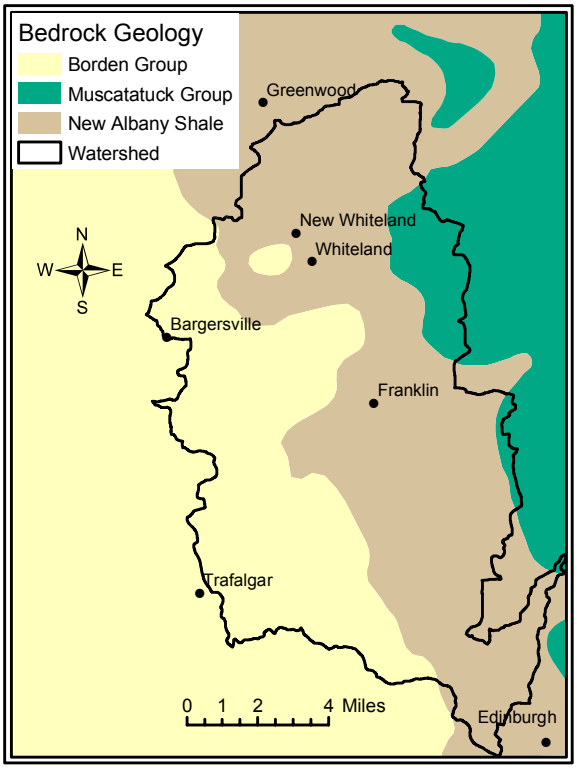

Figure 5. Youngs Creek Watershed: bedrock geology

The Mascatatuck Group in the eastern edge of the county consists mostly of dolomite. The New Albany Shales are brown to black shales that are rich in organic materials. Borden shales are comprised of shale, siltstone, some sandstone, and limestone. Borden shales are exposed by streambanks and road cuts.

Physiographic Features

Two distinct physiographic regions are contained in the Youngs Creek Watershed: the Scottsburg Lowland and the New Castle Till Plains and Drainageways (Figure 6) (Gray, 2000). The Scottsburg Lowland covers the extreme southeastern part of the county and the watershed. This region includes broad glaciofluvial outwash plains and terraces in addition to wide bottomlands that lie adjacent to the Blue and Driftwood Rivers, Sugar Creek, and its tributaries.

Most of the Youngs Creek Watershed is classified as New Castle Till Plains and Drainageways, part of the larger Central Till Plain. The till plains were formed from glacial deposits. They are characterized by fairly low relief with occasional terminal moraines and knolls that rise above the level ground.

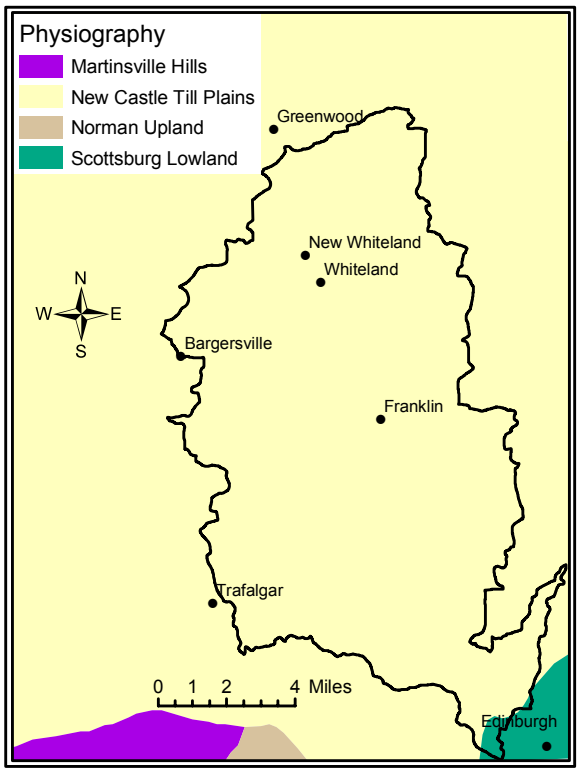

Figure 6. Youngs Creek Watershed: physiography

Water Supply

Drinking water is provided through both private wells and municipal water systems for residents of the Youngs Creek Watershed. The Indiana-American Water Company provides water service to an area encompassing the cities of Greenwood and Franklin, as well as portions of Clark, Needham, Pleasant, and White River townships in the northern portion of the watershed. Indiana-American also wholesales water to municipally owned systems in New Whiteland and Whiteland. To provide water to this system, Indiana-American has combination well/water treatment facilities throughout the county. Private wells are found primarily in unincorporated areas of the county.

