

**Upper White River Watershed  
Regional Watershed Assessment and Planning Report  
November 2011**

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## **EXECUTIVE SUMMARY**

### **PROJECT PURPOSE**

Public and municipal concern regarding overall water quality in the White River continues to rise. Current urban development pressures, continued agricultural pressure, concern for the quality of local drinking water supplies, and other use impairments drive the Upper White River Watershed Alliance's (UWRWA) activities. The Alliance's projects, partnerships, and stakeholders are defined by the geographic boundaries of the Upper White River Watershed. This watershed is defined as the geographic region with the 8 digit hydrologic unit code (HUC) designation 05120201, as referenced by the United States Department of Agriculture Natural Resource Conservation Service and as delineated by the United States Geological Survey, commonly known as the Upper West Fork of the White River Watershed. Seventeen 10 digit subwatersheds further define the Watershed.

As land use changes rapidly, stormwater regulations increase, water supply questions are raised, water quality continues to degrade and visible impacts to the watershed's natural resources occur, a regional effort has been organized to draw communities together and begin to address these issues from a regional perspective. In an effort to make real strides in the improvement of overall quality of the Upper White River ecosystem, a broader, more holistic assessment of current conditions needed to be completed. Likewise, an understanding and emphasis on preventing potential future degradation is important to the regional planning approach.

### **WATERSHED MANAGEMENT AREAS**

When viewed holistically, the Upper White River Watershed (UWRW) naturally divides into three watershed areas; 1) Agricultural Till Plain Headwaters, 2) Urban and Urbanizing Core; and 3) Southern Forested Hills (Figure 2.10). These areas are based on the interaction of the inherited natural landscape and current land use. The inherited landscape is a product of the watershed's glacial history, which in turn defines the natural regions through topography, soil types, and water resource availability. These inherited attributes are then reflected in land use and by extension, land cover. Because the watershed management areas share commonalities related to landscape and land use, their water quality condition and many social and cultural norms, opportunities and barriers to watershed management are also shared.

#### *Agricultural Till Plain Headwaters*

The till plain natural regions have relatively flat topography and rich soils, albeit with typically poor drainage. With the aid of drainage systems, these areas are prime farm lands. The till plains with their dominance of agricultural land use and rural character are especially prevalent in the northern headwater portions of the Upper White River Watershed. The agricultural signature on both water quality and water quantity and response is a dominant component of the Upper White River Watershed.

#### *Urban and Urbanizing Core*

The central portion of the Upper White River Watershed lies within the till plain natural area but has been extensively developed and is undergoing continued urbanization with the expansion of development into surrounding agricultural areas. The inherited landscape has been largely overprinted by urbanization and its associated modifications to water resources from both a water quality, as well as quantity perspective. The fingerprint of urbanization is strong and is a dominant feature of the Upper White River Watershed.

### *Southern Forested Hills*

The bedrock uplands and small area of karst bedrock natural areas are found in the southern portion of the watershed. Hill and valley topography, thin soils, and abundant bedrock outcrops limit agriculture in this portion of the watershed. With the exception of the broad fertile floodplain valleys of the White River, the region is heavily forested and rural. Where agriculture is important, the focus is on pasture and cattle rather than row crops.

### WATER QUALITY DATA SUMMARY

The prevalence of row crop agriculture (in a corn soybean rotation) found throughout the headwaters imparts a specific set of water quality impacts to the watershed. These include elevated nitrogen levels throughout area streams. The most notable of these impacts is elevated nitrogen levels that are far in exceedence of water quality guidelines and recommendations and are moving through tile drainage systems. Elevated levels of atrazine, a regulated corn herbicide, accompany elevated levels of nitrogen. Peak values of atrazine measured in the White River far exceed drinking water standards and at times exceed aquatic health standards. Questions related to the effects of even low levels of atrazine on human health are mounting raising additional concern about the high loads of atrazine being utilized in the UWRW and their occurrence in surface waters used for drinking water.

Both nitrogen and atrazine move off the agricultural landscape preferentially through tile drainage networks so that any recommended conservation practices for the Agricultural Till Plain Headwaters needs to recognize this transport pathway and focus on proven methods for reduction. Accompanying the elevated dissolved contaminants are elevated measures of turbidity and suspended sediment throughout this area of the watershed. Most streams in the headwaters subwatersheds lack effective buffers; however, the use of extensive soil conservation practices help mitigate some of the historic/typical field erosion that would be contributing to elevated turbidity. Instream (ditch) erosion and even regulated drain maintenance are other likely factors contributing to high turbidity in this part of the UWRW.

While mostly agricultural land use activities dominate the Agricultural Till Plain Headwaters area, a few cities of notable size are located here. These cities also contribute significant loads of both dissolved and organic pollutants. The largest source of these loads come from Combine Sewer Overflows (CSOs) associated with old infrastructure found in a few urban pockets. CSO effects, as well as separate storm sewer effects are readily apparent in the water quality data just downstream of these cities, namely Muncie and Anderson. While the urban pulse of impacts is clear here, these effects generally transcend this watershed management area and are seen and tied directly to the occurrence of the discharges throughout the watershed. CSOs affect *E. coli* concentration and impair biotic communities which account for most of the impaired stream listings throughout the watershed. CSOs impact both the Agricultural Till Plain Headwaters and the Urban and Urbanizing Core management areas. However, the headwaters area in Randolph County, upstream of any CSO impacts, is also worth noting. In this area, elevated *E.coli* is not CSO related. This area has a high concentration of Confined Feeding Operations (CFOs) that may be an additional cause of *E. coli* and impaired biotic communities. Likewise, unsewered or failing septic communities in this area are also potential causes, as are the septage waste sites located in this uppermost reach of the watershed. Water exiting the Agricultural Till Plain Headwaters area is already significantly polluted before it even reaches the Urban and Urbanizing Core area of the UWRW.

Streams in the Urban and Urbanizing Core have unique water quality characteristics that are derived from both inherited water quality sourced from the Agricultural Till Plain Headwaters along with water quality and quantity challenges sourced from dense and changing urban land use. The UWRW continues to see

land use/land cover changes due mostly to changes in human activity. In general, areas of urbanization are increasing at the expense of agricultural and forested areas. This is occurring even in areas of urban decline as new developments are mostly occurring at the outer edges of urban zones and not in the existing declining cores. This change is most notable along the major transportation corridors such as interstates and state highways. Rapidly urbanizing areas are focused in Hamilton, Johnson, Boone, and Hendricks counties.

Streams in the Urban and Urbanizing Core suffer from elevated levels of suspended sediment and turbidity with highly elevated levels occurring in areas of urban expansion and increasing stormwater contribution to stream discharge. This sediment is likely sourced from instream erosion, construction runoff, and stream adjustment and downcutting from stormwater volume increases. This increase in stormwater runoff is also contributing to flooding and flood erosion hazards in the Urban and Urbanizing Core.

Total phosphorus in the Upper White River Watershed is excessively high throughout the watershed. While agricultural land use in the Agricultural Till Plain Headwaters area contributes phosphorus, instream total phosphorus concentrations in these agricultural areas are only slightly elevated relative to the EPA Reference Condition. In contrast, urban sourced phosphorus is elevating phosphorus levels in the White River and its tributaries to levels that so far exceed EPA Reference Conditions that it is hard to envision a strategy that can reduce phosphorus to levels that approach healthy stream ecosystem levels. USGS SPARROW models of phosphorus yield in the Upper White River Watershed attribute 50% of the phosphorus load to urban sources (Robertson et al., 2009). Urban sources of phosphorus include wastewater treatment plant discharge, CSOs, failing septic systems, stormwater and other industrial discharges. Stormwater is enriched in phosphorus due to fertilizer runoff, pet waste, and deicing agents among a host of other sources. Strategies for reducing phosphorus loads to streams will have to address the myriad of phosphorus sources to effectively impact the problem. CSO effects are readily identified in the Urban and Urbanizing Core with a high concentration of discharges occurring here. Impacts from CSOs include *E. coli* contamination, elevated organic nitrogen and elevated chemical oxygen demand levels, among others. The scale of the impacts to water quality from the CSOs make it difficult to tease out other focused or identifiable sources or 'hot spots' of pollution, as might be done in a watershed diagnostic study.

#### RISK FACTORS & VULNERABILITY

According to the U.S. Census Bureau 1990 Census, 2000 Census, and 2008 Population Estimates, it was estimated that 1,660,227 million people lived in the 13 counties in Indiana that comprise most of the UWRW. This accounts for 26% of the population of the state of Indiana. By 2008 that estimate increased to 2,083,684 accounting for 29% of the state's population. This is an average increase in population by 32.5% across the watershed. This is twice the state average (15% increase) for the same time period. These changes are not equally distributed among the subwatersheds. Hamilton County (which includes much of Cicero, Stony, and Crooked Creek subwatersheds, as well as parts of Duck, Eagle, Pipe, Geist Reservoir Fall Creek, and Fall Creek subwatersheds) had a 148% increase in its population.

These increases in urbanization have a number of implications. Negative impacts may include increases in pollution from erosion during construction, impervious areas, stormwater runoff, and nonpoint pollution sources, including the nutrients nitrogen and phosphorus. Increases in nitrogen and phosphorus are of particular concern because these nutrients contribute to eutrophication in the reservoirs which, in turn, causes taste and odor problems in drinking water and recreational public health concerns associated specifically with blue-green algae.

Likewise, the most dominant land use in the Upper White River Watershed, agriculture, also contributes significant loads of these pollutants. Research in the Midwest and Indiana specifically, shows that tile-drained agricultural landscapes are the source areas for high levels of nitrate export to water bodies. Tile drained areas also export water very quickly so that drainage ditches may be highly erosive. In-stream erosion is a source of suspended sediment and turbidity to downstream water resources.

These tile drainage networks discharge to agricultural ditches and streams, many of which are regulated drains. Both water quality and quantity in these drainage systems are dominated by the large changes in system function which is being controlled by the standard condition and maintenance practices of regulated drains.

Regulated drains are not comprehensively mapped or available; however, they are critically important to future watershed planning and restoration efforts. For many counties, most of the streams are regulated drains. Future water quality improvement project recommendations will need to consider the regulated drain status of a given stream before determining what sort of restoration alternatives are possible or palatable to the governing Drainage Board. Drainage laws and approaches to drainage are currently an important control and barrier to improving water quality in Upper White River Watershed streams.

A common restoration strategy for improved water quality and habitat is the creation of forested buffers. This is one such example of a practice that is commonly not allowed within regulated drain easements. The buffer analysis done as part of this report shows more than 70% (12 of 17) of the subwatersheds have less than 50% of their stream miles in forested buffer, while many are closer to 30% forested buffer or less.

The historic removal and limited restoration of buffers is not the only challenge facing stream and riparian habitat and health. Development associated with urbanization and redevelopment also present negative impacts. Permits for construction in a floodway were researched because they have a direct impact on stream morphology and function. Key counties within the Urban and Urbanizing Core area such as Marion and Hamilton Counties led with the highest number of permits over a 16 year period of time. Permits for these two counties alone totaled 977. While the scale of these permitted impacts can vary greatly, it appears that the cumulative effects are great.

Other key permitted impacts worth noting are associated with the National Pollutant Discharge Elimination System (NPDES) dischargers in the watershed. Research done as part of this report shows that the majority of the permitted industrial and/or municipal dischargers regularly report violations. These violations can be simple administrative errors or in some cases flagrant, repeated pollution violations. Regular non-compliance by multiple NPDES dischargers often results in elevated concentrations of pollutants that may otherwise be attributed to non-point sources of pollution. Partway through the creation of this report, compliance records were revisited for NPDES dischargers that were out of compliance for at least nine of the last twelve quarters in order to determine if they were making changes to improve their violations, or if they were still in violation. The updated compliance information showed that of the 43 dischargers in the UVRW originally out of compliance for nine or more quarters, 26 improved their compliance records by at least one quarter. Sixteen of the 26 NPDES dischargers which had improved by one quarter improved compliance records by 3 quarters or more. There were 10 dischargers which showed no improvement, while the compliance of two of the discharger's was worse than when originally reported. Four of the dischargers were no longer listed in the EPA ECHO database. This dismal compliance and enforcement record represents a major challenge to water quality in the UVRW.

The NPDES program also governs combined sewer overflows (CSOs). There are more than 700 communities nationwide and 108 communities in Indiana that still have combined sewer systems and overflows. Of the 108 CSO communities in Indiana, 15 are located within the Upper White River Watershed. As noted above, CSO impacts degrade water quality in the UWRW. Information from Office of Water Quality at the Indiana Department of Environmental Management (IDEM), shows approximately 220 combined sewer outfalls in the Upper White River Watershed. Many of these CSOs discharge directly into the White River, while others discharge to key tributary streams. When this occurs, these streams are dominated by CSO discharge during overflow events.

Similarly, stormwater discharges from separate storm sewer systems can dominate the chemistry and flow of tributary streams. There are roughly fifty (50) individual communities or entities that are regulated as part of the Municipal Separate Storm Sewer System (MS4) program. The NPDES permit process also governs these dischargers. Forty-three MS4 communities were interviewed for this report in order to understand their impacts, their programs, and their plans for stormwater management in the future. While twenty-four of these communities have their various outfalls mapped, acquiring this data proved difficult and a strategy could not be developed to universally map the outfalls all together in time for this report. Without information and data the relative impact of the outfalls on the watershed is impossible to discern. It is clear that there are many thousands outfalls present and the cumulative impacts would be expected to be high.

In stark contrast to all of the above noted assaults and impacts to waters in the UWRW, many communities rely on surface water from streams in the watershed for drinking water sources. Likewise, thousands of entities including industries, businesses, schools, farms, and golf courses need it for daily operations. Some of these entities fall into a category known as Significant Water Withdrawal Facilities. A significant water withdrawal facility is a high-capacity pump capable of withdrawing a minimum of 100,000 gallons of ground water, surface water, or combination of ground and surface water in one day, regardless of how much water is actually pumped. There are 141 of these users widely distributed in the UWRW, most having multiple sites for water withdrawal. Users obtain water either via surface intake or by wells for uses such as public supply, irrigation, energy production, and industry. The facilities withdraw an average of over 218 billion gallons of water annually.

How these businesses and communities choose to plan for and protect both the quantity and the quality of the water supply will prove paramount to the continued growth of central Indiana and the health and quality of life of its residents. Water quality in the UWRW is in peril if efforts are not made to reduce pollution loads and amend land use strategies in key areas.

#### PLANNING TOOLS AND OPPORTUNITIES

It is reasonable to expect more undeveloped land (that may be providing ecological services within the watershed) to be developed. Environmentally sensitive areas and connectivity of various natural resources should be considered, as well as Low Impact Development (LID) practices when planning for this inevitable change in the UWRW. A concerted effort for land use planning that incorporates greater watershed and large-scale hydrology can reduce expensive treatments, mitigations, and remedies for flooding, pollution, and many other problems associated with poor planning or a lack of planning.

Current land use zoning and associated comprehensive plans frame how local planners and community leaders make important land use decisions. These tools provide a broad vision and road map for the future growth of a community. Watershed planning is intimately tied to community growth and resource

management since if, how, and where a community decides to alter its land will have long term effects on the regional watershed. Many zoning plans in the watershed have outdated or unavailable zoning information readily available. This underscores the need for regional and unified planning efforts. A lack of clear restrictions and boundaries can make for inefficient and uncomplimentary growth patterns.

Simply gathering zoning and planning documents across sixteen counties, planning and zoning offices, historical maps, municipal officials, county surveyors, engineering firms and public websites proved to be a monumental challenge. Collecting information in a usable, comparable format was a difficult task. Compiling future land use information from such documents was an even more difficult challenge, yet critical to help forecast where watershed land use is headed. Three subwatersheds were analyzed as a 'pilot study' of sorts in order to see the results of comparing current zoning and planned future land use across adjacent jurisdictional boundaries. These subwatersheds represent some of the fastest growing portions of the watershed and therefore serve as an example of what land use change may look like if the current trend in population, for the State and this region in particular, continues.

When anticipated land use changes were assimilated for the three subwatershed study areas, some interesting overall shifts in land use occurred, namely a significant loss of agriculture (11%) and significant gains in conservation areas and commercial land use, 10% and 11% respectively. However, it is important to note, that while it would appear conservation areas would tend to increase according to future land use maps, current zoning shows many locations where residential land use has already moved in and surround these areas. Such residential zoning is unlikely to revert to conservation once zoned as such. Some opportunities exist within residential development to provide conservation-type land uses, but such opportunities are not the equivalent of zoning these areas into conservation. Also notable is the intended gain of commercial land use sought by each planning jurisdiction/entity. These shifts are likely associated with intentional economic initiatives that are linked to expanding local tax base revenues; therefore, they will likely be realized to the extent the market will support it.

While many local planning documents seem to state a commitment to conservation areas and green space, challenges remain to actually see that those objectives are maintained, and a clear value placed on them such that they are not thwarted when development pressures arises. One possible solution to this is to increase the legitimacy of such conservation planning by tying it into a regional objective and network of conservation areas so that local leaders, and the public, could envision its real value. Greening the Crossroads (GTC) project undertaken by the Central Indiana Land Trust does just that. Over 60,000 of the identified acres for the GTC's green infrastructure network are located within the floodplain. Floodplain areas could be turned into parks with recreational areas and also provide disaster resistance to flooding. The plan also outlines many corridors which have been identified as proposed routes for trails in local planning documents. Likewise, green infrastructure locations that overlay already developed properties and locations could be considered when redevelopment of urban stormwater retrofits or beautification projects are undertaken by local government or special interest groups. Conservation areas and strategies for both small scale (stormwater) and large scale (corridors) can complement and interface with the developed environment. It simply requires that local leaders are aware of such objectives and benefits, and that initiatives such as the GTC project and overall Low Impact Development (LID) principals get added into local planning and regulatory documents.

As social infrastructure was researched and compiled for this report, it was striking to see how many different departments and how many different ordinances played a role in the larger objective of resource protection or land development. Future land use depends heavily on well communicated goals and guidance from multiple departments within the same municipality, as well as adjacent municipal

jurisdictions. However, in most cases planning and associated ordinance documents exist within local government and limited coordination occurs with neighboring governments. Further coordination between bordering and regional jurisdictions could facilitate efficient land use and maximize public efforts to reduce negative impacts to the watershed.

Stormwater regulations and planning aspects were inventoried to better understand the compatibility of stormwater management strategies across the watershed. Interviews with various MS4 staff occurred to gather input on ordinances, incentives, enforcement, and public awareness campaigns. Stormwater planning initiatives and programs varies significantly across the regulated communities (MS4 entities) in the watershed; yet, all MS4s are facing the same regulatory requirements and water quality management challenges. While the water quality impacts associated with urban stormwater are tremendous, communities are faced with tight restrictions on budgets and staff, as well as aged infrastructure when trying to address and manage local stormwater quality. Funding through the use of utility fees and regulatory enforcement of both construction and post-construction stormwater practices are highly variable across the watershed. This variability can be attributed to the strength of associated ordinances, local political leadership and the will to enforce them.

Similarly, a given community's interest and commitment to public education and involvement as it relates to stormwater also seems dependent upon the vision of its local leaders and the flexibility to coordinate across municipal departments and with outside partners. While the UWRWA is building a nationally-recognized regional program to assist with standardized messaging and measureable outcomes, participation remains limited by lack of financial commitment from many entities that struggle to get resources allocated in the direction of education. Part of what seems to limit such resource allocation is that many MS4s have sunk costs into parts of their programs that have clearer deliverables and therefore a clearer approach such as outfall mapping and internal training. It appears that when there is an easily identifiable goal and outcome, MS4 programs respond more consistently. Much could be done to tie these outcomes together to coordinated overall stormwater program initiatives throughout the watershed.

## CONCLUSIONS and STRATEGIES

The extensive and comprehensive review of water resources in the Upper White River Watershed was organized into a three-prong approach that evaluated a) the level of water quality degradation from a spatial and temporal water quality basis, b) the level of vulnerability to impacts to water resources from a perspective of existing uses and stresses related to indicators of changing intensity or type of use, and c) the availability and utilization of social infrastructure to support water resource enhancements and improvements. This approach has provided a holistic overview of the status and trends of a major water resource for the State of Indiana and elucidated a set of observations about these water resources.

A key finding of this report is that the relative water quality throughout the Upper White River Basin is very poor overall when compared to benchmarks related to ecosystem health and water quality standards. This result is, in part due to the types of uses that the resource is subjected to; however, the UWRW suffers a disproportionate level of degradation when compared to watersheds with similar uses in neighboring states. This suggests that change is possible, feasible and perhaps critical. This report does not evaluate impacts related to quality of life, economic impacts related to loss of use or enhanced treatment requirements, or usage limitations related to health and recreation. These factors, however, all have a major impact on life in central Indiana and are all at risk if current water resource trends continue in the UWRW.



A second key finding of this report is that there is a very large discrepancy in social infrastructure and human resources dedicated to conservation across the watershed. Some areas have well developed planning tools and staff for the protection and management of key water resources. Other areas lack both the critical infrastructure and the focus on enhancing the water resource for the long-term viability of the communities. Also missing from local programs and initiatives is the concept of the system as a WATERSHED with interconnected and interdependent elements that need to be managed comprehensively.

There is no simple answer to improving the water quality in the UWRW. The diversity of land use presents nearly every possible pollution transport pathway and pollution source, as well as the need to reach and work with a huge number of highly varied stakeholders. Upon review of the findings from each part of the three-pronged analysis, the below list of solutions and strategies was developed. These strategies have been organized to align with the three primary watershed management areas.

#### *Strategies & Policy Solutions for Agricultural Till Plain Headwaters*

- 1.) Develop an outreach program and planning guidance to assist county or municipal transportation planners in lessening impacts associated with transportation projects such as induced sprawl, increased road runoff, and unintended utility expansion and rezoning.
- 2.) Develop outreach programs and tools for land use planners that promote watershed-wide planning. Utilize findings in this report and targeted conservation areas included in Greening the Crossroad's green infrastructure maps to identify key areas for cross-jurisdictional landuse planning and protection. Work with municipal and county planners to get targeted areas into local comprehensive plans and develop ordinances that help protect key floodplain areas and already degrade areas.
- 3.) Promote Low Impact Development strategies to key economic development professionals and stormwater staff that focus on infiltration and pollution reduction strategies in developed (urbanized) portions of the management area.
- 4.) Work on wide-scale promotion and implementation of agricultural conservation practices, particularly those targeting nitrogen and atrazine reduction such as nutrient management, cover crops, upland wetland restoration, and tile interception into bioretention cells. Secure funding to cost-share on these key practices.
- 5.) Coordinate with ISDA/NRCS to promote CREP funding for key agricultural practices and expansion of On-Farm network to aid in reduced fertilizer applications.
- 6.) Improve drainage management approaches in coordination with the county surveyors – focusing on management and planning at the subwatershed level. Conduct education and outreach events on drainage practice impacts with surveyors and landowners. Work toward policy shift with surveyors regarding forested buffers in certain locations. Develop a list of sensitive regulated drains that warrant special consideration and work with surveyors to develop alternative drainage maintenance strategies for these drains/streams.
- 7.) Develop and promote wide-spread coordination on septic system education and development of incentives or regulatory/enforcement change. Conduct outreach program for realtors and engage health department in coordinated septic education program. Work with health departments to address unsewered communities. Explore funding and regulatory options for improvements in these areas.
- 8.) Follow-up on habitual non-compliant NPDES dischargers. Work with IDEM on regular communication and enforcement

Portions of the Agricultural Till Plain Headwaters have concentrated areas of urban and urbanizing land use that provide both additional barriers and opportunities that are presented below in the Urban and Urbanizing Core areas discussion. Therefore, further solutions and strategies for this watershed management area's pockets of urban land use lie below and need to be considered.

*Strategies & Policy Solutions for Urban and Urbanizing Core Areas*

- 1.) Wide-spread promotion of LID (work to reduce the use of retention ponds to manage stormwater)
  - a. Develop core planning principles and promote/educate area planners/municipal staff
  - b. Help municipalities identify and reduce ordinance barriers to LID/green infrastructure adoption
  - c. Discuss and share LID BMP Technical Standards across municipal jurisdictions, work toward universal standards
  - d. Promote discussion and development of stormwater ordinances that set more diverse or different water quality standards targeted at dissolved pollutants like phosphorus
- 2.) Promote targeted conservation areas including Greening the Crossroad's green infrastructure sites. Work with municipal and county planners to get targeted areas into local comprehensive plans and develop ordinances that help protect key floodplain areas.
- 3.) Strengthen regional MS4 public education and involvement program
  - a. Expand program to assist with water quality monitoring efforts
  - b. Coordinate stormwater ordinances and expand understanding of needed changes to water quality requirements
  - c. Standardize messaging across municipalities; focus on individual behavior change and pollution source reduction, since the scale of the problem/pollution (as documented by this study) is beyond what structure BMPs can remedy
  - d. Leverage current program elements into additional funding opportunities
  - e. Focus messaging on shifting rainfall intensity patterns resulting in infrastructure failure, intense stream erosion – unsafe streams. These real life observations transcend many stakeholders and key audiences and will help bridge varying cultural perspective of stakeholders.
- 4.) Promote urban reforestation programs and residential forested buffers
  - a. Create educational materials and outreach opportunities regarding heat island effects and other health, recreational, and economic benefits
  - b. Partner with regional conservation partners like Keep Indianapolis Beautiful, area land trusts, and The Nature Conservancy to provide education and trees for residential adoption of BMPs
- 5.) Work with master gardeners, habitat stewards, Indiana Wildlife Federation, and other groups to education about benefits of urban conservation and native plantings. Develop standardized presentations and shared materials.
- 6.) Host summits (panel discussions, host national experts, etc.) that help raise awareness water quality and quantity concerns facing Central Indiana
- 7.) Coordinated well-head protection efforts to leverage messaging and awareness and work toward better planning and protection of these areas
- 8.) Educate about the effects of invasive species and their role in impacting water quality and habitat
- 9.) Continue stream cleanups and conduct float trips to get more people connected to the river, its uses, threats, conditions, and needs

- 10.) Work with partner agencies to promote urban conservation and BMPs through the development of agency-approved technical standards for urban practices and increased or expanded cost-share funding
- 11.) Implement existing watershed management plan recommendations and address key pollution sources in critical areas. Seek funding for implementation. Coordinate funding efforts across subwatersheds to insure greatest improvement of the UWRW as a whole.

#### *Strategies & Policy Solutions for Southern Forested Hills*

- 1.) Promote sustainable forestry practices among planning professionals. Promote/foster discussions on steep soil loss management and the development of protective ordinances for these areas.
- 2.) Wide-spread promotion of reforestation of over harvested areas
- 3.) Develop residential buffer program and promotions for buffers on pasture lands. Work on cattle-based BMP program implementation. Secure funding for such practices.
- 4.) Develop and promote wide-spread coordination on septic system education and development of incentives or regulatory/enforcement change. Conduct outreach program for realtors and engage health department in coordinated septic education program. Work with health departments to address unsewered communities. Explore funding and regulatory options for improvements in these areas.
- 5.) Promote targeted conservation areas including Greening the Crossroad's green infrastructure sites. Work with municipal and county planners to get targeted areas into local comprehensive plans and develop ordinances that help protect key floodplain areas.
- 6.) Focus new outreach effort on small reservoir management. Many of these reservoirs could benefit from naturalized edge plantings and other residential best management practices. Steep erodible ravines entering many of these reservoirs are being impacted by the stormwater from residential development around them.
- 7.) Engage the DNR's Forestry Division in discussions about sustainable harvests and protection of important ecological or ecosystem function locations. Utilize the DNR's public education efforts to raise awareness about forestry best management practices.
- 8.) Conduct workshops for forestry contractors on BMPs, sustainable practices, and the quality of the overall White River watershed
- 9.) Partner with TNC on Brown County Hills project (forest banking program), Sycamore Land Trust, and the Central Indiana Land Trust to target protection of floodplain properties

As with portions of the Agricultural Till Plain Headwaters, portions of the Southern Forested Hills have concentrated areas of urban and urbanizing land use that provide both barrier and opportunities that are presented above in the Urban and Urbanizing Core areas discussion. Therefore, further solutions and strategies for this watershed management area's pockets of urban land use are listed above and should be part of the plans to affect meaningful change in this area.

While the above lists include some monumental efforts and significant overall policy shifts, the UWRW cannot afford to wait to take immediate action on as many of the strategies as possible. The water resources in the UWRW are in peril; yet, they remain critical to sustaining the state's largest population and economic center. How human drinking water, waste management, and storm water services are provided will impact every aspect of the watershed for tens of years into the future. Finding a way to protect a sustainable water cycle of use and reuse in a community is the essence of watershed planning. This report has explored the current condition, the risks, and the opportunities to do just that.

## **1.0 PROJECT PURPOSE**

Public and municipal concern regarding overall water quality in the White River continues to rise. Current urban development pressures, continued agricultural pressure, concern for the quality of area drinking water supplies, and other use impairments drive the Upper White River Watershed Alliance's (UWRWA) activities. The Alliance's projects, partnerships, and stakeholders are defined by the geographic boundaries of the Upper White River Watershed. This watershed is defined as the geographic region with the 8 digit hydrologic unit code (HUC) designation 05120201, as referenced by the United States Department of Agriculture Natural Resource Conservation Service and as delineated by the United States Geological Survey, commonly known as the Upper West Fork of the White River Watershed (Figure 1.1).

As land use changes rapidly, stormwater regulations increase, water supply questions are raised, water quality continues to degrade and visible impacts to the watershed's natural resources occur, a regional effort has been organized to draw communities together and begin to address these issues from a regional perspective. In an effort to make real strides in the improvement of overall quality of the Upper White River ecosystem, a broader, more holistic assessment of baseline, current conditions needed to be completed. Coupled with this documentation was the need for an assessment of current and future risk factors facing the UWRW. An understanding and emphasis on preventing potential future degradation is important to the regional planning approach. The integration of the baseline assessment with risk factors could then be evaluated within a framework of a set of planning tools that identifies both watershed management opportunities as well as potential barriers to improved water resources.

In this report, this three-prong assessment approach has been conducted and presented as:

- Part I – a degradation assessment (current watershed conditions),
- Part II – a vulnerability assessment (linked to indicators of resource impact),
- Part III – a tool kit for planning (opportunities for improvement).

The intended result of this broad assessment and collection of information is to create a Regional Planning Document for the Upper White River 8-digit HUC that can be used to support planning efforts, local stakeholder engagement, water resource enhancement projects, large-scale grant applications, and conservation practice implementation at the subwatershed level.

A great deal of information, collected by many different entities, currently exists related to water quality (Section 3.0); however, many questions remain related to how the physical characteristics of the river interact to contribute to some of the recreational and social impacts being realized in the river and drinking water reservoirs. Likewise, many communities in the watershed have undertaken land use, transportation, and stormwater planning in a vacuum defined by their jurisdictional boundaries. The project aims to better understand how the efforts and actions of various communities are affecting one another and overall watershed health. The goal is that summary maps and data analysis will provide the UWRWA better natural resources communication tools that help lead partners toward better ecosystem, water and landuse management decisions.

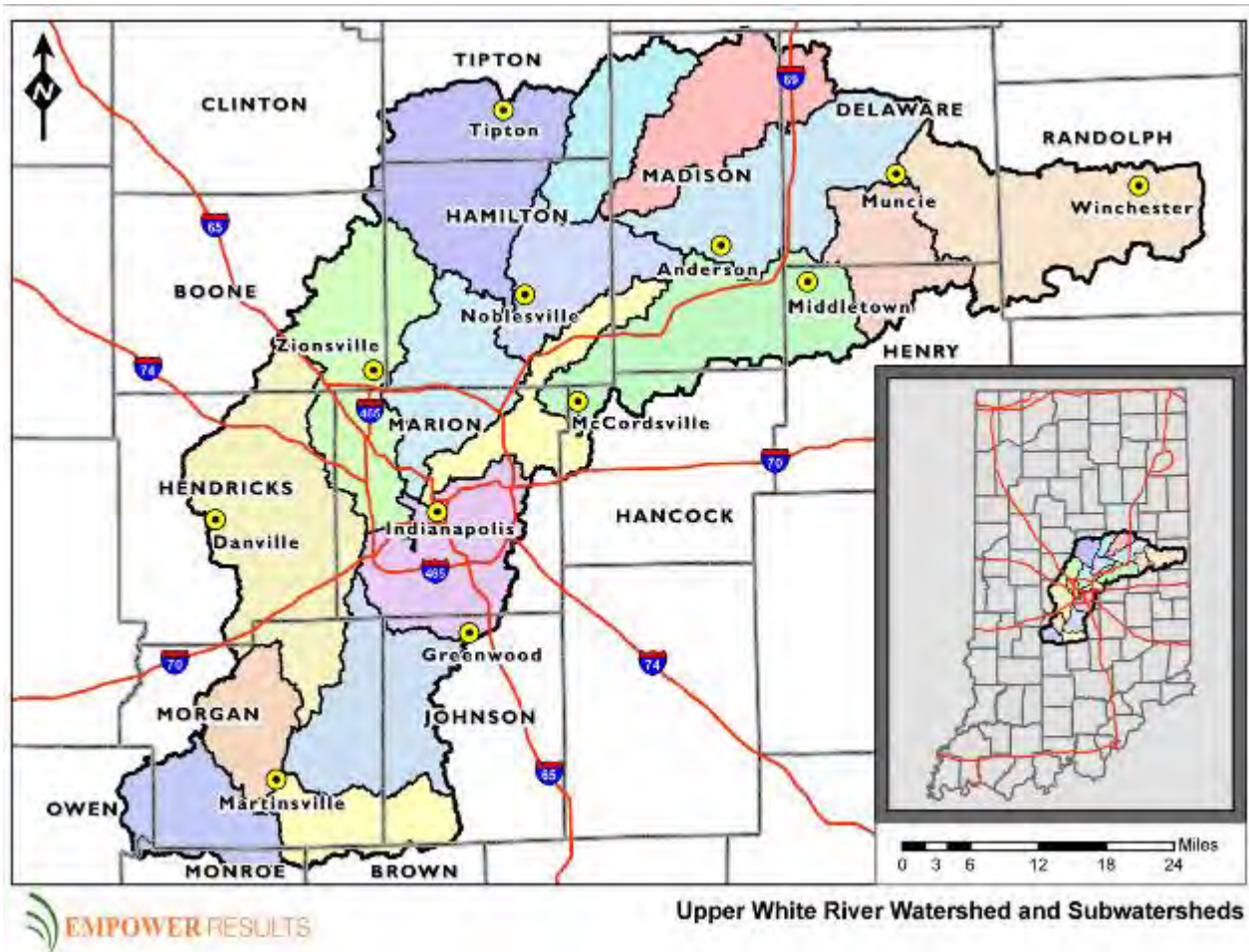


Figure I.1 - The West Fork of the Upper White River Watershed showing state location, major cities, and HUC10 subwatershed boundaries.

## 2.0 WHITE RIVER WATERSHED NATURAL SETTING

In order to develop this planning document, numerous maps and resources were gathered, developed and generated. A complete set of maps was developed at the HUC 8 scale, as well as at the HUC 10 scale. Table 2.1 provides a list of the base maps that were created at both the HUC 8 watershed and HUC 10 subwatershed scale. Most of these maps have not been included in the document due to the large number of maps that were generated. Where maps are referenced and utilized in the text, they are included in the document or appendices. All maps are provided electronically for download at: [http://www.cees.iupui.edu/Research/Water\\_Resources/IWIN/Data/Watersheds/UWRW.htm](http://www.cees.iupui.edu/Research/Water_Resources/IWIN/Data/Watersheds/UWRW.htm).

Table 2.1 Environmental maps for Upper White River Watershed HUC8 scale and for each of the 17 HUC10 subwatersheds.

