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## Landuse Description of the Watershed

This section includes an overview of the watershed’s landuse in terms of settlement history, recent and historical population changes, recent landuse changes, an impervious surface analysis performed during the assessment, and particular areas of interest in the watershed, including locations of point source discharge facilities and unique recreational areas.

### Landuse History

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The Delaware Indians, a tribe of the Miami, inhabited what is now Johnson County until the land was sold in 1818. In 1819, the land within Johnson County was surveyed for purchase. Jacob Whetzel bought a tract of land in the White Water area and appealed to the Delaware Chief to allow him to cut a road to his purchase. This became known as the Whetzel Trace, and was traveled by many settlers.

In 1822 the area now known as Johnson County was a part of Delaware County. After a long struggle within the legislature, Johnson County was formed the December 31, 1822. The county was named in memory of John Johnson, the first judge of Indiana’s Supreme Court. The population of Johnson County at the time was 550.

Youngs Creek was named for Joseph Young who settled in the fork of Sugar (named for the Sugar trees) and Lick Creeks in 1821. The early surveyors originally named Youngs Creek “Lick Creek” for the incredible salt licks in the area, but soon the Young cabin became better known, and Lick Creek became Youngs Creek. Youngs Creek furnished power for water mills, which were abandoned by 1850. The city of Franklin was sited in 1822 in the tract between Youngs Creek and Hurricane Creek.

During the early 1800s when Johnson County was settled, the lands within Johnson County were wet, swampy, and covered with vegetation. In an excerpt from D. D. Banta’s *A Historical Sketch of Johnson County* (1881), Judge Franklin Harden describes the original condition of the land.

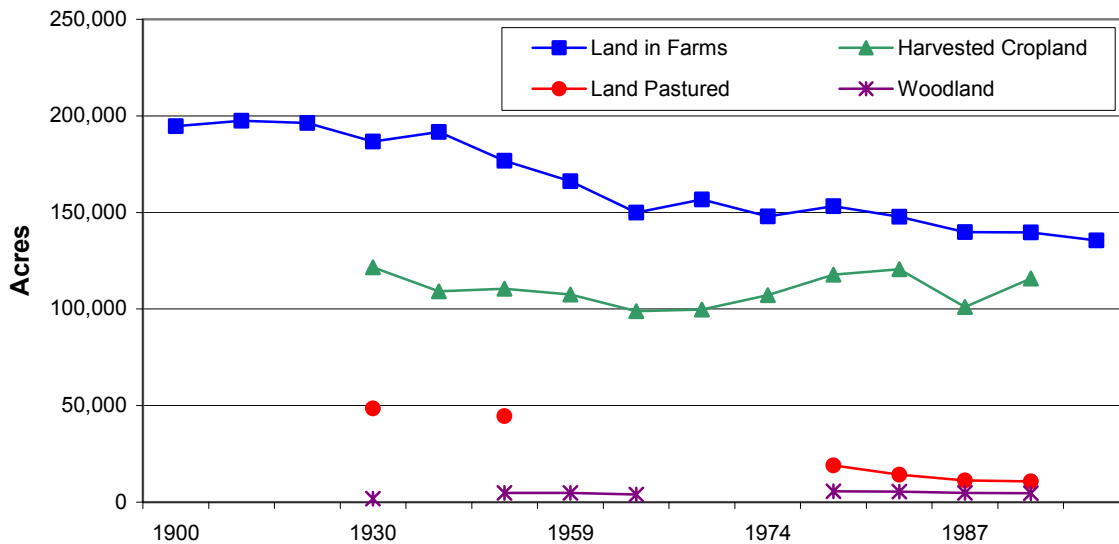
Tall trees covered the whole county with their wide-spreading branches, depending to the ground, and the shrubbery below arose and united with the branches of the trees...In the open space, in the valleys, grew either prickly ash or nettles, both equally armed with sharp, fiery prickles...It was of the necessary to cover the horses’ legs while plowing fresh land to prevent contact with the nettles. The soil, after a heavy rain, seemed to be afloat, and a deer, in its escape from the hunter, left so conspicuous a trail that he could be readily followed as in snow...Where spice-wood did not grow to thickly, male fern formed a solid mass three feet in depth, covering logs and pit falls so completely...The dry land along the creeks and rivers were first brought into cultivation. The highest lands were often table-lands, and the wettest. One-half of Johnson County was of this character...



1 The character of the landscape has changed dramatically since the county was settled. Hardly  
 2 any of the original stands of forest exist in Johnson County. Most land was cleared in the early days  
 3 of settlement for agriculture, as is described below in an additional excerpt from Harden’s account.

4 In passing over these wet lands in the rainy season, but little dry land would appear, except an  
 5 occasional dry spot like an islet, with its crest lowly bowed as if in dread of submergence. If  
 6 any attempt was made to cultivate these wet lands, by deadening the timber, and also opening  
 7 the drains, nothing was produced. The crop was drowned by the percolation and infiltration  
 8 of water from the adjoining wet lands. It was, therefore, indispensably necessary that large  
 9 bodies be brought into cultivation at once. And so it was that for miles in extent, the lands  
 10 were deadened and exposed to the action of the sun...During a dry time, two or three men  
 11 might, by merely sowing and deadening over with fire, burn up the whole superincumbent  
 12 covering over eight or ten acres in a single day. The sloughs, which abounded, and which,  
 13 except for obstructions by fallen timber, might have been navigated by small crafts for miles,  
 14 were thus opened, and the drainage further assisted by ticing, till the whole county, in an  
 15 incredibly short time, was brought into cultivation.