Soils

An extensive survey of soils in Johnson County was completed in 1948 and updated in 1979. Due to the large number of individual soil types within the Youngs Creek Watershed, this report discusses soil associations. A soil association is a landscape that is comprised of a distinctive pattern of individual soils in defined proportions. The soil association is named for the most prevalent soil types within the association.

There are eight major soil associations in the Youngs Creek Watershed: (1) Crosby – Brookston, (2) Crosby – Miami, (3) Genesee – Shoals – Ross, (4) Rensselear – Whitaker, (5) Ockley – Fox, (6) Genesee – Eel, (7) Fox – Ockley – Nineveh, and (8) Miami – Hennepin. Table 2 lists the soil associations, the amount of watershed area classified in each, and a brief description (USDA - SCS, 1979). The Crosby, Brookston, Genesee, Shoals, Ross, Rensselear, Whitaker, Eel, and Hennepin soil types have severe limitations for septic tank absorption fields.

Table 2. Soil associations and watershed area

Soil Association	% of watershed	Description
Crosby - Brookston	40%	Very poorly drained and somewhat poorly drained, nearly level and gently sloping soils on terraces and uplands
Crosby - Miami	34%	Well drained and somewhat poorly drained, nearly level to moderately steep soils on uplands
Genesee – Shoals – Ross	8%	Well drained to somewhat poorly drained, nearly level soils on bottom lands, subject to flooding
Rensselear – Whitaker	8%	Very poorly drained and somewhat poorly drained, nearly level and gently sloping soils on terraces and uplands
Ockley – Fox	4%	Well drained, nearly level to moderately sloping soils on terraces
Genesee – Eel	2%	Well drained to somewhat poorly drained, nearly level soils on bottom lands, subject to flooding
Fox – Ockley – Nineveh	2%	Well drained, nearly level to moderately sloping soils on terraces
Miami – Hennepin	1%	Well drained, gently sloping to very steep soils on uplands

Slope and Elevation

Land within the Youngs Creek Watershed ranges in elevation from 610 feet above sea level to 930 feet above sea level, providing approximately 320 feet of relief (Figure 7). Digital maps of elevation and slope for Johnson County were developed using a digital topographic map of 2-ft contour lines obtained from the Johnson County Geographic Information System (GIS) department. The highest elevations in the county are found near the town of Trafalgar, southwest of the Youngs Creek Watershed boundary. The lowest elevations in the county are located in the northwestern corner where the White River flows into Morgan County and the southeastern corner of the county near Edinburgh where Sugar Creek meets with the Big Blue and Driftwood Rivers. Slope is a measurement of elevation change, and slope variations in Johnson County range from 0 to 34 percent (Figure 7). Higher percentages indicate steeper slopes. The map of Johnson County slopes indicates the steepest slopes in the southern and western edges of the county. Much of the northern and central portion of the Youngs Creek Watershed is nearly flat with a gentle slope.