Map	Map Scale	Example File Name
2000 Land Use & Land Cover	HUC 8/ HUC10	HUC8_2000_LULC.jpg
2003 Land Use & Land Cover	HUC 8/ HUC10	uwr_huc8_lulc_2003.jpg
2007 Land Use & Land Cover	HUC 8/ HUC10	HUC8_2007_LULC.jpg
2005 Aerial Photography	HUC 8	HUC8_2005_AERIAL_PHOTOGRAPHY.jpg
2005 Color Infrared Photography	HUC 8/ HUC10	Pleasant_2005_CIR.jpg

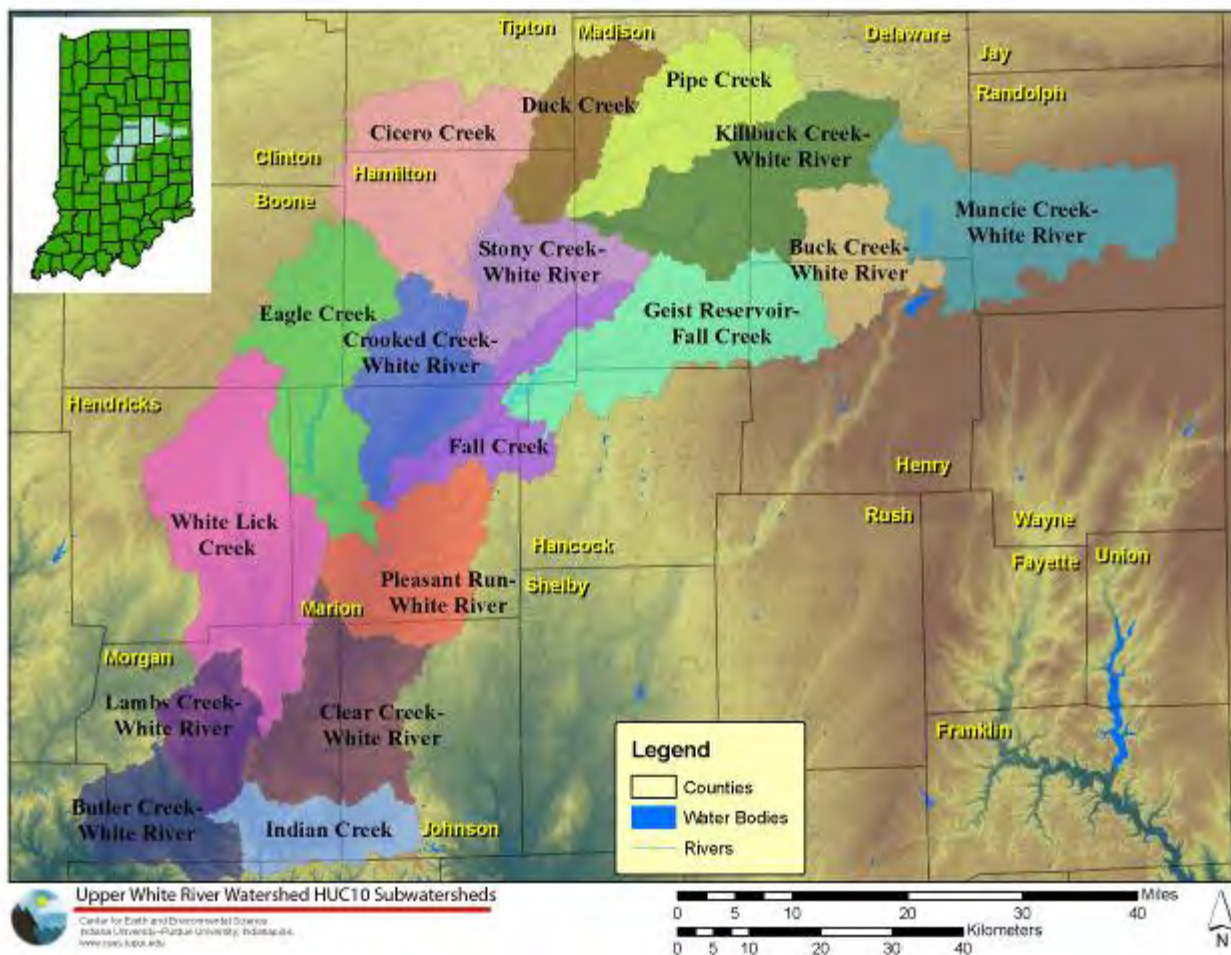
<b>Map</b>	<b>Map Scale</b>	<b>Example File Name</b>
HUC10 Subwatersheds	HUC 8	HUC8_HUC10_WITH_NAMES.jpg
HUC12 Subwatersheds	HUC10	UW_HUC12_Pleasant_with_names.jpg
National Hydrography Dataset (Rivers, Streams)	HUC 8	HUC8_National_Hydrography_Dataset_MEDIUM_RESOLUTION.jpg
Natural Regions	HUC 8	HUC8_NATURAL_REGIONS.jpg
Bedrock Geology	HUC 8	HUC8_BEDROCK_GEOLOGY.jpg
Hydric Soils	HUC 8/ HUC10	HUC8_HYDRIC.jpg Pleasant_Creek_Hydric.jpg
Soil Drainage Classes	HUC 8/ HUC10	HUC8_DRAINAGE.jpg Pleasant_Creek_Drainage.jpg
Floodplains	HUC 8/ HUC10	HUC8_GENERAL_FLOODPLAIN.jpg Pleasant_Creek_Floodplain.jpg
Physiographic Regions	HUC 8/ HUC10	HUC8_PHYSIOGRAPHIC.jpg Pleasant_Creek_Physiographic.jpg
National Wetland Inventory	HUC 8/ HUC10	HUC8_NWI.jpg Pleasant_Creek_NWI.jpg
Slope	HUC 8/ HUC10	HUC8_PERCENT_SLOPE.jpg Pleasant_Creek_Slope.jpg
Surficial Geology	HUC 8/ HUC10	HUC8_SURFICAL_GEOLOGY.jpg Pleasant_Creek_Surficial.jpg
Tree Canopy	HUC 8	HUC8_USGS_TREE_CANOPY.jpg
USGS Gaging Stations	HUC 8	HUC8_USGS_REAL_TIME_GAGING_STATIONS.jpg
Existing Water Quality Monitoring Stations	HUC 8/ HUC10	HUC8_EXISTING_SAMPLING_LOCATIONS.jpg Pleasant_Creek_All_Sites.jpg
IDEM Fixed Stations	HUC 8/ HUC10	HUC8_IDEM_SAMPLING_STATIONS.jpg Pleasant_Creek_IDEM_2006.jpg
Incorporated Boundaries	HUC 8/ HUC10	HUC8_INCORPORATED_BOUNDARIES.jpg Pleasant_Creek_Inc.jpg
MS4 Entities	HUC 8	HUC8_MS4_Entities.jpg
Impaired Streams/Lakes	HUC 8/ HUC10	HUC8_IMPAIRED_STREAMS_LAKES.jpg Pleasant_Creek_Impaired.jpg
Impervious Surfaces	HUC 8/ HUC10	HUC8_IMPERVIOUS.jpg HUC 8/ HUC10
Significant Water Withdrawals	HUC 8/ HUC10	HUC8_SIGNIFICANT_WATER_WITHDRAW.jpg Pleasant_Water_Withdraw.jpg
IDEM Superfund Sites	HUC 8	HUC8_IDEM_SUPERFUND_SITES.jpg
Confined Feeding Operations	HUC 8	HUC8_CONFINED_FEEDING_OPERATIONS.jpg
EPA Bacteria Monitoring Stations	HUC 8	HUC8_EPA_BACTERIA_MONITORING.jpg
Brownfields	HUC 8	HUC8_BROWNFIELDS.jpg
NPDES Pipe Locations	HUC 8	HUC8_NPDES_PIPES.jpg
NPDES Program Facilities	HUC 8	HUC8_NPDES_PROGRAM_FACILITIES.jpg
Active Solid Waste Sites	HUC 8	HUC8_ACTIVE_PERMITTED_SOLID_WASTE.jpg
Industrial Waste Sites	HUC 8	HUC8_INDUSTRIAL_WASTE_SITES.jpg
Restricted Waste Sites	HUC 8	HUC8_RESTRICTED_WASTE_SITES.jpg
Waste Transfer Stations	HUC 8	HUC8_WASTE_TRANSFER_STATIONS.jpg
Waste Tire Sites	HUC 8	HUC8_WASTE_TIRE_SITES.jpg
Open Dump Sites	HUC 8	HUC8_OPEN_DUMPS.jpg
Underground Storage Sites	HUC 8	HUC8_UST_SITES.jpg
Voluntary Remediation Sites	HUC 8	HUC8_VPR_SITES.jpg



Map	Map Scale	Example File Name
Septage Waste Sites (Land Application of Septic Waste)	HUC 8	HUC8_SEPTAGE_SITES.jpg HUC8_SEPTAGE_WASTE_SITES.jpg
Environmental Hazards	HUC10	Pleasant_Creek_Environmental_Hazards.jpg

## 2.1 Basin Characteristics

The Upper White River Watershed is a HUC 8 watershed (05120201) located in central Indiana and consists of 17 smaller HUC 10 subwatersheds. The hydrologic unit code (HUC) system utilized by the USGS subdivides the United States into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units (Seaber et al., 1987). The hydrologic units are arranged within each other, from the smallest to the largest, and each is identified by a unique hydrologic unit code consisting of two to eight digits based on the four levels of classification (Seaber et al., 1987). The watershed has a drainage area of approximately 7,040 km<sup>2</sup> (2718 mi<sup>2</sup>) and includes parts of sixteen counties (Figure 2.1).



**Figure 2.1 – The West Fork of the Upper White River Watershed showing the names of counties and the HUC 10 subwatersheds.**

The West Fork of the White River begins as a small creek near the Ohio border in central Indiana and winds gently westward. By the time it passes Muncie, it is a substantial river (IDEM, 2001). As the river

passes through Hamilton County, it turns southward and continues to build in size and discharge with the addition of numerous streams and rivers. The confluence of Fall Creek and White River is near the heart of the Indianapolis metropolitan region and is the site of the state Capital (IDNR, 1996). Further to the south, urban growth and expansion continues in the now broad floodplain valley of the White River as the river passes out of the glaciated till plain and into the hill country of Martinsville. The White River continues south out of the Upper West Fork of the White River watershed into even wider valleys, through Indiana's southern coal fields and sandy farmland (IDNR, 1996). In total, the West Fork flows about 356 miles and drains 5,600 square miles (IDEM, 1995) before joining the Wabash River at the Illinois/Indiana State Line between Know and Gibson Counties.

The Upper White River Watershed includes more than 2180 miles of streams, numerous artificial lakes (typically old dredge pits and quarries), and 4 reservoirs (Figure 2.2). The state capital, Indiana's largest city, Indianapolis, is located in the watershed. The major cities in the watershed include Winchester, Muncie, Yorktown, Alexandria, Anderson, Pendleton, Elwood, Tipton, Westfield, Noblesville, Carmel, Fishers, Zionsville, Brownsburg, Avon, Danville, Plainfield, Mooresville, Greenwood, and Martinsville with 29% of the population of the State of Indiana residing within the watershed (Figure 2.3 and Table 2.2). The watershed is at the center of economic development for the state and provides drinking water and industrial usage water for major sectors of the state's economy. Drinking water supply reservoirs, Eagle Creek Reservoir, Geist Reservoir, Morse Reservoir, and Prairie Creek Reservoir are also important recreational amenities in the watershed. Eagle Creek Reservoir also has a primary use as a flood control reservoir.

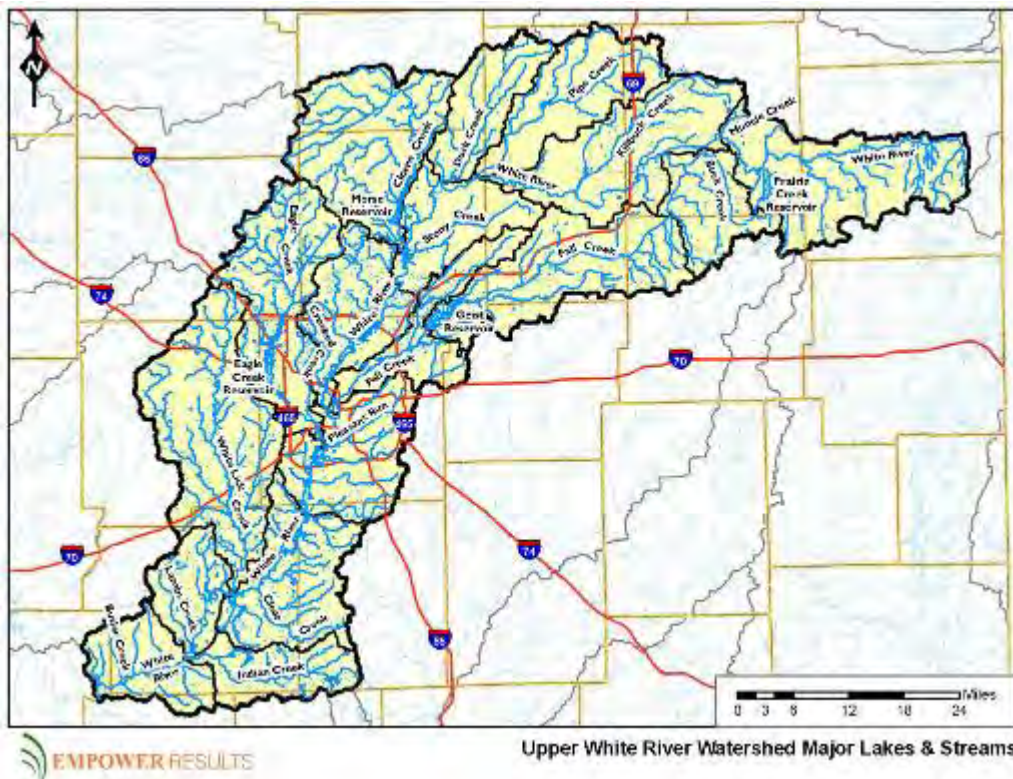


Figure 2.2 – The West Fork of the Upper White River Watershed showing streams, lakes, quarries and reservoirs.



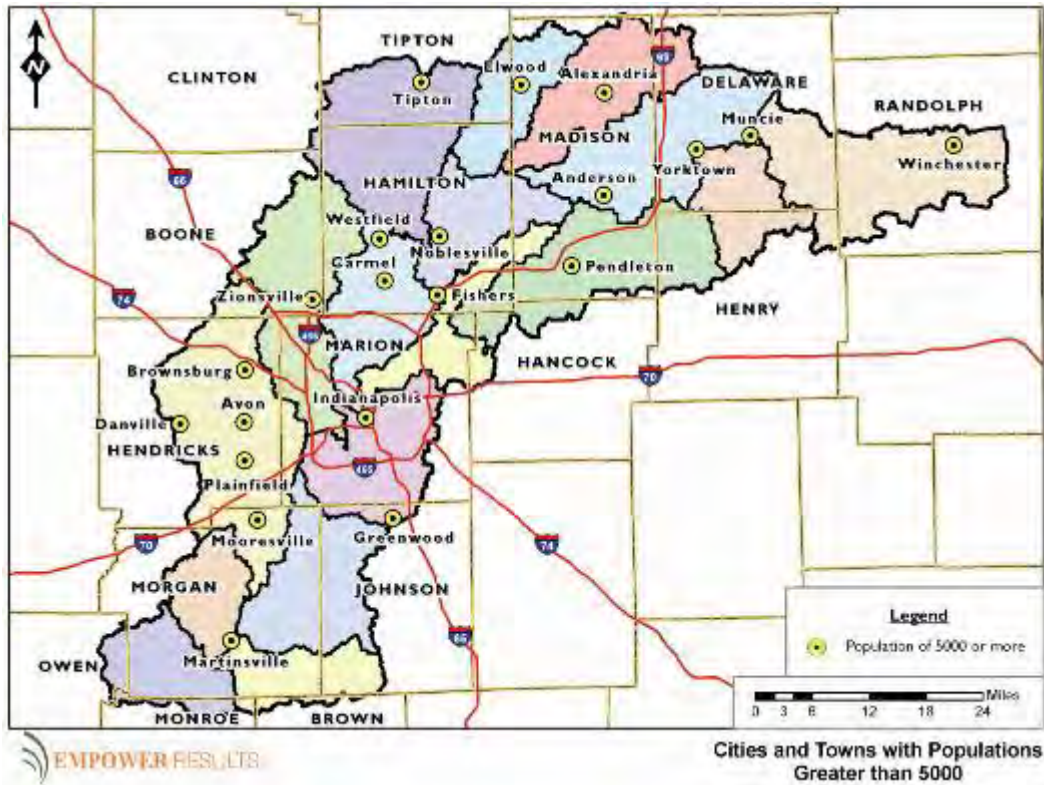


Figure 2.3 – The West Fork of the Upper White River Watershed showing cities and towns in the watershed with populations >5000.

**Table 2.2 Cities and Towns in the Upper White River Watershed with populations <5000 including county and HUC10 subwatershed.**

CITY/TOWN	COUNTY	SUBWATERSHED	CITY/TOWN	COUNTY	SUBWATERSHED	CITY/TOWN	COUNTY	SUBWATERSHED
Big Springs	Boone	Eagle Creek	Cross Roads	Delaware	Buck Creek	Clare	Hamilton	Stony Creek - White River
Eagle Village	Boone	Eagle Creek	Daleville	Delaware	Killbuck Creek - White River	Clarksville	Hamilton	Stony Creek - White River
Fayette	Boone	White Lick Creek	Gaston	Delaware	Pipe Creek	Deming	Hamilton	Cicero Creek
Gadsden	Boone	Eagle Creek	Mount Pleasant	Delaware	Muncie Creek - White River	Durbin	Hamilton	Stony Creek - White River
Herr	Boone	White Lick Creek	New Burlington	Delaware	Muncie Creek - White River	Eagletown	Hamilton	Eagle Creek
Northfield	Boone	Eagle Creek	Oakville	Delaware	Buck Creek	Home Place	Hamilton	Crooked Creek - White River
Rosston	Boone	Eagle Creek	Progress	Delaware	Buck Creek	Hortonville	Hamilton	Cicero Creek
Royalton	Boone	Eagle Creek	Reed	Delaware	Killbuck Creek - White River	Jolietville	Hamilton	Eagle Creek
Shepherd	Boone	Eagle Creek	Royerton	Delaware	Killbuck Creek - White River	Lamong	Hamilton	Eagle Creek
Waugh	Boone	Eagle Creek	Selma	Delaware	Muncie Creek - White River	Millersburg	Hamilton	Cicero Creek
Whitestown	Boone	Eagle Creek	Smithfield	Delaware	Muncie Creek - White River	New Britton	Hamilton	Stony Creek - White River
Zionsville	Boone	Eagle Creek	Arcadia	Hamilton	Cicero Creek	Omega	Hamilton	Duck Creek
Peoga	Brown	Indian Creek	Aroma	Hamilton	Duck Creek	Sheridan	Hamilton	Cicero Creek
Anthony	Delaware	Killbuck Creek - White River	Atlanta	Hamilton	Cicero Creek	Strawtown	Hamilton	Stony Creek - White River
Bethel	Delaware	Killbuck Creek - White River	Bakers Corner	Hamilton	Cicero Creek	Walnut Grove	Hamilton	Duck Creek
Cammack	Delaware	Killbuck Creek - White River	Boxley	Hamilton	Cicero Creek	Fortville	Hancock	Geist Reservoir - Fall Creek

CITY/TOWN	COUNTY	SUBWATERSHED		CITY/TOWN	COUNTY	SUBWATERSHED		CITY/TOWN	COUNTY	SUBWATERSHED
Cowan	Delaware	Buck Creek		Cicero	Hamilton	Stony Creek - White River		McCordsville	Hancock	Geist Reservoir - Fall Creek
Mount Comfort	Hancock	Fall Creek		Sulphur Springs	Henry	Buck Creek		Dundee	Madison	Pipe Creek
Cartersburg	Hendricks	White Lick Creek		Bargersville	Johnson	Clear Creek - White River		Edgewood	Madison	Killbuck Creek - White River
Center Valley	Hendricks	White Lick Creek		Bluff Creek	Johnson	Clear Creek - White River		Emporia	Madison	Geist Reservoir - Fall Creek
Friendswood	Hendricks	White Lick Creek		Bud	Johnson	Clear Creek - White River		Florida	Madison	Killbuck Creek - White River
Maplewood	Hendricks	White Lick Creek		Frances	Johnson	Clear Creek - White River		Frankton	Madison	Pipe Creek
Pittsboro	Hendricks	White Lick Creek		Kinder	Johnson	Clear Creek - White River		Huntsville	Madison	Geist Reservoir - Fall Creek
Raintown	Hendricks	White Lick Creek		Old Bargsville	Johnson	Clear Creek - White River		Ingalls	Madison	Geist Reservoir - Fall Creek
Six Points	Hendricks	White Lick Creek		Providence	Johnson	Clear Creek - White River		Lapel	Madison	Stony Creek - White River
Tilden	Hendricks	White Lick Creek		Samaria	Johnson	Indian Creek		Linwood	Madison	Killbuck Creek - White River
Blountsville	Henry	Muncie Creek - White River		Smith Valley	Johnson	Clear Creek - White River		Markleville	Madison	Geist Reservoir - Fall Creek
Honey Creek	Henry	Geist Reservoir - Fall Creek		Stones Crossing	Johnson	Clear Creek - White River		Moonville	Madison	Killbuck Creek - White River
Luray	Henry	Buck Creek		Trafalgar	Johnson	Clear Creek - White River		New Columbus/ Ovid	Madison	Geist Reservoir - Fall Creek
Mechanicsburg	Henry	Geist Reservoir - Fall Creek		Alliance	Madison	Geist Reservoir - Fall Creek		Orestes	Madison	Pipe Creek

CITY/TOWN	COUNTY	SUBWATERSHED		CITY/TOWN	COUNTY	SUBWATERSHED		CITY/TOWN	COUNTY	SUBWATERSHED
Middletown	Henry	Geist Reservoir - Fall Creek		Bloomer	Madison	Stony Creek - White River		Perkinsville	Madison	Killbuck Creek - White River
Springport	Henry	Buck Creek		Chesterfield	Madison	Killbuck Creek - White River		Prosperity	Madison	Killbuck Creek - White River
Anita	Johnson	Indian Creek		Country Club Heights	Madison	Killbuck Creek - White River		Summitville	Madison	Pipe Creek
Beech Grove	Marion	Pleasant Run - White River		Lake Hart	Morgan	Lambs Creek - White River		Rural	Randolph	Muncie Creek - White River
Camby	Marion	White Lick Creek		Landersdale	Morgan	Clear Creek - White River		Unionport	Randolph	Muncie Creek - White River
Clermont	Marion	Eagle Creek		Mahalasville	Morgan	Indian Creek		Windsor	Randolph	Muncie Creek - White River
Lawrence	Marion	Pleasant Run - White River		Monrovia	Morgan	Lambs Creek - White River		East Union	Tipton	Cicero Creek
Oaklandon	Marion	Fall Creek		Morgantown	Morgan	Indian Creek		Ekin	Tipton	Cicero Creek
Southport	Marion	Pleasant Run - White River		Paragon	Morgan	Butler Creek - White River		Goldsmith	Tipton	Cicero Creek
Speedway	Marion	Eagle Creek		Waverly	Morgan	Clear Creek - White River		Hobbs	Tipton	Cicero Creek
Hindustan	Monroe	Butler Creek - White River		Whitaker	Morgan	Butler Creek - White River		New Lancaster	Tipton	Duck Creek
Banta	Morgan	Clear Creek - White River		Wilbur	Morgan	Lambs Creek - White River		Normanda	Tipton	Cicero Creek
Bethany	Morgan	White Lick Creek		Silex	Owen	Butler Creek - White River		Tetersburg	Tipton	Cicero Creek
Brooklyn	Morgan	White Lick Creek		Buena Vista	Randolph	Muncie Creek - White River		West Elwood	Tipton	Duck Creek
Centerton	Morgan	Lambs Creek - White River		Farmland	Randolph	Muncie Creek - White River				

CITY/TOWN	COUNTY	SUBWATERSHED		CITY/TOWN	COUNTY	SUBWATERSHED		CITY/TOWN	COUNTY	SUBWATERSHED
Chetwynd	Morgan	Clear Creek - White River		Georgetown	Randolph	Muncie Creek - White River				
Cope	Morgan	Clear Creek - White River		Harrisville	Randolph	Muncie Creek - White River				
Exchange	Morgan	Clear Creek - White River		Huntsville	Randolph	Muncie Creek - White River				
Five Points	Morgan	Clear Creek - White River		Maxville	Randolph	Muncie Creek - White River				
Gasburg	Morgan	Lambs Creek - White River		Parker City	Randolph	Muncie Creek - White River				

## **2.2 Climate**

Central Indiana is located in a humid-continental climate characterized by well-defined summer and winter seasons, large annual temperature changes, and highly variable weather patterns. Mean annual temperatures range from approximately 10.6-12.8° C (51-55° F) with mean monthly temperatures of approximately -2.8° C (27° F) in January and 23.9° C (75° F) in July according to 1961-1990 data (Shampine, 1977; Schnoebelen et al., 1999). Mean annual precipitation for the state of Indiana ranges from approximately 96.5 cm (38 in) in the northernmost part of the state to 111.8 cm (44 in) in the southernmost part of the state with the majority of the study basin associated with 101.6 cm (40 in) of annual precipitation. In Indiana, cooler months are generally associated with precipitation events with lower intensities and longer durations while, in the warmer months, precipitation events with higher intensities and shorter durations are more common (Schnoebelen et al., 1999). Due to the direct influence of precipitation levels on mean annual runoff trends in central Indiana, a similar pattern of increased runoff from north to south exists (Schnoebelen et al., 1999). In the northernmost portion of the White River Basin, mean annual runoff totaled approximately 30.5 cm (12 in) while the southernmost portion saw approximately 43.2 cm (17 in) with the study basin ranging from 30.5 cm (12 in) in the north and 35.6 cm (14 in) in the south (Schnoebelen et al., 1999). Expressed as a percentage of mean annual precipitation, mean annual runoff ranges from 30% in the northernmost portion of the White River Basin and 40% in the south (Schnoebelen et al., 1999). Evapotranspiration is estimated to total 66 cm (26 in) (Clark, 1980; Schnoebelen et al., 1999).

## **2.3 Natural Regions**

The White River Basin can be divided into natural regions that have similar natural characteristics on the basis of geologic, geomorphologic, and hydrologic factors (Figure 2.4). These regions are defined by both glacial deposits (the Tipton and Bluffton till plains) and bedrock geology (the Brown County Hills upland and Mitchell karst plain). This till plain region extends throughout the central portion of Indiana and is the largest natural region in the state. The till plains (including fluvial deposits) are the most intensively farmed regions in the Upper White River Basin. The till plains, areas of low topographic relief in the northern and central part of the basin (Figure 2.5), are typically covered by 30.5-70 meters (100 to 200 feet ) of silty clay till interspersed with thin 1.5-3.0 meters (5 to 10 feet) layers of sand and gravel. The relatively impervious till limits infiltration and promotes surface runoff. The Bluffton till plain area in the northern portions of Muncie Creek-WR, Killbuck Creek – WR, and Pipe Creek subwatersheds is an important feature as it was formed by different glacial ice margin conditions including a small end moraine complex and the associated mixed drift, till, and stratified drift in lineated form associated with subice tunnels and ice-walled channels (Gray, 2000). The complex drift includes extensive sand and gravel deposits making portions of Randolph County moderately well drained in comparison to the remainder of the Till Plains in the Upper White River Watershed.

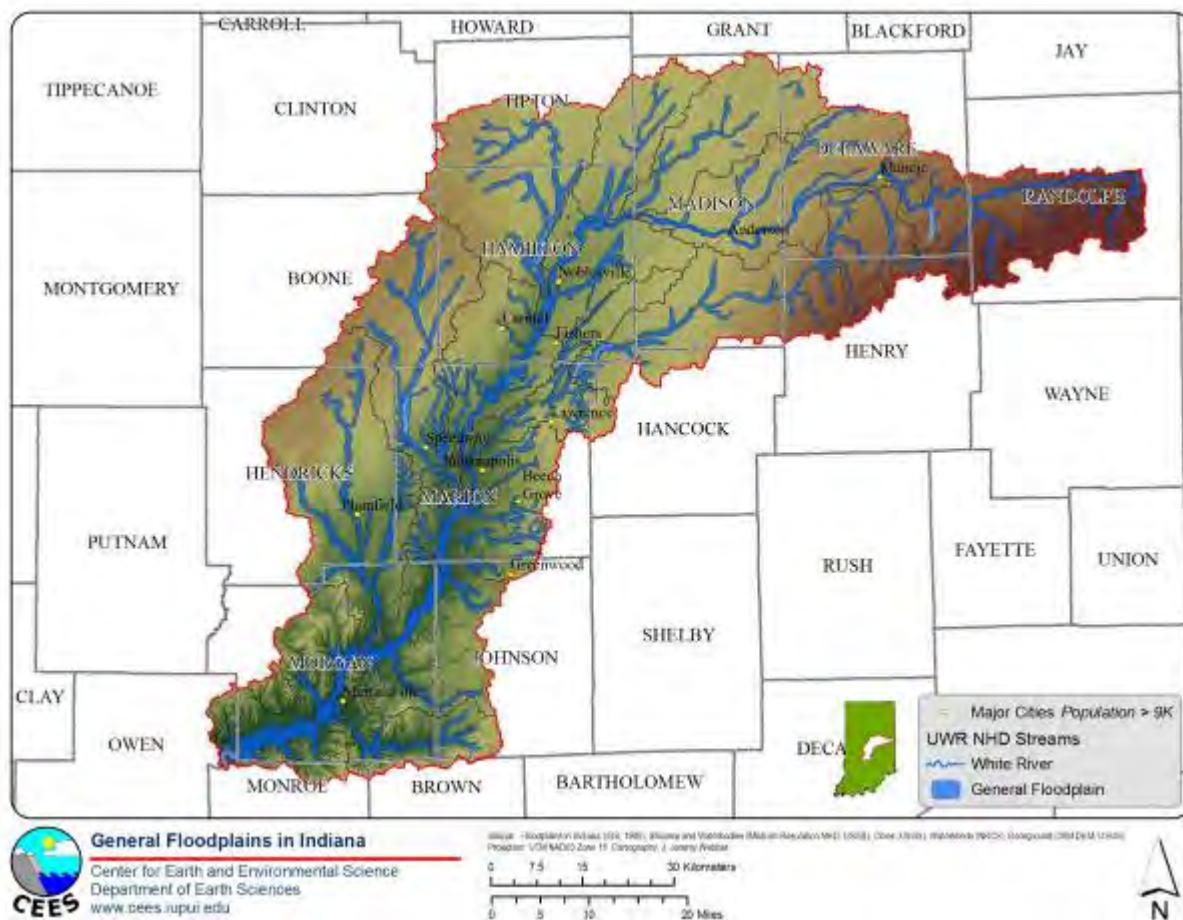
The physiography of the rest of the basin is controlled by bedrock features. Soils in this region are generally highly erosive or poorly drained; subsurface drainage is difficult because tile drains tend to fill with silt. The Brown County Hills bedrock uplands are unglaciated or were glaciated in pre-Wisconsin glacial epochs and are characterized by a hill and valley landscape with higher relief than other parts of the basin. Bedrock outcrops are common in this region and soils are generally thin. The Mitchell karst plain is characterized by numerous sinkholes and dissolution features. These areas tend to be forested.





## 2.4 Geology and Soils

The bedrock underlying the Upper White River Watershed consists almost entirely of Silurian limestone and dolomite with small areas of Ordovician Maquoketa Group shale and limestone. Devonian Muscatuck Group limestone and dolomite are also included. The underlying bedrock of this area is overlain completely by varying thicknesses of loam to sandy loam, Wisconsinan-age till glacial deposits with small patches of clay, silt, and sand, Wisconsinan-age lake deposits and fingers of sand, silt, and some gravel from Holocene alluvium and Pleistocene glacial outwash (Schneider, 1966; Shaver et al., 1986; Gray et al., 1987; Gray, 1989; Soller, 1993; Schnoebelen et al., 1999). The White River valley is back filled with thick deposits of glacial outwash sands and gravels that serve as excellent aquifers especially in the southern portions of the watershed where the floodplains and outwash valleys are very large (Figure 2.6).



**Figure 2.6 - Map of floodplains of the Upper White River Watershed. Floodplains increase in size towards the southern portions of the watershed.**

The soils of the Upper White River Basin are divided into thirteen regions based on parent material, vegetation, and topography (Franzmeier et al, 1989; Schnoebelen et al., 1999), but can be clustered to form four primary groups. These four groups are comprised of those soils that were developed from loess or glacial till, those developed along floodplains, those developed from bedrock, and those developed from lake deposits (Schnoebelen et al., 1999). The majority of the study basin is covered by soils developed from loess and glacial tills with some smaller areas of those associated with floodplains occurring along stream channels (Figure 2.7). The glacial soils originate from a calcareous parent material

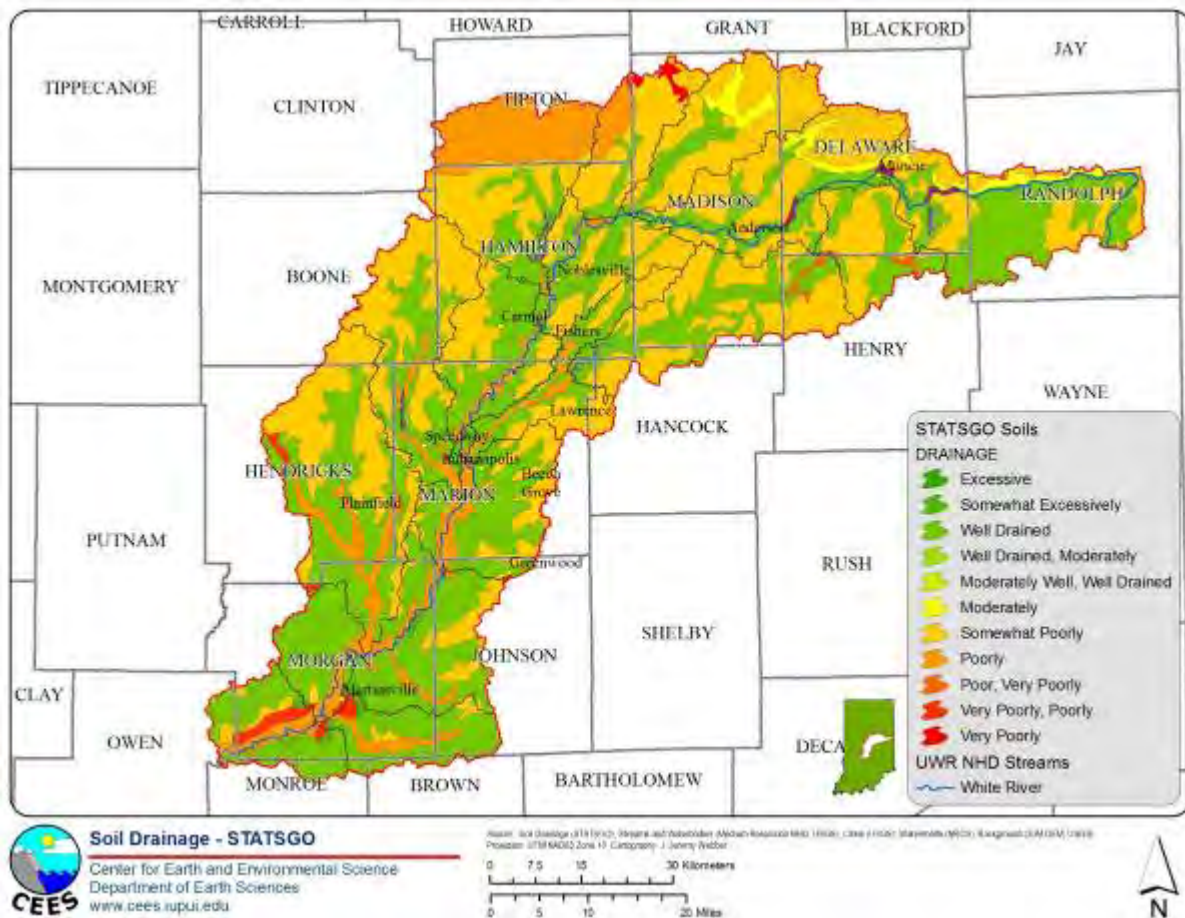




Figure 2.8 shows the distribution of various soils in the watershed based on their drainage characteristics (soil data layers from the Soil Survey Geographic Data Base (SSURGO)). Drainage classes are more transferable from county to county than soil association types. Indiana county soil surveys have been published and revised over many years and soil nomenclature evolves, while the soil drainage classes are more consistent. The soil drainage class of the basin plays a critically important role in influencing overall water quality in the White River basin. Soil drainage class determines the degree to which precipitation ponds on the surface, runs off, or infiltrates. Soils drainage classes are formally defined by the Natural Resource Conservation Service (NRCS) based on measured field parameters.

Poorly drained soil classes tend to be tiled-drained and this tile drainage influences both water quality and quantity in watershed streams. In somewhat poorly drained soils water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall. In poorly drained soils, water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below the plow-depth (0.2-0.3 m). Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these. In very poorly drained soils water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater (NRCS).

Poorly drained soil classes (somewhat poorly drained, poorly drained, and very poorly drained) are widely reported to be tile drained (Franzmeier et al., 2001, Kladivko, et al., 2004). Additionally, research in the Midwest and Indiana specifically, shows that tile-drained agricultural landscapes are the source areas for high levels of nitrate export to water bodies (Wagner et al., 2008, Baker et al., 2006; Royer et al., 2006). Thus by identifying somewhat poorly drained, poorly drained, and very poorly drained soils, we have also identified watershed areas that are tile drained (Figure 2.8) and require different water management or land management strategies to mitigate certain types of water quality impairments and areas of high water volume export. The development or restoration of wetlands on these soils (provided other important wetland characteristics are present {i.e. wetland hydrology}) thus also focuses water quality improvements into areas of known high contribution of nitrate and other dissolved loads (e.g. atrazine).



**Figure 2.8 - Soil drainage classes of the Upper White River Watershed (STATSGO). Soils that are very poorly drained, poorly drained, and somewhat poorly drained (red hues) are commonly tiled drained and require different water management strategies than areas that are not tile-drained to mitigate contaminant transport to streams.**

## 2.5 Streamflow

Under natural conditions, streamflow in the northernmost small to moderate drainage basins of the White River generally exhibit well-sustained base flow and moderate peak flows relative to those watersheds lying farther to the south which may be dry at base flow and associated with higher peak flows (Schnoebelen et al., 1999). These differences between north and south are the result of the types of materials exposed at the surface. In the north, flat, thick glacial deposits allow rainfall to pond and infiltrate thereby moderating runoff and peak flows. Additionally, these thick glacial deposits are able to support aquifers that regulate sustained base flows to surrounding streams. In the south, however, steeper slopes, thin glacial deposits, older, more compact tills, and bedrock all contribute to increased runoff, flashier flow events, and an inability to maintain flow during drier periods (Schnoebelen et al., 1999). While this may accurately describe the general behaviors of the different landscapes of the White River Watershed under natural conditions, anthropogenic influences (i.e. artificial drainage systems, urbanization) have altered natural drainage patterns in many areas thereby complicating this simplistic conceptualization.

## **2.6 Flood Mitigation**

Increased runoff associated with climate and land use change has been identified as a major factor in increased flooding, erosion hazards, and water quality problems. Analysis of USGS stream gage data from 1947-2008, indicates a 30 percent increase in annual peak discharges for the White River at Centerton, Indiana. This trend can be expected to continue. The recent (2009) report: Global Climate Change Impacts in the United States, released by the U.S. Global Change Research Program (2009), indicates that runoff in Indiana can be expected to increase by an additional 40 percent for 2041-2060. Most of the increase in runoff is expected to occur in late winter and early spring, a trend that appears to be occurring already. Managing the increased runoff is imperative. The June 2008 floods in central and southern Indiana, occurring just 3 years after statewide flooding in 2005, renewed interest in runoff management and highlighted some of the problems associated with increased runoff. An obvious place to start was loss of storage. Based on a 1989 report by the Indiana Department of Natural Resources, Indiana had approximately 5.6 million acres of wetland 200 years ago. By the mid-1980s, only 813,000 acres or 15 % of the original wetland area remained in Indiana (IDNR, 1989). Indiana Department of Environmental Management data on the success of wetland mitigation in Indiana indicates that wetland loss continues in Indiana (Robb, 2002). Most of the wetland loss was a result of drainage for agricultural production though recent losses are related to urban development. Some of these drained lands have proven to be marginal agricultural lands, and marginal agricultural lands may be much more valuable providing ecosystem services as restored wetlands - such as flood mitigation, water quality improvement, etc. Therefore, the restoration of degraded wetlands is receiving considerable attention in Indiana.

## **2.7 Land Use Land Cover**

Land cover refers to the physical and biological cover over the surface of land; including water, vegetation, bare soil, and/or artificial structures. These conditions can be observed directly in the field or by remote sensing. Land use is a more complicated term. Natural scientists define land use in terms of areas of human activities such as agriculture, forestry, and urbanization that alter land surface processes including biogeochemistry, hydrology, and biodiversity (Ellis, 2010). These conditions require further understanding of the ramifications of, or methods of use.

### *2.7.1 Methodology*

ArcGIS was used to analyze historic and current land use in the watersheds of the Upper White River Watershed. 2000 and 2008 derived data were used for comparison purposes. A simplified classification system for land cover type was employed to compare these two disparate datasets (Tables 2.3 and 2.4). These data sets are different and land cover classifications differed making direct comparison difficult. The most prominent errors were associated with the Herbaceous and Forest cover classes. The 2000 herbaceous class includes grass lands, pastures, and open urban spaces. In the 2008 data, open urban spaces are separately classed. In addition to actual forest cover, the 2000 Forest class also includes older closed canopy residential areas, scrublands, and forested wetland areas that are classed separately in the 2008 dataset. The 2008 Forest class also includes areas that were classed as open water in 2000. This may be due to the season of data collection and extent of vegetation growth and tree cover in the 2008 dataset. For these reasons a direct percent change between 2000 and 2008 was not calculated. Instead, a qualitative description of the land use change is provided for each subwatershed of the Upper White River.

2000 Land Use/Land Cover was acquired from the IUPUI Center for Urban Policy and the Environment. The land cover data were created from unsupervised classification of satellite imagery and cover the entire state of Indiana at a spatial resolution of 30 meters. The images were classified into 13 gridcodes each attributed to a land cover class and further simplified for the purpose of this change analysis. The

error category includes outlier pixels and represents a minimal percent of the total area (0.02%). 2008 Land Use/Land Cover was acquired from United States Department of Agriculture, National Agricultural Dataset (NASS, 2008).