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 17 With the addition of numerous drainage tiles and ditches during settlement, much of Johnson  
 18 County became valuable farm ground, and agriculture became the primary landuse in Johnson County  
 19 by 1900. However, like many midwestern counties on the urban fringe, there has been a steady  
 20 decline in farmland as residential and commercial areas have grown. Since 1900, land in farms has  
 21 declined 30% in Johnson County (Figure 13), and the number of individual farms has declined from  
 22 2,053 in 1900 to just 526 in 1997. However, land in farms still comprised 66% of Johnson County’s  
 23 total land area in 1997.



24 **Figure 13. 1900-1997 Agricultural landuse for Johnson County, IN**

25 (Source: Indiana Agricultural Statistics Service, 1997)

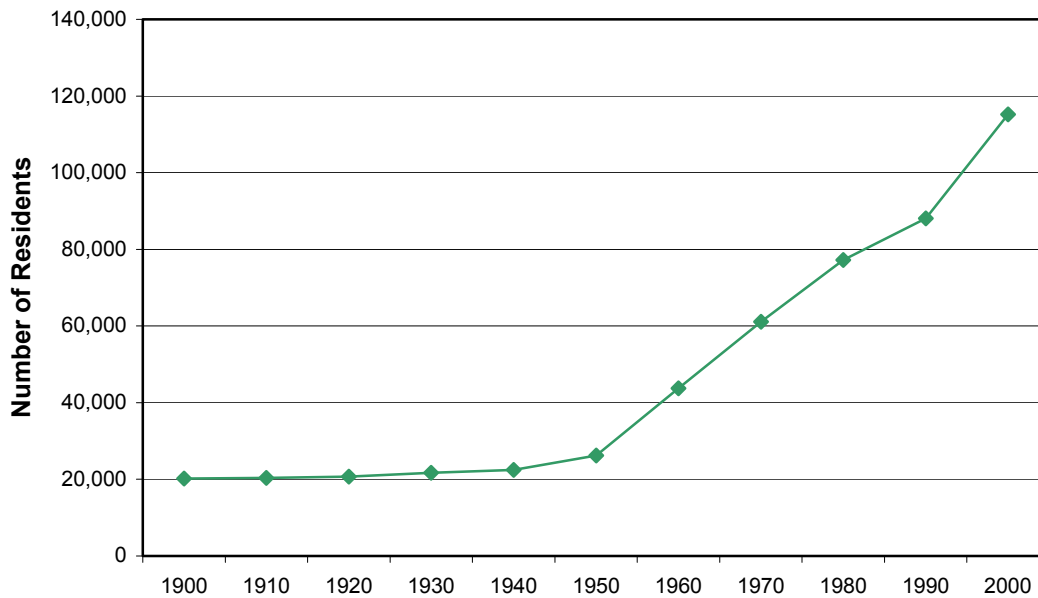
26  
 27 Much of this farmland has been used for residential, commercial, and industrial development  
 28 near the major roadways of US 31 and I-65, around the cities of Greenwood, Whiteland, New



1 Whiteland, and Franklin. Johnson County planners addressed the issue of declining farmland in the  
 2 1997 comprehensive plan for Johnson County. The plan emphasizes that “farming should be  
 3 preserved as a vital part of Johnson County’s culture, economy, and tradition” (Woolpert LLP, 1997).  
 4 However, current activities and future landuse plans within the watershed imply that land in farms  
 5 will continue to decline.

6 **Demographic History**

7 Johnson County’s population has grown steadily over the last century (Figure 14), but the  
 8 most dramatic increase of over 80,000 residents has occurred since 1950. The major roadways of  
 9 Interstate 65 and U.S. Highway 31 pass through the county and the watershed from north to south and  
 10 provide quick transportation to the state’s capitol. This close proximity and access to Indianapolis  
 11 have supplied the momentum for demographic change over the last few decades. From 1980 to  
 12 1990, Johnson County’s population increased by just over 10,000 people, approximately 14 percent.  
 13 From 1990 to 2000, the population increased by over 27,000 people, a 30 percent increase. Johnson  
 14 County recorded the second highest percent increase for the last decade of the nine counties  
 15 surrounding Indianapolis, and the third highest increase in the state (IBRC, 2002).



16 **Figure 14. Johnson County population: 1900-2000**  
 17 (Source: IBRC, 2002)

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 20 Growth patterns within the county illustrate the importance of proximity and access to  
 21 Indianapolis. Table 5 depicts the population of major cities in Johnson County for 1980, 1990, and  
 22 2000, as well as the percent population change for each city between 1980-2000. The cities of



1 Franklin, Whiteland, New Whiteland, and Greenwood that frame the north-south corridor leading  
 2 from the county seat to Indianapolis grew by more than 25,000 people from 1980 to 2000. This  
 3 accounts for over 65% of the county’s population growth for the same time period. These cities and  
 4 their immediate surroundings also account for a large area of the watershed, and this population  
 5 growth has resulted in dramatic changes upon the watershed’s landscape.