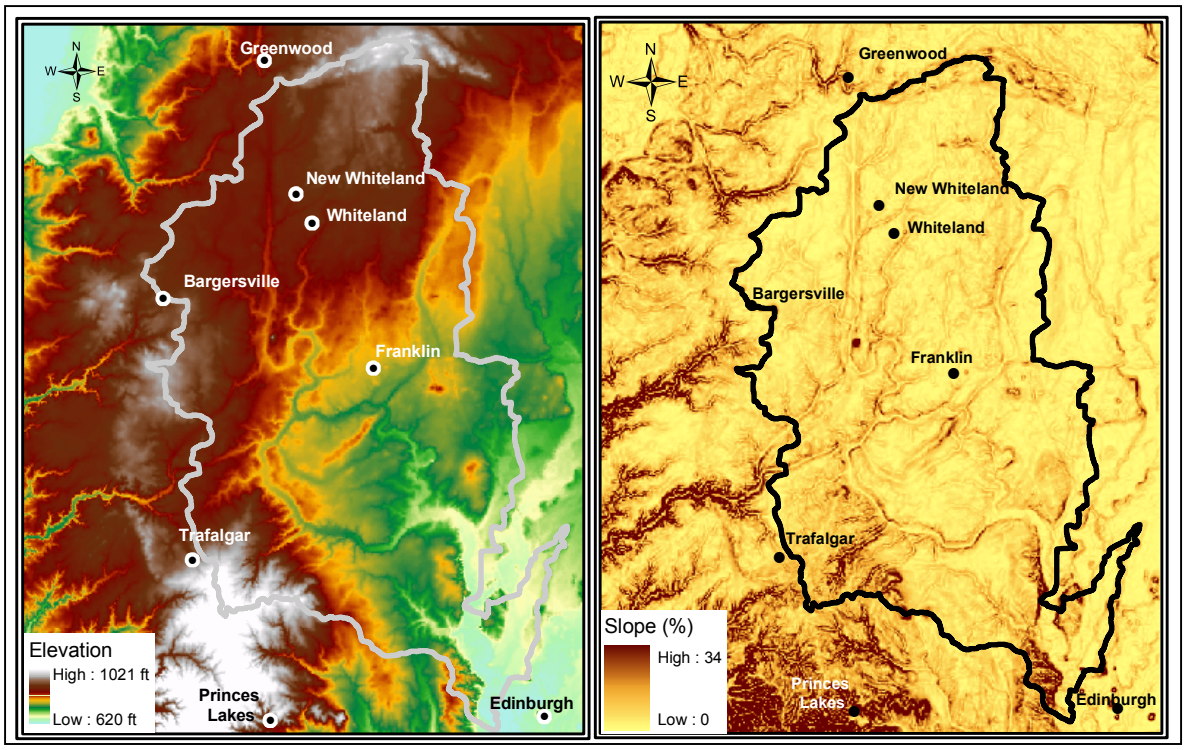

Figure 7. Youngs Creek Watershed: elevation (ft above sea level) and slope (%)

Hydrologic Features

Youngs Creek is approximately 22 miles in length and flows from the northwest portion of the watershed to the southeast, where it meets Sugar Creek and eventually drains into the Driftwood River. Youngs Creek receives waters from the following tributaries (Figure 8): (1) Alexander Ditch, (2) Roberts Ditch, (3) Gilmore Creek, (4) Grassy Creek, (5) Moores Creek, (6) Brewer Ditch, (7) Powell Ditch, (8) Canary Ditch, (9) Ray Creek, (10) Hurricane Creek, (11) Hazelett Ditch, (12) Herod Ditch, (13) Buckhart Creek, and (14) Amity Ditch. After Youngs Creek empties into Sugar Creek near Edinburgh, Indiana, (15) Herriotts Creek enters Sugar Creek near the base of the watershed. Of note, Sugar Creek within Johnson County was listed in 1993 as an Outstanding River on the Indiana Department of Natural Resources list of Outstanding Rivers (Natural Resources Commission, 1993).