**Table 2.3 2000 land cover classes and the simplified classes utilized in this analysis.**

<b>GridCode</b>	<b>2000 Land Cover</b>	<b>Simplified Land Cover</b>
0	Error	Error
9	Agriculture	Ag
8	Grass Lands/Suburban Lands	Herbaceous
5	Forest	Forest
1	High Density Urban	Urban
2	Medium Density Urban	Urban
16	Roads	Urban
3	Bare Soil-Sparse Vegetation	Urban
4	Excavations	Urban
10	Wetland Forest	Wetland
11	Wetland Other Vegetation	Wetland
14	Wetland Bare	Wetland
15	Open Water	Open Water

**Table 2.4 2008 land cover classes and the simplified classes utilized in this analysis. For the purposes of comparison between these two disparate land cover datasets, the land use classes were grouped to simplify classes and allow comparison.**

<b>GridCode</b>	<b>2008 Land Cover</b>	<b>Level I Class</b>	<b>Simplified Land Cover</b>
0	Unidentified	Error	Error
1	corn	Corn	Ag
4	sorghum	Sorghum	Ag
13	popcorn	Popcorn	Ag
23	spring wheat	Wheat	Ag
24	winter wheat	Wheat	Ag
26	winter wheat/soybean	Wheat-Soybean	Ag
27	rye	Other_Crop	Ag
28	oats	Other_Crop	Ag
36	alfalfa	Other_Crop	Ag
42	dry beans	Other_Crop	Ag
44	other crops	Other_Crop	Ag
48	watermelon	Other_Crop	Ag
58	clover/wild flowers	Grass-Pasture	Herbaceous

<b>GridCode</b>	<b>2008 Land Cover</b>	<b>Level I Class</b>	<b>Simplified Land Cover</b>
61	fallow/idle/flooded cropland	Grass-Pasture	Herbaceous
62	grass/pasture	Grass-Pasture	Herbaceous
63	woodland	Woodland	Forest
68	apples	Woodland	Forest
87	wetlands	Herbaceous Wetlands	Wetlands
111	open water	Open_Water	Open_Water
121	developed/open space	Urban_Open	Herbaceous
122	developed/low intensity	Urban_Low	Urban
123	developed/medium intensity	Urban_Med	Urban
124	developed/high intensity	Urban_High	Urban
131	barren	Barren	Urban
141	deciduous forest	Deciduous_Forest	Forest
142	evergreen forest	Evergreen_Forest	Forest
143	mixed forest	Evergreen_Forest	Forest
152	shrubland	Shrubland	Scrub
171	grassland herbaceous	Grassland-Herbaceous	Herbaceous
181	pasture/hay	Pasture-Hay	Herbaceous
190	woody wetlands	Woody_Wetlands	Wetlands
195	herbaceous wetlands	Herbaceous Wetlands	Wetlands

### 2.7.2 2000 Land Use

In 2000, agriculture dominates the Upper White River Watershed, accounting for 48.52% of the total area of the watershed (Table 2.5). The Duck Creek subwatershed had the highest percentage of agricultural land use at 82.89%. Pleasant Run-White River, Crooked Creek-White River, and Lambs Creek-White River had the least amount of land cover in agriculture ranging between 10 to 16%. The herbaceous land cover including grass and turf and pastures accounts for 24.31% of the watershed land cover. Urban land cover including roads represents 13.89% of the watershed. Forest cover represents 10.47% of the watershed with forest cover focused primarily in the southern subwatersheds.



**Table 2.5 2000 land cover summary for the Upper West Fork White River. Totals are for the 8 digit HUC, while max and min are land cover values for the 10 digit subwatersheds. Individual 10 digit HUC subwatersheds are shown in the lower part of the table.**

	Error	Agriculture	Herbaceous	Forest	Urban	Wetland Forest	Wetland Other	Wetland Bare	Open Water
<b>Total</b>	0.02%	48.52%	24.31%	10.47%	13.89%	1.36%	0.16%	0.04%	1.23%
<b>Max</b>	0.07%	82.89%	31.84%	52.61%	59.05%	2.28%	0.25%	0.24%	2.80%
<b>Min</b>	0.00%	10.13%	10.15%	1.49%	1.16%	0.47%	0.03%	0.00%	0.02%

Subwatershed	HUC10	Error	Agriculture	Herbaceous	Forest	Urban	Wetland	Open Water
Muncie Creek-White River	0512020101	0.02%	65.10%	23.62%	4.83%	3.61%	1.66%	1.17%
Buck Creek-White River	0512020102	0.01%	59.40%	27.98%	5.09%	6.34%	0.96%	0.22%
Killbuck Creek-White River	0512020103	0.00%	51.78%	25.39%	5.22%	14.94%	1.91%	0.76%
Pipe Creek	0512020104	0.03%	74.43%	17.41%	2.79%	3.05%	2.01%	0.29%
Duck Creek	0512020105	0.01%	82.89%	10.15%	1.49%	3.89%	1.56%	0.02%
Cicero Creek	0512020106	0.01%	74.80%	15.89%	2.22%	3.34%	2.48%	1.26%
Stony Creek-White River	0512020107	0.00%	59.83%	23.76%	3.48%	9.29%	2.26%	1.38%
Geist Reservoir-Fall Creek	0512020108	0.02%	58.66%	24.75%	5.32%	7.84%	1.70%	1.71%
Fall Creek	0512020109	0.01%	35.74%	20.72%	9.05%	32.12%	1.09%	1.28%
Crooked Creek-White River	0512020110	0.00%	11.49%	31.84%	9.95%	43.11%	0.81%	2.80%
Eagle Creek	0512020111	0.01%	40.39%	29.32%	8.41%	18.99%	1.17%	1.71%
Pleasant Run-White River	0512020112	0.03%	10.13%	24.36%	4.00%	59.05%	0.61%	1.82%
White Lick Creek	0512020113	0.02%	44.84%	31.09%	8.06%	14.30%	1.20%	0.50%
Clear Creek-White River	0512020114	0.01%	41.25%	31.26%	17.33%	6.90%	1.64%	1.60%
Lambs Creek-White River	0512020115	0.01%	16.74%	20.96%	52.61%	5.32%	2.05%	2.32%
Indian Creek	0512020116	0.03%	24.86%	25.55%	43.99%	3.21%	0.74%	1.61%
Butler Creek-White River	0512020117	0.07%	33.95%	17.04%	44.55%	1.16%	2.27%	0.96%

### 2.7.3 2008 Land Use

In 2008, agriculture continues to dominate the land use in the Upper White River Watershed, with 43.61% of the watershed in agriculture (Table 2.6). Duck Creek still has the highest percentage of agricultural cover at 80.33%. Pleasant Run – White River and Crooked Creek – White River have the lowest percentage of land cover in agriculture as in 2000, with approximately 5% each.

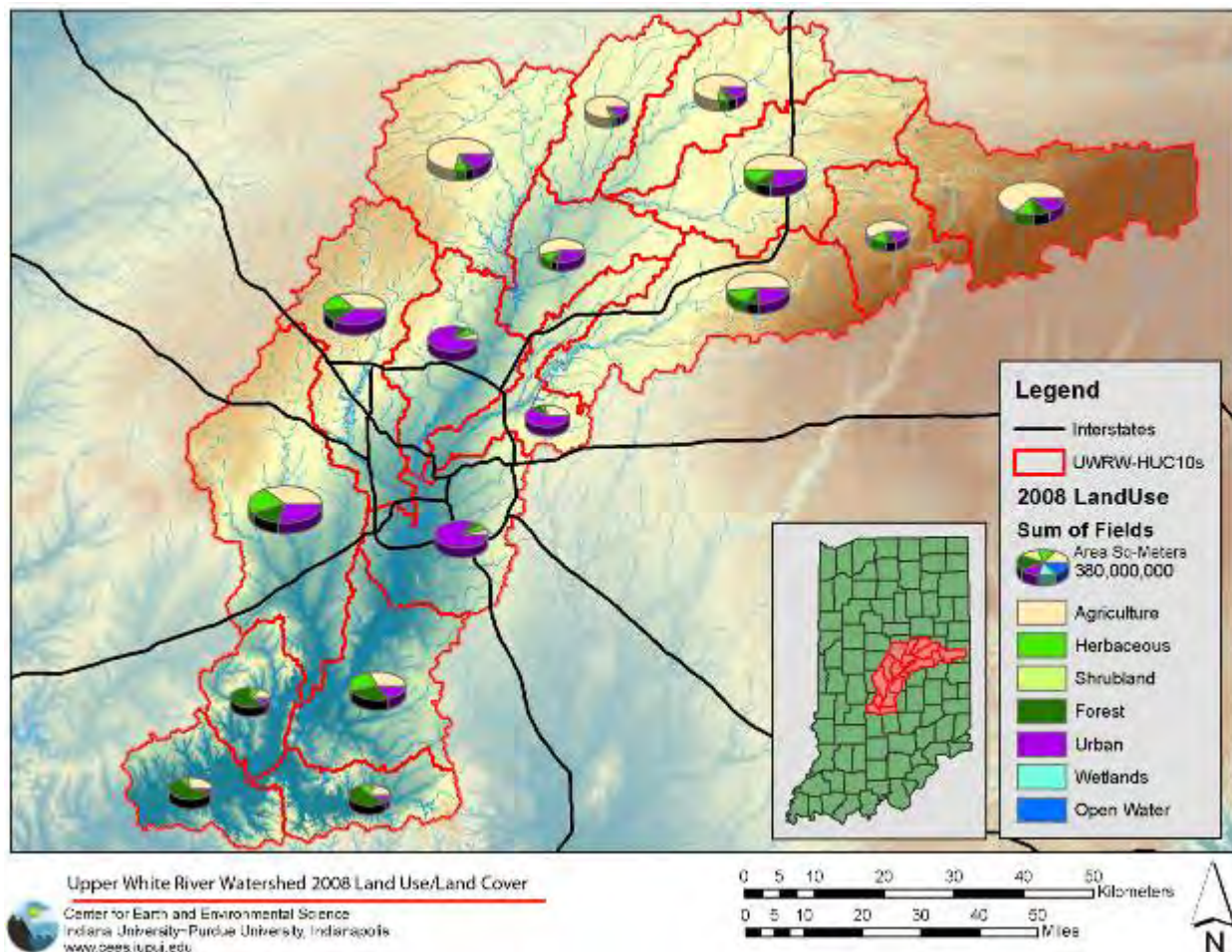
**Table 2.6 2008 land cover summary for the Upper West Fork White River. A) Totals are for the 8 digit HUC, while max and min are land cover values for the 10 digit subwatersheds. B) Individual 10 digit HUC subwatersheds are shown in the lower part of the table.**

	Error	Agriculture	Herbaceous	Shrub-land	Forest	Barren	Woody Wetlands	Herbaceous Wetlands	Open Water	Urban - Open	Urban - Low	Urban - Med	Urban - High
<b>Total</b>	0.06%	43.61%	12.13%	0.04%	15.33%	0.06%	0.02%	0.09%	1.22%	14.55%	8.69%	2.91%	1.28%
<b>Max</b>	0.17%	80.33%	23.15%	0.27%	65.77%	0.33%	0.09%	0.33%	2.55%	37.25%	34.11%	16.64%	8.84%
<b>Min</b>	0.00%	4.72%	4.26%	0.00%	4.02%	0.00%	0.00%	0.00%	0.01%	4.21%	0.22%	0.04%	0.03%

HUC 10	Error	Agriculture	Herbaceous	Shrub-land	Forest	Barren	Urban - Open	Urban - Low	Urban - Med	Urban -High	Woody Wetlands	Herbaceous Wetlands	Open Water
Muncie Creek - White River 0512020101	0.00%	63.74%	12.48%	0.00%	10.28%	0.00%	9.25%	2.32%	0.50%	0.17%	0.04%	0.05%	1.16%
Buck Creek - White River 0512020102	0.10%	57.07%	15.76%	0.01%	10.24%	0.00%	10.77%	4.26%	0.94%	0.35%	0.01%	0.08%	0.41%
Killbuck Creek - White River 0512020103	0.03%	48.85%	11.91%	0.01%	9.82%	0.00%	15.10%	9.30%	2.62%	1.28%	0.09%	0.31%	0.67%
Pipe Creek 0512020104	0.00%	72.96%	7.71%	0.03%	6.79%	0.01%	9.50%	2.01%	0.32%	0.12%	0.05%	0.14%	0.37%
Duck Creek 0512020105	0.00%	80.33%	4.26%	0.02%	4.02%	0.00%	8.25%	2.34%	0.56%	0.19%	0.01%	0.01%	0.01%
Cicero Creek 0512020106	0.09%	71.90%	7.71%	0.04%	5.48%	0.00%	10.39%	2.60%	0.46%	0.15%	0.02%	0.05%	1.12%
Stony Creek - White River 0512020107	0.04%	54.42%	10.18%	0.03%	6.60%	0.02%	17.56%	6.86%	1.86%	0.64%	0.05%	0.33%	1.42%
Geist Reservoir - Fall Creek 0512020108	0.10%	52.23%	14.27%	0.02%	9.33%	0.02%	14.98%	5.80%	1.02%	0.35%	0.04%	0.11%	1.74%
Fall Creek 0512020109	0.07%	27.00%	4.88%	0.01%	8.45%	0.04%	26.87%	22.46%	7.09%	2.00%	0.04%	0.10%	0.99%



<b>HUC 10</b>	<b>Error</b>	<b>Agriculture</b>	<b>Herbaceous</b>	<b>Shrub -land</b>	<b>Forest</b>	<b>Barren</b>	<b>Urban - Open</b>	<b>Urban - Low</b>	<b>Urban - Med</b>	<b>Urban - High</b>	<b>Woody Wetlands</b>	<b>Herbaceous Wetlands</b>	<b>Open Water</b>
Crooked Creek - White River 0512020110	0.00%	5.36%	7.13%	0.01%	6.41%	0.01%	37.25%	28.90%	8.69%	3.54%	0.02%	0.14%	2.55%
Eagle Creek 0512020111	0.06%	36.23%	14.18%	0.04%	10.27%	0.10%	18.16%	12.20%	4.83%	2.10%	0.02%	0.10%	1.70%
Pleasant Run - White River 0512020112	0.06%	4.72%	5.41%	0.00%	5.90%	0.07%	22.14%	34.11%	16.64%	8.84%	0.00%	0.02%	2.06%
White Lick Creek 0512020113	0.06%	36.99%	18.67%	0.02%	14.54%	0.33%	16.76%	8.13%	2.59%	1.18%	0.00%	0.02%	0.72%
Clear Creek - White River 0512020114	0.07%	31.26%	23.15%	0.02%	29.20%	0.02%	10.05%	3.83%	0.62%	0.14%	0.00%	0.00%	1.64%
Lambs Creek - White River 0512020115	0.06%	13.84%	11.31%	0.27%	65.77%	0.02%	4.64%	1.45%	0.49%	0.14%	0.00%	0.01%	2.01%
Indian Creek 0512020116	0.11%	18.47%	17.76%	0.27%	54.72%	0.00%	5.52%	1.32%	0.35%	0.10%	0.00%	0.01%	1.36%
Butler Creek - White River 0512020117	0.17%	27.10%	8.94%	0.16%	58.30%	0.00%	4.21%	0.22%	0.04%	0.03%	0.00%	0.02%	0.82%



**Figure 2.9 – 2008 Land use and land cover for Upper White River Watershed by HUC10 subwatershed.**

## 2.8 Watershed Management Areas

When viewed holistically, the Upper White River Watershed naturally divides into three watershed areas; 1) Agricultural Till Plain Headwaters, 2) Urban and Urbanizing Core; and 3) Southern Forested Hills (Figure 2.10 and Table 2.7). These areas are based on the interaction of the inherited natural landscape and land use. The inherited landscape is a product of the watershed’s glacial history, which in turn defines the natural regions through topography, soil types, and water resource availability. These inherited attributes are then reflected in land use and by extension land cover. Because the watershed management areas share commonalities related to landscape and land use, their water quality condition and many social and cultural norms, opportunities and barriers to watershed management are also shared.

### 2.8.1 Agricultural Till Plain Headwaters

The till plain natural regions have relatively flat topography and rich soils, albeit with typically poor drainage. With the aid of drainage systems, these areas are prime farm lands. The till plains with their dominance of agricultural land use and rural character are especially prevalent in the northern headwater portions of the Upper White River Watershed. The agricultural signature on both water quality and water quantity and response is a dominant component of the Upper White River Watershed.

### 2.8.2 Urban and Urbanizing Core

The central portion of the Upper White River Watershed lies within the till plain natural area but has been extensively developed and is undergoing continued urbanization with the expansion of development into surrounding agricultural areas. The inherited landscape has been largely overprinted by urbanization and its associated modifications to water resources from both a water quality as well as quantity perspective. The fingerprint of urbanization is strong and is a dominant feature of the Upper White River Watershed.

### 2.8.3 Southern Forested Hills

The bedrock uplands and small area of karst bedrock natural areas are found in the southern portion of the watershed. Hill and valley topography, thin soils, and abundant bedrock outcrops limit agriculture in this portion of the watershed. With the exception of the broad fertile floodplain valleys of the White River, the region is heavily forested and rural. Where agriculture is important, the focus is on pasture and cattle rather than row crop agriculture.

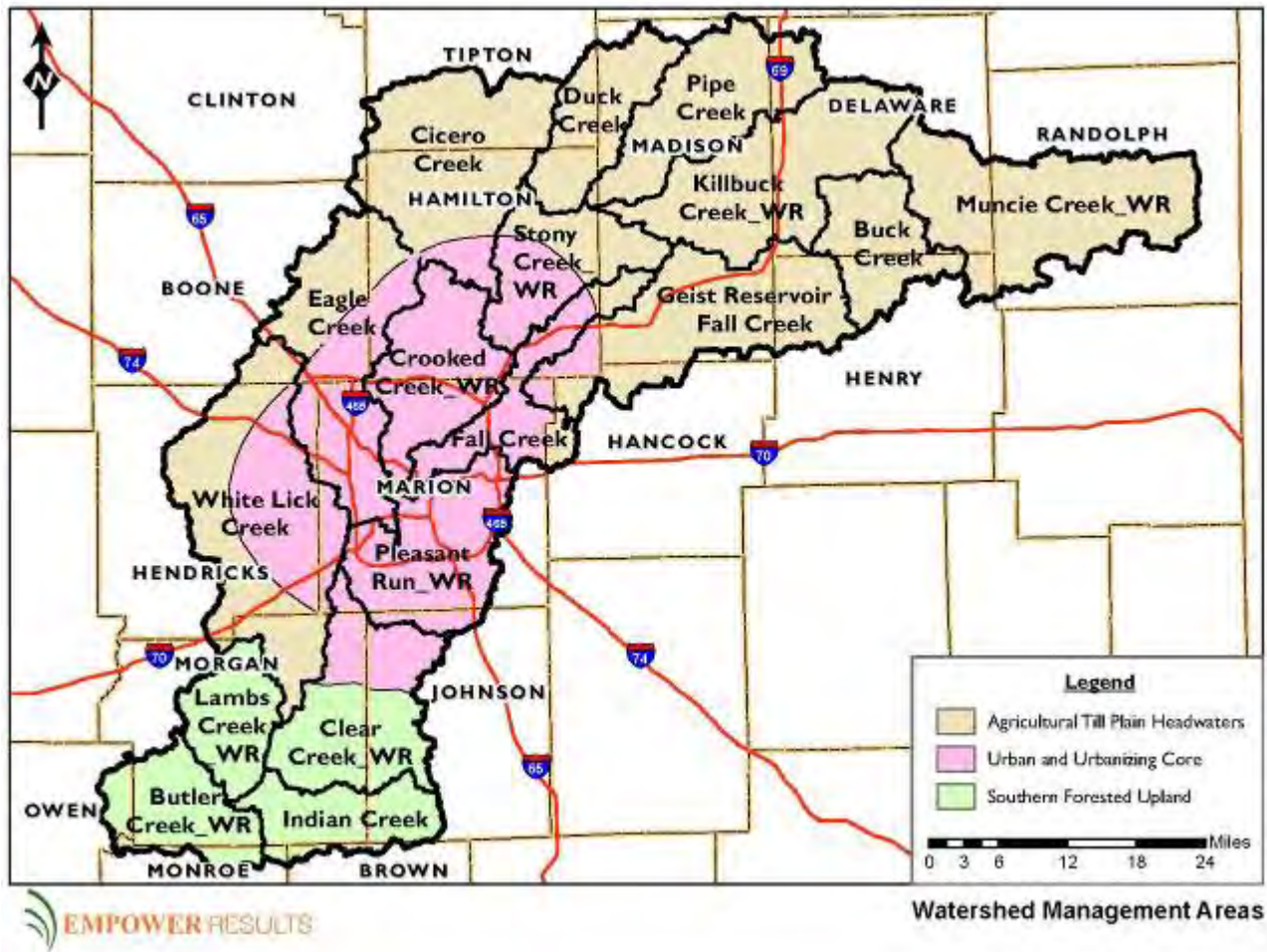


Figure 2.10 – Watershed Management Areas of the Upper White River Watershed. Agricultural Till Plain Headwaters are dominated by rural character and row crop agricultural land use; the Southern Forested Hills are forested bedrock defined hills and valleys with pastures; the Urban and Urbanizing Core is superimposed upon these land uses and dominates portions of the Southern Forested Upland.

**Table 2.7 Watershed Management Areas of the Upper White River Watershed**

<b>Watershed Management Area</b>	<b>HUC 10 Subwatershed</b>	<b>County</b>
Agricultural Till Plain Headwaters		
	Muncie Creek - White River	Randolph/ Delaware
	Buck Creek- White River	Delaware/ Henry
	Killbuck Creek - White River	Delaware/ Madison
	Duck Creek	Madison/ Tipton/ Hamilton
	Pipe Creek	Madison
	Cicero Creek	Tipton/ Hamilton
	Geist Reservoir - Fall Creek	Henry/ Madison/ Hancock
	Fall Creek (headwaters)	Madison/ Hamilton
	Stony Creek - White River (headwaters)	Madison/ Hamilton
	Eagle Creek (headwaters)	Boone
	White Lick Creek (headwaters)	Boone/ Hendricks
Urban and Urbanizing Core		
	Crooked Creek - White River	Hamilton/ Marion
	Fall Creek (downstream)	Marion
	Pleasant Run - White River	Marion/ Johnson
	Stony Creek - White River (downstream)	Hamilton
	Eagle Creek (downstream)	Marion
	White Lick Creek (downstream)	Hendricks/ Morgan
	Clear Creek - White River (headwaters)	Johnson/ Morgan
Southern Forested Hills		
	Lambs Creek - White River	Morgan
	Indian Creek	Morgan/ Johnson
	Butler Creek - White River	Morgan
	Clear Creek - White River (downstream)	Morgan/ Johnson

### **3.0 DEGRADATION ASSESSEMENT (HISTORIC WATER QUALITY DATA REVIEW)**

In order to develop an assessment of the degree of degradation of water resources in the Upper White River Watershed, baseline water quality conditions were documented and evaluated. This assessment represents the first prong of the report approach. Data collected as part of this project and utilized for the degradation assessment is included in Appendix VII.

#### **3.1 Background Research**

As part of this assessment, staff at the Center for Earth and Environmental Science (CEES) at IUPUI conducted an extensive search and collection of available literature on the White River. The bibliography contains more than 330 citations (Appendix I). Where possible, electronic copies of citations have been collected and are posted on the web at:

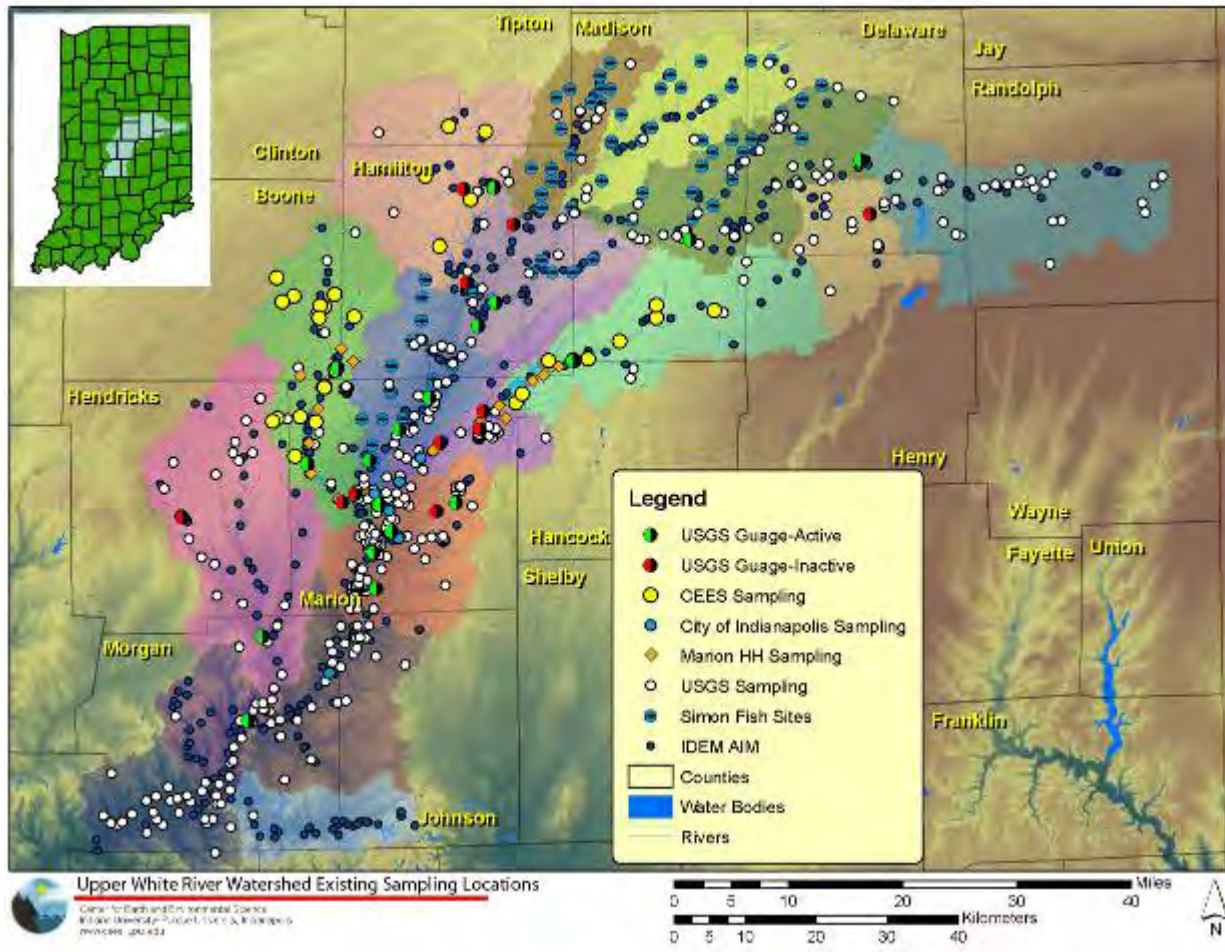
[http://www.cees.iupui.edu/Research/Water\\_Resources/IWIN/References.htm](http://www.cees.iupui.edu/Research/Water_Resources/IWIN/References.htm)

#### **3.2 Available Data Sets Inventoried & Utilized**

CEES scientists performed an analysis of existing data resources from the Upper White River Watershed. While there are extensive data sets available for water quality parameters in the watershed, most of the collected data are limited in either temporal or spatial distribution or are limited in the parameters measured. For example, the City of Indianapolis collects extensive water quality data that include a comprehensive suite of water quality parameters, have high temporal frequency and have a relatively long record. However, this data set is limited to Marion County so that it has limited value for an analysis of water quality throughout the 8-digit HUC. The USGS has collected extensive data throughout the Upper White River Watershed especially as part of the NAWQA program. These data however, are limited in temporal distribution and there are very few sites that have been monitored over a temporally significant frame. Additionally, there are a host of local water sampling efforts as well as rotational sampling by municipal and government entities.

A partial list of data available for the Upper White River Watershed includes IDEM (both fixed station data and the AIMS database), Marion County Health Department, USGS, Hendricks County, Hamilton County, and the City of Indianapolis Office of Environmental Services (OES). IDEM fixed station data provides metals, general chemicals, organics, and field data available from 1991 to present; data are irregularly reported especially until 1995. Pesticides data were collected from 2002 to 2006. Marion County Health Department offers field data, pesticides, metals, etc. for Fall Creek (1997-2007), and Upper White River (mostly 1998-2007). USGS has analyzed turbidity, conductance, dissolved oxygen, BOD, COD, pH, CO<sub>2</sub>, and carbonate compounds from early 1930s for some parameters or 1960s for others until the 1970s and 1990s. Hendricks County provides data for Nitrates (2004) and *E. coli* (2001-2007).





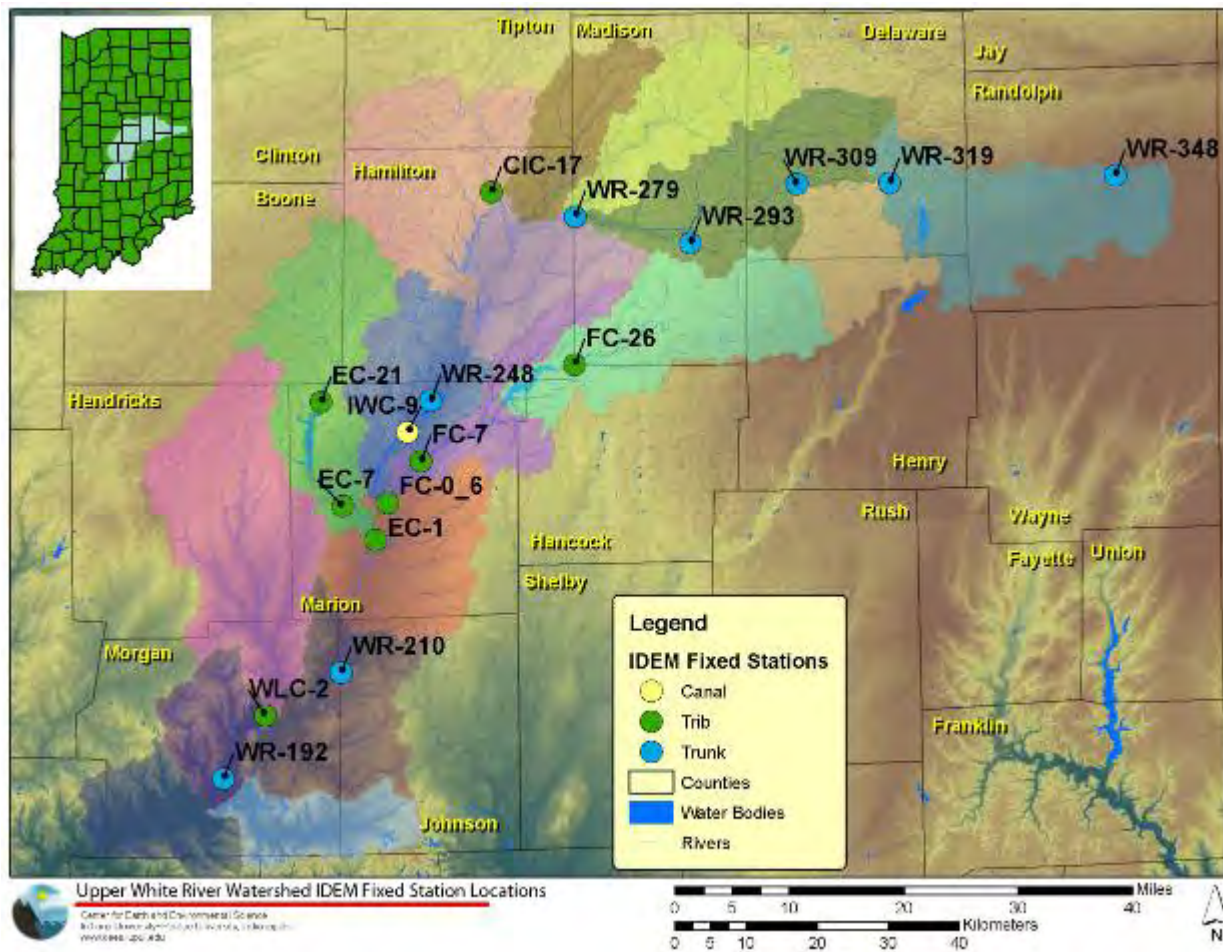
**Figure 3.1 – Existing sampling locations in the Upper West Fork of the White River Watershed, the entity that collected the data and the location of USGS gaging stations.**

After analyses of the existing data sets, the IDEM Fixed Station data set was selected for further analysis. This data set includes 17 stations distributed throughout the watershed, has been monitored continuously at each station on a monthly basis, and has maintained the site network throughout. Some stations do not have as long a temporal range as others, but overall the data set most completely meets the needs of the proposed analyses.

### 3.2.1 IDEM Fixed Station Data

The Upper White River Watershed (West Fork) includes 17 IDEM fixed station monitoring sites (Figure 3.2). For the purpose of this analysis, data from 1991-2006 or 1991-2008 was included. 1991 was selected as the earliest date because important land use changes had already occurred in the watershed giving the watershed its overall rural vs. urban land use pattern by 1991. Prior to 1991, important areas of the watershed were still in agricultural land use making the near-present land use pattern different. While the effects of land use change are important and represent a clear component of water resource planning, the goal of the analysis was to document water quality in the White River and determine where areas of special interest for water quality exist. If the data analysis included too much data prior to the current land use configuration, these patterns and trends would be masked. 1991 also marked the onset of consistent data collection at these sites. These sites have water quality samples collected on a monthly basis. Samples were not collected relative to stream stage but the high number of samples included in the

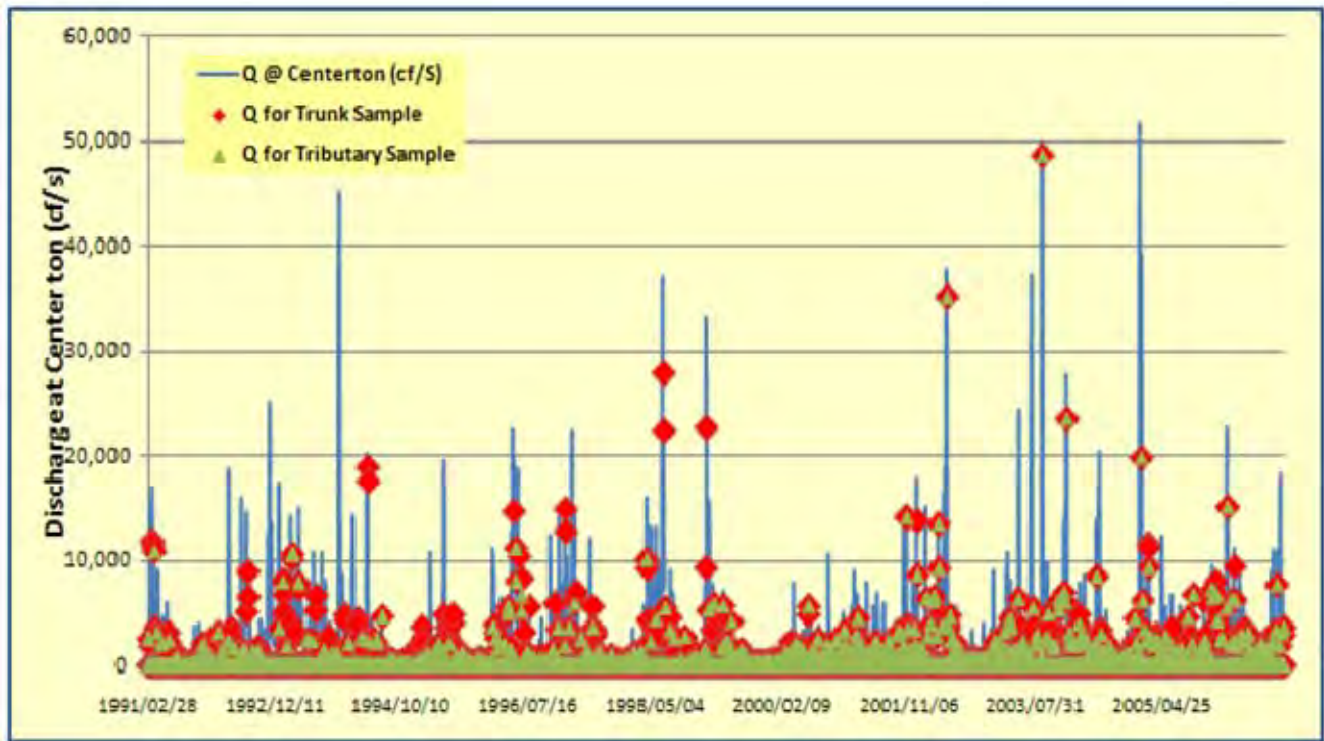
analyses (n ranges from 100 to 200 for each station) ensures that samples were collected under a wide range of stream stage and discharge (Figure 3.3) conditions. Despite the 15 year span of the data and monthly sampling frequency, the data set is still overly represented by low flow samples.



**Figure 3.2 – Location of 17 IDEM Fixed Stations utilized in the data analysis. Stations with a WR prefix are located on the White River trunk stream and are designated as trunk stations.**

IDEM fixed stations samples are not associated with discharge data making analyses of loads impossible. In an attempt to understand the distribution of samples relative to discharge, a plot of discharge versus sampling date was constructed (Figure 3.3). The USGS gage at Centerton was utilized for this assessment. The Centerton gage is on the trunk of the White River near the southern end of the watershed. Both trunk and tributary stations are plotted on this graph even though the tributary discharge is not expected to directly mirror the White River trunk at any given time especially during times of regional rainfall as is common during the summer. The plot illustrates that despite the long record of sample collection, the overwhelming majority of samples represent low or base flow conditions (Figure 3.3).





**Figure 3.3 - Mean Daily Discharge over the period 1991 – 2006, the period of analysis at the USGS stage gage at Centerton. The Centerton gage provides a long record and is in the lower reaches of the Upper West Fork of the White River on the main trunk of the river. The green and red triangles represent the sampling dates for the IDEM fixed station data.**

Fourteen of the sites have been monitored since 1991, while three sites (FC-26; CIC-17; WLC-2) were added in 1999 (Table 3.1). Parameters that were monitored and utilized in this analyses include alkalinity, total organic carbon, chemical oxygen demand, biological oxygen demand, dissolved oxygen, hardness, total Kjeldahl nitrogen, nitrate+nitrite, pH, total phosphorus, total suspended solids, turbidity, and iron. The total number of sample analyses for each site and each analyte are shown in Table 3.2.

**Table 3.1 IDEM Fixed Station Sites, Location, Measured Parameters, and Data Ranges**

<b>IDEM Site</b>	<b>Site HUC10 Subwatershed</b>	<b>County</b>	<b>Parameters</b>	<b>Data Time Ranges</b>
WR-348	Muncie Creek - White River	Randolph	Alkalinity, Total Organic Carbon (TOC), Chemical Oxygen Demand (COD), Biological	1991-2008
WR-319	Muncie Creek - White River	Delaware		1991-2008
WR-309	Killbuck Creek - White River	Delaware		1991-2008
WR-293	Killbuck Creek - White River	Madison		1991-2008
WR-279	Killbuck Creek - White River	Madison		1991-2008
WR-248	Crooked Creek - White River	Marion		1991-2008



WR-210	Clear Creek - White River	Morgan	Oxygen Demand (BOD), Dissolved Oxygen (DO), Total Hardness, Total Kjeldahl Nitrogen (TKN), Nitrite + Nitrate, pH, Total Phosphorus (TP), Total Suspended Solids (TSS), Turbidity, Iron	1991-2008
WR-192	Lambs Creek - White River	Morgan		1991-2008
EC-21	Eagle Creek	Marion		1991-2008
EC-7	Eagle Creek	Marion		1991-2008
EC-1	Eagle Creek	Marion		1991-2008
FC-26	Geist Reservoir - Fall Creek	Hamilton		1999-2008
FC-7	Fall Creek	Marion		1991-2008
FC-0.6	Fall Creek	Marion		1991-2008
CIC-17	Cicero Creek	Hamilton		1999-2008
WLC-2	White Lick Creek	Morgan		1999-2008
IWC-9	Indianapolis Water Canal	Marion		1991-2008

**Table 3.2 Sample Size for Stations and Parameters Utilized in Statistical Analyses of IDEM Fixed Station Data.**

	Alkalinity	TOC	COD	DO	Hardness	TKN	NO2+NO3	pH	Total P	TSS	Turbidity	Fe	TBOD5
WR-348	194	148	206	195	206	204	206	204	206	205	141	206	102
WR-319	205	148	206	195	206	147	205	204	206	204	140	149	101
WR-309	205	153	206	195	306	204	205	204	206	204	145	154	101
WR-293	208	150	209	195	209	206	208	207	209	207	141	151	102
WR-279	209	149	210	194	210	153	208	208	208	206	144	155	100
WR-248	211	152	211	202	212	153	211	210	211	211	148	154	104
WR-210	211	153	212	199	211	207	212	208	212	211	149	211	101
WR-192	212	153	211	201	212	148	211	209	211	212	149	156	102
EC-21	207	152	208	199	208	152	208	206	207	207	148	155	104
EC-7	207	151	209	198	208	209	209	206	208	207	148	155	102
EC-1	206	152	207	195	207	207	207	205	206	206	148	156	102
FC-26	111	113	113	114	112	111	112	110	113	111	111	113	NONE
FC-7	209	152	210	200	210	153	210	208	209	209	147	155	103
FC-0.6	204	153	207	197	207	207	207	204	206	205	148	156	101
CIC-17	111	110	112	113	112	112	111	109	111	109	109	112	NONE
WLC-2	118	118	118	118	118	113	118	115	118	118	118	118	NONE
IWC-9	209	153	211	201	210	211	211	208	210	209	148	210	104

Monitoring stations are distributed along the trunk of the White River beginning in the headwaters in Randolph County and extending from Randolph County through the watershed to a southernmost site in Morgan County near the southern terminus of the watershed. Of the seventeen sites, eight sites are located on the White River trunk; and eight sites are distributed along tributary streams. Three sites are

on the Eagle Creek tributary (EC21, EC7, and EC1), three sites are on Fall Creek tributary (FC26, FC7, FC0.6), 1 site is on Cicero Creek tributary (CC17), and one is on White Lick Creek tributary (WLC1). Station numbers refer to stream miles from a confluence, thus tributary site designations provide information about site location upstream from the confluence with the White River, while White River trunk site station numbers represent distance from the White River confluence with the Wabash River. Thus, higher WR designations are upstream stations. One site (IWC-9) is located on the Broad Ripple Canal and has been designated as a canal station since data interpretation is affected by the site location.