6 **Table 5. Population of Johnson County cities: 1980, 1990, and 2000**

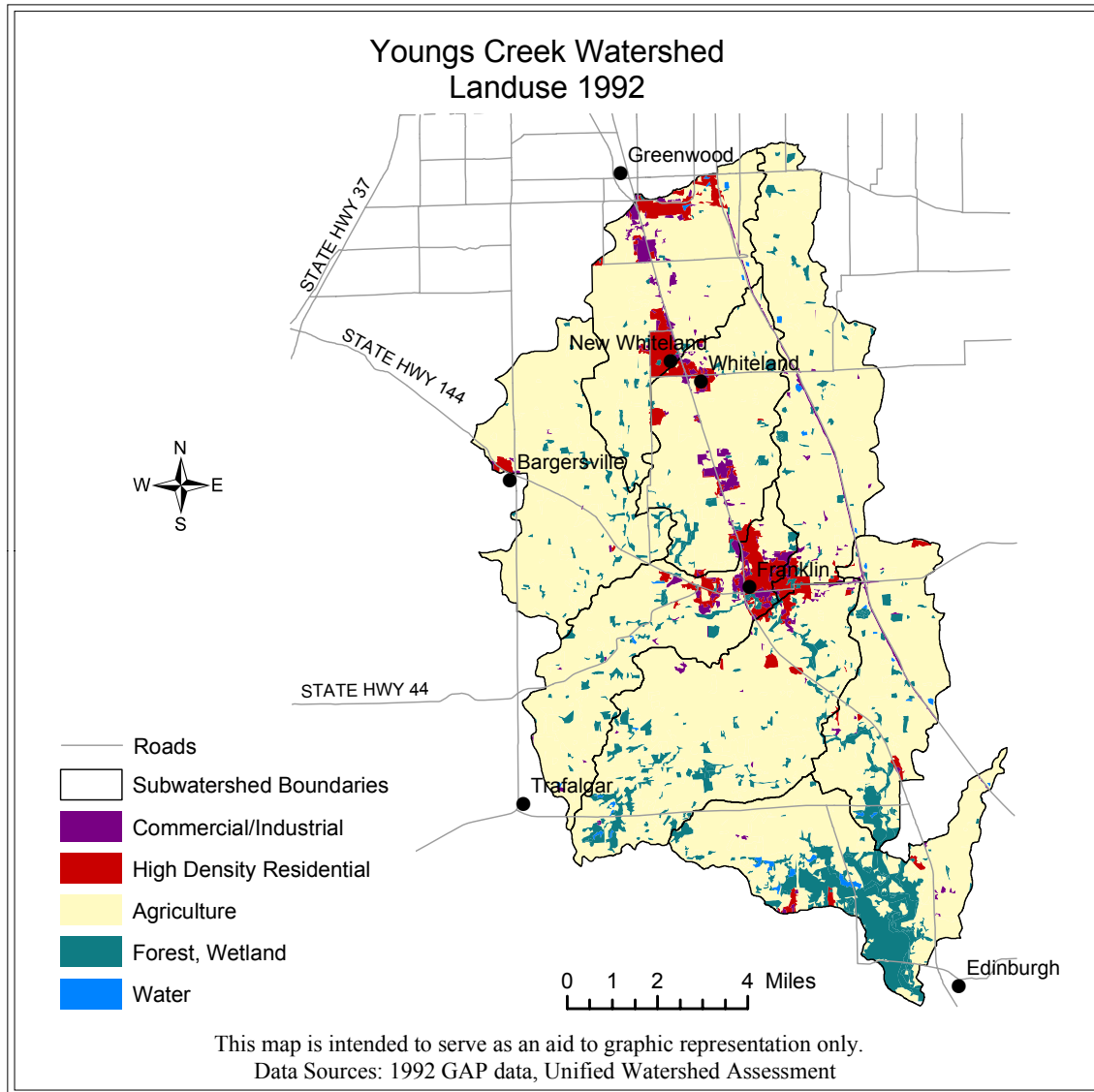
<b>Johnson County total population</b>				
<b>Area</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>% change 1980-2000</b>
Johnson County	77,240	88,109	115,209	49.2%
<b>Population of cities entirely within the watershed</b>				
<b>Area</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>% change 1980-2000</b>
Franklin	11,967	12,907	19,463	62.6%
Whiteland	1,956	2,446	3,958	102.4%
New Whiteland	4,502	4,097	4,579	1.7%
<b>Population of Cities partially within the watershed</b>				
<b>Area</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>% change 1980-2000</b>
Greenwood	20,220	26,265	36,037	78.2%
Bargersville	1,647	1,681	2,120	28.7%
Trafalgar	NA	NA	798	
Edinburgh	4,856	4,536	4,505	-7.2%

7 **Landuse History: GAP Analysis Project**

8 The USGS – Biological Resources Division and the U.S. Fish and Wildlife Service are  
 9 overseeing the National Gap Analysis Program (GAP). The purpose of GAP is to identify the extent  
 10 of habitats for animal and plant species so land managers, planners, scientists, and policy makers have  
 11 the information they need to identify priority areas for conservation (USGS, 2002). Indiana’s Gap  
 12 Analysis Project began in 1994 and involved the analysis of vegetation from satellite imagery. From  
 13 this analysis, a 30 x 30 meter resolution land cover map for the state was developed at Indiana State



1 University (ISU, 1999), depicting land cover conditions in Indiana in 1992. Landuse in the Youngs  
 2 Creek Watershed was inferred from this land cover layer (Figure 15). Appendix D includes a detailed  
 3 description of the GAP data preparation.