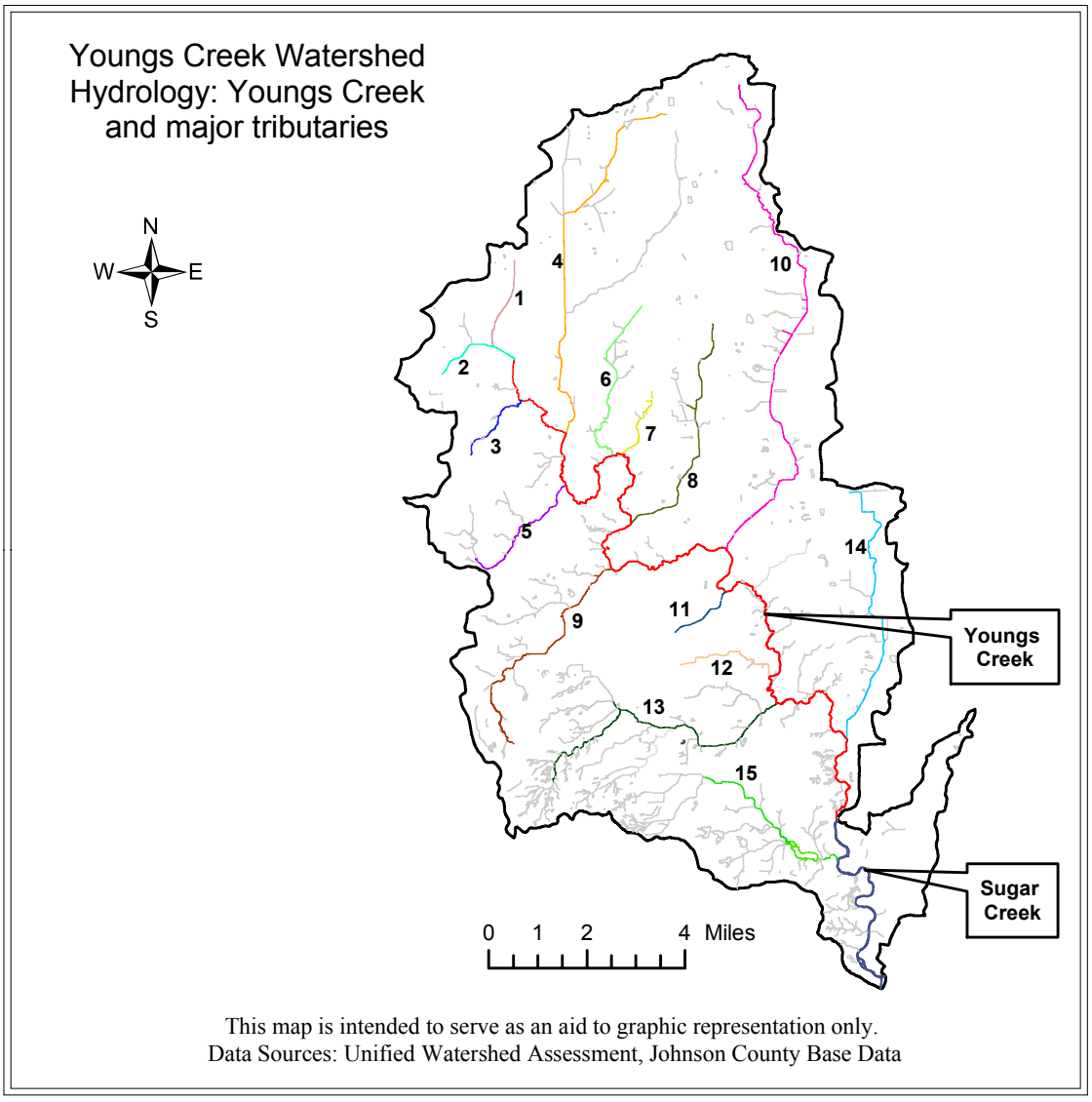

Figure 8. Youngs Creek Watershed hydrology: Youngs Creek and major tributaries

The Watershed is comprised of eight (8) major subwatersheds (14-digit HUC), shown in Figure 9, ranging in size from 12 square miles to 21 square miles. Each subwatershed is named for the major waterbody(s) that drains the land area into Youngs Creek. Examining the watershed on a subwatershed level helps to more accurately isolate and address water quality issues. These subwatershed units formed the basis for analyzing landuse and water quality in the Youngs Creek watershed.