Utilization of IDEM Fixed Station data, while providing a fairly comprehensive data set for documentation of baseline conditions throughout the watershed, had significant challenges for the purposes of this analysis. A stated goal was to identify hot-spots of water quality degradation on a subwatershed basis so that targeted solutions could be developed. The location of the IDEM sampling stations were selected for different purposes so that they occur along downstream gradients without reference to subwatershed contributing areas on either the 10 or 12-digit HUC scale. As a result, analysis of water quality cannot be effectively tied back to contributing areas on a subwatershed basis. Additionally, some subwatersheds are not represented in the data set. Table 3.3 describes each IDEM sampling station location, contributing drainage area, and contributing subwatersheds that are represented for each sample. In addition to the sampling station information provided in Table 3.3, the following subwatersheds were not sampled separately so that their contribution to water quality cannot be assessed: Buck Creek, Pipe Creek, Killbuck Creek, Duck Creek, Crooked Creek-WR, Stony Creek-WR, a portion of Cicero Creek, and Pleasant Run-WR. Indiana Creek and Butler Creek-WR were not sampled at all so they could not be assessed either.

**Table 3.3 IDEM Fixed Stations Site Location, Contributing Subwatersheds and Contributing Drainage Areas. USGS Gage numbers are provided for stations in close proximity to a gaging station.**

<b>IDEM Site #</b>	<b>UTM Easting</b>	<b>UTM Northing</b>	<b>Subwatershed(s) Drained to Station</b>	<b>Contributing Area (mi<sup>2</sup>)</b>	<b>Contributing Area (Km<sup>2</sup>)</b>	<b>USGS Gage</b>
<b>TRIBUTARY</b>						
CIC-017	585095.5	4447598	Portion of Cicero Creek	131.13	339.63	USGS 03349510
EC-021	561054.6	4418042	Eagle Creek Upstream Reservoir	173.89	450.36	USGS 03353500
EC-007	564169.6	4403414	Eagle Creek Downstream Reservoir	117.56	304.49	
EC-001	568844.6	4398685	Eagle Creek Confluence with WR	210.23	544.49	
FC-026	596782.6	4423316	Fall Creek Upstream Reservoir	172.59	447.02	USGS 03351500
FC-007	575136.5	4409740	Fall Creek Downstream Reservoir	309.21	800.84	
FC-000.6	570492.8	4403856	Fall Creek Confluence with WR	321.19	831.89	
WLC-002	553272.9	4373958	White Lick Creek Confluence with WR	288.19	746.41	
<b>CANAL</b>						
IWC-009	573295.7	4413826	IWC Canal (Broad Ripple) and all above WR248	1235.06	3198.79	

## WR TRUNK

IDEM Site #	UTM Easting	UTM Northing	Subwatershed(s) Drained to Station	Contributing Area (mi <sup>2</sup> )	Contributing Area (Km <sup>2</sup> )	USGS Gage
WR-192	547381.2	4365072	Most of Lambs Creek-WR (not Lambs Creek) + Clear Creek-WR + White Lick Creek + WR210 drainage	2484.80	6435.60	
WR-210	563921.6	4379959	Half of Clear Creek-WR + Pleasant Run – WR + Eagle Creek + Fall Creek + WR 248 (WR upstream of Johnson/Morgan County line (downstream Indianapolis))	2019.66	5230.88	
WR-248	576494.3	4418192	Half of Crooked Creek-WR + Stony Creek-WR + Cicero Creek + Duck Creek + Pipe Creek + WR 279 (all WR upstream of 86th St; includes some Indianapolis)	1215.70	3148.66	USGS 03351000
WR-279	596872.3	4444163	All of Killbuck Creek-WR + all upstream subwatersheds (includes Anderson)	551.23	1427.69	
WR-293	613116.6	4440440	Half of Killbuck Creek-WR + Buck Creek-WR + Muncie Creek-WR	406.19	1052.02	USGS 03348000
WR-309	628133	4448698	Muncie Creek - WR + small portion of Killbuck Creek (includes Muncie)	248.33	643.16	
WR-319	641141.9	4448868	Muncie Creek - WR	225.44	583.89	
WR-348	672919.4	4449960	Near headwaters Muncie Creek - WR	33.94	87.90	

### 3.2.2 CIWRP-Veolia Water Indianapolis, LLC. Data

The Upper White River Watershed serves as an important source for drinking water with 75% of the drinking water for the more than 1 million central Indiana residents coming from surface water. As such, this analysis has included documentation of atrazine in the Eagle Creek reservoir and in a portion of the White River trunk stream. Data comes from research conducted by the Central Indiana Water Resources Partnership and Veolia Water Indianapolis, LLC. and is reported as total triazines.

### 3.3 Data Analysis Methods

Water quality monitoring data was analyzed for station to station variability utilizing a variety of 2D statistical measures. Three different statistical indicators were chosen to time-average each water quality variable at each site: mean, median, and trimmed mean. Different statistical indicators were examined to determine the most suitable measures for the data set. The apparent advantage of the mean lies in the fact that it contains all of the information about all of the data; however, this can also be a disadvantage when large outliers skew the true value of a data point. Thus, the apparent advantage to the median can be attributed to their robustness to outliers. The trimmed mean is considered semi-robust since it removes the largest and smallest values (for this study 5% of the data at each extreme was removed), and takes the mean of the remaining data.

Accounting for the values of observations below the detection limit was an issue in calculating the different statistical indicators. While there is merit in generating data for below detection values utilizing regression on order statistical methods, in this study a value of one-half the detection limit was substituted for below detection values.

Box plots were constructed that show the median (center of the frequency distribution), mean (average of all values), the 25<sup>th</sup> and 75<sup>th</sup> percentile values as boxes, the 5<sup>th</sup> and 90<sup>th</sup> percentiles (as lines), and outlier values (as circles). The number of values included in the analysis is shown on each plot.

To further identify watershed locations and water quality parameters of interest, percent exceedence values were calculated for each station and each parameter over the 15 or 17 years of the study period. Percent exceedence was calculated against a published water quality benchmark. For each station, the number of times a sample exceeded the benchmark criteria for a given parameter was calculated. This measure provides information about the frequency of water quality impairments but is limited in that it does not provide information about the level of exceedence or impairment. This analysis allows for an evaluation of overall water quality relative to ecological, and in some cases, regulatory compliance. Taken with time-averaged statistical indicators of mean, median, and trimmed means, a picture emerges of the watershed areas of concern and the water quality parameters of concern in the Upper White River basin as possible given the limitations of the sample site locations.

To aid with the visualization of water quality in the basin, maps were constructed using GIS to display the spatial distribution of time-averaged values.

Multivariate statistical analyses were also performed and included principal component analyses and cluster analyses to try to identify if there were groupings of either water quality parameters that characterized the sites, or sites that clustered together because of similarity. The first step included calculating the trimmed means of all available data for the 17 IDEM fixed station sites occurring in the Upper White River Watershed for all available water quality parameters. This data was inserted into the PAST statistical analysis software in order to run the Shapiro-Wilk test for normality for each water quality parameter. All parameters were determined to be normal ( $p(\text{normal}) > 0.05$ ) and there was no need to transform any of the data before inserting them into the SAS statistical analysis software. Principle Component Analysis (PCA) was run in the SAS software and all parameters that were confounding results including specific conductance, temperature, chloride, and sulfate were removed. *E. coli* and ammonium were also removed due to lack of quality data (i.e. *E. coli* very sparse and highly variable data and ammonium was almost always below the detection limit). TBOD5 and total dissolved solids data were not available for inclusion. In the end, PCA analysis was run with a separation of four factors based on alkalinity, total organic carbon, chemical oxygen demand, dissolved oxygen, hardness, total Kjeldahl

nitrogen, nitrite + nitrate, pH, total phosphorus, total suspended solids, turbidity, and iron. Water quality parameters grouped well according to expected flow pathways and contaminant sources. K-mean cluster analysis was run with SAS software and by comparing cubic clustering criterion (CCC) values, it was determined that 3 clusters was ideal for this collection of data. Each site was assigned to a cluster and these assignments were then mapped on ArcGIS software.

### **3.4 Water Quality Parameters and Benchmarks**

#### *3.4.1 Turbidity*

Turbidity is a measure of water transparency and is measured by reflectance of light. Turbidity is affected by particles in the water that reflect or absorb light. These are commonly algae and other suspended sediments. Levels of Turbidity greater than 10.4 NTU (Nephelometric Turbidity Units) exceed the EPA recommended water quality limits (USEPA, 2000).

#### *3.4.2 Total Suspended Sediment*

Total Suspended Solids (TSS) are comprised of organic and mineral particles that are transported in suspension in the water column. TSS is closely linked to erosion of land and to instream erosion of river channels. It is a physical measure of the concentration of materials collected on a filter and reported in mg/L. TSS is not only an important measure of erosion in river basins, but is also closely linked to the transport of nutrients (especially phosphorus), metals, and a wide range of industrial and agricultural chemicals. Its concentration varies widely related to discharge. There are no state water quality criteria or guidelines for TSS; however Waters (1995) identified 50 mg/L TSS as a guideline above which is harmful to aquatic life.

#### *3.4.3 Escherichia coli (E. coli)*

Of particular concern to recreational waters is fecal contamination and the associated risks to human health. *Escherichia coli* (*E. coli*) is a bacterium commonly used as an indicator of water quality for freshwaters. *E. coli*'s natural habitat is the intestinal tract of warm-blooded animals, and although typically non-pathogenic, its presence in water indicates fecal contamination and the potential for waterborne disease (University of Vermont, 2010).

The presence of *E. coli* in surface waters is typically attributed to fecal contamination from agricultural and urban/residential areas. However, variation in *E. coli* concentrations from site to site and the contribution of human vs. agricultural sources or natural sources are not readily understood (University of Vermont, 2010). The concentration of *E. coli* in surface water depends on the runoff from various sources of contamination and is thus related to the land use and hydrology of the contributing watersheds as well as uncontrolled and untreated sewage discharge.

The EPA recommended recreational water quality standard for *E. coli* is based on two criteria: 1) a geometric mean of 125 organisms/100 ml based on several samples collected during dry weather conditions or 2) 235 organisms/100 ml for any single water sample (EPA 1986). The current EPA water quality standard for *E. coli* corresponds to approximately 8 gastrointestinal illnesses per 1000 swimmers (Dufour 1984). Indiana Administrative Code (IAC Title 327) utilize these same criteria uses 235 colonies/100 mL in any one sample within a 30 day period or geometric mean of 125 colonies per 100 mL for five samples collected in any 30 day period. These standards are in effect to protect human health for full body recreational contact.

The IDEM Fixed Station data set shifted the method used to measure *E. coli* and reporting. From 1991-1999 data is reported as colony forming units (CFU)/100 ml. From 2000 onward, the data is reported as

most probably number (MPN). Theoretically, there should not be any difference in the results with the change in units. However, in this report, the data have been analyzed separately.

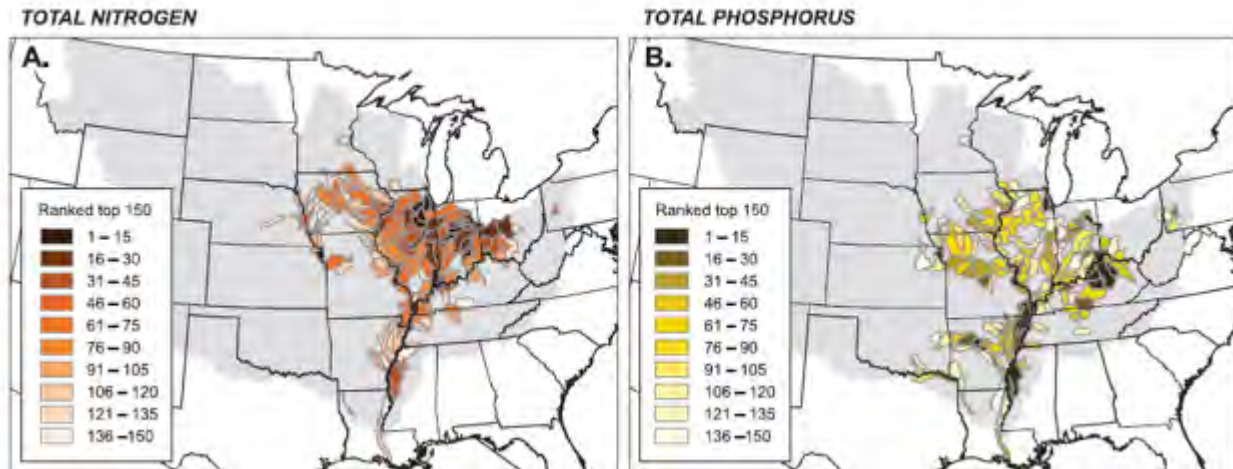
#### 3.4.4 *Atrazine*

The four reservoirs (Prairie Creek, Eagle Creek, Morse, and Geist) in the Upper West Fork White River Watershed are all designated as drinking water resources. Of these reservoirs, Eagle Creek Reservoir is the only reservoir that has a drinking water intake directly in the reservoir. The White River also serves as a drinking water supply for central Indiana. The Central Indiana Water Resources Partnership (CIWRP) and Veolia Water Indianapolis, LLC., have detailed atrazine data so that analyses for atrazine has been included in this assessment. Eagle Creek subwatershed has been characterized for atrazine and benchmarked against the number of times they exceed the US EPA Primary Drinking Water Standard Regulations of 3 ppb. The Eagle Creek Watershed Alliance uses 3 ppb as a benchmark to indicate the level of treatment that might be required by the drinking water treatment systems and not as a measure of raw water stream compliance. This assessment will do the same. US EPA also has guidance for aquatic life and has set 17.5 ppb as the Chronic Aquatic Community Life Guideline and 18 ppb as an Acute Toxicity for Vascular Plants (USEPA. OPP).

These data document the importance of targeted BMP implementation for atrazine management in the watershed. A significant challenge to implementation of BMPs for atrazine comes from the fact that atrazine moves via both overland and tile drainage flow. The BMP toolbox that is available to watershed managers contains a paucity of BMPs that are effective at managing dissolved loads being sourced from tile drains.

#### 3.4.5 *Nutrients*

Nutrients are an important component of water quality in the Upper White River Watershed (UWRW). In fact, recent SPARROW modeling by the USGS has identified the Upper West Fork White River Watershed as a leading contributor of both nitrogen and phosphorus to the Gulf of Mexico and the hypoxia problems there (Robertson et al., 2009). These models rank the 818 HUC 8 watersheds in the Mississippi drainage basin relative to their contribution of nitrogen and phosphorus. These rankings place the UWRW 30<sup>th</sup> of 818 HUC 8 watersheds for nitrogen export and 91<sup>st</sup> for phosphorus (Figure 3.4). They also further attribute only 27.5% of the nitrogen load to urban sources further supporting research data that shows agricultural land use as the primary contributor to nitrogen runoff to streams (Robertson et al., 2009). In contrast, Robertson et al. (2009) attribute 49.9% of the incremental yield of phosphorus to urban sources making managing phosphorus runoff a more complex issue.



**Figure 3.4 - USGS SPARROW model results ranking 8-digit HUC watersheds of the Mississippi Basin based on contribution of nutrients to the Gulf of Mexico (Robertson et al., 2009).**

### Total Nitrogen, Nitrate, and TKN

Nitrogen is an essential nutrient for plant growth and both total N and nitrate are important monitoring parameters. Total Nitrogen includes both inorganic and organic forms of N and may be particulate or dissolved. Nitrate is the primary form of inorganic dissolved nitrogen. The other form of inorganic nitrogen, nitrite is rarely found above detection limits in surface waters. Organic forms of nitrogen are measured as Total Kjeldahl Nitrogen (TKN). TKN is the sum of organic nitrogen, ammonia ( $\text{NH}_3$ ) and ammonium ( $\text{NH}_4^+$ ), as well as a suite of humic and fulvic acids from the breakdown of organic forms of nitrogen, especially plants. In this analysis, Nitrate + Nitrite, TKN, ammonia, and Total N are all evaluated. Total N is represented by the sum of nitrate, nitrite and TKN and therefore provides a complete accounting for both organic and inorganic nitrogen in watershed streams.

### Nitrate

Nitrate is widely known to be especially sourced from agricultural land use, especially row crop agriculture. It has also been shown that the highest nitrate loads are associated with event flows and tile drainage (Wagner et al., 2008; Baker et al., 2006). There are several benchmarks for nitrate that were utilized when evaluating nitrate loads in the Upper White River Watershed. These include the IAC and Drinking Water Standard of 10/mg/L, the EPA Nutrient Criteria (2000) for the ecoregion that includes the Upper White River Watershed of 1.6 mg/L, and the average value of stream nitrate for watersheds that are 50-75% agriculture of 2.75 mg/L (Omernik, 1977). Note the EPA nutrient criterion is for nitrate + nitrite. In this study a very high percentage of samples have nitrite concentrations below detection limit thus the nitrate+nitrite indicator is driven by nitrate concentrations.

### Total Nitrogen

Total Nitrogen patterns are also indicative of the high levels of nutrient loading in Upper White River Watershed streams. The USEPA criterion for total nitrogen is 2.0 mg/l for nutrient ecoregion 55b (USEPA, 2000). Another important benchmark for comparison is the boundary between mesotrophic and eutrophic streams. For total nitrogen, 1.5 mg/L is the boundary (Dodd et al., 1998). Finally, the national average total nitrogen concentration for agricultural watersheds with between 50% and 75%

agricultural land use is 2.75 mg/L (Omernik, 1977). Total nitrogen is an important component of the nutrient balance of the stream and reservoirs in the Upper White River Watershed.

#### Total Kjeldahl Nitrogen (TKN)

TKN provides a measure of organic forms of nitrogen. Organic nitrogen includes nitrogen found in plants and animal materials, and includes proteins, peptides, nucleic acids and urea. In the analytical procedures, Total Kjeldahl Nitrogen (TKN) determines both organic nitrogen and ammonia. The USEPA criterion for TKN is 0.4 mg/L for nutrient ecoregion 55b (USEPA 2000).

#### Phosphorus as Total Phosphorus

Total Phosphorus is monitored because of its importance as an essential nutrient for plant growth. Excessive phosphorus is problematic for both streams and the four reservoirs where nuisance algal blooms have led to recreational usage advisories as well as ongoing taste and odor issues for the drinking water supply. There are three benchmarks that were utilized for comparative purposes. The EPA nutrient criterion for nutrient ecoregion 55b is 0.0625 mg/L (EPA, 2000). The mesotrophic/eutrophic boundary for streams is 0.07 mg/L (Dodd et al., 1998). The national average total P concentration for watersheds with 50%-75% agricultural land use is 0.125 mg/L (Omernik, 1977).

#### 3.4.6 *Chemical Oxygen Demand*

The chemical oxygen demand (COD) test is used to indirectly measure the amount of organic compounds in water. Most applications of COD determine the amount of organic pollutants found in surface water, making COD a useful measure of water quality. It is expressed in milligrams per liter (mg/L), which indicates the mass of oxygen consumed per liter of solution (Sawyer et al., 2003; Clerscerl, et al., 1999).

#### 3.4.7 *Biochemical Oxygen Demand (5 Day)*

Biochemical oxygen demand (BOD) is a chemical procedure for determining the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a water sample. It is not a precise quantitative test, but is widely used as an indication of the organic quality of water (Sawyer, et al., 2003). It is most commonly expressed in milligrams of oxygen consumed per liter of sample during 5 days of incubation at 20°C and is used as an indicator of the degree of organic pollution.

BOD can be used as a gauge of the effectiveness of wastewater treatment plants. Most pristine rivers will have a 5-day carbonaceous BOD below 1 mg/L. Moderately polluted rivers may have a BOD value in the range of 2 to 8 mg/L. Municipal sewage that is efficiently treated by a three-stage process would have a value of about 20 mg/L or less. Untreated sewage varies, but averages around 200 mg/L (Sawyer et al., 2003; Clerscerl, et al., 1999).

### **3.5 Trends and Discussion**

The following are summaries of notable water quality observations from the IDEM fixed station data. The information is presented as a series of observations related to the complete set of analyses undertaken. Where possible, land use relationships are incorporated. A significant problem with the dataset however, is that very few stations sampled individual 10 digit HUCs. Instead, most sample stations amalgamated several subwatersheds and portions of watersheds. Thus any hotspot analyses are difficult. It should be noted however, that for many water quality parameters evaluated in the data set, the most notable feature is how poor the water quality actually is. As a result, a major outcome of this analysis is documenting and reporting on the concentrations of many standard water quality parameters throughout



the Upper White River Watershed over the period 1991-2006 or 2008. These data sets are rich and have a relatively high number of samples incorporated into each analysis. Thus, it is a robust dataset, albeit one that over represented low flow conditions.

### 3.5.1 2D Statistical Measures

#### 3.5.1.1 Turbidity (10.4 NTU as benchmark) – Figures 3.5 and 3.6, Table 3.4

- a. Areas upstream of urban influence have the highest outlier values indicating high flow events captured significant instream turbidity
- b. Median turbidity in upstream agricultural areas – (above WR293) are below EPA target concentrations however, outliers are very high (up to 800 NTU)
- c. Median turbidity in urban areas - WR248 and downstream are also above the EPA target concentrations. Outliers are still high but not as high as agricultural areas upstream
- d. Tributary sites medians are at or below EPA target concentrations
- e. Percent exceednce above USEPA target of 10.4 NTU – all stations (except WR348 – extreme headwaters) exceed target concentration more than 50% of times sampled.
- f. Trimmed means identify White Lick Creek and Cicero Creek (upstream of Morse Reservoir) as tributary samples with high turbidity
- g. Analyses indicate that significant areas of the Upper White River suffers from very high turbidity, well above EPA guideline values indicating that sediment is a problem in the watershed. High outlier turbidity values are attributable to sampling during high flow events; their concentration in agricultural areas relative to urban areas indicates that soil loss from agricultural areas continues to be a challenge. Headwater subwatersheds continue to have streams that lack effective buffers, however the use of extensive soil conservation practices in Indiana agricultural areas without mitigated effects may be an indicator that it is instream (ditch) erosion and even regulated drain maintenance that is contributing turbidity in the UWRW.

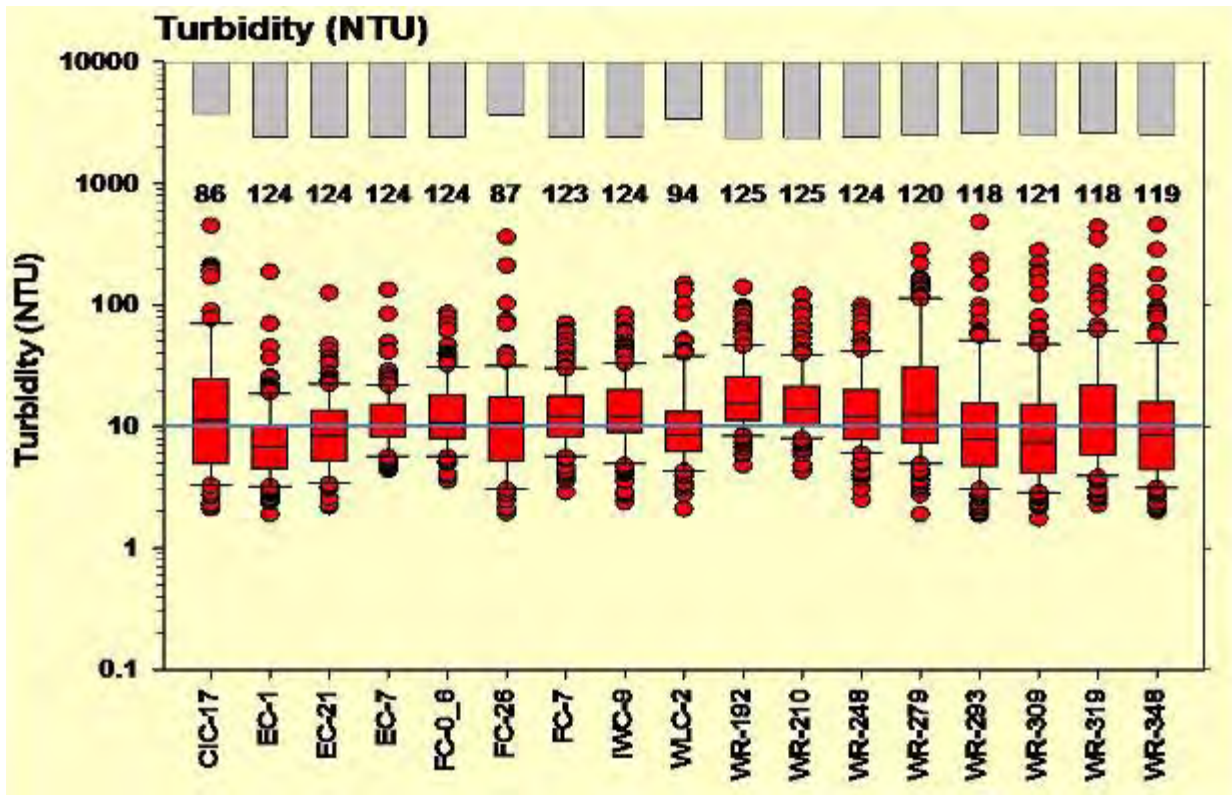


Figure 3.5 – Box and whisker plots of turbidity (NTU) for IDEM fixed station data from 1991-2006. Box represents 25th-75th percentile; line in box is median value; lines are 5th and 9th percentile values; dots are outliers. Grey bars are the number of values utilized in the analyses with number shown below the bars. Blue line is reference NTU of 10.4 NTU.

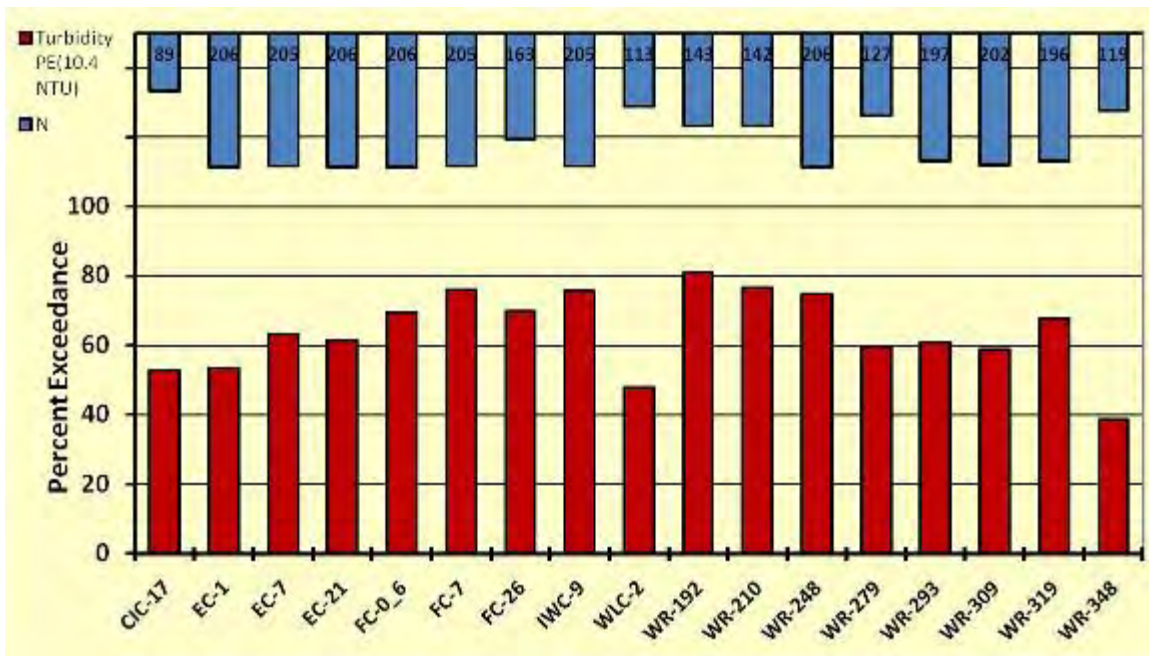


Figure 3.6 – Percent exceedance for turbidity samples utilizing 10.4 NTU as the benchmark value. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 1991-2008. Tributary samples to the left and trunk stations to the right with samples going from south to north.

**Table 3.4 Trimmed Means for each analyte and site.**

Values significant to data interpretation have been bolded.

Station	Alkalinity	TOC	COD	DO	Hardness	TN	NO <sub>x</sub> -NO <sub>3</sub>	pH	Phosphorus	TSS	Turbidity	Iron
WR-898	242.59	8.89	18.88	10.18	312.20	0.37	2.84	8.09	0.09	14.87	16.09	0.81
WR-519	235.10	5.54	13.98	9.20	302.51	0.36	1.82	8.03	0.10	17.87	17.77	0.82
WR-309	244.16	4.12	14.93	9.41	331.27	0.85	3.27	7.98	0.35	13.80	13.36	0.43
WR-293	255.21	3.41	12.18	9.76	325.71	0.82	2.37	8.07	0.20	16.38	12.32	0.48
WR-279	248.49	3.73	15.80	9.84	328.77	0.72	2.88	8.10	0.28	23.21	27.08	0.78
WR-240	231.12	3.73	14.35	9.84	314.81	0.75	2.30	8.04	0.28	18.08	16.22	0.63
WR-210	225.50	4.98	20.32	9.58	310.99	1.23	3.53	7.85	0.46	26.07	18.89	0.71
WR-192	222.23	4.98	19.78	9.88	303.33	1.89	3.17	8.01	0.38	33.49	22.08	0.83
FC-21	227.16	8.80	12.87	10.03	310.20	0.80	3.45	7.97	0.10	17.36	10.33	0.57
FC-7	183.24	3.73	14.38	10.83	244.43	0.85	1.83	7.95	0.05	11.43	11.98	0.38
FC-1	198.81	4.34	18.82	10.81	278.54	0.98	2.82	8.00	0.13	8.98	8.93	0.38
FC-26	258.52	2.67	8.94	9.22	344.39	0.45	2.43	8.07	0.07	15.25	14.78	0.57
FC-7	188.21	3.88	15.31	9.88	248.85	0.89	1.18	8.04	0.08	14.95	14.29	0.45
FC-0.6	208.41	3.80	16.80	10.14	277.17	0.81	1.43	8.03	0.11	18.75	18.61	0.48
CIC-17	218.45	4.88	12.80	9.87	311.01	0.66	5.87	8.05	0.08	12.71	21.85	0.51
WLC-2	238.39	3.12	12.82	10.24	307.88	0.37	2.88	8.18	0.20	28.80	17.38	0.84
FWC-9	228.34	3.72	14.52	9.85	310.42	0.79	3.20	8.01	0.26	16.97	14.99	0.56

3.5.1.2 Total Suspended Solids (50 mg/L deleterious to aquatic life) – Figures 3.7 and 3.8, Table 3.4

- a. Tributaries with elevated trimmed means and percent exceedence include downstream Fall Creek (FC0.6) and White Lick Creek (WLC2), both urban or urbanizing areas
- b. Trunk sites with elevated trimmed means and percent exceedence (>5%) include WR319 (draining Muncie Creek-WR and upstream, WR 293 (draining upstream agricultural areas), WR279 (draining Killbuck Creek subwatershed and upstream), WR210 (downstream of city of Indianapolis below Pleasant Run), and WRI92 (below White Lick Creek), CIC17 (Cicero Creek) and WL2 (confluence of White Lick Creek and White River).
- c. Sites with elevated TSS and Turbidity trimmed means – WR279 (draining Killbuck Creek subwatershed and upstream), WR210 (downstream of city of Indianapolis below Pleasant Run), and WRI92 (below White Lick Creek)
- d. Sites with elevated trimmed means for both TSS and turbidity identify sites with urban and urbanizing influences. Trimmed means by definition remove the outlying 5% of the data so that sites with very high outliers will be removed. Therefore, this measure identifies urban areas as having habitually high TSS and turbidity. These contaminants are likely sourced from instream erosion, construction runoff, and stream adjustment and downcutting from stormwater volume increases.

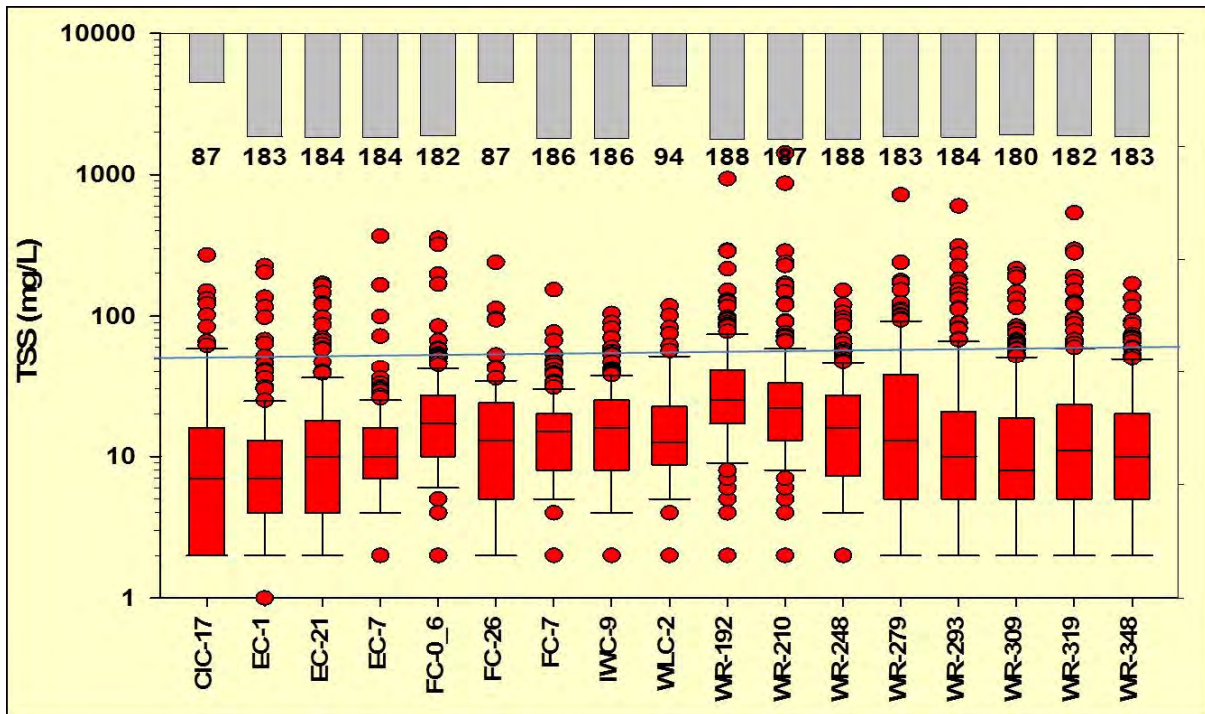
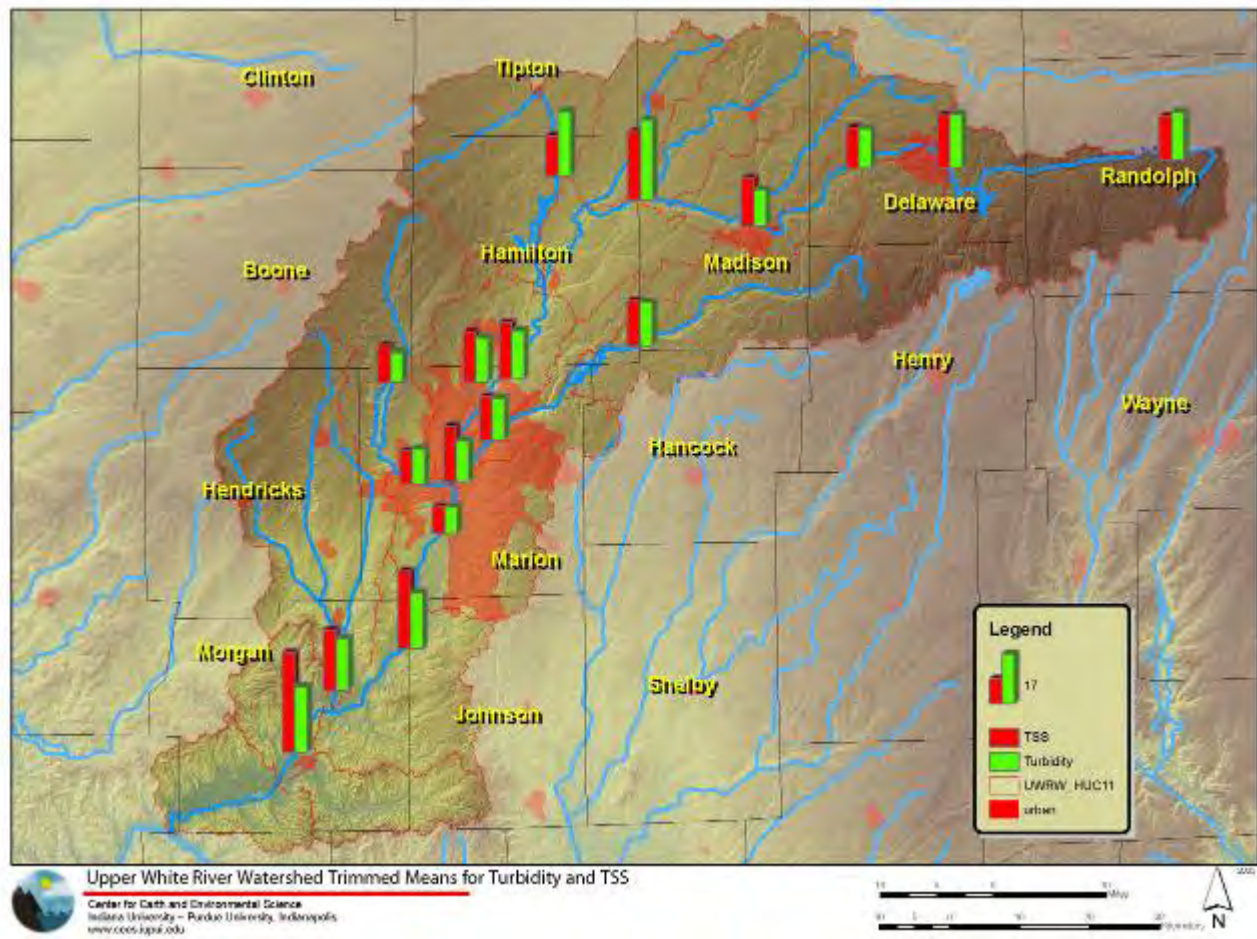


Figure 3.7 - Box and whisker plots of total suspended solids (TSS in mg/L) for IDEM fixed station data from 1991-2006. Box represents 25<sup>th</sup>-75<sup>th</sup> percentile; line in box is median value; lines are 5<sup>th</sup> and 9<sup>th</sup> percentile values; dots are outliers. Grey bars are the number of values utilized in the analyses with number shown below the bars. Blue line is reference TSS of 50 mg/L which is a benchmark for deleterious effects for aquatic life (Waters, 1995).