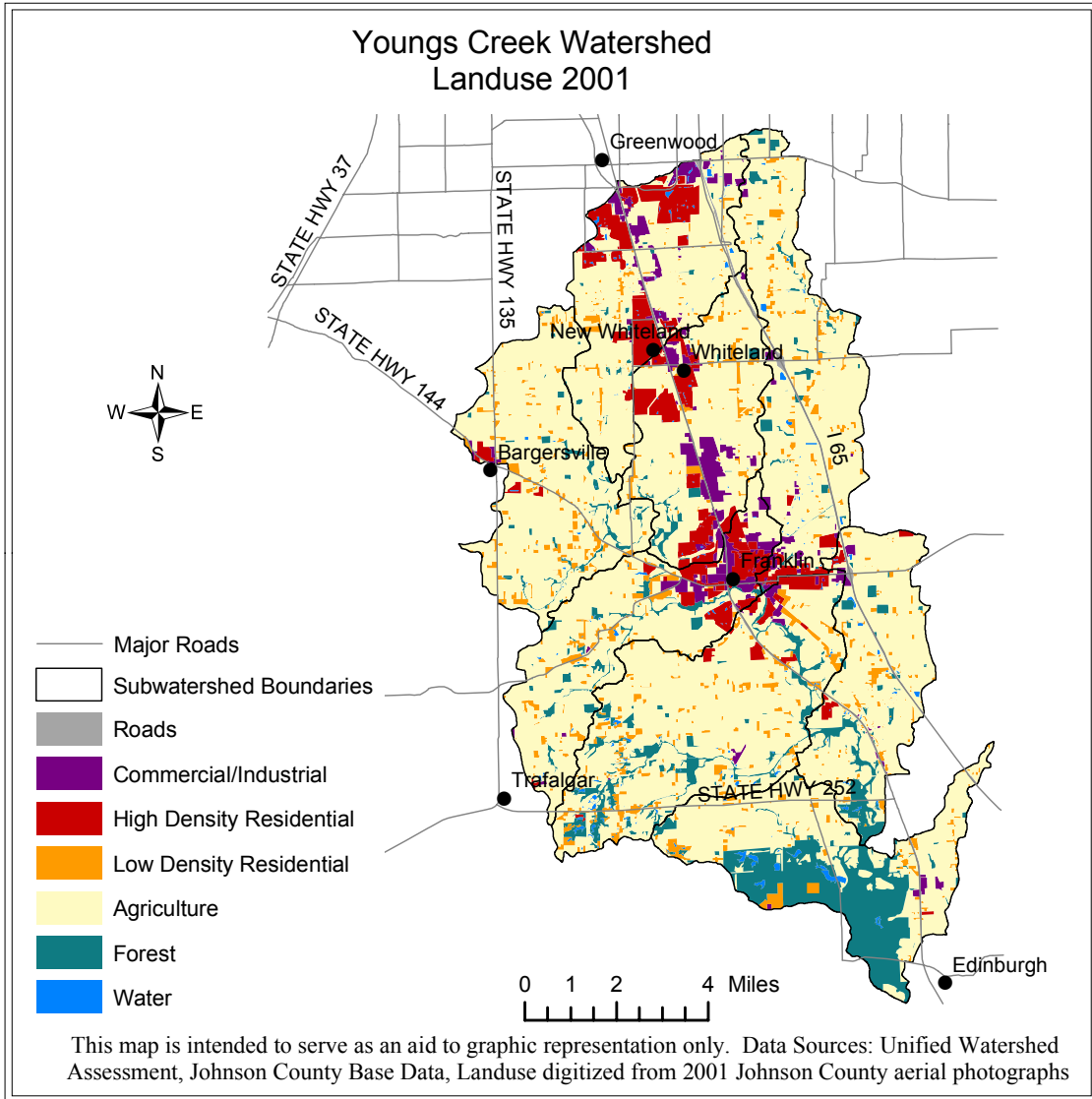
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**Figure 15. Youngs Creek Watershed landuse 1992**

6 **2001 Landuse Data Layer**

7 In order to gain an understanding of how population growth in the Youngs Creek Watershed  
 8 may be impacting landuse change, this assessment included the creation of a 2001 landuse layer for  
 9 the watershed. Landuse within the watershed was digitized from aerial photographs obtained from  
 10 Johnson County. A detailed description of the 2001 landuse layer procedure and classification is  
 11 included in Appendix D. A map of the 2001 landuse layer is shown in Figure 16.





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**Figure 16. Youngs Creek Watershed landuse 2001**

When comparing the 1992 map to the 2001 map, conversion of agricultural land to commercial and residential landuses is visible near the cities of Greenwood, Whiteland, New Whiteland, and Franklin, which is consistent with the population increases. A quantitative comparison of the watershed’s landuse in 1992 and 2001 provides a rough estimate of landuse change in the Youngs Creek watershed over the last decade (Table 6). Appendix E provides a breakdown of landuse percentages by subwatershed.

It should be noted that the classification scheme and resolution of each data set is different, and differences between landuse values in 1992 and 2001 are approximate. However, several trends can be established. Agriculture, the dominant landuse in 1992, continues to be the dominant landuse



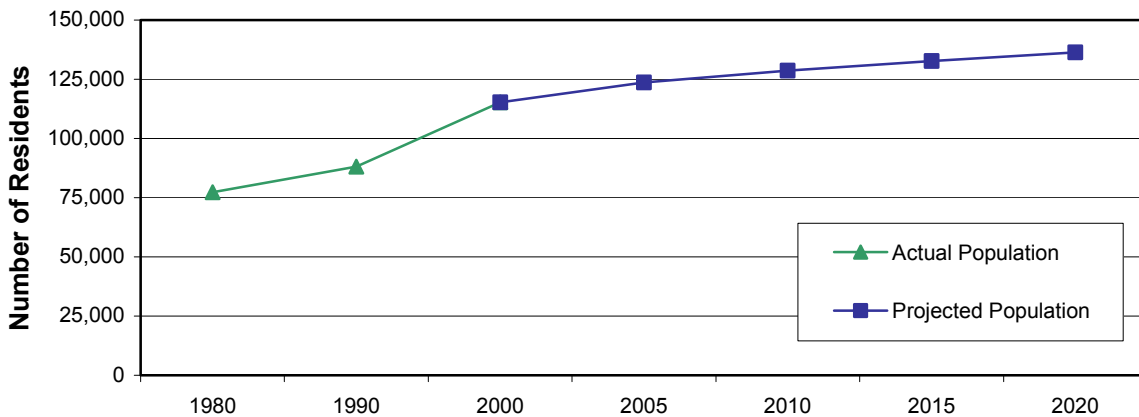
1 in 2001. However, the last decade has seen a considerable amount of the watershed’s agricultural  
 2 land converted to residential and commercial landuses within the Youngs Creek Watershed.