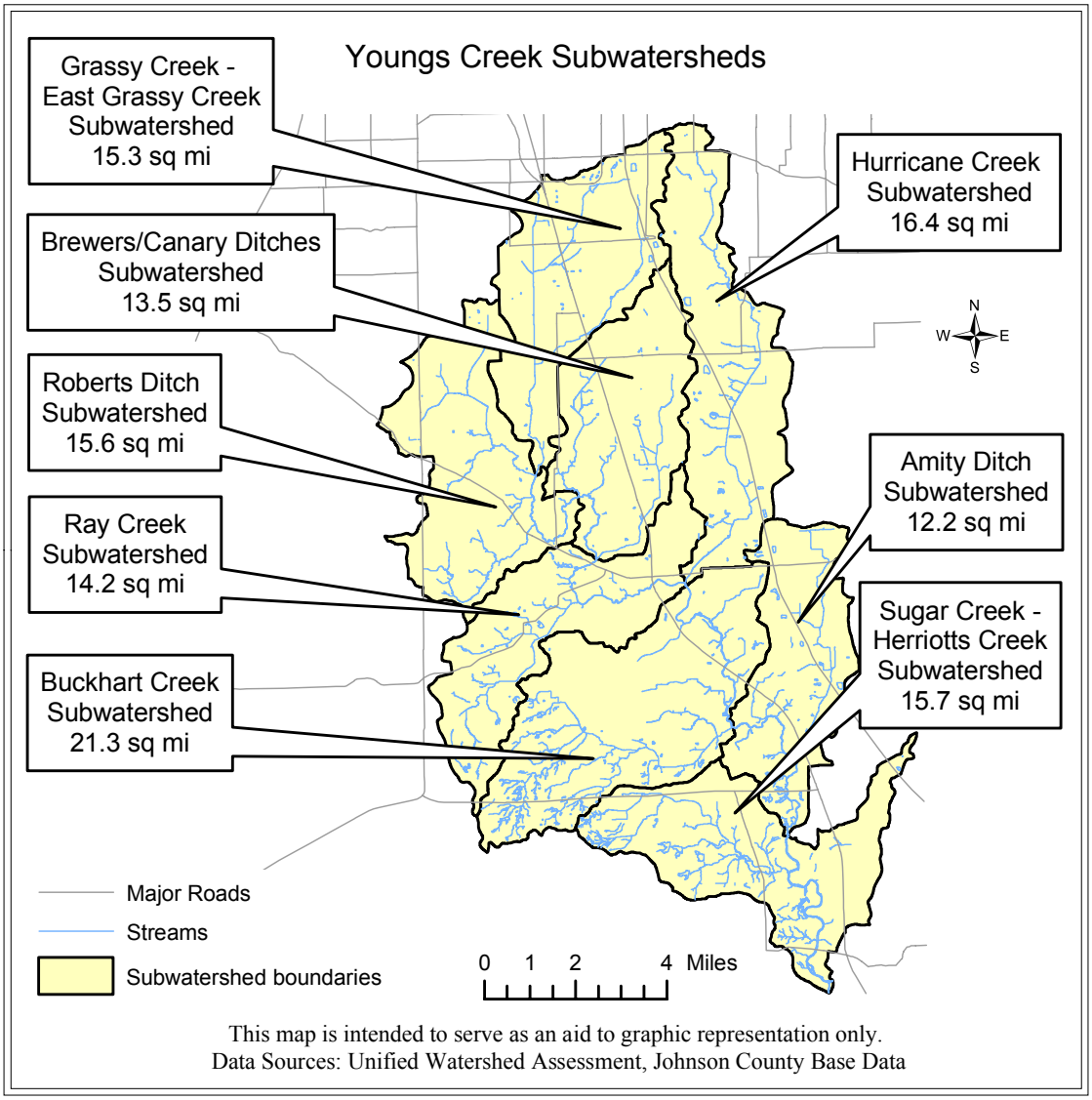

Figure 9. Youngs Creek Watershed: subwatersheds

Johnson County's Legal Drain System

A legal drain is a stream segment or a collection of stream segments whose primary purpose is to drain water from agricultural land. The Youngs Creek Watershed contains 20 legal drains, many of which are located in the northern portion of the watershed (Figure 10).

Legal drains are maintained by the Johnson County Surveyor's Office and are funded by taxes from residents living within a legal drain's watershed boundary. Maintenance of legal drains includes occasional spraying of streambanks with herbicide to reduce vegetative material and occasional removal of sediment and debris. Major dredging projects, clearing of obstructions, or reconstruction of a drain happens infrequently, and must be approved by the Johnson County Drainage Board.