**Figure 3.8 – Graphical representation of trimmed means for turbidity (NTU) and TSS (mg/L) showing the spatial distribution of sites with elevated trimmed means for both TSS and turbidity.**

3.5.1.3 *E. coli* – 235 cfu/100 mL – full body recreational contact (IAC) - Figures 3.9 and 3.10, Table 3.4

- a. Median *E. coli* – tributaries with exceedances >50% of times sampled – Eagle Creek in area downstream of reservoir to the confluence with White River (EC1) and Fall Creek downstream of the reservoir between FC7 and confluence with White River (FC0.6). Both of these are CSO stream reaches.
- b. WR Trunk sites with exceedances >50% of times sampled – Muncie Creek-WR headwaters (WR348), WR downstream of Muncie (WR309), and White River downstream of the City of Indianapolis (WR210). Stations WR309 and WR210 are both capturing CSO stream reaches.
- c. CSO effects are readily identified in IDEM fixed station data. One area is of note. The headwaters area in Randolph County where elevated *E.coli* is not CSO related. This area has a high concentration of CFO's that may be a cause however, unsewered or failing septic communities are also potential causes as are septage waste sites.

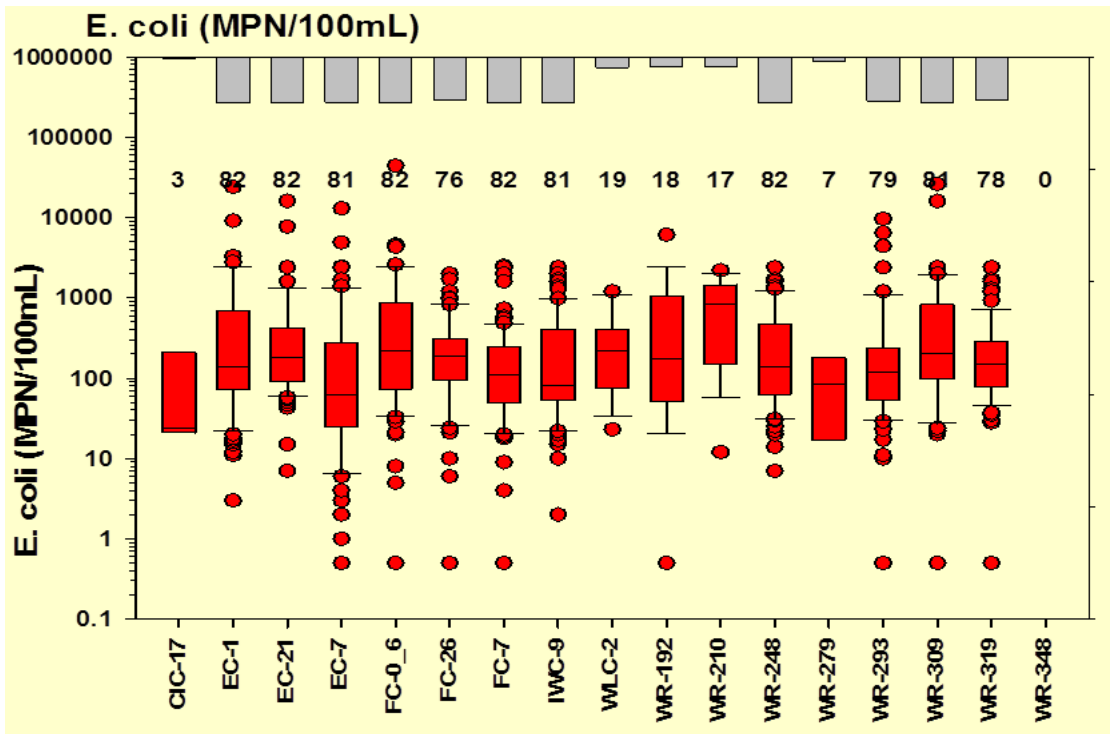


Figure 3.9 - Box and whisker plots of *E. coli* (in MPN/100 mL) for IDEM fixed station data from 2000-2006. Box represents 25<sup>th</sup>-75<sup>th</sup> percentile; line in box is median value; lines are 5<sup>th</sup> and 9<sup>th</sup> percentile values; dots are outliers. Grey bars are the number of values utilized in the analyses with number shown below the bars. *E. coli* reference is 235 MPN/100 mL which is a benchmark full body contact.

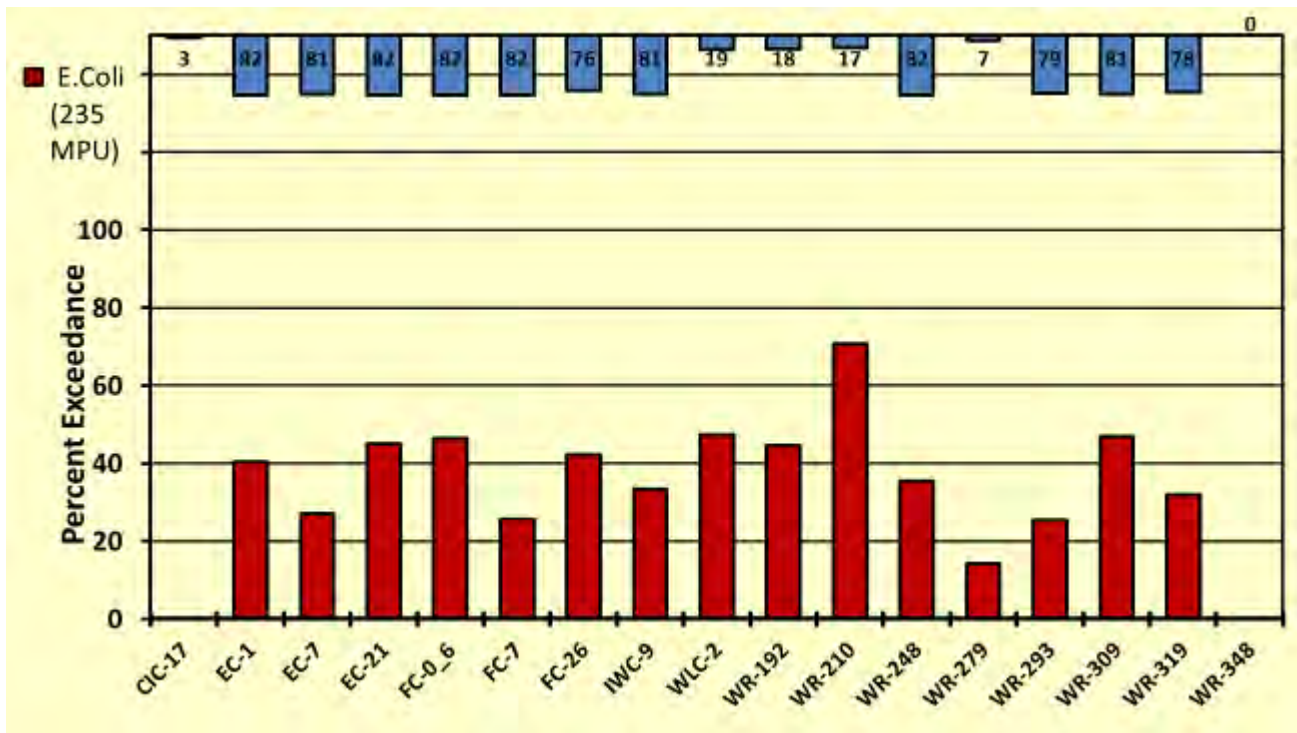


Figure 3.10 – Percent exceedance for *E. coli* samples utilizing 235 MPU/100 mL as the benchmark value. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 2000-2006. Tributary samples to the left and trunk stations to the right with samples going from south to north.

3.5.1.4 Inorganic N (NO<sub>2</sub>+NO<sub>3</sub>) – EPA Reference Condition 1.6 mg/L - Figures 3.11, 3.12 and 3.13, Table 3.4

- All stations show very high concentrations of inorganic N
- All stations median values exceed EPA Reference Condition except EC7 and FC7 – which are immediately below Eagle Creek and Geist reservoirs and have lower concentrations because the reservoirs act as nutrient sinks.
- All stations exceed EPA reference conditions more than 60% of the time sampled (most exceeding 80% occurrence) except Eagle Creek just below the reservoir (EC7 but note EC1 increases again), Fall Creek just below Geist Reservoir and persisting downstream to the confluence with White River (FC7 and FC0.6), and Muncie Creek-WR (WR319).
- Trimmed means show agricultural sites in tributaries are high – more than twice the EPA Reference Condition (upstream of Morse and Eagle Creek reservoirs) except for Fall Creek. White Lick Creek is also an exception however White Lick Creek includes a substantial amount of urban land use.
- Cicero Creek (CIC17) has the highest median value of inorganic N of all fixed stations (>6 mg/L) and several very high outliers for inorganic N. The Cicero Creek subwatershed is a hot spot for inorganic Nitrogen.
- There is great temporal variability in stream concentrations but spatial trends show downstream decreases in inorganic N indicating an agricultural source and dilution in urban and stormwater influenced systems.

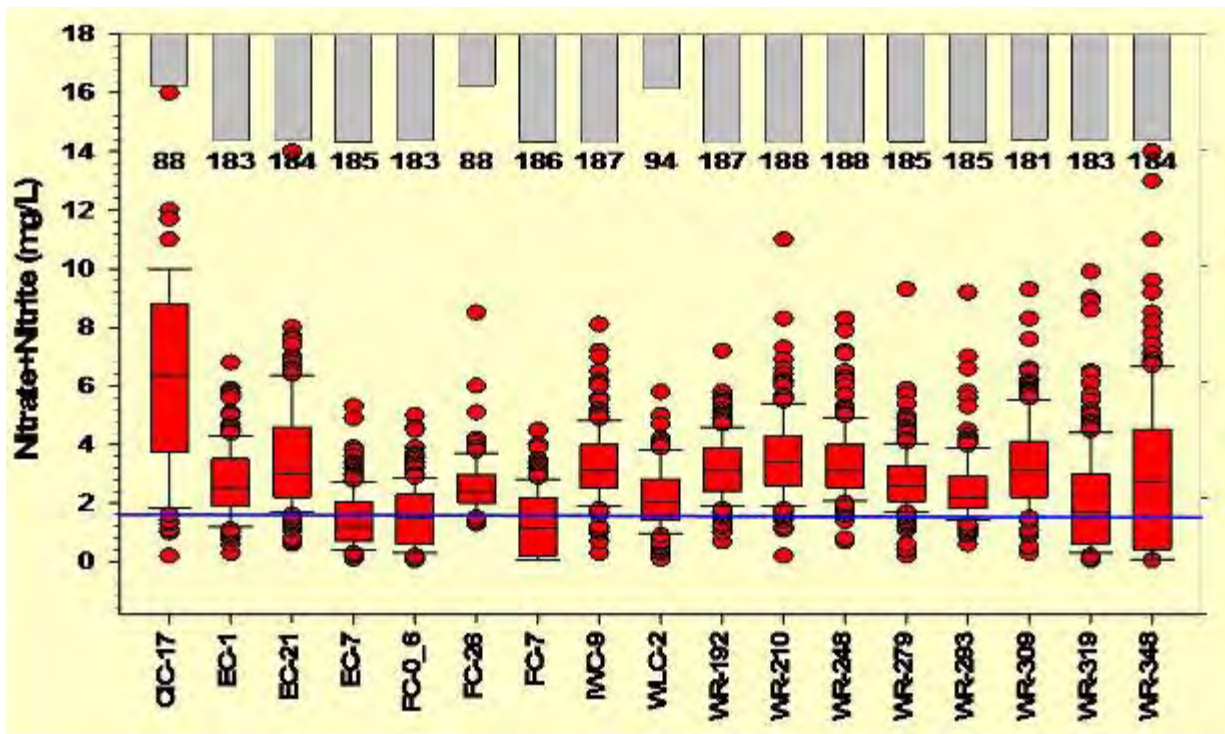


Figure 3.11 - Box and whisker plots of inorganic nitrogen (nitrate+nitrite in mg/L) for IDEM fixed station data from 1991-2006. Box represents 25<sup>th</sup>-75<sup>th</sup> percentile; line in box is median value; lines are 5<sup>th</sup> and 9<sup>th</sup> percentile values; dots are outliers. Grey bars are the number of values utilized in the analyses with number shown below the bars. Blue line is EPA reference condition of 1.6 mg/L.



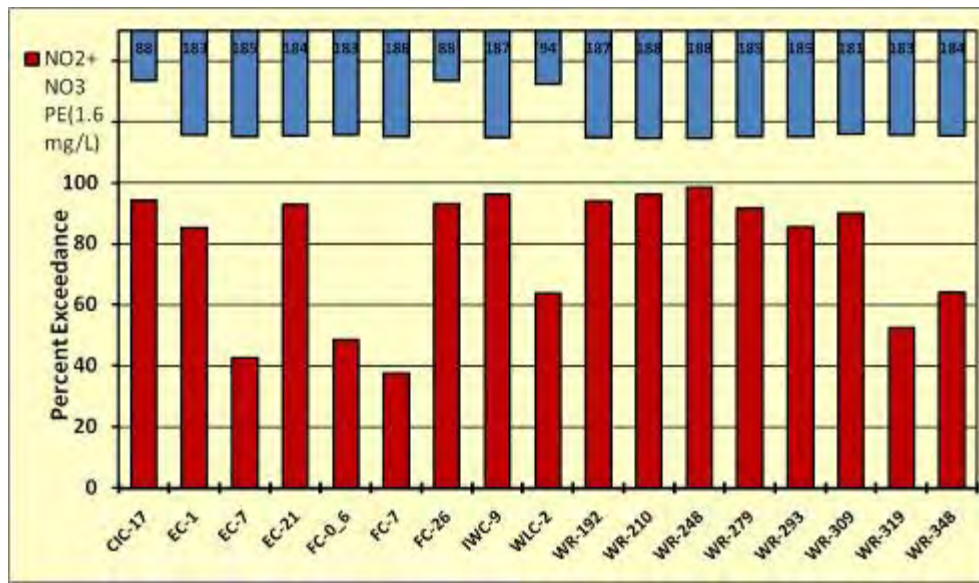


Figure 3.12 – Percent exceedance for nitrate + nitrite samples utilizing 1.6 mg/L as the benchmark value. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 1991-2008.

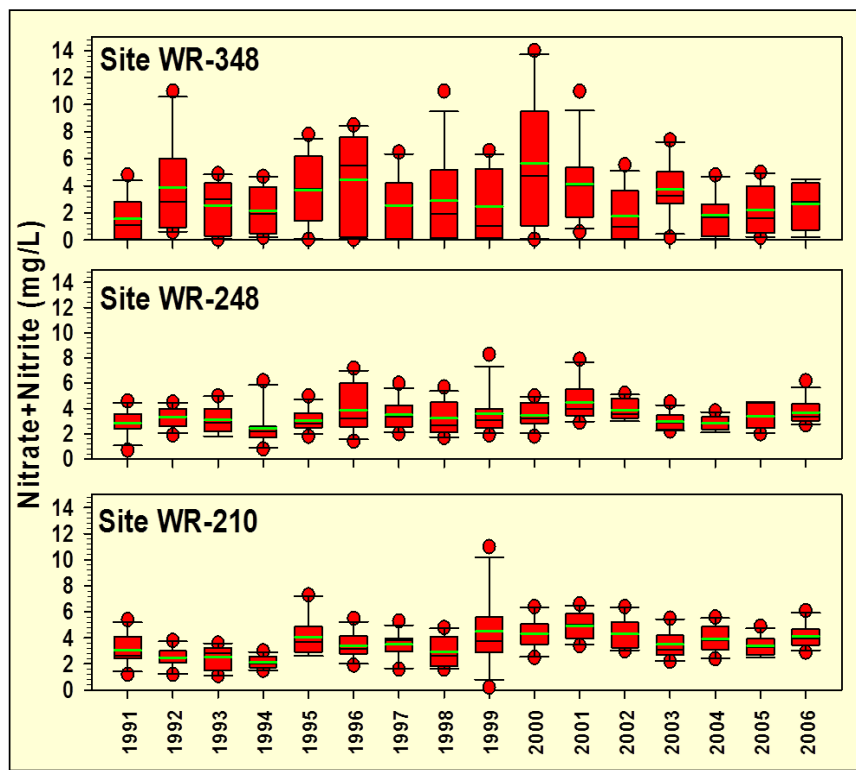


Figure 3.13 - Box and whisker plots of annual inorganic nitrogen (nitrate+nitrite in mg/L) for three White River trunk IDEM fixed stations (monthly data; 1991-2006). Box represents 25<sup>th</sup>-75<sup>th</sup> percentile; line in box is median value; lines are 5<sup>th</sup> and 9<sup>th</sup> percentile values; dots are outliers. EPA reference condition for Upper White is 1.6 mg/L. Site WR348 is an agricultural site in the headwaters of Muncie Creek-WR watershed; the drainage area of site WR248 is mixed urban and agricultural land use on the north side of Indianapolis; and site WR210 is located downstream of the city of Indianapolis. There is a great deal of spatial and temporal variability in inorganic N concentrations, but a clear pattern of elevated inorganic N is seen in agricultural areas relative to urban influenced sites.



3.5.1.5 Total N - EPA Reference Condition 2.0 mg/L/ Mesotrophic Boundary 1.5 mg/L - Figures 3.14 and 3.15, Table 3.4

- All stations exceed EPA reference conditions for total N more than 90% of the time sampled except Eagle Creek just below the reservoir (EC7), Fall Creek just below Geist Reservoir and persisting downstream to the confluence with White River (FC7 and FC0.6), White Lick Creek (WLC2 – 76%), Muncie Creek-WR (WR319) and Muncie Creek – headwaters (WR348).
- The same patterns hold for exceedences utilizing the ecological benchmark for water quality based on the mesotrophic/eutrophic boundary for streams in ecoregion 55b (1.5 mg/L). The lower benchmark raises the percentages of exceedences for almost all stations to essentially 100% exceedence with the same exceptions.
- The lack of variability of occurrences and exceedences of Total N relative to inorganic N indicates that nitrogen in the WR basin is largely driven by nitrate concentrations. Nitrate concentrations are heavily controlled by agricultural land use.

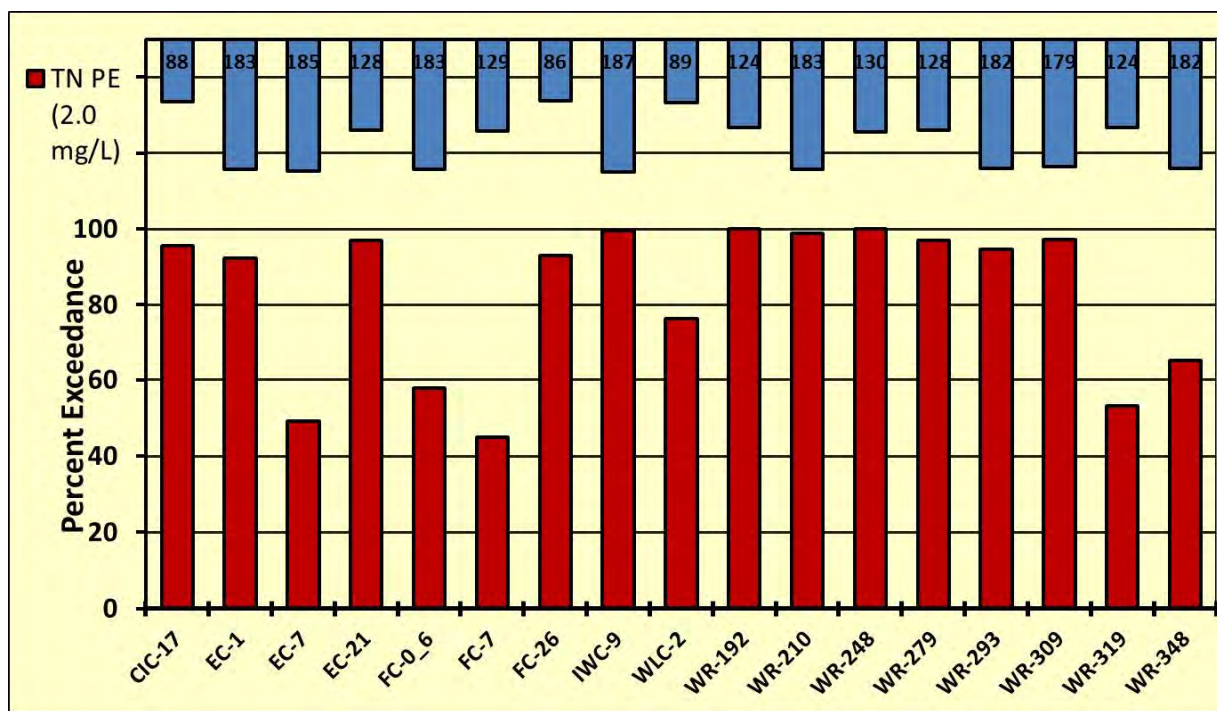


Figure 3.14 – Percent exceedence for total N samples utilizing 2.0 mg/L as the EPA reference condition benchmark value. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 1991-2008.

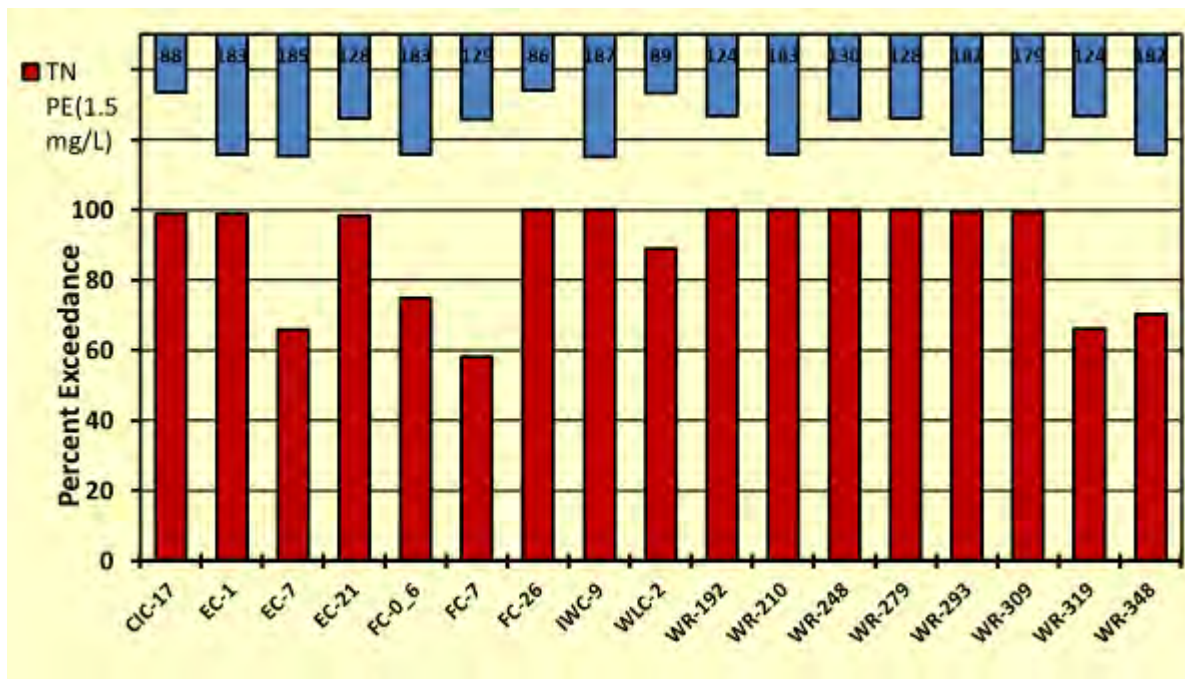
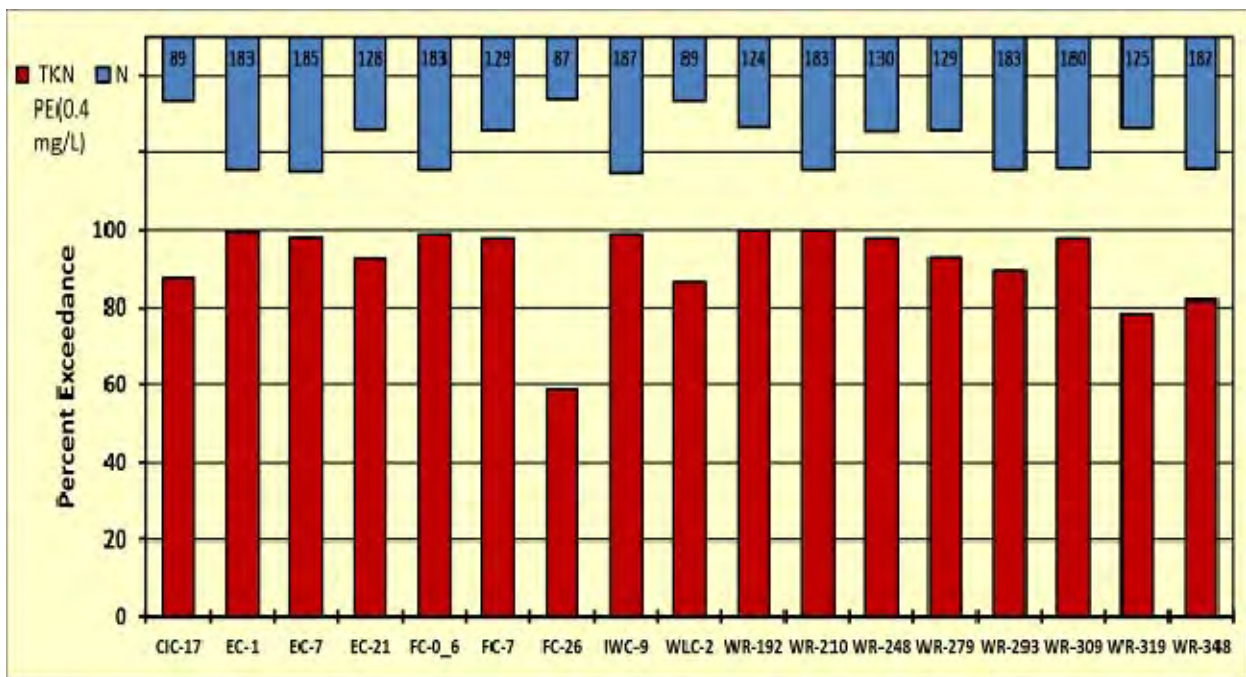


Figure 3.15 – Percent exceedance for total N samples utilizing 1.5 mg/L as the benchmark value. 1.5 mg/L represents an important biological threshold as the boundary between eutrophic and mesotrophic waters. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 1991-2008.

### 3.5.1.6 TKN – EPA Reference Condition 0.4 mg/L - Figure 3.16 and Table 3.4

- All median values exceed EPA Reference Condition for organic nitrogen. Several stations show higher median values including WR downstream of Muncie (WR309), White River downstream of the City of Indianapolis (WR210), WR further downstream of Indianapolis in southern Morgan (WR192), Eagle Creek near the confluence with WR (EC1), and Fall Creek near the confluence with WR (FC0.6)
- Site trimmed means show similar patterns with WR309, WR210, WR192, EC1, and FC0.6 all having elevated trimmed means (>0.8 mg/L)
- All sites show very high percentage exceedences (>80%) except the agricultural headwaters area of the watershed (WR319) and Fall Creek above the reservoir (FC26).
- The difference in patterns noted between Total N, inorganic N and organic (TKN) nitrogen help identify the different source areas for organic vs. inorganic nitrogen in the WR system. Inorganic N is sourced from agricultural land use ( $\text{NO}_3 + \text{NO}_2$ , and Total N), while organic N is sourced from urban areas associated with CSO discharges.



**Figure 3.16 – Percent exceedance for total Kjeldahl nitrogen utilizing 0.4 mg/L as the benchmark value. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 1991-2008.**

**3.5.1.7 Phosphorus as Total Phosphorus – EPA Reference Condition 0.0625 mg/L - Figures 3.17, 3.18, 3.19 and 3.20, Table 3.4**

- a. All stations show very high concentrations of phosphorus
- b. All stations median values exceed the EPA Reference Condition except EC7 and FC7 – which are immediately below Eagle Creek and Geist reservoirs and have lower concentrations because the reservoirs act as nutrient sinks
- c. All stations along the White River trunk exceed EPA Reference Conditions more than 60% of the time sampled and all but two stations in the headwaters of the watershed (Muncie Creek-WR; WR348, WR319) exceed EPA Reference Conditions more than 90% of the time sampled
- d. All stations along the White River trunk except two stations in the headwaters of the watershed (Muncie Creek-WR; WR348, WR319) have trimmed means that exceed EPA Reference Conditions by more than 3 times.
- e. White River trunk stations downstream of urban influences have very high total phosphorus. Trimmed means indicate that the site just downstream of Muncie (WR309) has a mean concentration of 0.35 mg/L; the site downstream from Anderson (WR-279) 0.28 mg/L and the site just downstream from Indianapolis (WR-210) 0.46 mg/L. These sites have mean concentrations of total phosphorus of 5.6, 4, and 7.4 times the EPA Reference Condition. This reference condition is set to be just below the concentration that marks an important ecological boundary between moderate and high nutrient levels (mesotrophic/eutrophic boundary). Streams with total phosphorus concentrations that exceed the EPA Reference Condition are likely to experience excessive algae growth, nuisance aquatic vegetation growth, and fluctuating dissolved oxygen conditions that can lead to fish kills.

- f. White River tributary stations show similar patterns in trimmed mean total phosphorus concentration. Upstream and agricultural sites exceed the EPA Reference Condition – but to much lower levels. Eagle Creek (EC21) and Cicero Creek (CIC17) stations upstream of Eagle Creek and Morse Reservoirs both exceed the reference condition (1.0 mg/L and 0.09 mg/L, respectively). Fall Creek upstream of Geist Reservoir (FC26) barely exceeds the reference condition (0.07 mg/L). Fall Creek and Eagle Creek stations just below the reservoirs (FC7; EC7) are both below the reference condition because the reservoirs are sinks for nutrients and all four reservoirs in the Upper White River Watershed (Prairie Creek Reservoir being the fourth) experience extensive blue-green algal blooms resulting in recreational usage and public health advisories, and taste and odor problems for drinking water supplies serving Anderson, Indianapolis and the 9 county metropolitan area.
- g. Tributary sites downstream of reservoirs or without reservoirs {White Lick Creek (WLC2) near the confluence with White River} include urbanized areas and exceed the Reference Condition by 2 or more times.
- h. Total phosphorus in the Upper White River Watershed is excessively high at almost all stations. Agricultural land use contributes phosphorus but instream total phosphorus concentrations in agricultural areas are only slightly elevated above the EPA Reference Condition. Urban sourced phosphorus is elevating phosphorus levels in the White River and its tributaries to levels that so far exceed EPA Reference Conditions that it is hard to envision a strategy that can reduce phosphorus to levels that approach healthy stream ecosystem levels. USGS SPARROW models of phosphorus yield in the Upper White River Watershed attribute 49.9% of the phosphorus load to urban sources (Robertson et al., 2009). Urban sources of phosphorus include wastewater treatment plant discharge, CSOs, failing septic systems, stormwater and other industrial discharges. Stormwater is enriched in phosphorus due to fertilizer runoff, pet waste, and deicing agents among a host of other sources. Strategies for reducing phosphorus loads to streams will have to address the myriad sources of phosphorus to effectively impact the problem.



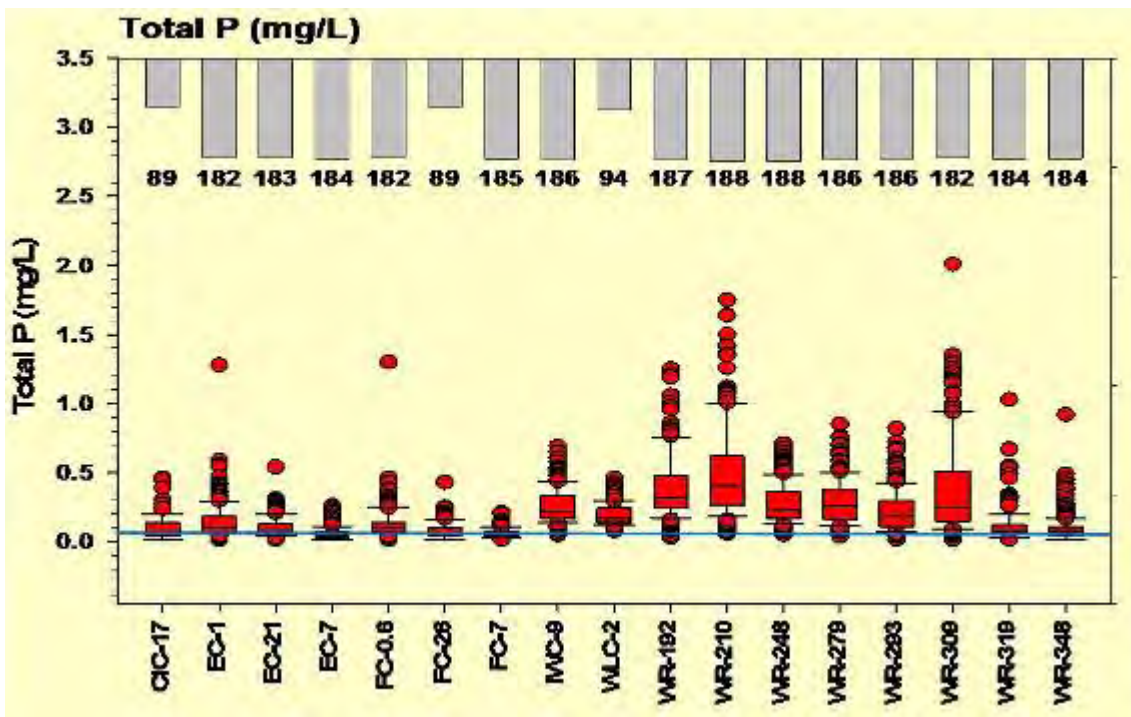


Figure 3.17 - Box and whisker plots of total phosphorus (mg/L) for IDEM fixed station data from 1991-2006. Box represents 25<sup>th</sup>-75<sup>th</sup> percentile; line in box is median value; lines are 5<sup>th</sup> and 9<sup>th</sup> percentile values; dots are outliers. Grey bars are the number of values utilized in the analyses with number shown below the bars. Blue line is EPA reference condition of 0.0625 mg/L.

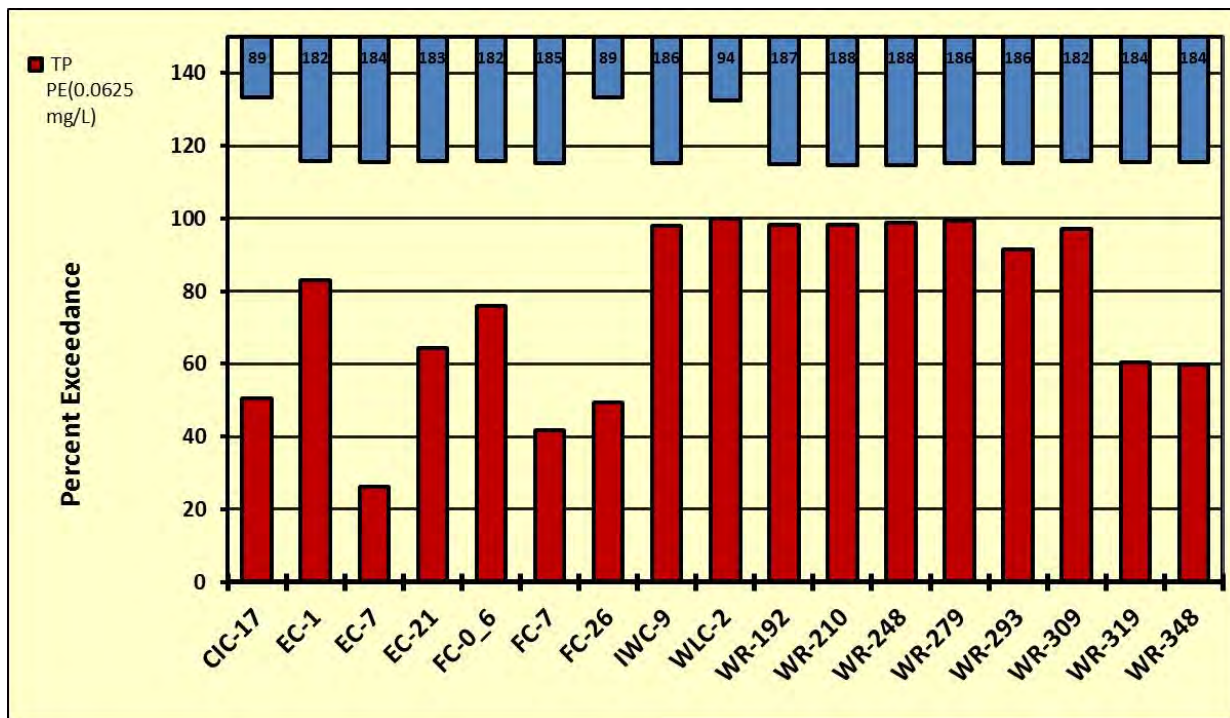


Figure 3.18 - Percent exceedance for total phosphorus samples utilizing 0.0625 mg/L as the benchmark value. Blue bars at the top indicate the number of samples analyzed at each station, values shown in bars. Data range 1991-2008.