3 **Table 6. Youngs Creek Watershed landuse: 1992 and 2001**

Landuse	1992 % of total area	2001 % of total area
Agriculture	84.8%	73.6%
Commercial / Industrial & Roads	2.5%	4.1%
Residential (high and low density)	3.5%	12.3%
Forest / Wetland	8.9%	9.3%
Water	0.3%	0.8%

4 **Future Changes**

5 Johnson County’s population is projected to increase by 20,000 people over the next 20 years  
 6 (Figure 17) (IBRC, 1998). Together with the projected population increase, recent local reports  
 7 indicate that more than 7,000 new homes are being planned for development in Johnson County  
 8 (Holtkamp, 2002). If the existing pattern of development continues, much of this construction will  
 9 occur around Franklin, Whiteland, New Whiteland, and Greenwood, all of which are located within  
 10 the watershed.



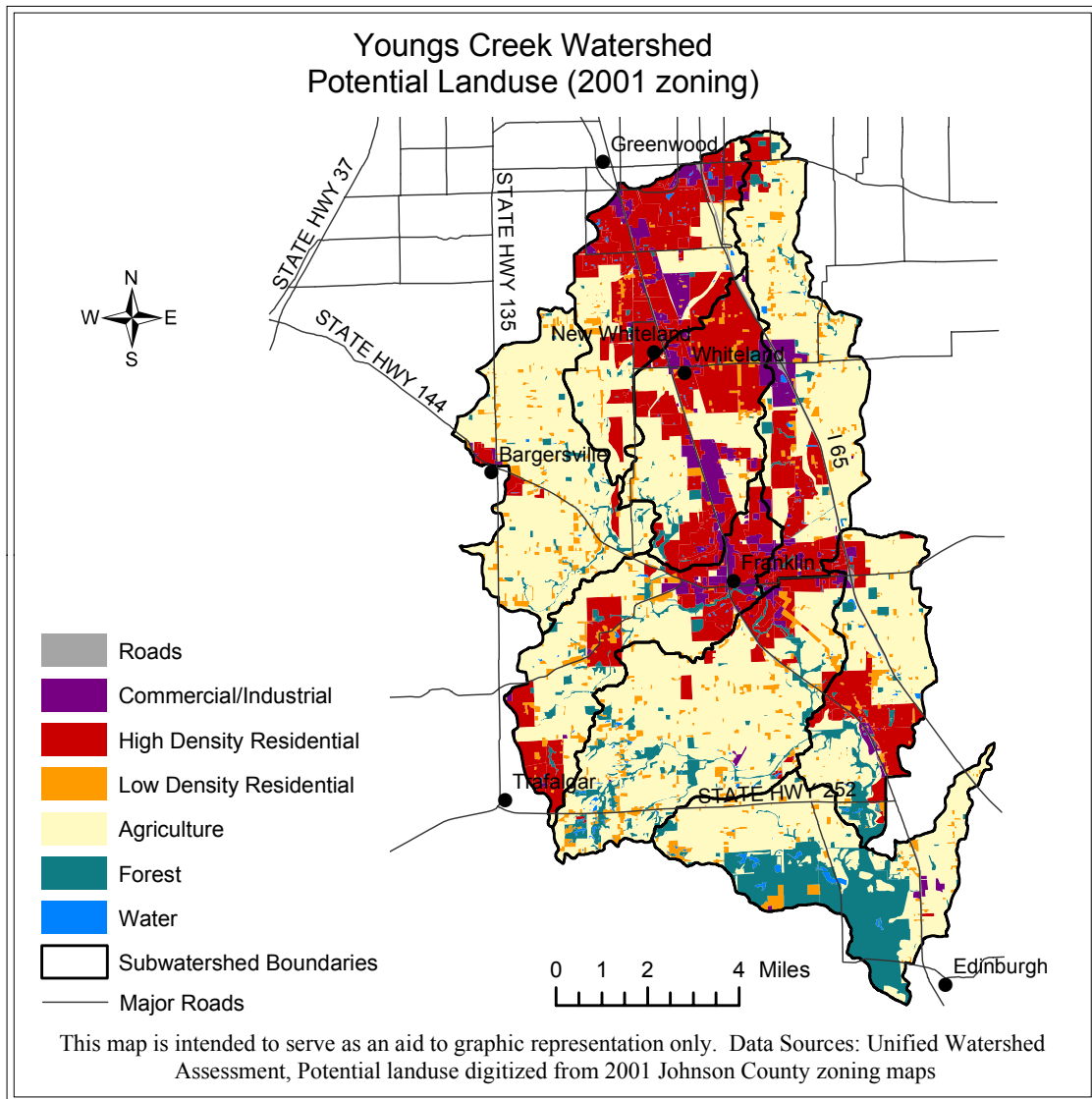
11 **Figure 17. Johnson County: projected population**  
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13 (Source: IBRC, 1998)

14 To quantify the impact that increased population and development will have on the  
 15 watershed, potential future landuse was approximated for the watershed from a 2002 zoning map,  
 16 which illustrates long-term landuse plans for Johnson County. A detailed description of this  
 17 procedure is included in Appendix D. A map of potential landuse based on this zoning information is  
 18 shown in Figure 18. According to this map, land surrounding the existing cities of Franklin,



- 1 Whiteland, New Whiteland, and Greenwood appears to be most likely to undergo landuse change
- 2 from agricultural to commercial, industrial, and residential in the future.