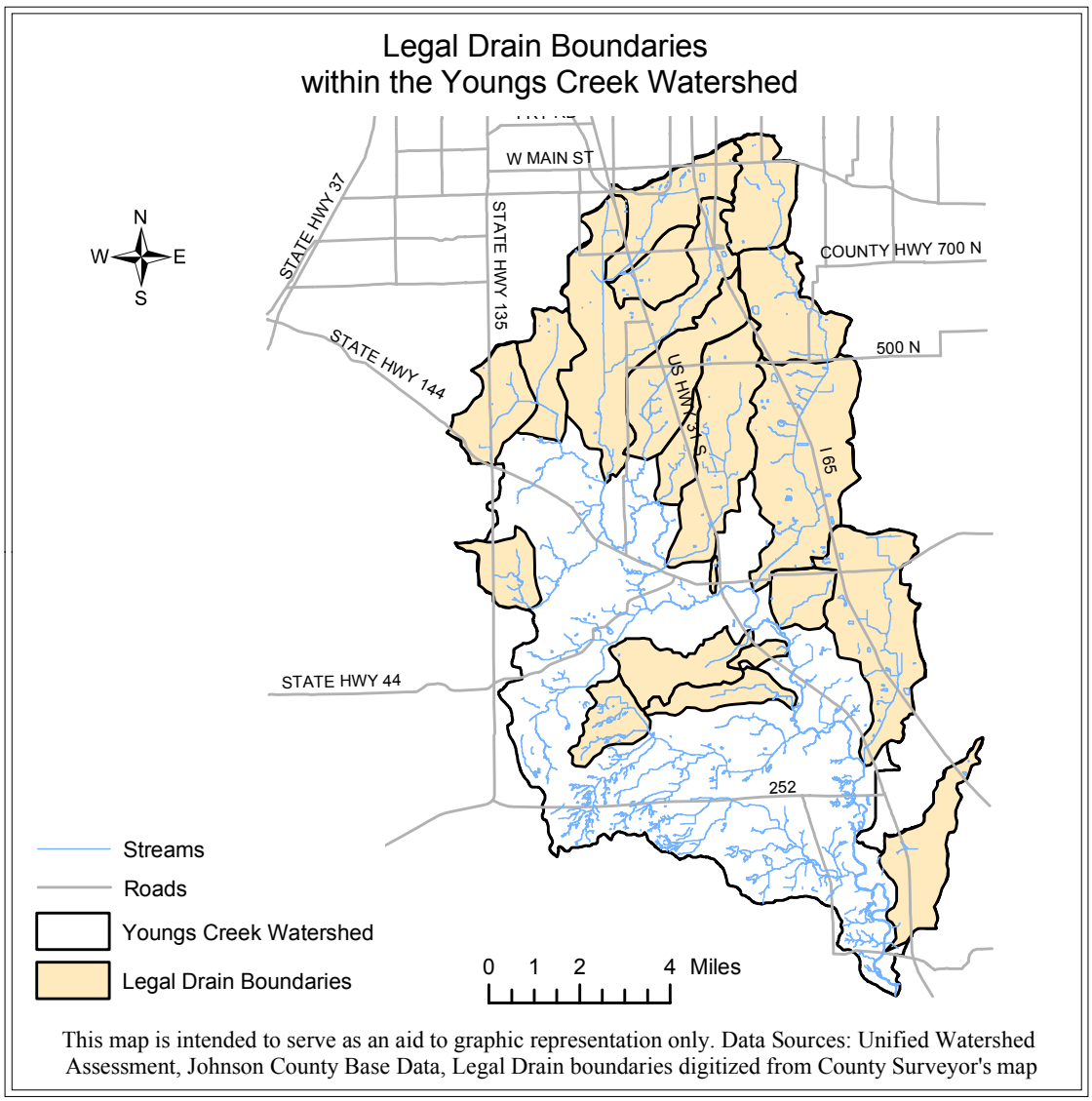

Figure 10. Youngs Creek Watershed: legal drains

Wetlands

The National Wetlands Inventory (NWI) of the U.S. Fish & Wildlife Service produces information about the extent, characteristics, and status of wetlands in the United States. The NWI has produced a digital map of wetlands in the Youngs Creek Watershed area, based on remotely sensed satellite data.

According to the National Wetlands Inventory database, very little (1.9%) of the Youngs Creek Watershed is classified as wetland. Most of the existing wetlands are located along Youngs Creek and Sugar Creek in the southern half of the watershed. The map of wetlands in the Youngs Creek Watershed is shown in Figure 11.