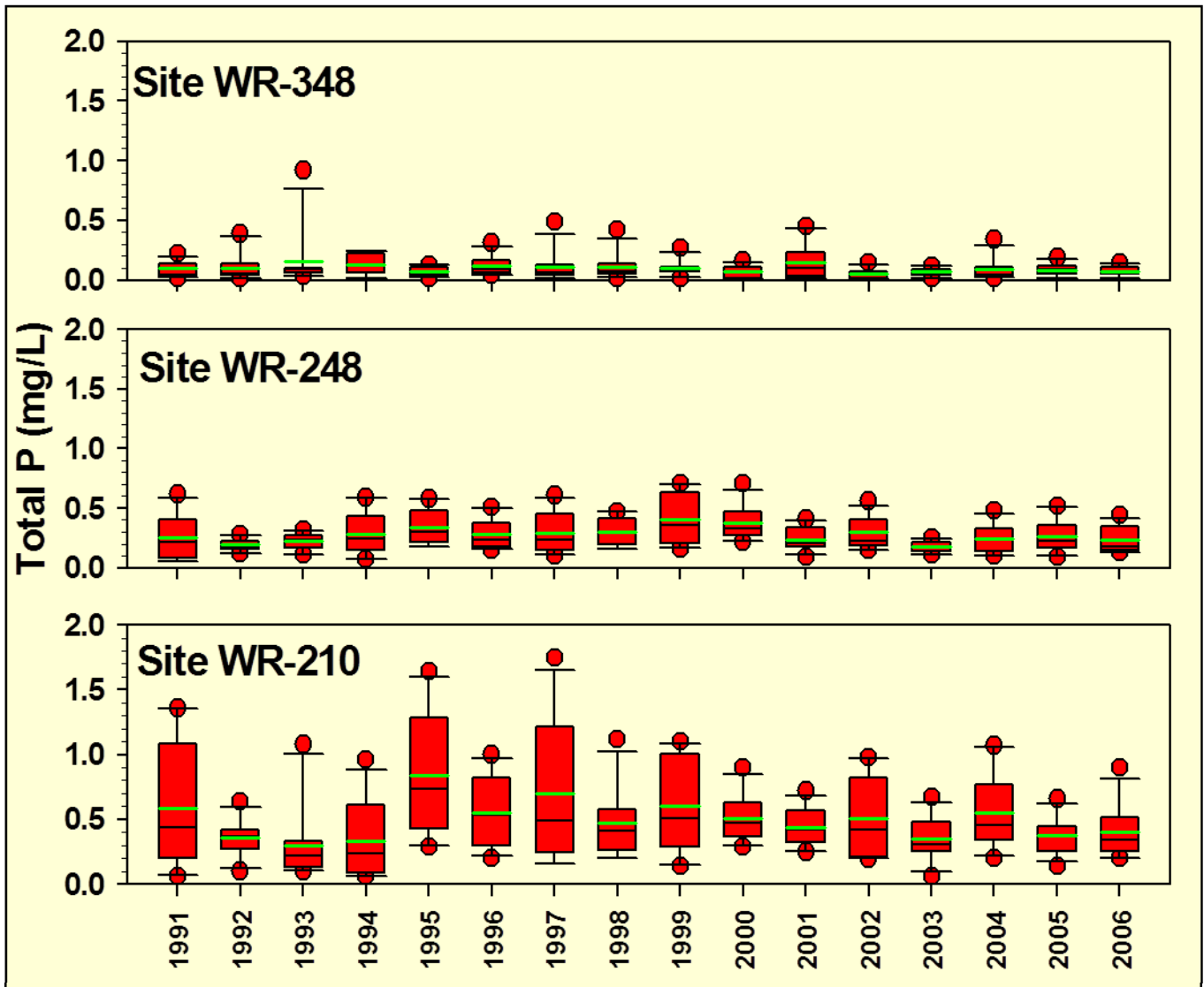
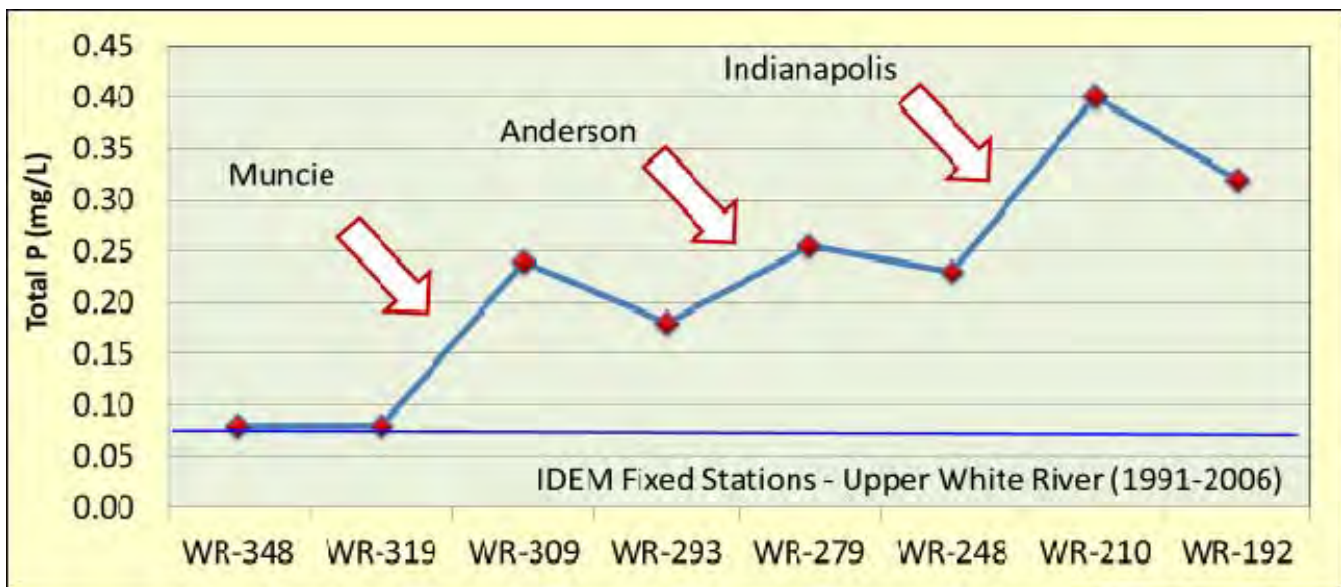


Figure 3.19 - Box and whisker plots of annual total phosphorus (mg/L) for three White River trunk IDEM fixed stations (monthly data; 1991-2006). Box represents 25<sup>th</sup>-75<sup>th</sup> percentile; line in box is median value; lines are 5<sup>th</sup> and 9<sup>th</sup> percentile values; dots are outliers. EPA reference condition for Upper White is 0.0625 mg/L. Site WR348 is an agricultural site in the headwaters of Muncie Creek-WR watershed; the drainage area of site WR248 is mixed urban and agricultural land use on the north side of Indianapolis; and site WR210 is located downstream of the city of Indianapolis. There is a great deal of spatial and temporal variability in total phosphorus concentrations, but a clear pattern of elevated total P is seen in urban-influenced sites relative to agricultural sites.



**Figure 3.20 – Total phosphorus concentration (mg/L) in White River trunk stations. Total phosphorus concentrations are close to the EPA reference condition (0.0625 mg/L) in the headwater agricultural areas (WR348; WR319). Total phosphorus concentrations increase dramatically and stepwise as urban areas are encountered. Total phosphorus concentrations downstream of the city of Indianapolis are more than 6 times the recommended EPA nutrient criteria.**

#### 3.5.1.8 Chemical Oxygen Demand – Table 3.4

- a. Trimmed means for COD had values ranging between 9.94 and 20.32 mg/L. Values exceeding 14 mg/L were found at stations influenced by CSOs and included the site downstream of Muncie (WR309), the site downstream from Anderson (WR-279), the site in northern Indianapolis (WR248), the site just downstream from Indianapolis (WR-210), the site further downstream from Indianapolis in southern Morgan County (WR192), and tributary sites on Eagle Creek downstream of the reservoir (EC7 and EC1), and sites downstream of Geist Reservoir on Fall Creek (FC7 and FC0.6).

#### 3.5.1.9 Atrazine (measured as total triazines) – EPA Aquatic Community Guideline 17.5 µg/L - Figures 3.21 and 3.22

- a. Atrazine (measured as total triazines) sampled from the White River near IDEM Fixed station WR248 and in Eagle Creek Reservoir downstream of EC21 both show an annual pattern of spring runoff of atrazine. Peak values were measured in the White River where concentrations of 70 µg/L were recorded. Peak values in Eagle Creek Reservoir are lower in part due to the dilution effects of the reservoir.



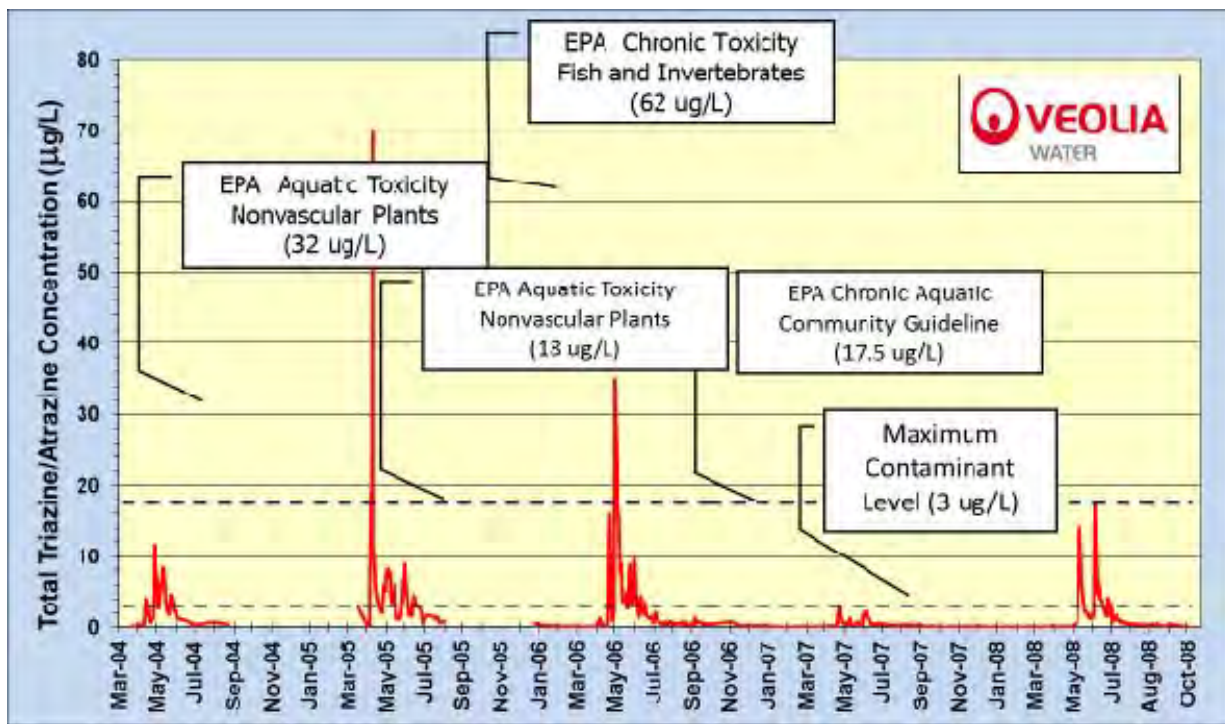


Figure 3.21 – Total triazines (ug/L) measured in raw water at the drinking water intake for the White River North Treatment plant (raw water). The intake location is near IDEM fixed station WR248. The drinking water MCL is an annual average value and is displayed here for benchmarking purposes only.

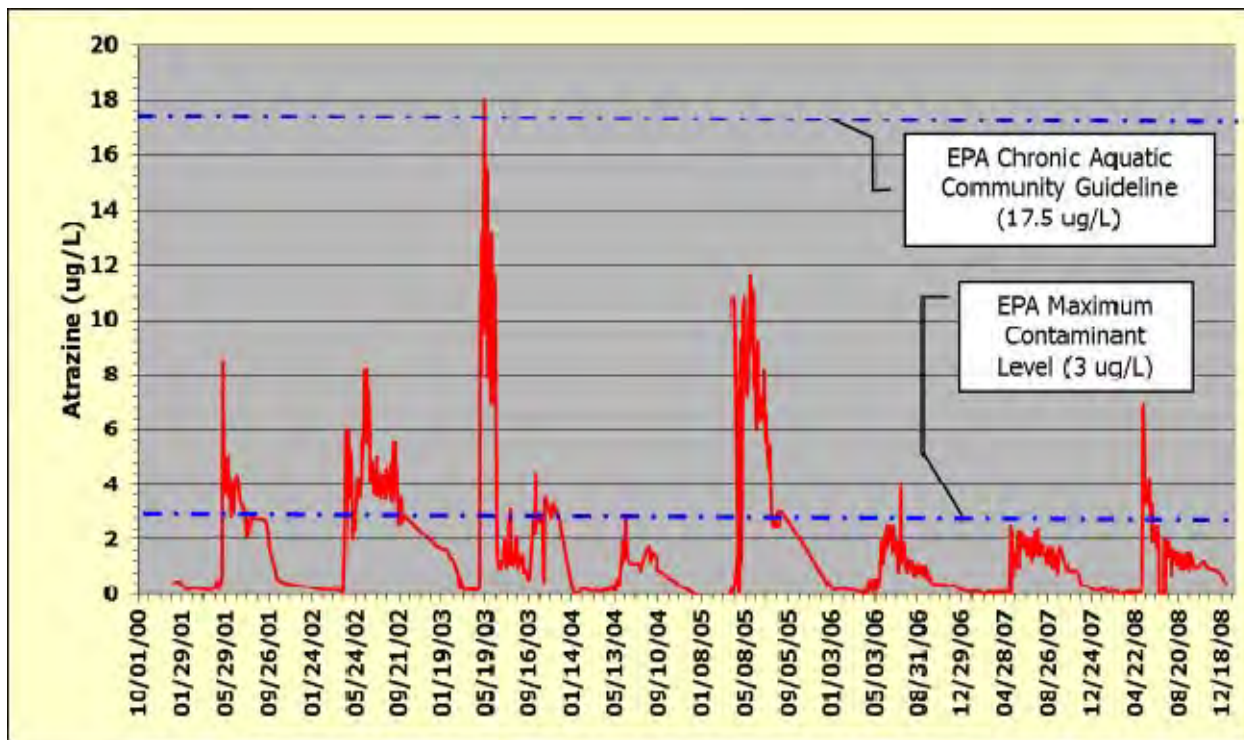


Figure 3.22 – Total triazines (µg/L) measured in raw water at the drinking water intake for the TW Moses Treatment Plant (raw water). The intake location is in Eagle Creek Reservoir downstream from IDEM fixed station EC21. The drinking water MCL is an annual average value and is displayed here for benchmarking purposes only.



### 3.5.2 Multivariate Statistical Analyses

Principal Component Analysis was run with a separation of four factors based on alkalinity, total organic carbon, chemical oxygen demand, dissolved oxygen, hardness, total Kjeldahl nitrogen, nitrite + nitrate, pH, total phosphorus, total suspended solids, turbidity, and iron. Factor 1 loaded high on Total Organic Carbon (TOC), organic nitrogen (TKN), total phosphorus (TP), and COD. All of these analytes are indicative of organics and nutrients and may be an indicator of organic discharges in the form of industrial and wastewater treatment plants or CSOs (Table 3.5). Factor 1 loaded highly negative on pH. Factor 2 loaded high on TSS, turbidity and iron – all indicative of sediment loading to streams. Factor 3 had a strong positive loading on alkalinity and hardness potentially indicating groundwater influenced sites. It also loaded very strongly negative on DO (Table 3.5). Factor 4 loaded very high on inorganic nitrogen and is an indicator of agricultural land use.

**Table 3.5 Principal Component Analyses Factor Loading by analyte.**

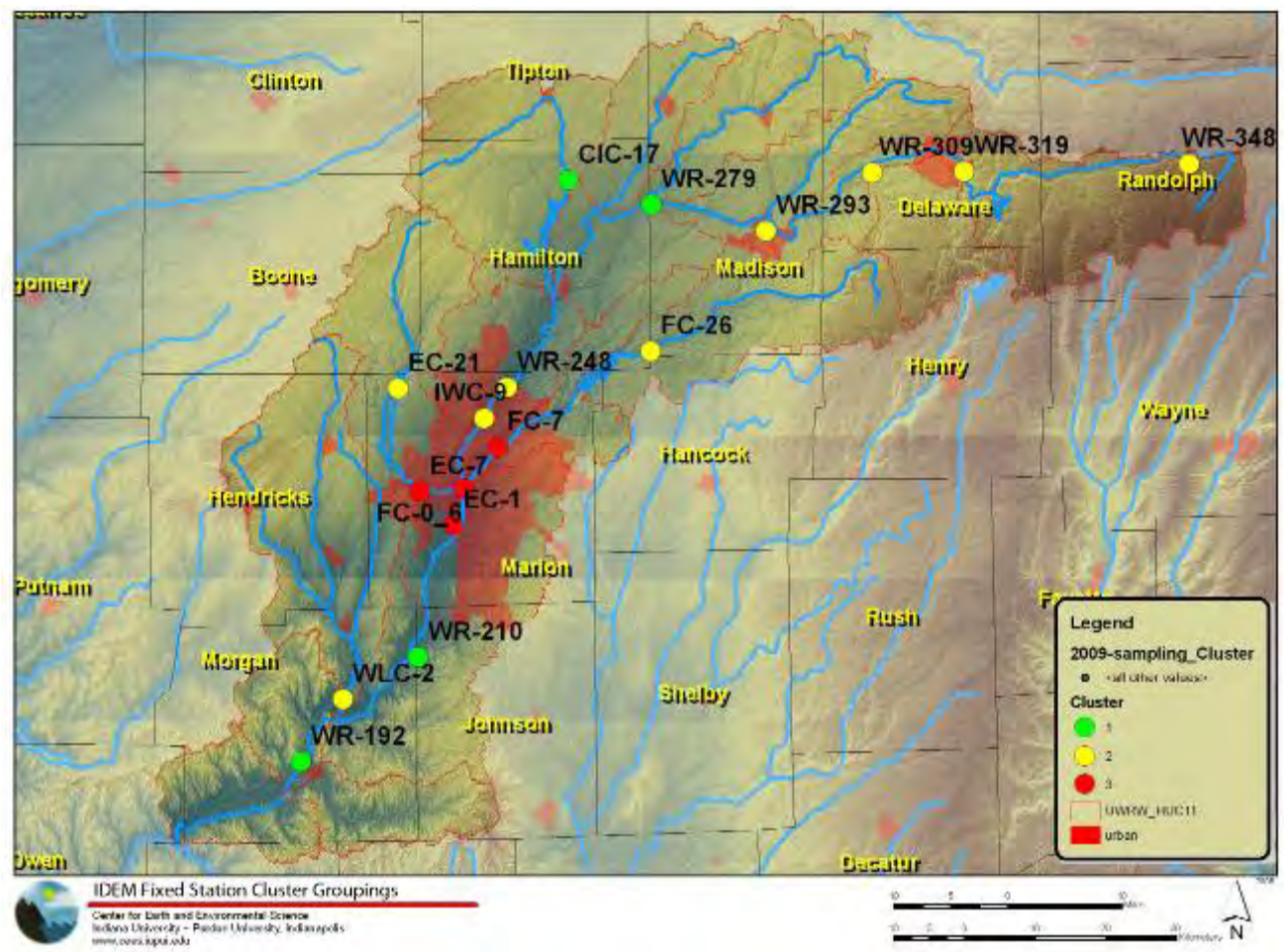
	Factor 1	Factor 2	Factor 3	Factor 4
<b>Alkalinity</b>	-26	20	89	17
<b>TOC</b>	86	21	-23	29
<b>COD</b>	87	36	-27	-4
<b>DO</b>	-7	-19	-83	9
<b>Hardness</b>	-14	17	88	35
<b>TKN</b>	95	19	-12	6
<b>NO2+NO3</b>	20	7	22	93
<b>pH</b>	-86	34	-6	-1
<b>Total P</b>	71	41	40	9
<b>TSS</b>	41	83	22	-15
<b>Turbidity</b>	-1	91	11	27
<b>Iron</b>	15	90	36	-1

K-mean cluster analysis was run with SAS software and by comparing cubic clustering criterion (CCC) values, it was determined that 3 clusters was ideal for this collection of data. The three clusters separated 4 stations into Cluster 1; 4 stations into Cluster 3, and the remaining stations into Cluster 2 (Figure 3.23). Cluster 1 includes stations WR279 – site downstream of Anderson, WR210 – site downstream of Indianapolis, WR 192 – site further downstream of Indianapolis in Morgan County, and CIC17 – Cicero Creek Tributary upstream of Morse Reservoir. Sites in cluster 1 are loaded high on one or more key factor, notably factors 1, 2, or 4. These factors are all nutrients or sediment associated parameters. WR279 was loaded high on TSS; WR210 and WR192 were loaded high on organic nutrients (TOC, TKN

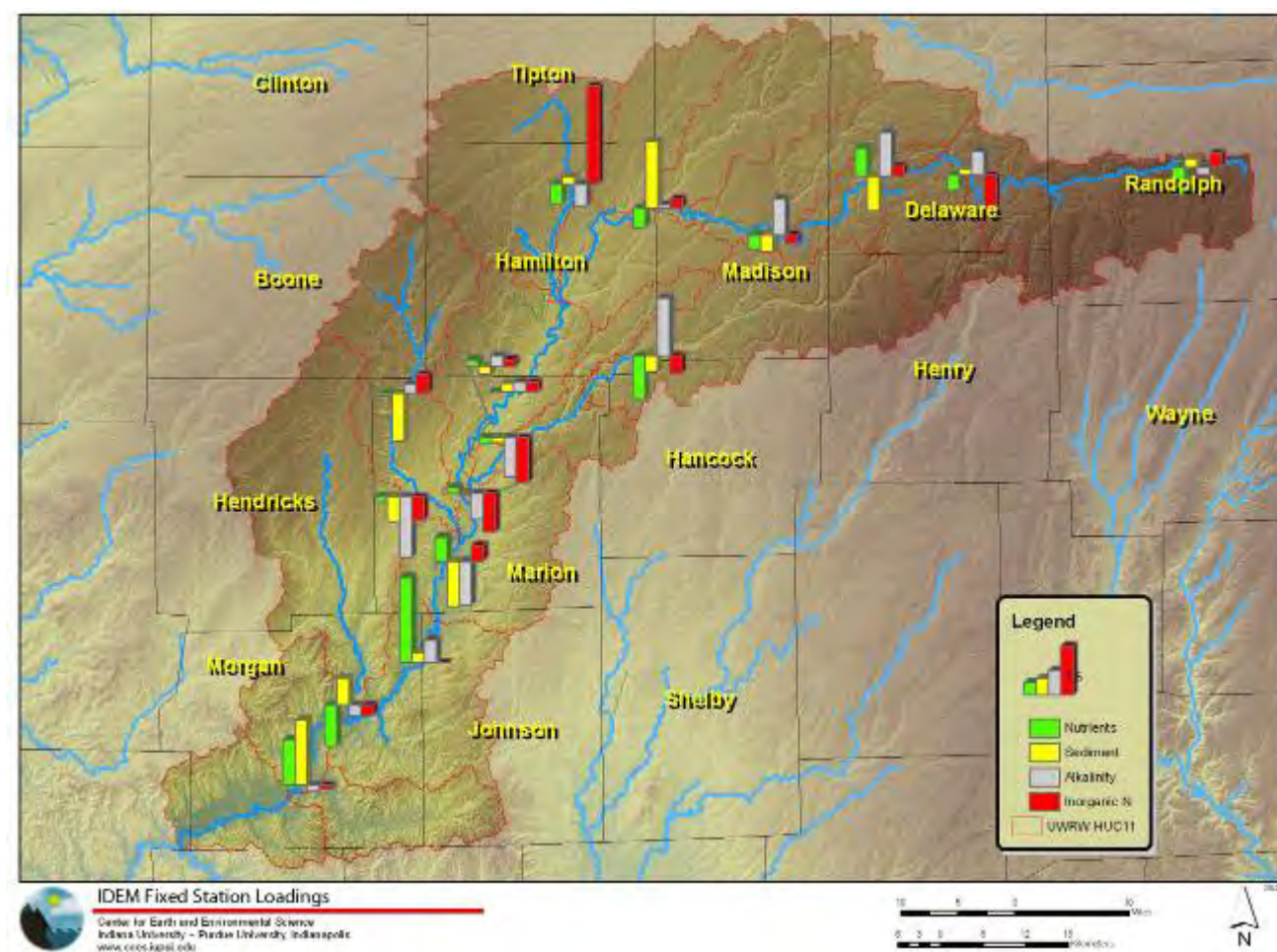
and Total P) and TSS; while CIC17 loads very high on inorganic N (nitrate+nitrite). Sites WR210 and WR192 are both loaded high on organic nutrients indicative of CSO discharges.

Cluster 3 also includes 4 sites. In this case they are all tributary sites downstream of the reservoirs; EC7 and EC1, FC7 and FC0.6. These sites are highly loaded on factor 3 with high positive loadings on alkalinity and hardness and high negative loading on DO. The high loadings on alkalinity and hardness are an indicator of groundwater influenced streams. These sites are all CSO influenced sites but also have an added component that the reservoirs serve as sinks for sediments, nutrients and modify other parameters. When all factors loadings are considered, sites in cluster 3 appear to be sites with negative factor loadings (Figure 3.24).

Cluster 2 is comprised of all the remaining sites. These sites include all the WR trunk stations with the exception of the 3 in cluster 1 (that broke out due to high nutrient or sediment load), the tributary sites upstream of Eagle Creek and Geist Reservoirs, and the White Lick Creek confluence site. These sites all have commonality in that they are all dominated by agricultural land use and have an absence of a parameter that separates them from the other stations.



**Figure 3.23 – IDEM Fixed Stations grouped by cluster. Cluster 1 includes stations with high loadings nutrients and sediments; cluster 3 includes stations with high loadings for alkalinity and low DO, and cluster 2 is the remaining sites.**



**Figure 3.24 – IDEM Fixed Stations showing loadings for different analytes. Cluster 1 includes stations with high loadings for organic nutrients, and/or sediment or inorganic N. Cluster 2 includes stations dominated with negative loadings, and cluster 2 is the remaining sites that have a mixture of positive and negative loadings.**

### 3.5 Impaired Stream Classification

Of the more than 2,180 miles of streams in the Upper White River Watershed, 1,104 miles (51%) are impaired (Table 3.6). While there are a host of reasons for impairment, a few impairments dominate the listings and include *E. coli*, mercury and PCBs in fish tissue, aluminum, and impaired biotic communities. Some of the HUC 10 subwatersheds are overrepresented relative to the number or percentage of impaired streams and notably include Buck Creek, Duck Creek, Eagle Creek, Geist Reservoir/Fall Creek, Killbuck Creek, Muncie Creek, Stony Creek, and White Lick Creek, all with impairments to greater than 50% of their subwatershed stream miles. Consideration of the impact of these impairments on the larger Upper White River scale identifies Eagle Creek, Killbuck Creek, Muncie Creek and White Lick Creek HUC 10 subwatersheds as the largest contributors, each accounting for greater than 5% of the impaired stream miles in the Upper White River Watershed.

**Table 3.6 Stream Impairments and Percentages of Streams Impaired**

<b>Subwatershed</b>	<b>Stream Miles Impaired</b>	<b>Total Stream Miles</b>	<b>% Impaired by Subwatershed</b>	<b>% Impaired in Larger Upper White</b>	<b>Impairments</b>
Upper White	1103.86	2180.31	50.63%		
Buck Creek	55.93	61.08	91.57%	2.57%	<i>E. coli</i> , Impaired Biotic Communities, PCBs in Fish Tissue
Butler Creek	14.86	65.77	22.59%	0.68%	Mercury in Fish Tissue, PCBs in Fish Tissue
Cicero Creek	76.8	215.96	35.56%	3.52%	Algae, Aluminum, <i>E. coli</i> , Impaired Biotic Communities, Nutrients, PCBs in Fish Tissue, Zinc
Clear Creek	47.19	189.67	24.88%	2.16%	Aluminum, <i>E. coli</i> , Impaired Biotic Communities, PCBs in Fish Tissue, Mercury in Fish Tissue
Crooked Creek	52.3	142.12	36.80%	2.40%	Aluminum, <i>E. coli</i> , PCBs in Fish Tissue, Mercury in Fish Tissue
Duck Creek	65.18	65.5	99.51%	2.99%	<i>E. coli</i> , Impaired Biotic Communities
Eagle Creek	158.34	236.58	66.93%	7.26%	Algae, Aluminum, <i>E. coli</i> , Impaired Biotic Communities, PCBs in Fish Tissue, Taste & Odor
Fall Creek	12.11	96.48	12.55%	0.56%	<i>E. coli</i> , Mercury in Fish Tissue, PCBs in Fish Tissue
Geist Reservoir - Fall Creek	106.46	169	62.99%	4.88%	Algae, Aluminum, <i>E. coli</i> , Lead, PCBs in Fish Tissue, Taste & Odor
Indian Creek	1.46	79.66	1.83%	0.07%	Aluminum, <i>E. coli</i>
Killbuck Creek	114.54	127.52	89.82%	5.25%	Aluminum, <i>E. coli</i> , Impaired Biotic Communities, Lead, PCBs in Fish Tissue
Lambs Creek	14.7	73.91	19.89%	0.67%	Aluminum, Cyanide, <i>E. coli</i> , Mercury, Mercury in Fish Tissue, PCBs in Fish Tissue
Muncie Creek	115.23	187.37	61.50%	5.29%	<i>E. coli</i> , Impaired Biotic Communities, PCBs in Fish Tissue, Mercury in Fish Tissue,
Pipe Creek	37.15	81	45.86%	1.70%	Impaired Biotic Communities, PCBs in Fish Tissue
Pleasant Creek	77.18	159.92	48.26%	3.54%	Aluminum, <i>E. coli</i> , Impaired Biotic Communities, Mercury in Fish Tissue, PCBs in Fish Tissue
Stony Creek	68.29	82.4	82.88%	3.13%	<i>E. coli</i> , Impaired Biotic Communities, PCBs in Fish Tissue
White Lick Creek	121.59	215.52	56.42%	5.58%	<i>E. coli</i> , Impaired Biotic Communities, PCBs in Fish Tissue



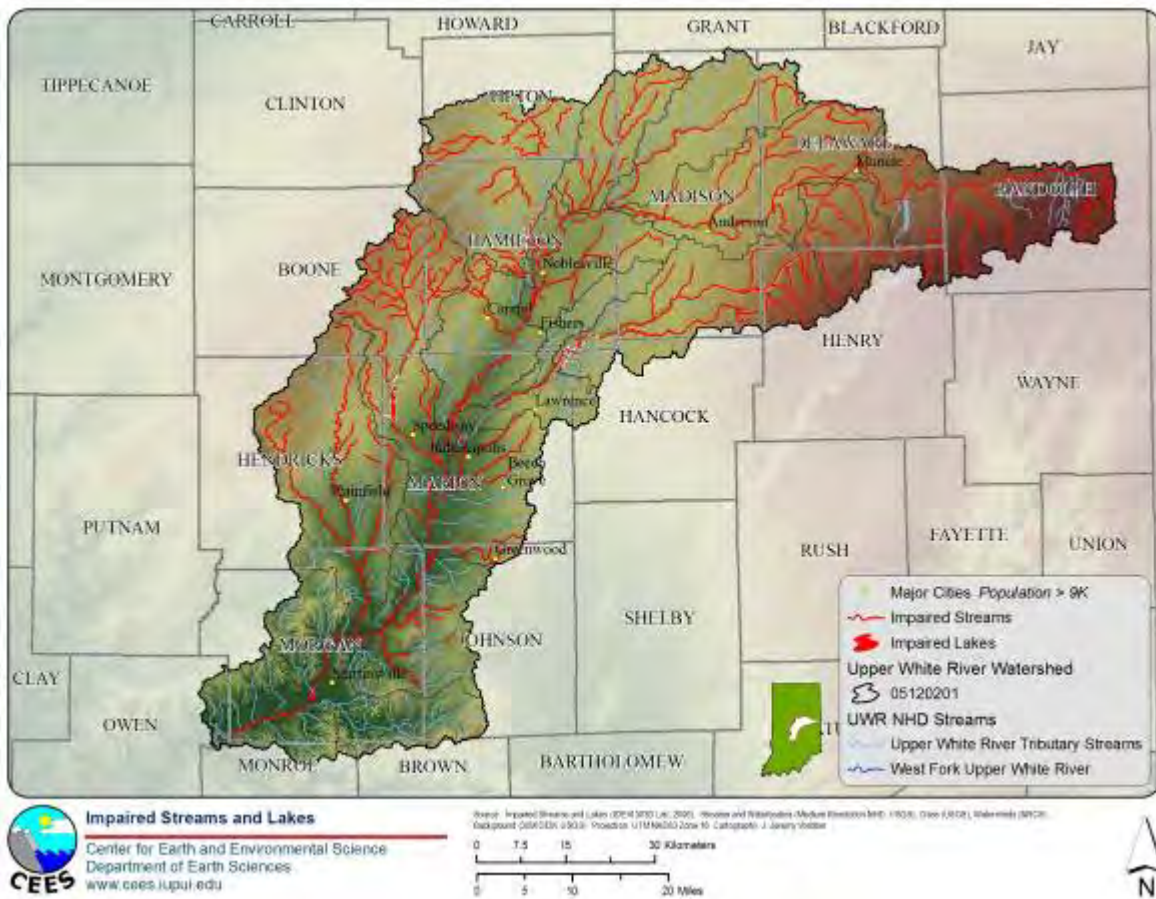


Figure 3.25 – 303D-listed impaired streams in the Upper White River Watershed (IDEM 2006). Impaired streams are shown in red.

#### 4.0 VULNERABILITY ASSESSMENT (ANALYSIS OF RISK FACTORS)

The second prong of the approach of this report identifies and evaluates risk factors. These factors are linked to indicators of resource impact and change. For each category of assessed risk, subwatersheds have been ranked with a three-tiered system that provides a relative ranking of impact. These rankings were then used to develop a matrix to allow for side by side comparison of these risk factors by HUC10 subwatershed. This matrix forms the basis for watershed management recommendations and opportunities for regional watershed planning.

##### 4.1 Land Use Land Cover

For the purpose of this report remotely sensed data from 2000 and 2008 were used to compare the Land Cover of the USGS HUC 10 subwatersheds of the west fork Upper White River in Indiana. The Upper White River Watershed continues to see land use/land cover changes due mostly to changes in human activity. In general, areas of urbanization are increasing at the expense of agricultural and forested areas. This is occurring even in areas of urban decline as new developments are mostly occurring at the outer edges of urban zones and not in the existing declining cores. This change is most notable along the major transportation corridors such as interstates and state highways. The Upper White River Watershed is bisected by the I-69 corridor and includes Hamilton County, one of the most rapidly developing counties

in Indiana. Additional rapidly urbanizing areas are also occurring in Johnson, Boone, and Hendricks counties.

#### *4.1.1 Changes in Land Cover (2000 to 2008)*

Urbanization continues throughout the watershed, particularly around the City of Indianapolis and surrounding communities. Direct mathematical comparisons of urban land cover between 2000 and 2008 shows a numeric decrease in urbanization that is due to the different way the cover classes include herbaceous and urban turf areas, as well as other compilation differences between the two methods for deriving this land use/land cover. Urbanization has increased in all subwatersheds, but that is not shown in this analysis, but is apparent in visual comparison of the two datasets. Areas of urban use as identified in the 2000 dataset are likely included in both herbaceous and forest cover classes in the 2008 dataset.

The forest cover class showed the largest apparent increase between 2000 and 2008 data sets. These increases were most notable in the southern subwatersheds that have the highest forest cover. Overall, most of the increase in forest cover is most notable in rural and suburban areas and is attributed to increases in areas of closed canopy in residential areas and associated with streams and creeks. Forest areas continue to mature also accounting for some of the remotely sensed increase in forest cover. Forest (canopy) cover is generally increasing, less in the upper highly agricultural subwatershed, and decreasing in Cooked Creek-White River and Fall Creek subwatersheds, northeast of Indianapolis.

The largest decrease for a particular land cover type occurred in the agricultural cover class. The Clear Creek-White River subwatershed experienced the largest decrease in agriculture land cover with an apparent loss of almost 10%. Agricultural areas are decreasing watershed wide, particularly in subwatersheds around Indianapolis and the southern portions of the watershed. Herbaceous areas of grasslands, pastures, and turf are expanding in all subwatersheds surrounding Indianapolis, suggesting this increase is actually turf in suburban areas and pasture for horses, and decreasing in the headwater areas of the Upper White River Watershed.

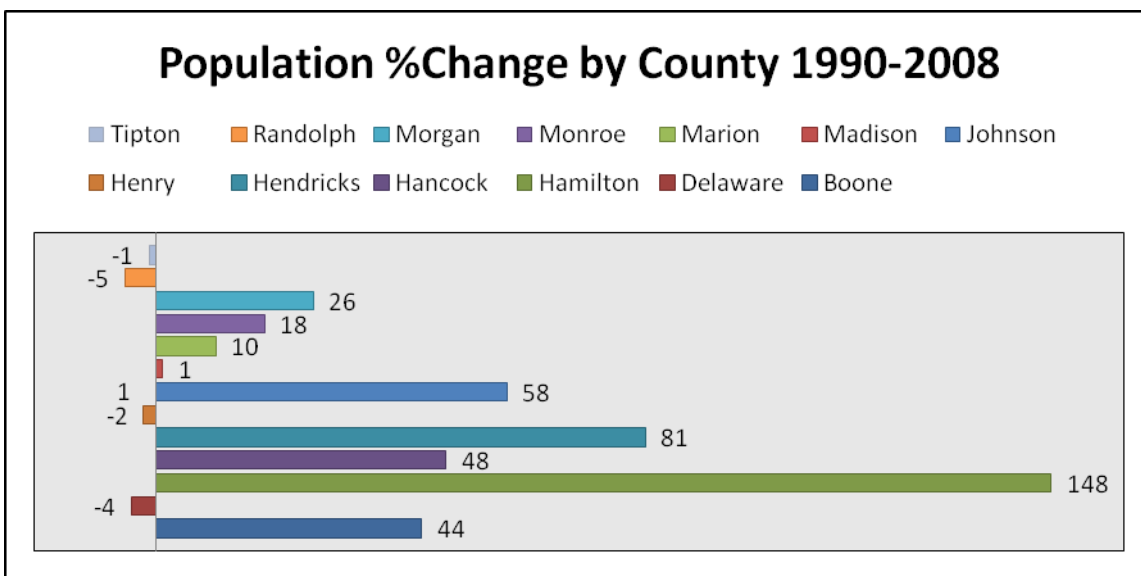
#### *4.1.2 Urbanization*

These increases in urbanization have a number of implications. Impacts may include increases in pollution from erosion during construction, impervious areas, stormwater runoff, and nonpoint pollution sources, including the nutrients nitrogen and phosphorus. Increases in nitrogen and phosphorus are of particular concern because these nutrients contribute to eutrophication in the reservoirs which, in turn, causes taste and odor problems in drinking water. Rates of nutrient loading from upland subwatersheds are a function of land use and land cover. For example, land in agricultural row crops typically contributes more nutrients to downstream receiving waters than land in forest cover, both because there is more runoff and because, as a result of the use of fertilizers, more nutrients are available for export.

#### *4.1.3 Community Growth Rates*

According to the U.S. Census Bureau 1990 Census, 2000 Census, and 2008 Population Estimates, it was estimated that 1,660,227 million people lived in the 13 counties in Indiana that comprise most of the UWRW. This accounts for 26% of the population of the state of Indiana. In 2008 that estimate was 2,083,684 accounting for 29% of the state's population. This is an average increase in population by 32.5% across the watershed. This is twice the state average (15% increase) for the same time period. These changes are not equally distributed among the subwatersheds. Hamilton County (which includes much of Cicero, Stony, and Crooked Creek subwatersheds, as well as parts of Duck, Eagle, Pipe, Geist Reservoir Fall Creek, and Fall Creek subwatersheds) had a 148% increase in its population, while Tipton, Randolph, Madison, Henry and Delaware Counties ranged in a -4% change to a 1% increase (Figure 4.1 and Table

2.6). These slower growing counties have rates well below the Indiana state population increase for that period. More people in an area mean more water use, discharge, waste, and demand for clean water. Unfortunately, from a land use and watershed management perspective, areas that have a net decrease in human population do not see a net decrease in pervious surface and other water use impacts. These counties are largely rural with agricultural land use and water resource stresses are related to agriculture regardless of population trend data. Most of the population increase is concentrated in formerly agricultural lands within the watershed. This compound nature to a problem as complex as watershed management warrants an increase in sound planning efforts and implementations to reduce impacts on threatened natural resources such as water.



**Figure 4.1 - Bar graph depicting percentage of population change by county for counties in the Upper White River Watershed between 1990 and 2008. Counties are plotted top to bottom in same order as listed left to right.**

Figures 4.2 and 4.3 show population change for the UWRW. Figure 4.2 is a reflection of the chart shown in Figure 4.1. The figure shows percent population change by county from 1990 to 2008. As mentioned above, Hamilton County has the most dramatic population change and is shown in red. The counties have been color coded by percent population change.

The breakdown for the color categories is:

- 30 to 0%
- 0 to 30%
- 30 to 60%
- 60 to 90%
- 90 to 120%
- 120 to 150%

Using this breakdown, most of the counties either fall in the 0 to 30 percent population change category or -30 to 0 percent population change.