3  
4 **Figure 18. Youngs Creek Watershed potential future landuse (current zoning)**

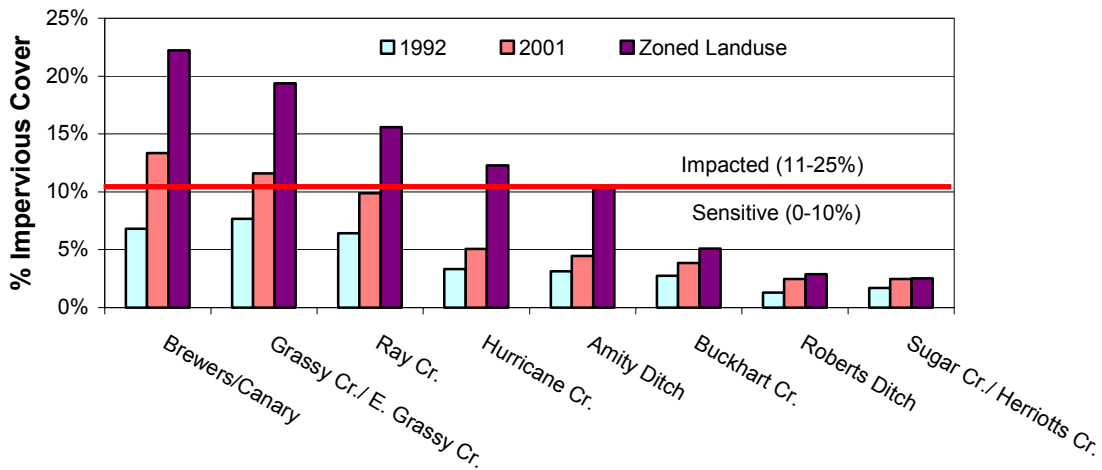
### 5 **Impervious Surface Analysis**

6 As the previous maps have shown, agricultural land is being converted for residential and  
7 commercial uses in the Youngs Creek Watershed. In order to examine the impact that these landuse  
8 changes could have on streams in the watershed, an impervious surface analysis was conducted.  
9 Impervious surfaces refer to the roads, rooftops, parking lots, and other impenetrable surfaces  
10 associated with residential and commercial landuses.



Ongoing research by the Center for Watershed Protection (CWP) has revealed a correlation between the percent of impervious surface in a watershed and stream quality indicators such as channel stability, habitat structure, water quality, and aquatic community diversity. CWP used the results of this research to create the Impervious Cover Model (ICM), a simple 3-tiered stream classification system (CWP, 2002). Based on this classification system, watersheds with impervious cover below 10% are termed “sensitive” and are likely to contain good to excellent stream quality indicators. Watersheds with impervious cover between 10% and 25% are termed “impacted,” and stream indicators are likely to display signs of degradation. Watersheds with impervious cover above 25%-30% are termed “non-supporting” and are likely to display poor stream quality indicators. However, it is important to note that the ICM predicts potential rather than actual stream quality.

The percent impervious surface in 1992, 2001, and currently zoned land was calculated for each 14-digit subwatershed in the Youngs Creek Watershed (Figure 19). Calculations for the impervious cover model were based on landuse area totals. A detailed description of this procedure is included in Appendix F. Impervious surface percentages for each subwatershed are included with landuse percentages in Appendix E.



**Figure 19. Impervious Cover (%) by subwatershed within the Youngs Creek Watershed**

(based upon landuse data from 1992, 2001, and current zoning plans)

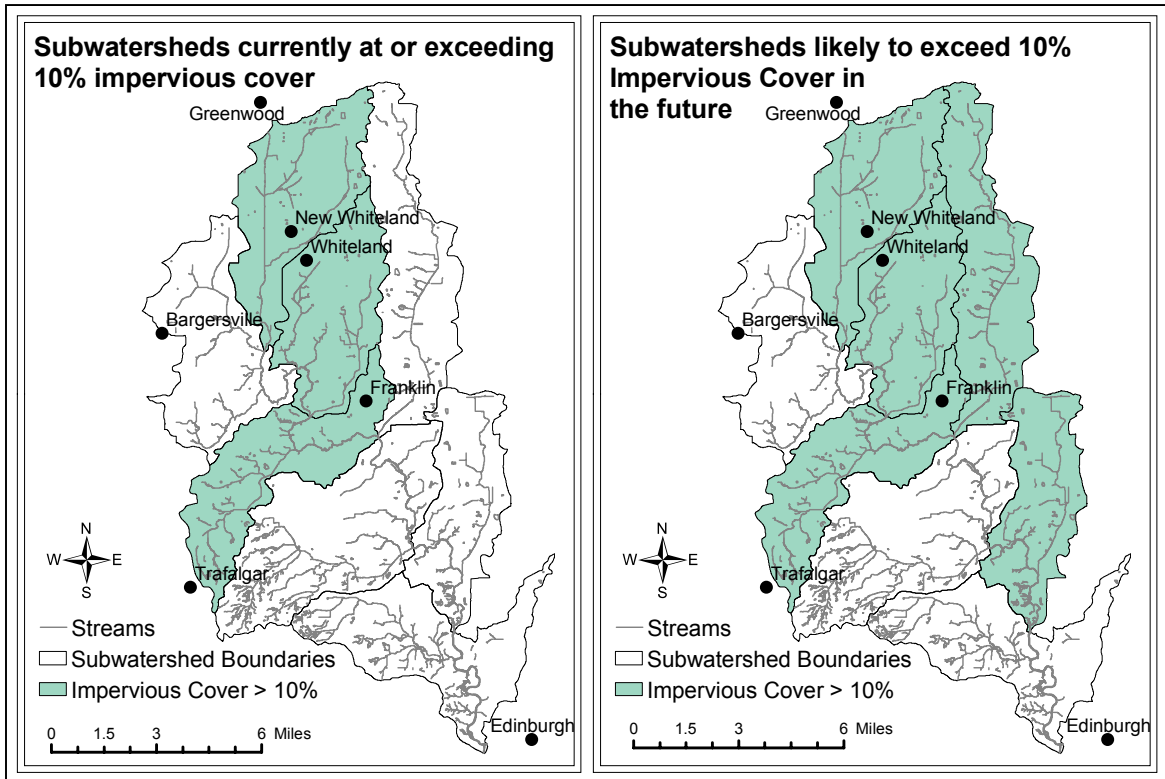
Impervious surface calculations using 1992 data indicated that none of the eight subwatersheds exceeded the 10% impervious surface area threshold. In 2001, five of the eight Youngs Creek subwatersheds contained less than 10% impervious surface. This analysis predicts that streams in these watersheds are capable of containing sensitive elements, but several factors can cause streams to deviate from this prediction. For instance, the CWP notes the importance of healthy