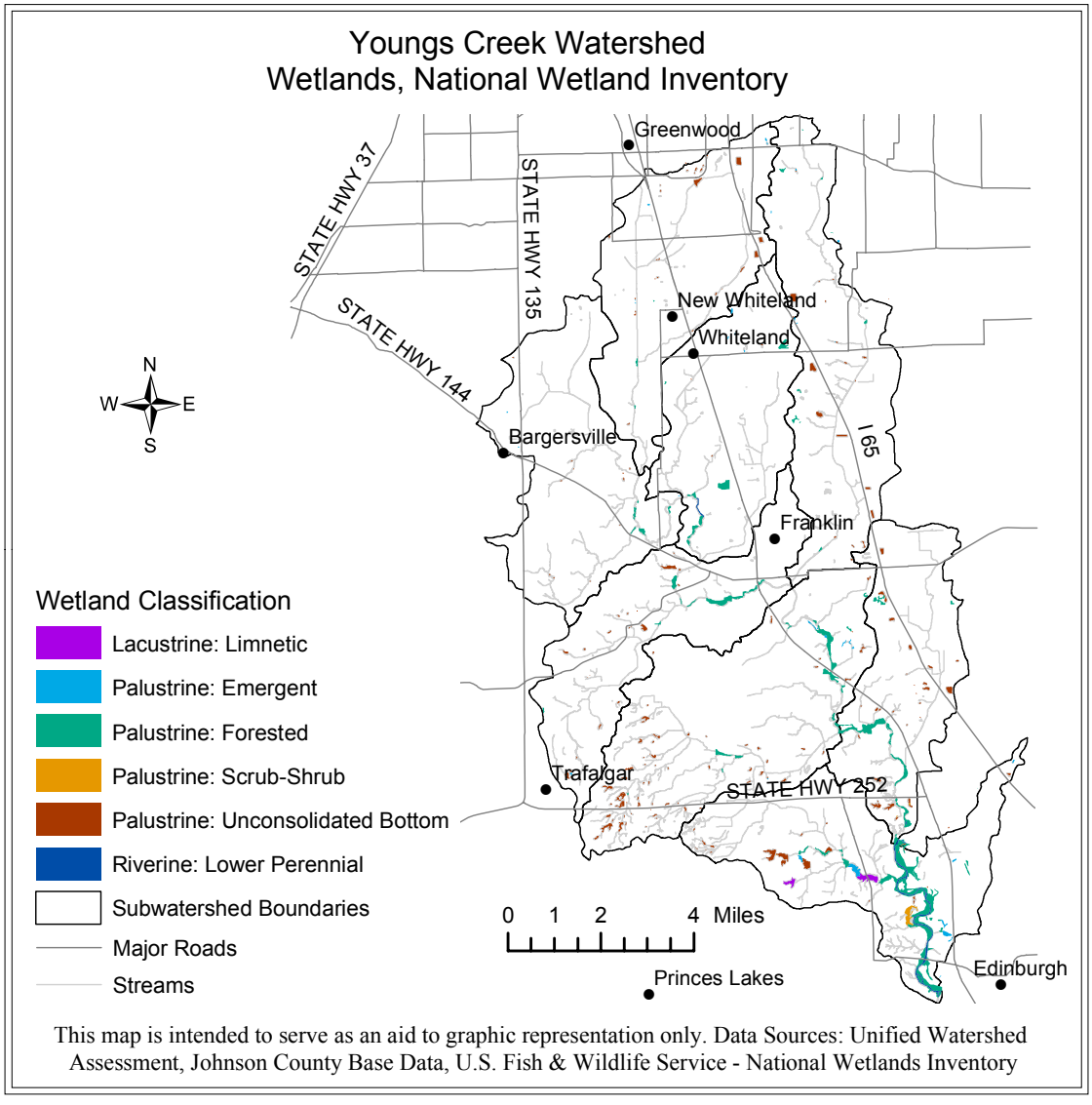

Figure 11. Youngs Creek Watershed: wetlands (NWI)

Ecoregions & Climate

An ecoregion is defined as an area with similar ecosystem functions based upon landform, soil, vegetation, and landuse. The entire Youngs Creek watershed is situated within the Eastern Corn Belt Plains ecoregion (Omernik and Gallant, 1988). This ecoregion is typically characterized by rolling plains and loamy, rich, well-drained soils. Today, this ecoregion is used extensively for corn, soybean, and livestock production.

The climate, temperatures, and precipitation data for the Youngs Creek Watershed are very similar to those of the Indianapolis area. The climate is continental, humid, and temperate, with warm humid summers and moderately cold winters. The median growing season in the region lasts 182 days, from the frost in mid-April to the first fall frost in mid-October (MRCC, 2002). Monthly mean temperatures and precipitation values are shown in Figure 12.