Figure 4.3 shows population change by subwatershed. To determine this breakdown, the area of each subwatershed in a county or counties was compared to the population change of the county. Reference to cities and towns in the subwatershed was also taken into consideration. The subwatersheds were then categorized into four color categories.

- Red – High Growth
- Orange – Moderate to High Growth
- Yellow – Low to Moderate Growth
- Cream – No to Low Growth

The counties that had the greatest percent population change also tended to have the subwatersheds with the greatest growth.

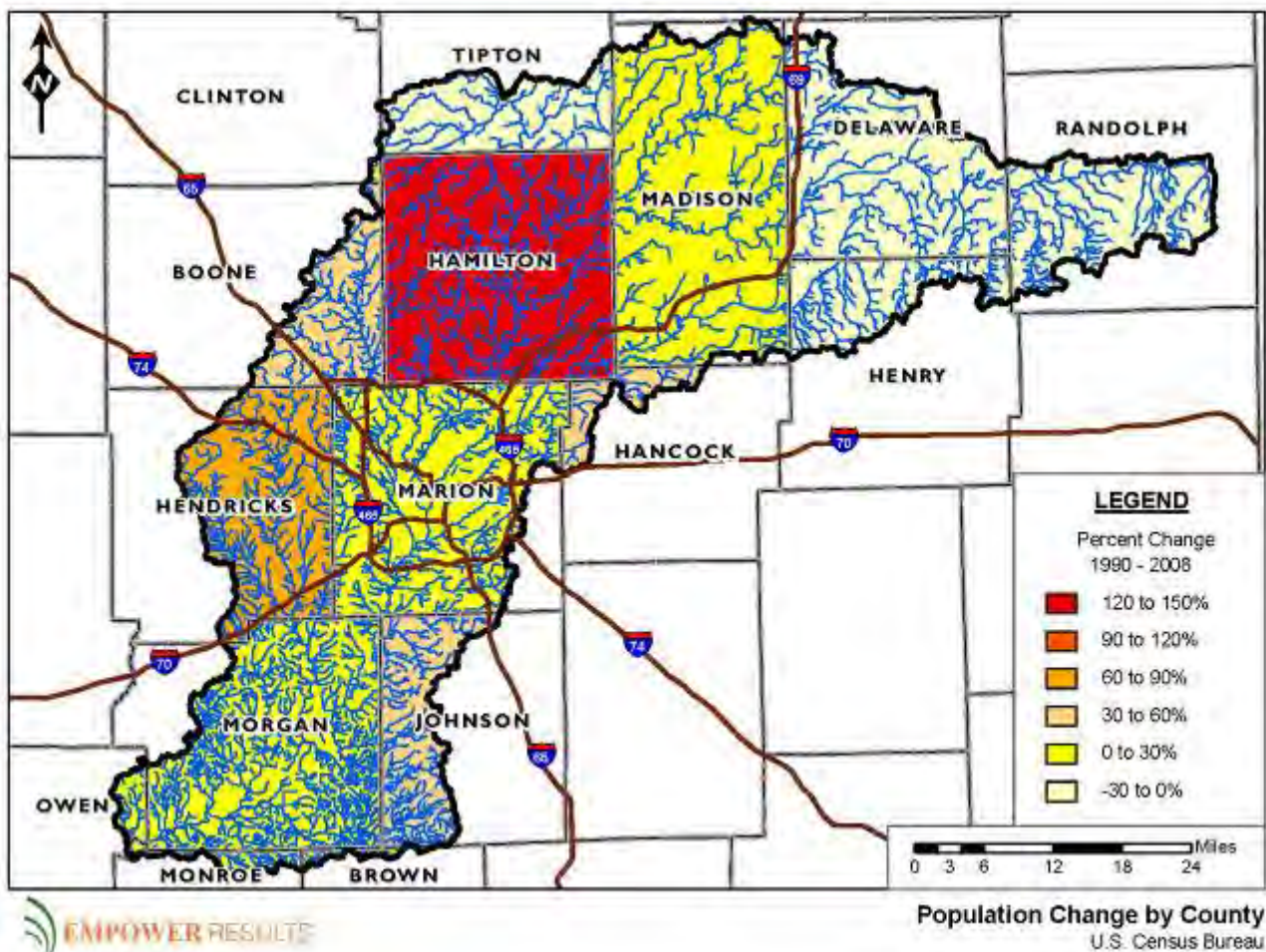


Figure 4.2 – Map showing population change by county in the Upper White River Watershed between 1990 and 2008. Hamilton County and some of the urbanizing core areas are seeing significant population increases, while rural communities to the north are stable or losing population (US Census Bureau).



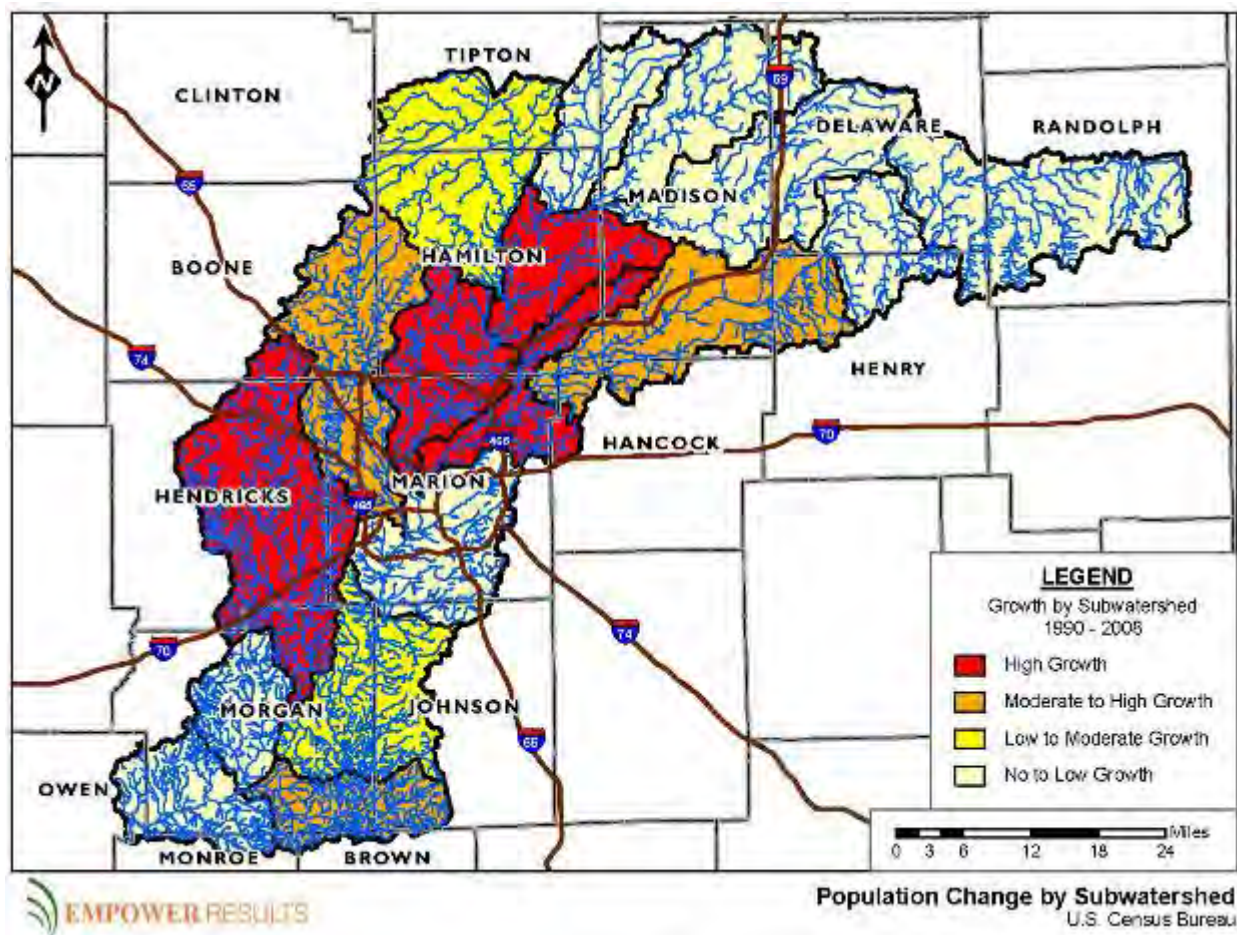


Figure 4.3 – Map showing population change by subwatershed in the Upper White River Watershed between 1990 and 2008. HUC10 subwatersheds in the Urban and Urbanizing Core areas are seeing significant population increases, while subwatersheds in the eastern and northern Agricultural Till Plain Headwaters Areas are stable or losing population. The Southern Forested Hills are growing or stable largely based on proximity to the Indianapolis metropolitan area (US Census Bureau).

## 4.2 Agricultural Practices

### 4.2.1 Row Crop Agriculture

Agriculture is the dominant land use in the Upper White River Watershed. Table 4.1 lists the 2009 acres of the corn and soybeans, the major crops produced throughout the sixteen counties in the watershed. Acreage data for row crop agriculture was available only by county and therefore not shown for each subwatershed. For 2009, the watershed sixteen county totals showed that soybeans were the number one planted crop, followed by corn. However, the difference between the corn and soybean planted acres was small. Over 1.5 million acres of corn and soybeans were planted. Row crop agriculture is focused on the till plains and is the dominant agricultural practice in the Agricultural Till Plain Headwaters area especially focused in the northern subwatersheds.

**Table 4.1 Acreage of corn and soybeans planted in the sixteen counties of the Upper White River Watershed in 2009 (NASS data set).**

<b>County</b>	<b>Acres of Corn Planted</b>	<b>Acres of Soybeans Planted</b>
Boone	98,000	96,800
Delaware	67,000	84,900
Hamilton	50,000	47,200
Hancock	71,000	76,300
Hendricks	66,000	69,900
Henry	75,000	83,100
Johnson	52,000	44,300
Madison	86,700	100,500
Marion	6,000	7,400
Morgan	50,000	41,100
Randolph	91,000	109,000
Tipton	72,000	81,300
<b>Total</b>	<b>784,700</b>	<b>841,800</b>

#### 4.2.2 *Confined Feeding Operations*

Animals raised for food, fur, or recreational purposes in confined areas such as lots, pens, ponds, or buildings, for at least 45 days during any given year is considered confined feeding. Vegetation or ground cover must also not be present over at least half of the animals' confinement and livestock markets and sale barns are usually excluded. Confined feeding operations (CFOs) are defined by Indiana law as any animal feeding operation involved in the confined feeding of at least 300 cattle, or 600 swine or sheep, or 30,000 fowl, such as chickens, turkeys, or other poultry (IDEM, 2001). Some CFOs are classified as concentrated animal feeding operations (CAFOs) because of size or compliance issues. CAFOs are regulated based upon EPA Clean Water Act regulations. All CAFOs are CFOs; CAFOs just have more rigid requirements. The following list shows the animal and their threshold numbers for needing an NPDES permit: at least 700 mature dairy cows; or 1,000 veal calves; or 1,000 cattle other than mature dairy cows; or 2,500 swine above 55 pounds; or 10,000 swine less than 55 pounds; or 500 horses; or 10,000 sheep or lambs; or 55,000 turkeys; or 30,000 laying hens or broilers with a liquid manure handling system; or 125,000 broilers with a solid manure handling system; or 82,000 laying hens with a solid manure handling system; or 30,000 ducks with a solid manure handling system; or 5,000 ducks with a liquid manure handling system.

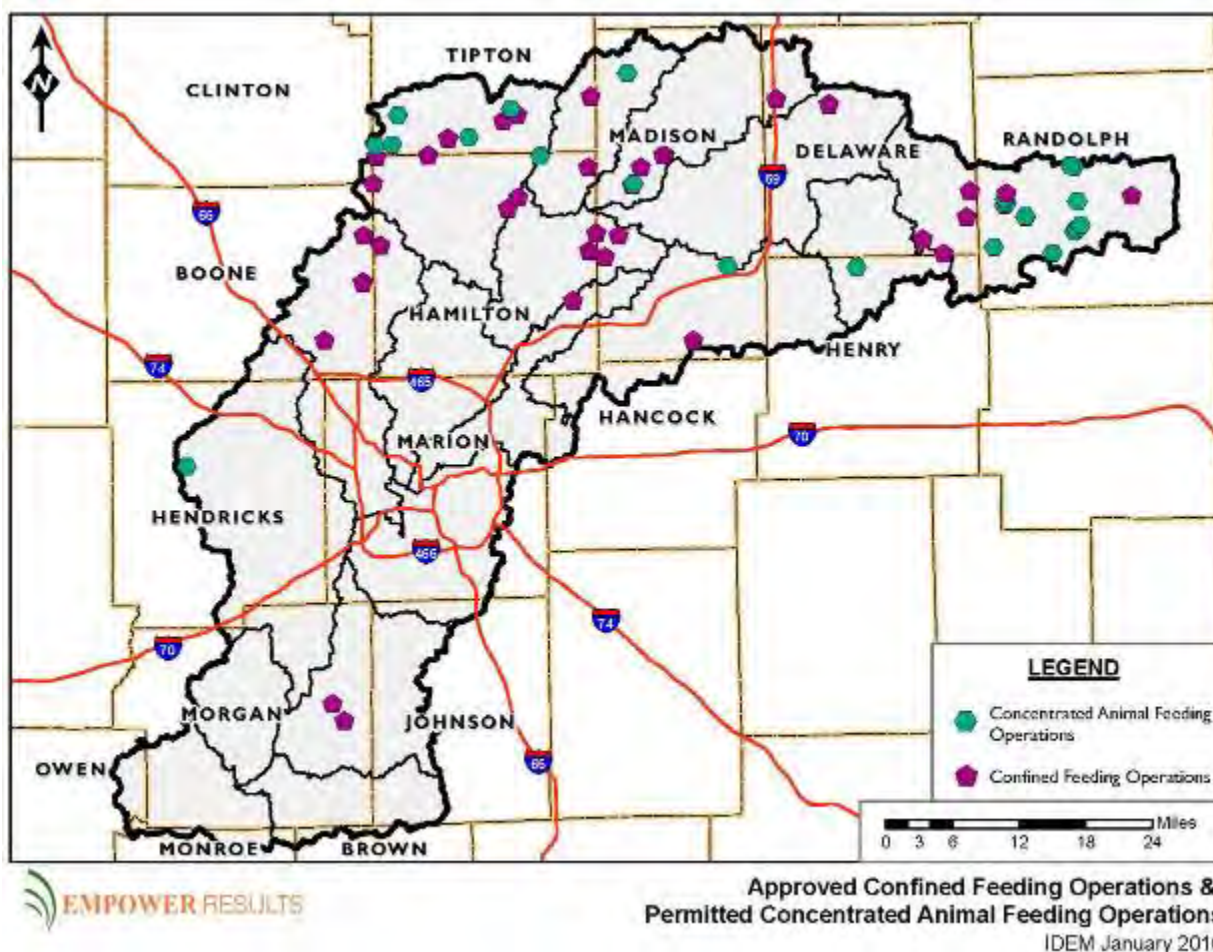
The Indiana Department of Environmental Management (IDEM) regulates confined feeding operations. They oversee permitting, monitoring, and enforcement of these operations. Regulation of confined feeding operations was adopted on November 14, 2001 by the Water Pollution Control Board and effective March 10, 2002. CAFOs are regulated under general permit regulation, 327 IAC 15-15 and the individual permit regulation 327 IAC 5-4-3, adopted on Jan. 14, 2004 effective on March 24, 2004. These regulations are based upon a U.S. EPA Clean Water Act regulation that went into effect in December, 2003.

The Upper White River Watershed, as of January 2010, had 59 approved and permitted operations. The Muncie Creek – White River subwatershed contains the most operations with 18. Figure 4.4 illustrates

these approved confined feeding operations and permitted concentrated animal feeding operations current as of January 2010.

Using Figure 4.4, the Upper White River subwatersheds were prioritized in the weighted matrix (Section 7.0) based on the number of CFOs (and CAFOs) within the area. Each subwatershed was then assigned a number with a one (1) representing a low number of CFOs in the subwatershed and a three (3) representing a high number of CFOs in the subwatershed. The breakdown for the CFOs per subwatershed weighted score is:

- 1 – 0 to 3 CFOs per subwatershed
- 2 – 4 to 10 CFOs per subwatershed
- 3 – 11 to 20 CFOs per subwatershed



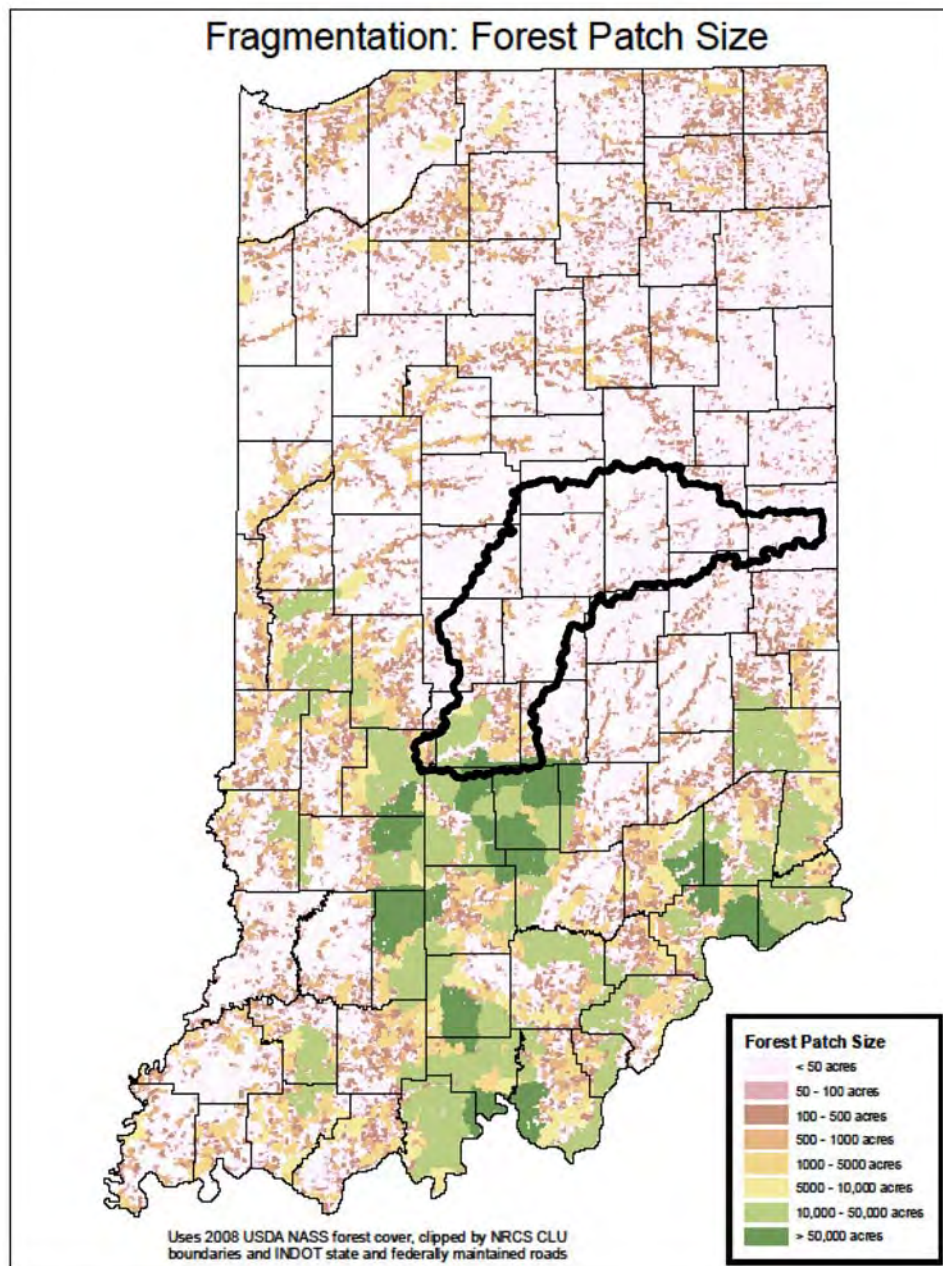
**Figure 4.4 – Map showing location of approved confined feeding operations and permitted concentrated animal feeding operations in the Upper White River Watershed. CAFOs and CFO are concentrated in the Agricultural Till Plain Headwaters area of the watershed. Data from IDEM.**

#### 4.2.3 Forestry

Indiana’s forest and hardwood industry has a total economic impact of \$17 billion dollars. There are 4,654,495 acres of forest land in Indiana, 85% of which is privately owned and 96% is hardwoods (IDNR, 2007). The forested areas throughout much of the Upper White River Watershed are not large,



contiguous tracts of land but are generally intermixed with agricultural and pasture land. This is especially the case in the northern and central portions of the watershed in the Agricultural Till Plain Headwaters and Urban and Urbanizing Core areas. HUC 10 subwatersheds in the Southern Forested Hills are dominated by forest land cover and have more continuous wooded stands (Figure 4.5). Most wooded areas are second or third growth forests. Morgan-Monroe State Forest is within these subwatersheds. Both private and public lands are timbered for hardwoods and numerous tree farms and other managed forest lands occur. Steep slopes and thin soils make suitable and sustainable forestry practices an important consideration for water resource protection in these HUC 10 subwatersheds.



**Figure 4.5 – 2008 forest patch size for Indiana. Most of the Upper White River Watershed has forest cover limited to small areas interspersed with agriculture and pasture. The Southern Forested Hills areas in Morgan County are an exception and forest patch size increases. (IDNR, 2010).**

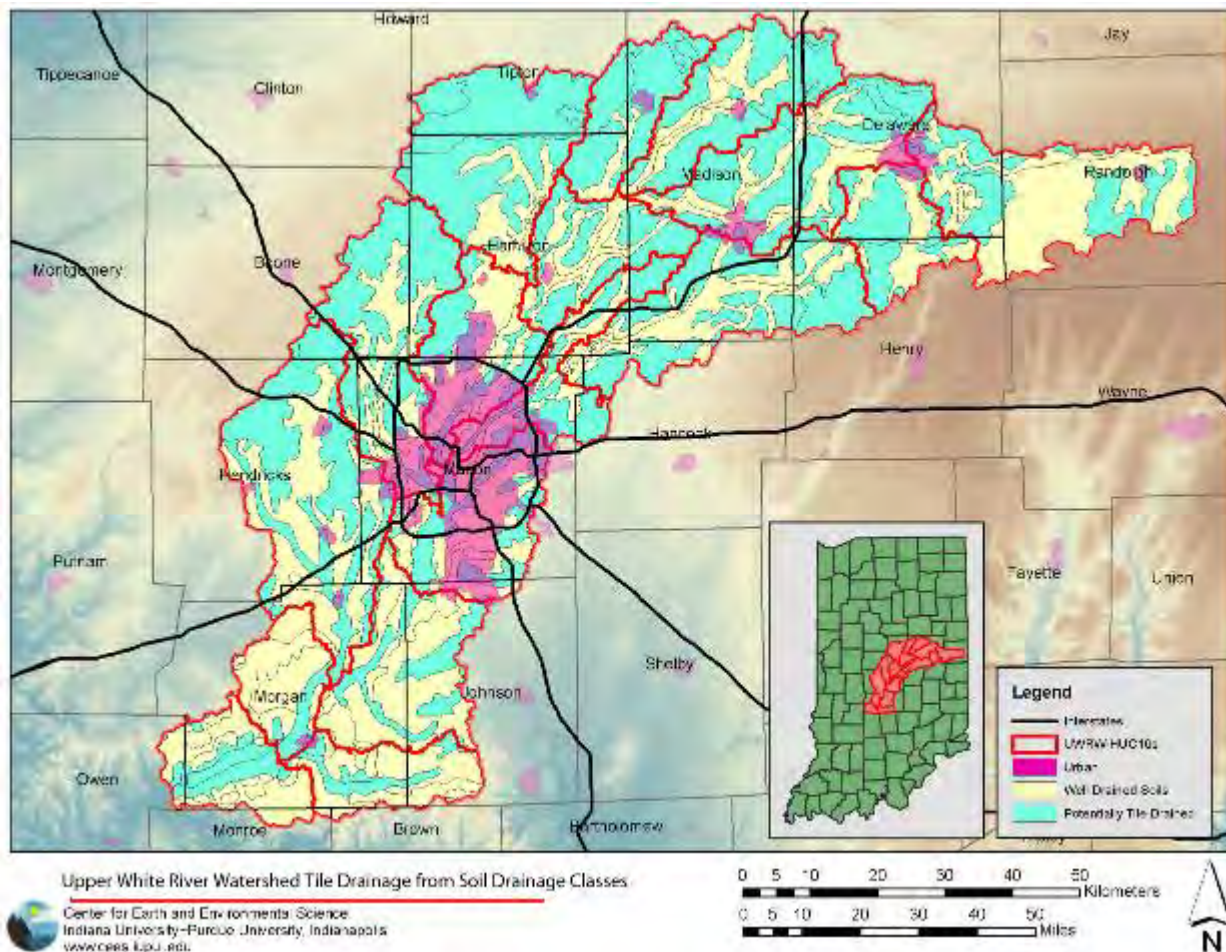
#### 4.2.4 Tile Drainage

In order to assess HUC 10 subwatersheds for degree of tile drainage, an assessment was made of soil drainage classes. Poorly drained soil classes (somewhat poorly drained, poorly drained, and very poorly drained) are widely reported to be tile drained (Franzmeier et al., 2001, Kladvko, et al., 2004). Research in the Midwest and Indiana specifically, shows that tile-drained agricultural landscapes are the source areas for high levels of nitrate export to water bodies (Wagner et al., 2008, Baker et al., 2006; Royer et al., 2006). Thus by identifying somewhat poorly drained, poorly drained, and very poorly drained soils, we have also identified subwatershed areas that are tile drained (Figure 2.8) and at higher risk for exporting increased loads of dissolved contaminants – especially nitrate and atrazine. Tile drained areas also export water very quickly so that drainage ditches may be highly erosional and instream erosion is a source of suspended sediment and turbidity to downstream water resources.

Table 4.2 shows the amount (acres) and percentage of each HUC 10 that is potentially tile drained. This analysis shows that the Agricultural Till Plain Headwaters areas contain HUC 10 subwatersheds with the highest percentage of tile drained areas, ranging from 60-90% of the subwatershed area. An important exception to this is Muncie Creek –WR subwatershed with only 36% tile drained. HUC 10 subwatersheds in the Urban and Urbanizing Core are also shown, but these estimates are not accurate for the urbanized areas due to the extensive modification related to impervious cover and storm water management. The HUC 10 subwatersheds of the Southern Forested Hills have small portions of the watershed that are tile drained (<35%) and these areas are concentrated in the floodplain valleys.

**Table 4.2 Amount (in acres) and Percentage of each HUC10 subwatershed that is potentially tile drained utilizing soil drainage classes as an estimator of tile drainage. Poorly drained soil classes are documented to be tile drained and were used to calculate potentially tile drained areas. Estimate is not accurate for Urban and Urbanizing Core due to extensive landscape manipulation.**

HUC 10	Watershed	Very Poorly Drained	Very Poorly to Poorly Drained	Poorly Drained	Somewhat Poorly Drained	Moderately Well Drained	Well Drained	Somewhat Excessively Drained	Total	Potentially Tiled	% Potentially Tiled
0512020101	Muncie Creek - WR	2,058			53,514	11,504	85,397		152,474	55,572	36.45%
0512020102	Buck Creek		2,152		36,276		25,600		64,027	38,427	60.02%
0512020103	Killbuck Creek - WR	1,449			84,617	10,331	38,483		134,881	86,066	63.81%
0512020104	Pipe Creek				70,890	10,620	16,466		97,975	70,890	72.35%
0512020105	Duck Creek	4,170		12,769	43,059		7,142		67,141	59,999	89.36%
0512020106	Cicero Creek			64,244	52,241		25,853		142,337	116,485	81.84%
0512020107	Stony Creek - WR			5,118	37,109		32,577		74,804	42,227	56.45%
0512020108	Geist Reservoir - Fall Creek		2,564	25	82,109		53,812		138,510	84,698	61.15%
0512020109	Fall Creek			7,356	33,209		25,076		65,641	40,565	61.80%
0512020110	Crooked Creek - WR			8,362	31,703		47,637		87,702	40,065	45.68%
0512020111	Eagle Creek	226		8,294	78,135		46,879		133,535	86,655	64.89%
0512020112	Pleasant Run - WR			14,236	28,010		58,512		100,758	42,245	41.93%
0512020113	White Lick Creek		2,574	22,907	76,725		83,496		185,702	102,206	55.04%
0512020114	Clear Creek - WR		191	13,517	20,200		74,341	1,808	110,056	33,908	30.81%
0512020115	Lambs Creek - WR		1,210	8,141	1,141		41,650	464	52,605	10,492	19.94%
0512020116	Indian Creek		2,297	8,522	3,792		43,583	1,616	59,811	14,612	24.43%
0512020117	Butler Creek - WR		7,003	9,493	6,052		41,361	2,096	66,006	22,549	34.16%



**Figure 4.6 – Map showing areas of extensive tile drainage as interpreted from soil drainage classes. Soils that are very poorly drained, poorly drained, and somewhat poorly drained tend to be tile drained and are shown in blue. Extensively tiled drained lands occur preferentially in the Agricultural Till Plain Headwaters area of the watershed with the exception of portions of Randolph County in the Muncie Creek- White River subwatershed. Urban areas are shown in pink.**

Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on the percent tile drainage in each subwatershed where agriculture is important. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a high percentage of tile drained areas. A one (1) signifies that the subwatershed has a low percentage of tile drained areas. The breakdown for the weighted categories for percentage of tile drained areas is:

- 1 – 0 to 40 percent tile drained areas
- 2 – 40.01 to 60 percent tile drained areas
- 3 – 60.01 to 90 percent tile drained areas

#### 4.2.5 Conservation Tillage Adoption

Conservation tillage systems are rapidly increasing in Indiana, as well as in the Upper White River Watershed. It is estimated that there has been over a 25 percent increase in total no-till acreage in Indiana since 1990. On the surface, this is good news for Indiana’s lakes and streams. Conservation tillage helps to reduce runoff. The corn or soybean residue left on a field by practicing conservation



tillage shield the soil from the impact of raindrops and acts as a barrier to slow the movement of water. Slower water movement allows for its infiltration into the soil. Infiltration reduces soil erosion and can help mitigate export of sediment and particle associated contaminants (esp. phosphorus). However, new discussions in the science community indicates that in areas of tile drainage, enhanced infiltrations, especially through macropores, can increase export of dissolved contaminants, including nitrate and certain pesticide, especially atrazine. Therefore, caution needs to be paid to such contaminants moving through tile. Where nitrate and atrazine transport are a concern, additional BMPs that intercept tile drainage before it enter the stream may be needed.

Because agriculture is an important part of the Upper White River Watershed, especially in the agricultural till plain headwaters region in the northern area of the watershed, no-till conservation trends were examined. 2009 data from the United States Department of Agriculture - National Agriculture Statistics Service (USDA-NASS) was analyzed in order to document trends of no-till adoption in the watershed. No-till adoption was analyzed in two different ways. For both corn and soybeans, adoption was analyzed by percentage of adoption and then both on a county by county basis and by a HUC10 subwatershed basis. An analysis of adoption by county has the potential to provide information about social barriers to adoption related to technical assistance, while an analysis by HUC10 subwatershed can be utilized to assess water quality benefit. Percentages for the 10 digit subwatersheds were calculated by averaging county percentages with the largest land area in the subwatershed. For example, the Muncie Creek – White River subwatershed is in Randolph, Delaware, and Henry Counties; however, the area of Henry County in the subwatershed is not significant, so it is not included in the calculation of the subwatershed percentage.

It was initially thought that corn would be the better crop for no-till practices than soybeans (ISDA, 2010). This, however, was not the case and soybeans were found to be better adapted to no-till. This is reflected in the figures. No-till adoption percentages are greater for soybeans (Figures 4.7 and 4.8) than they are for corn (Figures 4.9 and 4.10). No-till practices are also better suited on rolling landscapes where severe water erosion is more likely to occur. If one looks at the topography of the Upper White River Watershed, they will find that the eastern counties of the watershed have a more rolling terrain than the western portions. The eastern counties are where adoption of no-till practices for both corn and soybeans are highest.

Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on the percent adoption of no-till, calculated from total soybean acreage and total corn acreage, in each subwatershed. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a low percentage of no-till adoption, while a one (1) signifies a high percentage of no-till adoption. Those subwatersheds with limited agriculture have not been prioritized. The weighted breakdown for the percentage of no-till adoption for soybeans is:

- 1 – 66 to 100 percent adoption per subwatershed
- 2 – 51 to 65 percent adoption per subwatershed
- 3 – 0 to 50 percent adoption per subwatershed

The weighted breakdown for the percentage of no-till adoption for corn is:

- 1 – 51 to 100 percent adoption per subwatershed
- 2 – 26 to 50 percent adoption per subwatershed
- 3 – 0 to 25 percent adoption per subwatershed



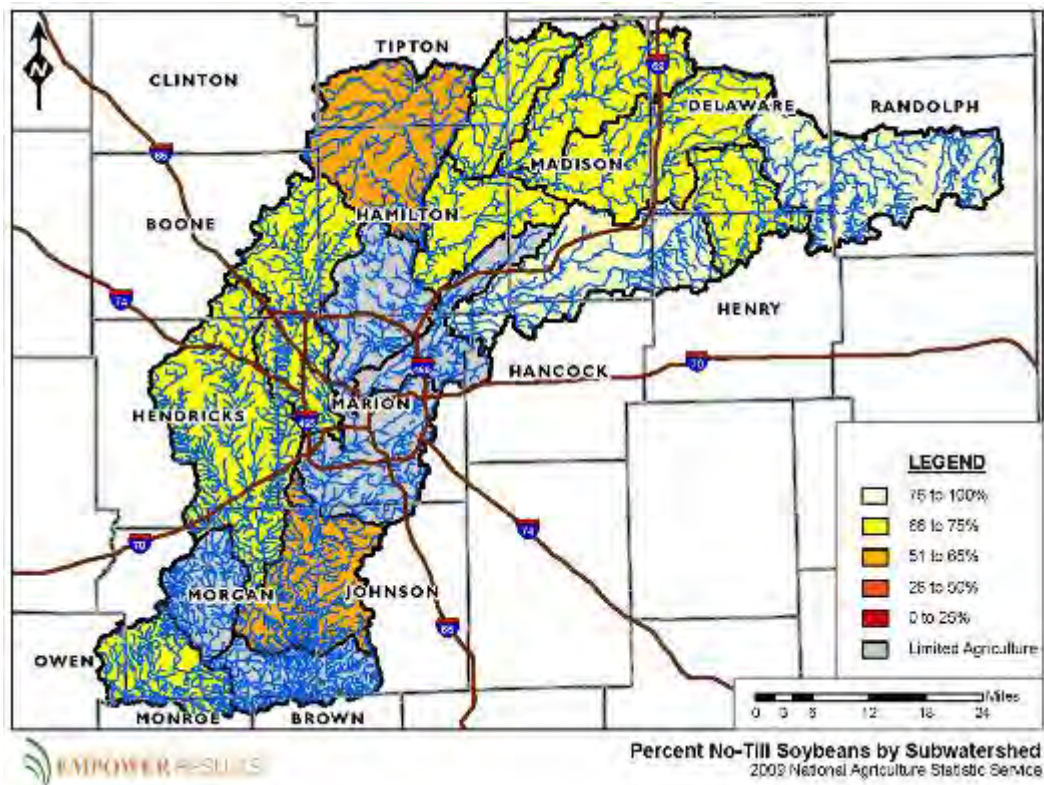


Figure 4.7 – No-till adoption for soybeans by HUC 10 subwatershed in the Upper White River. Data from USDA, NASS.

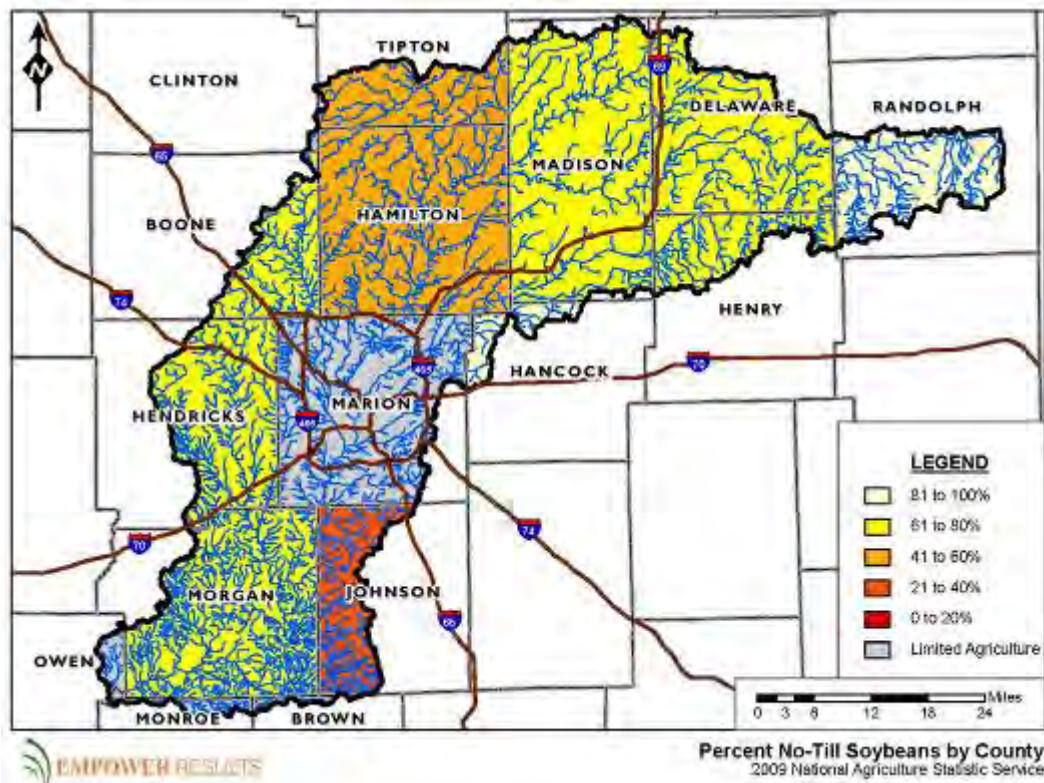


Figure 4.8 – No-till adoption for soybeans by county for counties in the Upper White River Watershed. Data from USDA, NASS.



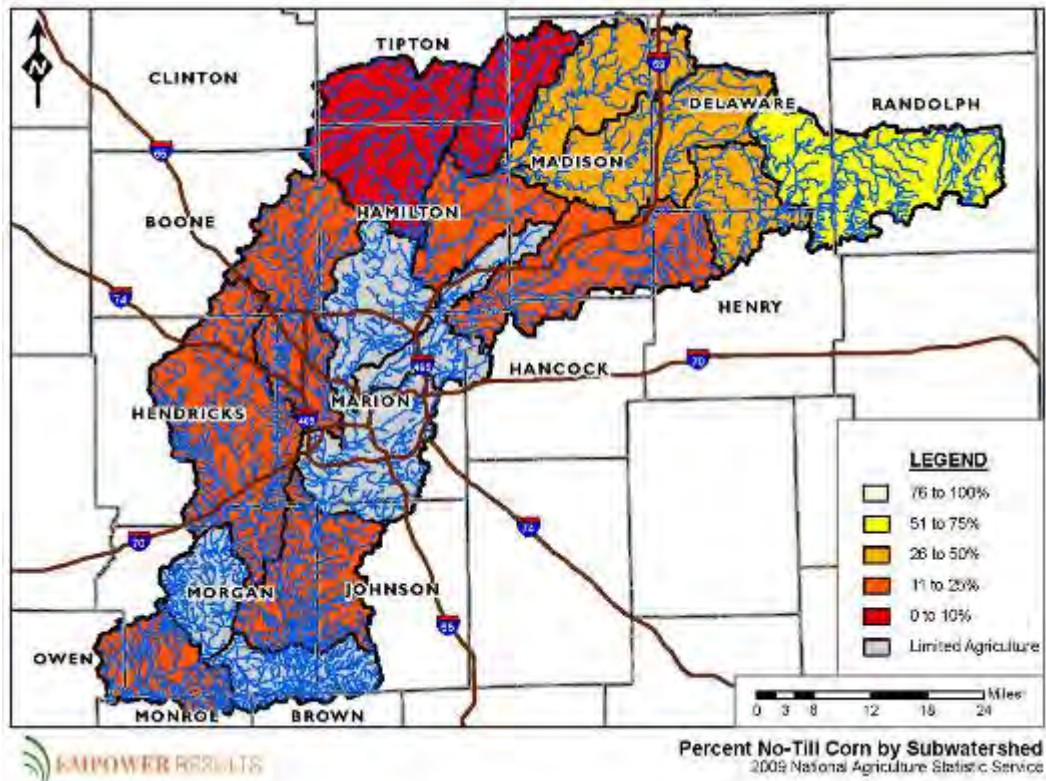


Figure 4.9 – No-till adoption for corn by HUC 10 subwatershed in the Upper White River Watershed. Data from USDA, NASS.