1 riparian zones in order for streams to contain sensitive elements. Cropping and grazing practices that  
 2 alter riparian zones can prevent the stream from having sensitive stream properties.

3 Three of the eight Youngs Creek subwatersheds met or exceeded the 10% threshold in 2001  
 4 (Figure 20). The ICM predicts that streams in these subwatersheds are likely to be impacted by  
 5 increased impervious surfaces that accompany high-density residential and commercial landuses.  
 6 These impacts can include the degradation of physical stream habitat, erosion, channel widening,  
 7 unstable stream banks, and the loss of sensitive aquatic species.

8 Spatially, the areas of the Youngs Creek watershed currently impacted by impervious surface  
 9 area are located predominantly in the northern portion of the watershed. As development continues,  
 10 subwatersheds on the eastern edge of the watershed will also be impacted. Both Amity Ditch and  
 11 Hurricane Creek subwatersheds have the potential to exceed 10% impervious cover if development in  
 12 the watershed follows the current zoning plan (Figure 20).



13 **Figure 20. Subwatershed impacted by impervious surface**

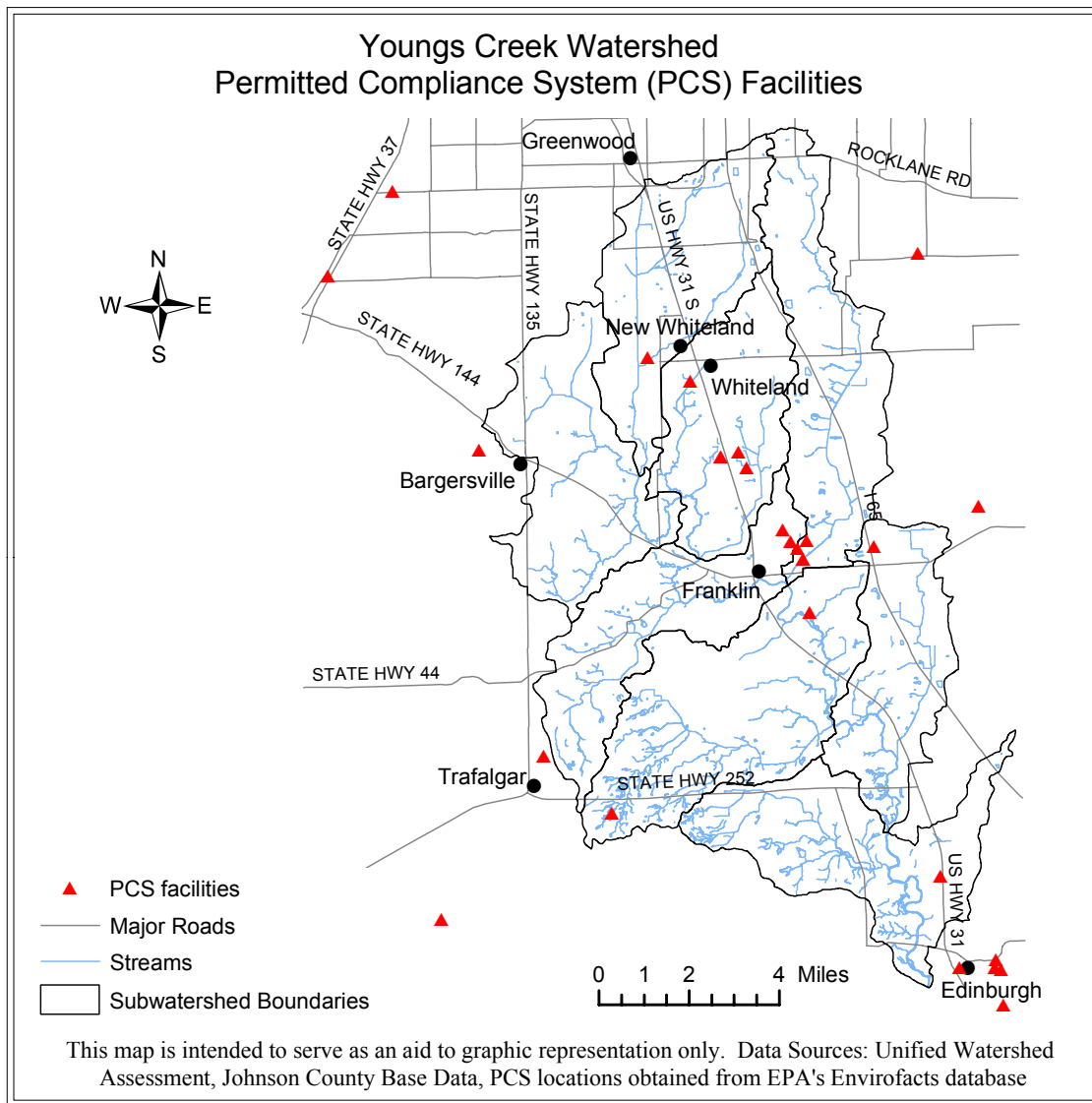
14 (current and potential future conditions)



**Point Source Discharges**

The Clean Water Act authorizes that all point source discharges into U.S. waters be regulated by the National Pollution Discharge Elimination System (NPDES). Point source discharges are discrete channels such as pipes or man-made ditches that flow directly into surface water.