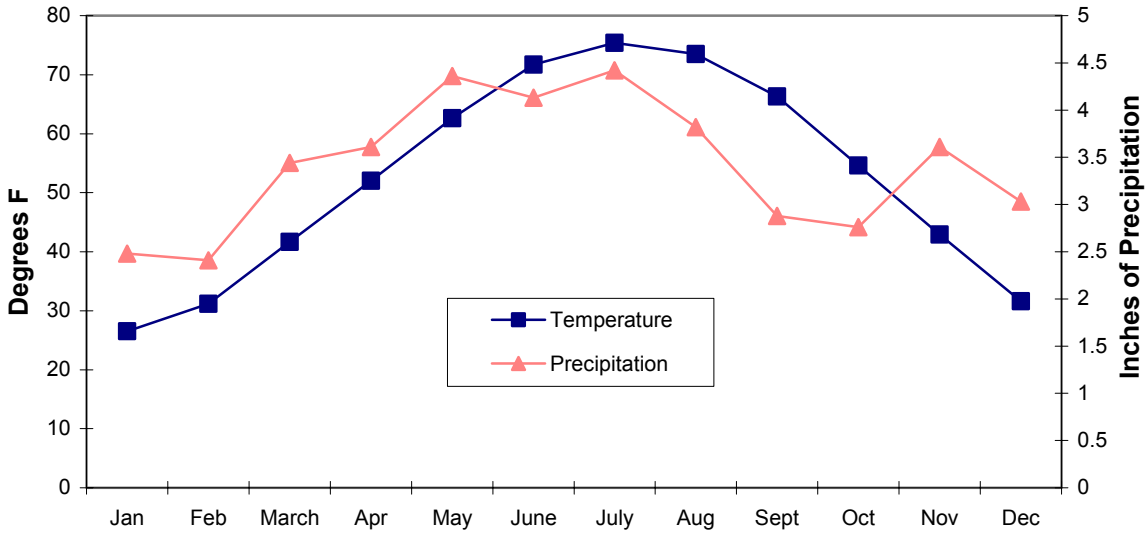

Figure 12. Indianapolis area monthly mean temperature and precipitation values

(Source, Midwestern Regional Climate Center)

Natural History

The natural history in the Youngs Creek Watershed is summarized by a description of current forests and native tree species as well as a list of threatened and endangered species in the area.

Forests and Tree Species

Although forest stands in Johnson County have diminished considerably since the early 1900s, forests still covered approximately 14% of the county's land area in 1992. Results of the USDA Forest Service Forest Inventory and Analysis of Indiana forests in 1998 reports that the maple-beech association is the most common forest type in much of northern Indiana (including the Youngs Creek Watershed), although the oak-hickory association is more common in the southern portion of the state (Tormoehlen et. al., 2000). A list of native tree species in Johnson County is provided in Table 3.

Table 3. Native tree species in Johnson County by forest type

(Branigin, 1913)

Upland	Poorly-drained	Bottomland	Understory
White Oak	Beech	Cottonwood	Blackberry
Black Oak	Maple	Ash or Linn Basswood	Wild Rose
Southern Red Oak	Ash	European White Willow	Black Locust
American Elm	Elm	Sycamore	Persimmon
Yellow Poplar or Tulip Tree			Sassafras
Sugar Maple			Sumac

Endangered, Threatened, and Rare Species

In addition to a wide variety of native tree species, Johnson County is home to several unique plant and animal species. Table 4 lists both the state and federal species within Johnson County that are classified as endangered, threatened, or rare. Since the Youngs Creek Watershed covers 40% of the county's land area and includes Atterbury Fish and Wildlife area, the watershed is likely to contain many of the species listed.

Table 4. State and federal endangered, threatened, or rare species in Johnson County

(Source Indiana Dept of Natural Resources, Division of Nature Preserves, 11/12/99)

Common Name	State Rank	Federal Rank
Vascular Plants		
Butternut	WL	**
Horned Pondweed	E	**
Mussels		
Slippershell Mussel	*	**
Northern Riffleshell	E	E
Snuffbox	E	**
Wavy-Rayed Lampmussel	SC	**
Round Hickorynut	SC	**
Clubshell	E	E
Kidneyshell	SC	**
Rabbitsfoot	E	**
Salamander Mussel	SC	**
Lilliput	*	**
Rayed Bean	SC	**
Little Spectaclecase	SC	**
Dragonflies; Damselflies		
Brown Spiketail	*	**
Band-Winged Meadowfly	*	**
Fish		
Harlequin Darter	E	**
Northern Studfish	SC	**
Reptiles		
Kirtlands's Snake	E	**
Birds		
Bachman's Sparrow	E	**
Henslow's Sparrow	E	**
Great Blue Heron	*	**
Upland Sandpiper	E	**
Northern Harrier	E	**
Edge Wren	E	**
Cerulean Warbler	SC	**
East Bittern	E	**
Black-Crowned Night-Heron	E	**
King Rail	E	**
Virginia Rail	SC	**
Barn Owl	E	**
Mammals		
Bobcat	E	**
Least Weasel	SC	**
Indiana Bat	E	E
American Badger	E	**

*E = Endangered, SC = Special Concern, WL = Watch List, * = No status but warrants concern, ** = not listed*