The Permit Compliance System (PCS) is a national information system designed to support the NPDES program. Permits established by the NPDES program and managed by each individual state provide pollution limits and specify monitoring requirements for these point sources. The Indiana Department of Environmental Management (IDEM) had permitted 30 PCS facilities in Johnson County as of January 2003, and 17 of these are located within the watershed (Figure 21).



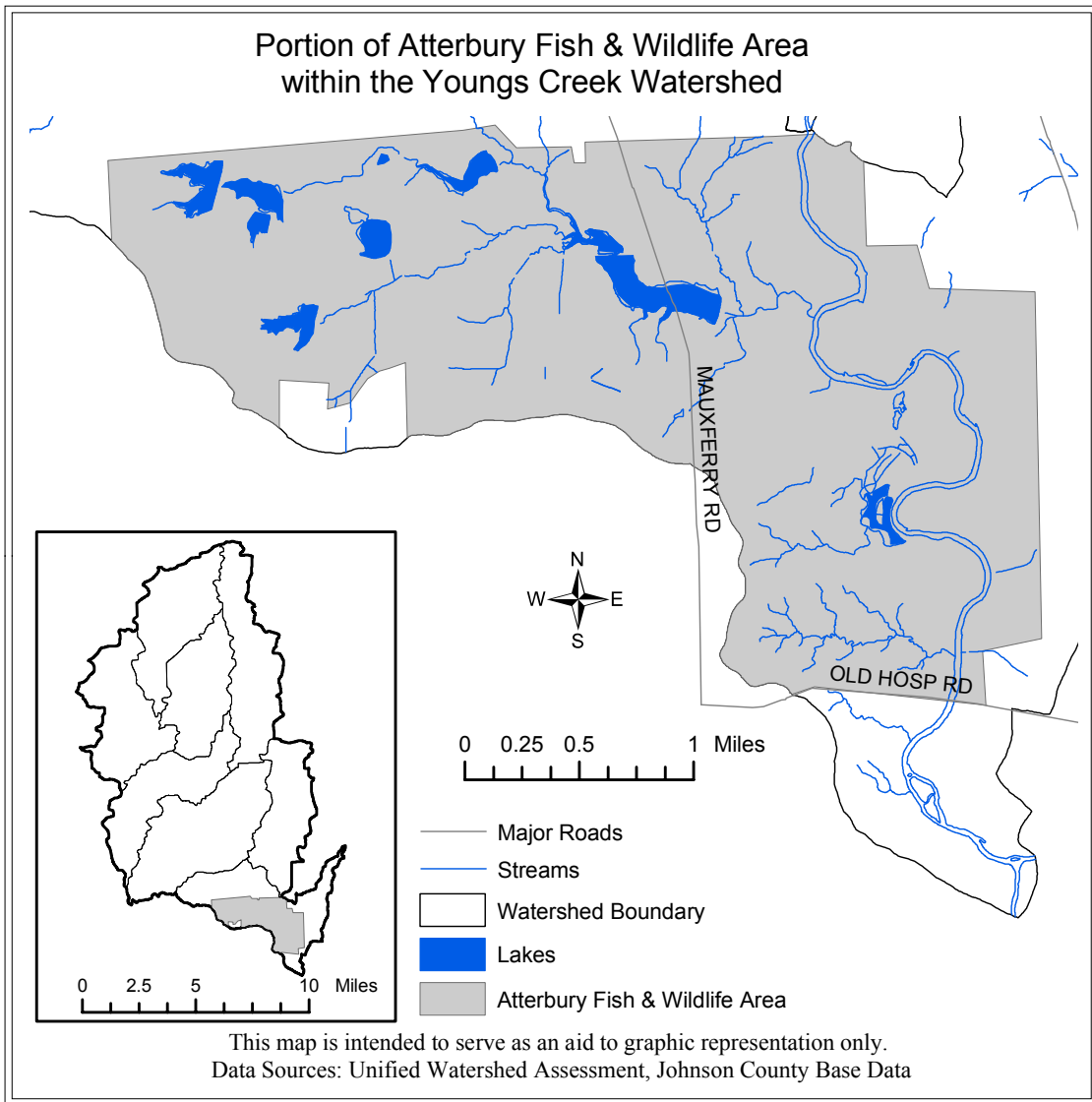
**Figure 21. Youngs Creek Watershed: PCS facilities**

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**Recreational Areas**

The Atterbury State Fish and Wildlife Area is widely known in the watershed for the many recreational opportunities it offers. Atterbury contains excellent habitat, wetland areas, and lakes that provide for game hunting, wildlife watching, and fishing. Atterbury is also the only major state-owned tract of land in the watershed (Figure 22). It accounts for only 5% of the total area of the Youngs Creek Watershed but 42% of the Sugar Creek – Herriotts Creek Subwatershed. Atterbury State Fish & Wildlife Area was originally part of Camp Atterbury Military Training Center, an army training installation that was established in 1942. The state purchased over 6,000 acres of land from Camp Atterbury to create the Atterbury Fish & Wildlife Area in 1969. Today, the remaining portion of Camp Atterbury is still used for Army Reserve and National Guard training (IDNR, 2003).



**Figure 22. Youngs Creek Watershed: Atterbury Fish & Wildlife Area**

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