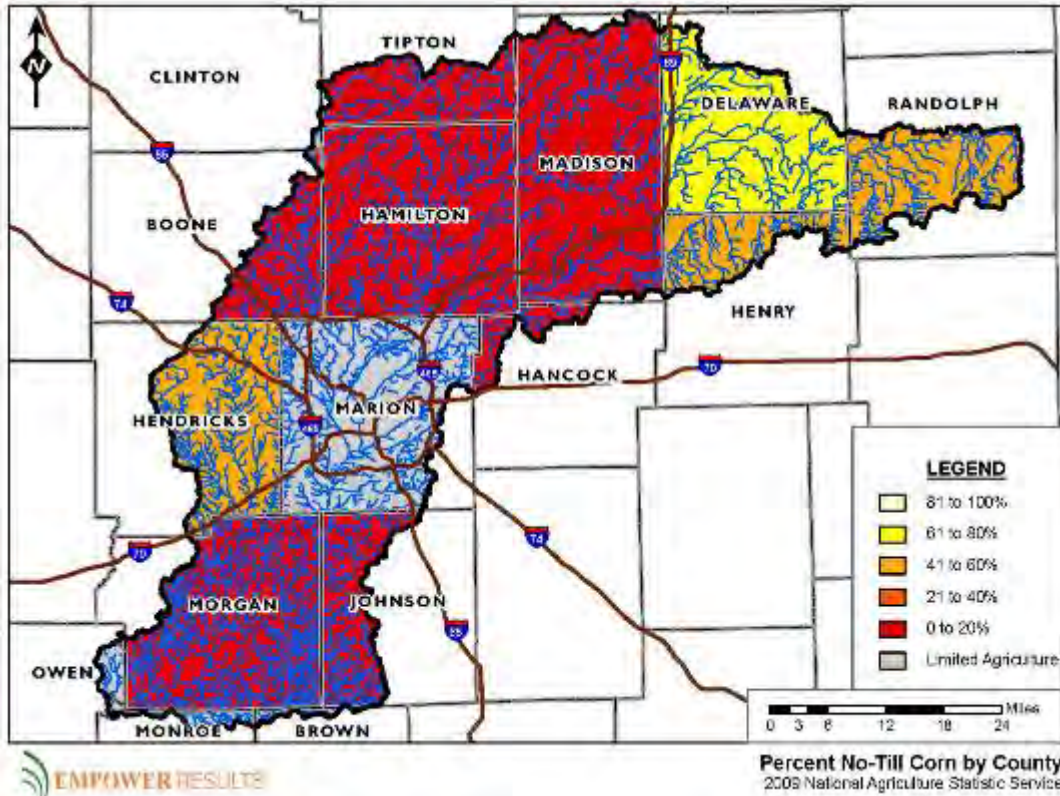


Figure 4.10 – No-till adoption for corn by county in the Upper White River Watershed. Data from USDA, NASS.

### **4.3 Regulated Drains and Maintenance**

County surveyors and drainage boards play a critical role in the implementation of streamside BMPs, as well as potential restoration efforts that may involve the manipulation of current above or below ground drainage infrastructure. The Indiana Drainage Code of 1965 sets forth the authority to create a Drainage Board in each County. Each Drainage Board consists of either the County Commissioners or a citizen board with one Commissioner as a member. The County Surveyor serves in a position on the Board as an Ex-Officio Member. The surveyor serves as a technical advisor to the Board and does not vote.

The Drainage Board has the authority within the county to construct, maintain, reconstruct or vacate a regulated drain. They may also create new regulated drains if so petitioned by landowners. The Board is in charge of maintaining drains by putting the drain back to its original specifications by dredging, repairing tile, clearing, removing obstructions, or other work necessary to keep the drain in proper working order. The County Surveyors are often the best contact for drainage projects or concerns, or to coordinate with the Drainage Boards.

Agricultural areas with very poorly drained, poorly drained, and somewhat poorly drained soils typically employ tile drainage systems to maintain groundwater levels at suitable levels to maintain soil aeration and strong crop yields. These tile drainage networks discharge to agricultural ditches and streams, many or most of which are regulated drains. Both water quality and quantity in these drainage systems are dominated by the drainage networks with large changes in system function being controlled by the condition and maintenance of regulated drains. The types of buffers and buffer width are typically controlled by drainage boards as they maintain easements along regulated drains. An understanding and consideration of the management of regulated drains in agricultural areas is critical to addressing water quality concerns in a given watershed especially when it is dominated by tile drained soils.

Impervious surfaces, disturbed soils, and changes in vegetative cover such as managed turf associated with urban development can have multiple detrimental impacts on streams and waterways throughout the watershed. Compared to the pre-development condition, post-development stormwater discharges can increase the runoff volume, increase the peak discharge, and decrease the infiltration of stormwater. This results in a decrease in the baseflow in headwater streams, which leads to negative impacts on channel stability. Common problems include bank scouring and erosion, increased downstream flooding, increased suspended solids, and loss of in-stream habitat for macroinvertebrates, fish, and other organisms. Since regulated drains have historically routed stormwater, it is imperative that they be maintained and monitored. As they often transect private property and various political jurisdictions, they are protected under local authorities.

Regulated drains are not comprehensively mapped or available; however they are critically important to future watershed planning and restoration efforts. For many counties, most of the streams are regulated drains. Future project recommendations will need to consider the regulated drain status of a given stream and be analyzed on a case by case basis. Drainage laws and approaches to drainage are currently an important control and barrier to improving water quality in Upper White River Watershed streams.

### **4.4 Buffer Analysis – Streamside Land Use Land Cover**

A buffer is the area of land adjacent to a waterway. Streambanks, floodplains, and wetlands that often comprise buffers are typically covered with trees, shrubs, and other types of vegetation. Buffers are constructed and protected because they serve to create a healthy ecosystem by improving water quality, slowing down and absorbing rainwater, trapping and removing pollutants, providing shade, and preventing streambank erosion. Efficacy of buffers depends on their size, shape, location, type of vegetation,

diversity, continuity, and maintenance. Buffer width is site specific and can fluctuate with landowner objectives and scientific criteria.

The 2008 Land Use / Land Cover layer (USDA, NASS, 2008) generated by the USDA, National Agricultural Statistics Service, 2008 Indiana Cropland Data Layer was utilized to determine the amount and type of buffer present along stream reaches in each of the HUC 10 subwatersheds of the Upper White River Watershed. The goal was to identify areas that would benefit from additional buffer as well as those areas that are adequately buffered. For the analysis, length of stream reach in contact with each of the 25 land use classes in the 55-meter pixel land use grid were summed. The length values were organized by HUC 10 subwatersheds and expressed as miles and percent of total miles in each HUC 10.

For tabulation and graphing purposes, each of these 25 classes was grouped together based on similar effectiveness as stream buffer (Table 4.3).

**Table 4.3 Land Cover Classes and Grouping utilized for buffer classifications (USDA, NASS, 2008).**

<b>Agriculture</b>	Alfalfa Corn Fallow/Idle/Flooded Cropland Miscellaneous Vegetables & Fruit Oats Popcorn or Ornamental Corn Soybeans Winter Wheat Winter Wheat/Soybeans Double-Cropped
<b>Grass</b>	Grass/ Pasture NLCD - Grassland Herbaceous NLCD - Herbaceous Wetlands NLCD - Pasture/Hay NLCD - Shrubland Seed/Sod Grass
<b>Forest</b>	NLCD - Deciduous Forest NLCD - Evergreen Forest NLCD - Woody Wetlands Woodland
<b>Urban-H</b>	NLCD - Developed/High Intensity
<b>Urban-L</b>	NLCD - Developed/Low Intensity NLCD - Developed/Open Space NLCD - Developed/Medium Intensity
<b>Barren</b>	NLCD - Barren
<b>Water</b>	NLCD - Open Water

For the classification of buffer, this report only considered the forest land use class as buffer. All of the land use classes that were combined to create the forest land use land cover category are cover classes that qualify as stream buffer (Table 4.3). The forest class is dominated by Deciduous Forest land cover. The category termed grass included several land use land cover classes - some of which could be considered by some to be stream buffer. However, analysis of the acreage in each of the cover classes

indicates that the grass category is dominated by the pasture and hay land use class (Figure 4.11). This land use class is not suitable stream buffer for water quality or stream health and therefore was not considered as stream buffer. Killbuck Creek and Stony Creek subwatersheds, however also have a notable component of riparian corridor in the herbaceous wetland category, which would be good buffer.

Table 4.4 shows the total length of streams in a given HUC 10 subwatershed, the length for each land use class that occurs along streams and the percentage of the total length of stream in that land use class. The barren class was omitted as it did not represent a significant length of the streams analyzed. The water class is over represented as a buffer because of wide areas in the stream and the inclusion of adjacent gravel pits in some areas. Figure 4.12 displays the stream buffer land use graphically for each subwatershed.

Streams by HUC 10 subwatershed, length of each land use class occurring along streams, and percentage of total stream miles (2008 USDA, NASS)

Length (mi)	Ag	Forest	Grass	Urban -High	Urban -Low	Water	Ag	Forest	Grass	Urban -High	Urban -Low	Water
1.00	15.51	23.85	12.04	0.00	7.07	2.53	25.4%	39.1%	19.7%	0.0%	11.6%	4.1%
5.70	7.16	41.92	6.41	0.00	1.60	8.60	10.9%	63.8%	9.8%	0.0%	2.4%	13.1%
5.68	86.97	48.64	27.85	0.19	37.43	14.53	40.3%	22.5%	12.9%	0.1%	17.4%	6.7%
6.74	14.45	105.59	27.62	0.00	14.06	25.02	7.7%	56.5%	14.8%	0.0%	7.5%	13.4%
6.63	3.55	32.49	8.64	1.16	57.03	33.77	2.6%	23.8%	6.3%	0.8%	41.7%	24.7%
5.40	33.83	17.50	6.26	0.08	7.73	0.00	51.7%	26.8%	9.6%	0.1%	11.8%	0.0%
9.59	43.69	77.18	30.48	0.81	56.30	21.13	19.0%	33.6%	13.3%	0.4%	24.5%	9.2%
2.08	8.09	25.07	3.86	0.27	27.56	7.23	11.2%	34.8%	5.4%	0.4%	38.2%	10.0%
8.52	28.91	58.19	27.01	0.20	34.13	19.93	17.2%	34.5%	16.0%	0.1%	20.3%	11.8%
5.33	4.52	47.72	9.93	0.00	1.76	11.38	6.0%	63.3%	13.2%	0.0%	2.3%	15.1%
1.32	23.06	48.13	22.18	0.09	23.65	14.21	17.6%	36.6%	16.9%	0.1%	18.0%	10.8%
3.85	3.54	45.09	6.25	0.10	2.15	16.68	4.8%	61.1%	8.5%	0.1%	2.9%	22.6%
9.45	52.18	63.94	27.72	0.20	18.59	16.82	29.1%	35.6%	15.4%	0.1%	10.4%	9.4%
4.27	29.72	30.67	10.84	0.03	9.17	3.83	35.3%	36.4%	12.9%	0.0%	10.9%	4.5%
0.92	2.49	39.07	6.42	4.32	75.02	23.45	1.6%	25.9%	4.3%	2.9%	49.7%	15.5%
7.50	13.40	21.58	12.91	0.03	16.32	13.22	17.3%	27.8%	16.7%	0.0%	21.1%	17.1%
1.57	27.76	111.85	27.25	0.81	35.02	8.55	13.1%	52.9%	12.9%	0.4%	16.6%	4.0%



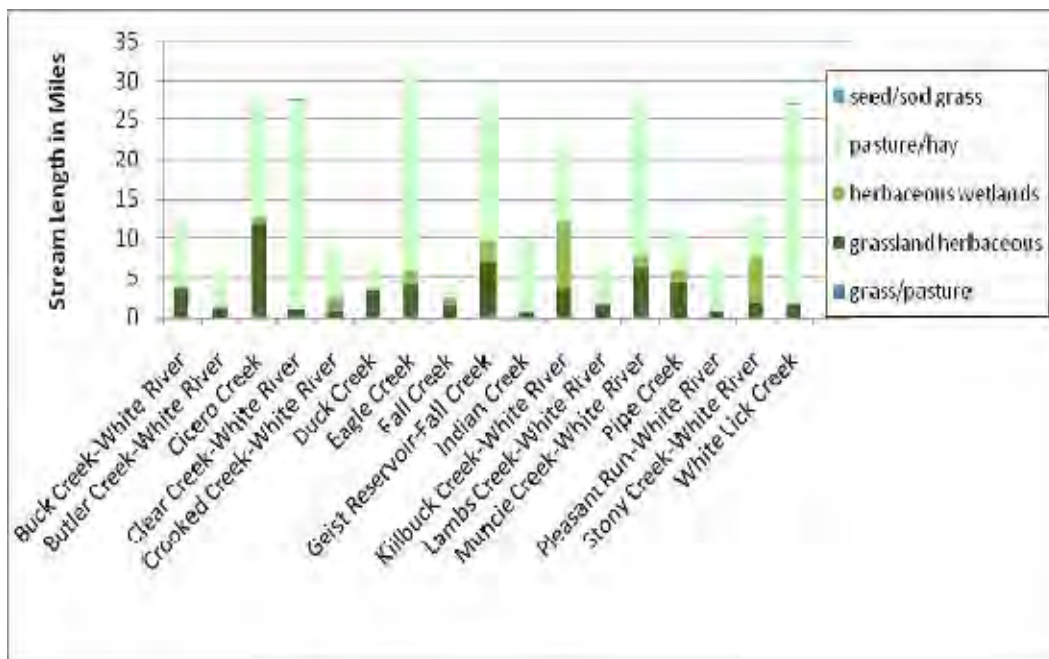


Figure 4.11 - Number of stream side miles in the various grass land cover categories. Forest cover is considered to be buffer while the grass category is dominated by pasture and hay and therefore not considered to be stream buffer.

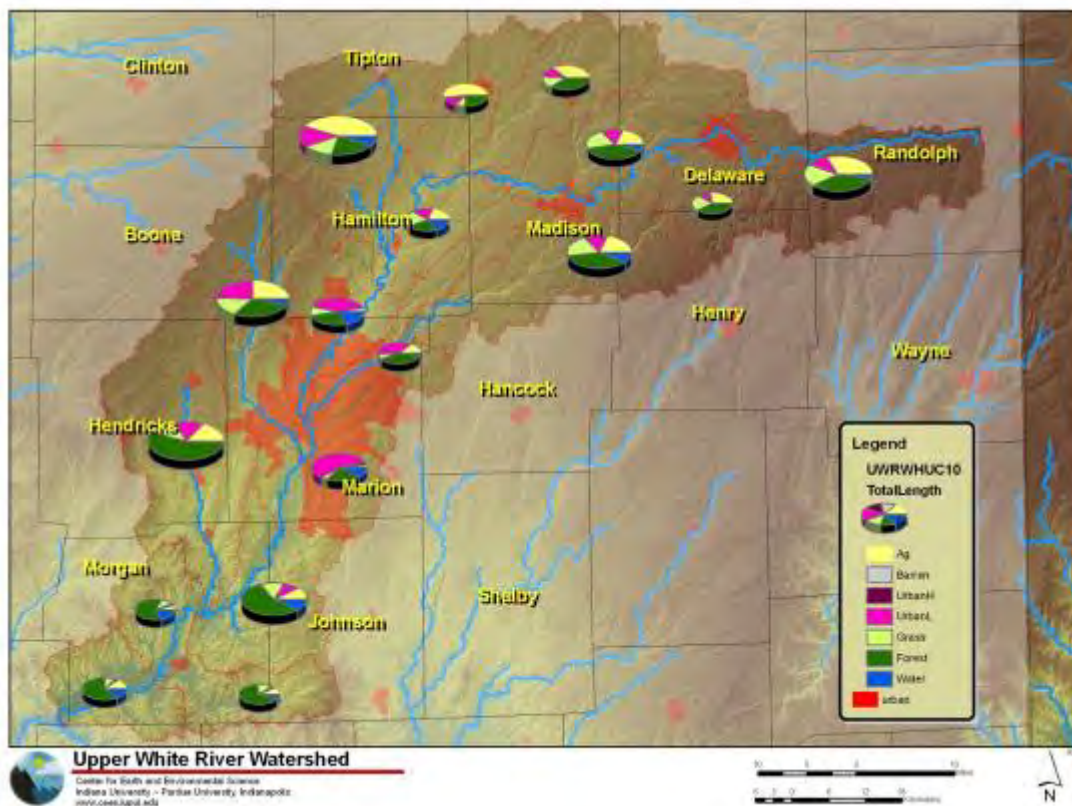
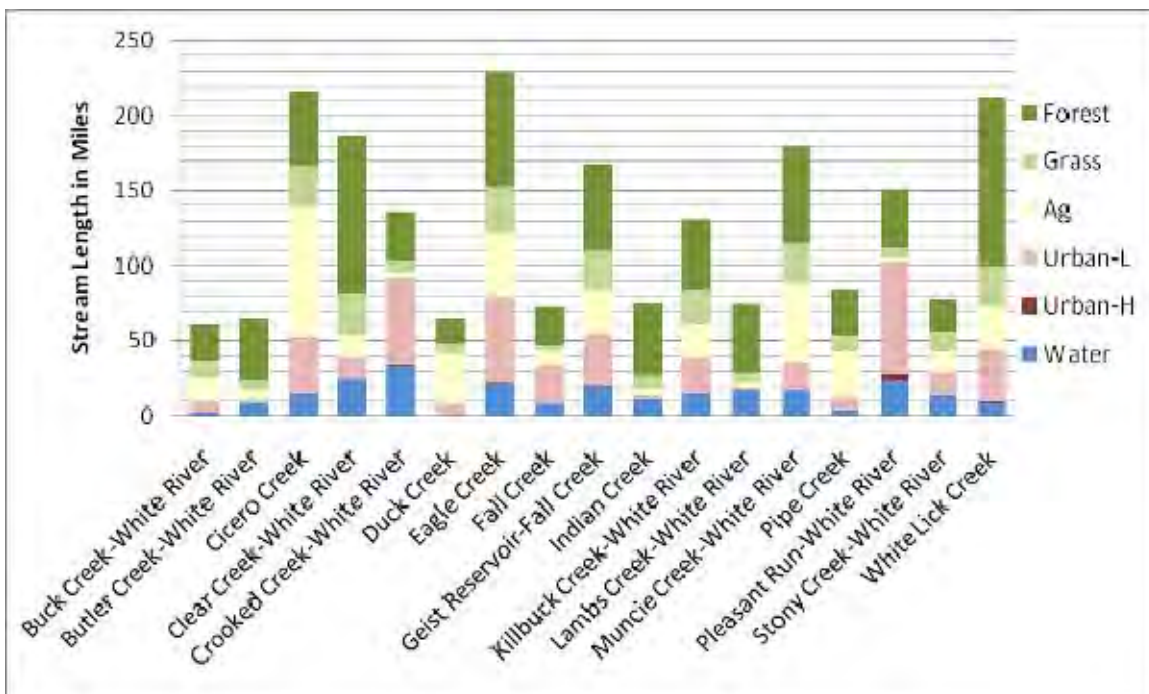


Figure 4.12 - Map showing the percentage of total steam length in a given land use land cover category. Size of pie chart reflects number of stream miles in the subwatershed. Forested land cover is considered to be buffer. USDA, NASS, 2008 data set.



**Figure 4.13 - Number of Stream Miles bordered by a given land use/land cover category for each HUC10 subwatershed.**

Subwatersheds within the Upper White River Watershed have been prioritized in the weighted matrix (Section 7.0) based on the percentage of stream miles in a subwatershed that are poorly buffered. In this assessment agricultural, low density urban and high density urban land use were combined in each subwatershed. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a high percentage of streamside land use in agricultural, low density urban and high density urban land use, while a one (1) signifies a low percentage. The weighted breakdown categories for the percentage of stream miles that are poorly buffered are:

- 1 – 0 to 30% poorly buffered stream miles per subwatershed
- 2 – 31 to 47% poorly buffered stream miles per subwatershed
- 3 – 48 to 67% poorly buffered stream miles per subwatershed

#### 4.5 Construction in a Floodway Permitting

Construction in a Floodway permits have been researched because they have a direct impact on streams. The Flood Control Act (IC 14-28-1) regulates development activities within the floodway of any State waterway. The Indiana Department of Natural Resources, under the Flood Control Act, has the authority requiring approval before the beginning of a project. Activities which may be regulated include such things as bridges, buildings – both residential and commercial, fill, excavations, flood control, dams, levees, outfalls, and certain utility activities.

Construction in a Floodway (CIF) permit information was collected from the Indiana Department of Natural Resources (IDNR) database in February 2008. In order to obtain information about streams within the Upper White River Watershed, the NHD Upper White streams layer was analyzed in GIS. Any named stream was recorded, as well as the county in which it is located. Once that information was

collected, the CIF database was then searched. The stream name and county were entered in as search criteria, as well as the FW designation indicating searching for Floodway permits only. The search then returned the number of permits issued for said stream in said county, dating as far back as 1992.

The permits were then tallied for each county by totaling the number of permits for each stream in the specific county. The counties were then color coded by number of permits in GIS (Figure 4.14).

The breakdown for the color categories is:

- 0 to 50 permits
- 51 to 100 permits
- 101 to 250 permits
- 251 to 500 permits
- 501+ permits

The county with the most permits is Marion County with 564 permits. Next is Hamilton County with 413 permits. These counties are the most urbanized or quickly developing counties in the Upper White River Watershed, so it would make sense that the most permits are being or have been issued for these counties. Six of the counties fall in the 0 to 50 permits category. These counties are ones that have very little of their area within the Upper White River Watershed and/or are very rural counties that are not quickly developing.

The 10 digit HUC subwatersheds were also color coded based on CIF permits (Figure 4.15). The color coding was based on several assumptions since there was no clear way to define the number of permits issued in each subwatershed. Assumptions that were made included the number of permits issued for the counties in which the subwatershed lies and the development that is happening in that subwatershed.

Subwatersheds within the Upper White River Watershed have been prioritized in the weighted matrix (Section 7.0) based on the number of CIF permits in each subwatershed. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a high number of CIF permits issued, while a one (1) signifies a low number of permits issued. The weighted breakdown categories for the number of Construction in a Floodway permits is:

- 1 – 0 to 100 CIF permits per subwatershed
- 2 – 101 to 250 CIF permits per subwatershed
- 3 – 251 to 500+ CIF permits per subwatershed



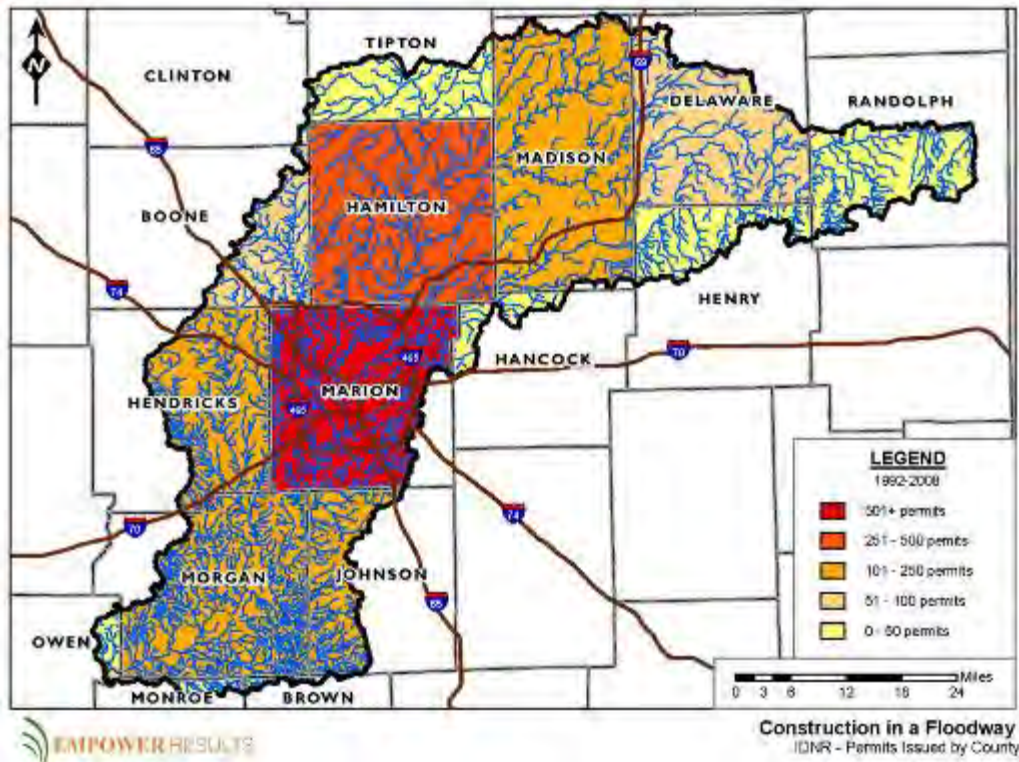


Figure 4.14 – Map showing the distribution of permits for Construction in a Floodway tallied by county in the Upper White River Watershed.

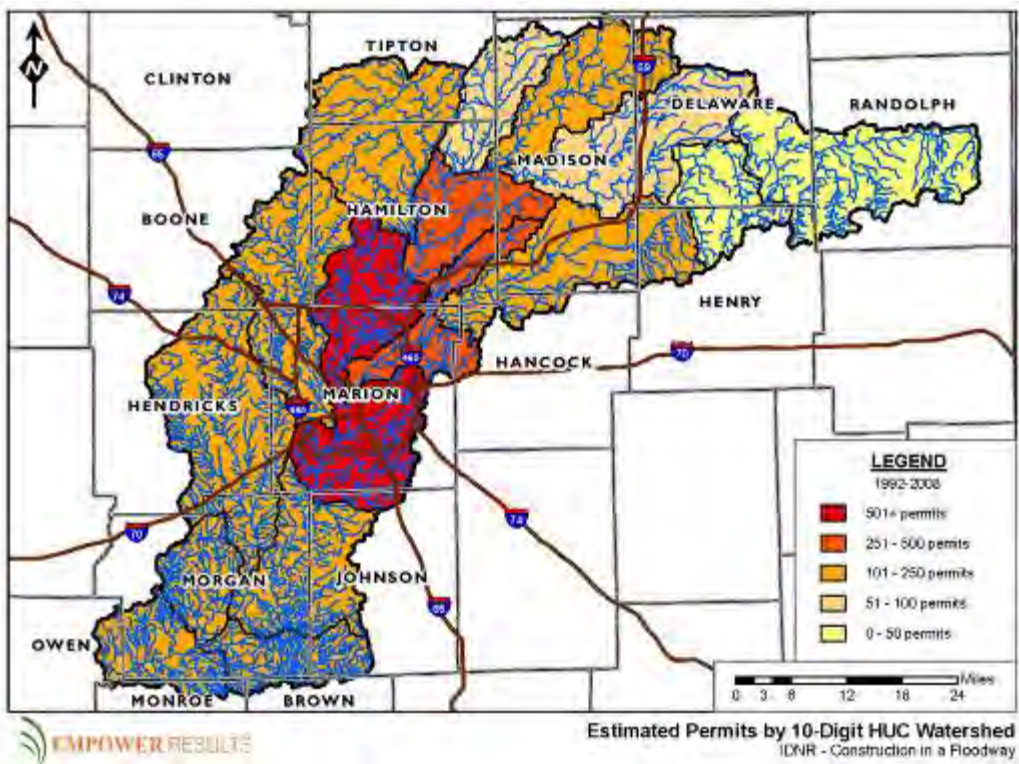


Figure 4.15 - Map showing the distribution of permits for Construction in a Floodway tallied by HUC10 subwatershed in the Upper White River Watershed.

## **4.6 NPDES Dischargers**

### *4.6.1 NPDES Permit Overview*

With the passage of the Stream Pollution Control Law in 1943, Indiana began its efforts to control direct pollutant discharge into State streams. The Clean Water Act of 1972 allowed a permit program to place limits on the amount of pollutants discharged to waters of the State by a discharger. The permit program is known today as the National Pollutant Discharge Elimination System (NPDES) Permit Program. The limits set by the NPDES program are set to protect both aquatic life in the waters which receive the discharge and human health.

The Indiana Department of Environmental Management (IDEM) Office of Water Quality regulates the NPDES Permit Program with oversight from the US Environmental Protection Agency (EPA). NPDES permits regulate the point source discharge of pollutants in order to maintain water quality standards as established by 327 IAC 2. Any point source is required to comply with technology-based treatment requirements.

Most NPDES permits have been around since 1974. The program is designed so that permits are reissued every five years. Several different types of permits are issued by the program. These include: Municipal, Industrial, and Wet Weather. Municipal permits are issued to entities such as cities, towns, schools, regional sewer districts, etc. Industrial permits are issued to facilities that create wastewater while producing a product. Wet Weather permits are issued for stormwater and combined sewer overflows (CSOs).

### *4.6.2 Non-compliance Water Quality Concerns*

The EPA's Enforcement and Compliance History Online (ECHO) is a searchable database that contains compliance inspections, violations, and enforcement actions for regulated entities. The database allows for searches by county, EPA region, and watershed, as well as a number of other methods. This database was searched by watershed in December 2008 to find NPDES dischargers and their violations in the Upper White River Watershed. The dischargers have been tabulated and mapped (Figure 4.16 and Appendix II) Appendix II summarizes the name of the discharger, city, county, 10 digit HUC subwatershed, quarters of noncompliance (out of 12 – current as of Jan-Mar 09), and violation. Regular non-compliance of NPDES dischargers could result in elevated concentrations of pollutants that may otherwise be attributed to non-point sources of pollution.

In order to create a map that reflected percent non-compliance by subwatershed, the UWR subwatersheds were weighted based on the total number of quarters of non-compliance discharges during a three year period from April 2006 through March 2009 (Appendix III) Each subwatershed was then assigned a score of one, two, or three. A score of three (3) indicates a subwatershed with the highest non-compliance, while a subwatershed with a one (1) indicates better compliance in that subwatershed. The system is only a relative comparison and doesn't take into account what parameter the discharger may have been out of compliance for or how far out of compliance any given incident may have been. In all, there has been an average of 53 quarters per subwatershed of non-compliance during this 12 quarter period. The breakdown for the weighted score for the quarters of non-compliance per subwatershed is shown in Figure 4.17 and is as follows:

- 1 – 0 to 53 quarters of non-compliance
- 2 – 54 to 108 quarters of non-compliance
- 3 – 109 to 158 quarters of non-compliance

The Upper White River subwatersheds have been prioritized in the weighted matrix (Section 7.0) based on the number of permitted dischargers located within the area. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a high-priority for NPDES non-compliance, while a one (1) signifies a low priority subwatershed. The breakdown for the weighted categories for the number of dischargers is:

- 1 – 0 to 10 dischargers per subwatershed
- 2 – 11 to 20 dischargers per subwatershed
- 3 – 21 to 31 dischargers per subwatershed

Partway through the creation of this report, NPDES dischargers that were out of compliance for nine quarters or more were revisited on the EPA ECHO website in order to determine if they were making changes to improve their violations, or if they were still in violation. The additional compliance information is current as of July to September 2010 (Table 4.5). Of the 43 dischargers out of compliance for nine quarters or more, 26 of them improved by at least one quarter and 16 of the 26 improved by 3 quarters or more. There were 10 dischargers which showed no improvement, while two of the discharger's compliance was worse than when originally reported. Four of the dischargers are no longer listed in the EPA ECHO database.



**Table 4.5 Comparison of Status of Non-Compliance - NPDES Dischargers (Nine or More Quarters of Non-Compliance)**

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Subwatershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jul-Sept 10)</b>
AMERICAN UNITED LIFE TOWER	INDIANAPOLIS	MARION	Pleasant Run - White River	11	Oil, Grease, TSS	5
ANDERSON WWTP	ANDERSON	MADISON	Killbuck Creek - White River	11	BOD, Chlorine, Copper, E coli, Nitrogen, TSS	5
ATLANTA WWTP	ATLANTA	HAMILTON	Cicero Creek	10	pH, Nitrogen	9
BARGERSVILLE MUNICIPAL WWTP	BARGERSVILLE	JOHNSON	Clear Creek - White River	9	Chlorine, E coli, Nitrogen, TSS	4
BROOKLYN MUNICIPAL STP	BROOKLYN	MORGAN	White Lick Creek	11	BOD, Chlorine, E coli, Nitrogen, DO, TSS	11
BUCKEYE TERMINALS LLC MUNCIE	MUNCIE	DELAWARE	Killbuck Creek - White River	12	TSS	1
CICERO MUNICIPAL WWTP	CICERO	HAMILTON	Stony Creek - White River	9	BOD, E coli, TSS	7
COUNTRYMARK JOLITVILLE TERMINAL	WESTFIELD	HAMILTON	Eagle Creek	12	TSS	3
COWAN ELEM & HIGH SCHOOL	MUNCIE	DELAWARE	Buck Creek - White River	12	BOD, E coli, Nitrogen, DO, TSS	9
EASTERN HENDRICKS CO UTILITY	AVON	HENDRICKS	White Lick Creek	10	BOD, Chlorine, E coli, Nitrogen	7

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Subwatershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jul-Sept 10)</b>
ECHO LAKE LLC	MOORESVILLE	MORGAN	White Lick Creek	11	E coli, Nitrogen, TSS	7
ELWOOD UTILITIES STP	ELWOOD	MADISON	Duck Creek	12	BOD, Chlorine, E coli, Nitrogen, DO, TSS	12
FARMLAND MUNICIPAL STP	FARMLAND	RANDOLPH	Muncie Creek - White River	12	pH, BOD, TSS	12
FORTVILLE MUNICIPAL WWTP	FORTVILLE	HANCOCK	Geist Reservoir - Fall Creek	12	E coli, Nitrogen	5
GASAMERICA 80	ANDERSON	MADISON	Geist Reservoir - Fall Creek	10	Benzene	no longer listed
GASTON WWTP, TOWN OF	GASTON	DELAWARE	Pipe Creek	9	BOD, Chlorine, E coli, Nitrogen, DO, TSS	10
HENDRICKS CO RSD RACEWAY PLAZA	AVON	HENDRICKS	White Lick Creek	10	E coli, TSS	4
169 AUTO TRUCK PLAZA	GASTON	DELAWARE	Pipe Creek	12	BOD, E coli, Nitrogen, DO, TSS	12
INDIANAPOLIS INTERNATIONAL AIRPORT	INDIANAPOLIS	MARION	White Lick Creek	10	COD, Propylene Glycol, pH, DO, Propylene Glycol Monobutyl Ether	9

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Subwatershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jul-Sept 10)</b>
KENNEDY ENTERPRISES, INC.	ALEXANDRIA	MADISON	Pipe Creek	11	BOD, E coli, Nitrogen	10
LUCENT TECHNOLOGIES INC	FORTVILLE	HANCOCK	Geist Reservoir - Fall Creek	12	Volatiles	no longer listed
MAPLE GROVE MOBILE HOME PARK	MARTINSVILLE	MORGAN	Clear Creek - White River	12	BOD, Chlorine, Nitrogen, TSS	12
MIDDLETOWN WWTP	MIDDLETOWN	HENRY	Geist Reservoir - Fall Creek	10	Chlorine, TSS	10
MODOC, TOWN OF	MODOC	RANDOLPH	Muncie Creek - White River	12	pH, Chlorine, E coli, Nitrogen, DO, TSS	7
PARKER CITY MUNICIPAL WWTP	PARKER CITY	RANDOLPH	Muncie Creek - White River	9	BOD, Chlorine, E coli, TSS	8
PAWS INC	ALBANY	DELAWARE	Muncie Creek - White River	12	BOD, E coli, Nitrogen, DO, TSS	10
PERRY ELEMENTARY SCHOOL WWTP	SELMA	DELAWARE	Muncie Creek - White River	12	E coli, Nitrogen, DO, TSS	no longer listed
PETRO STOPPING CENTER 74	GASTON	DELAWARE	Pipe Creek	12	BOD, E coli, Nitrogen, DO, TSS	12
PINE RIDGE MOBILE HOME PARK	ZIONSVILLE	BOONE	Eagle Creek	11	BOD, Nitrogen, TSS	9

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Subwatershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jul-Sept 10)</b>
PIPE CREEK REST PARK I69	GASTON	DELAWARE	Pipe Creek	12	pH, E coli, Nitrogen	6
PROPORTION AIR INC	MCCORDSVILLE	HANCOCK	Geist Reservoir - Fall Creek	11	BOD, E coli, DO, Trichloroethene	no longer listed
QUIET ACRES MOBILE HOME PARK	SELMA	DELAWARE	Muncie Creek - White River	12	BOD, E coli, Nitrogen, DO	N/A
RED GOLD INC. - ORESTES	ORESTES	MADISON	Pipe Creek	12	Oil, Grease	4
ROLLING VISTA ESTATES	FIVE POINTS	MARION	Clear Creek - White River	9	BOD, Chlorine, E coli, Nitrogen, DO, TSS	10
RUBY HILLS MOBILE HOME PARK	MARTINSVILLE	MORGAN	Lambs Creek - White River	12	BOD, Chlorine, E coli, Nitrogen, DO, TSS	11
SHADY HILLS UTILITY COMPANY, INC	INDIANAPOLIS	MARION	Eagle Creek	10	BOD, E coli, Nitrogen, Phosphorus, TSS	10
SPEEDWAY WWTP	SPEEDWAY	MARION	Eagle Creek	10	BOD, Chlorine, Cyanide, E coli, Nitrogen, TSS	10
ST JOHNS EVANGELICAL LUTHERAN	INDIANAPOLIS	MARION	Pleasant Run - White River	9	BOD, E coli, Nitrogen, DO, TSS	8

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Subwatershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jul-Sept 10)</b>
SUBURBAN ESTATES MHP	NOBLESVILLE	HAMILTON	Stony Creek - White River	12	pH, Chlorine, E coli, Nitrogen, TSS	8
SUMMIT SPRINGS REGIONAL WASTE DISTRICT WWTP	MT. SUMMIT	HENRY	Buck Creek - White River	10	E coli, Nitrogen	8
TALL TIMBERS MOBILE HOME PARK	NOBLESVILLE	HAMILTON	Stony Creek - White River	10	BOD, Chlorine, E coli, Nitrogen, DO, TSS	5
WES-DEL JR-SR HIGH SCHOOL	GASTON	DELAWARE	Killbuck Creek - White River	12	BOD, Chlorine, Nitrogen, DO, TSS	12
WEST CENTRAL CONSERVANCY DIST	AVON	HENDRICKS	White Lick Creek	11	BOD, E coli, Nitrogen, DO, TSS	6



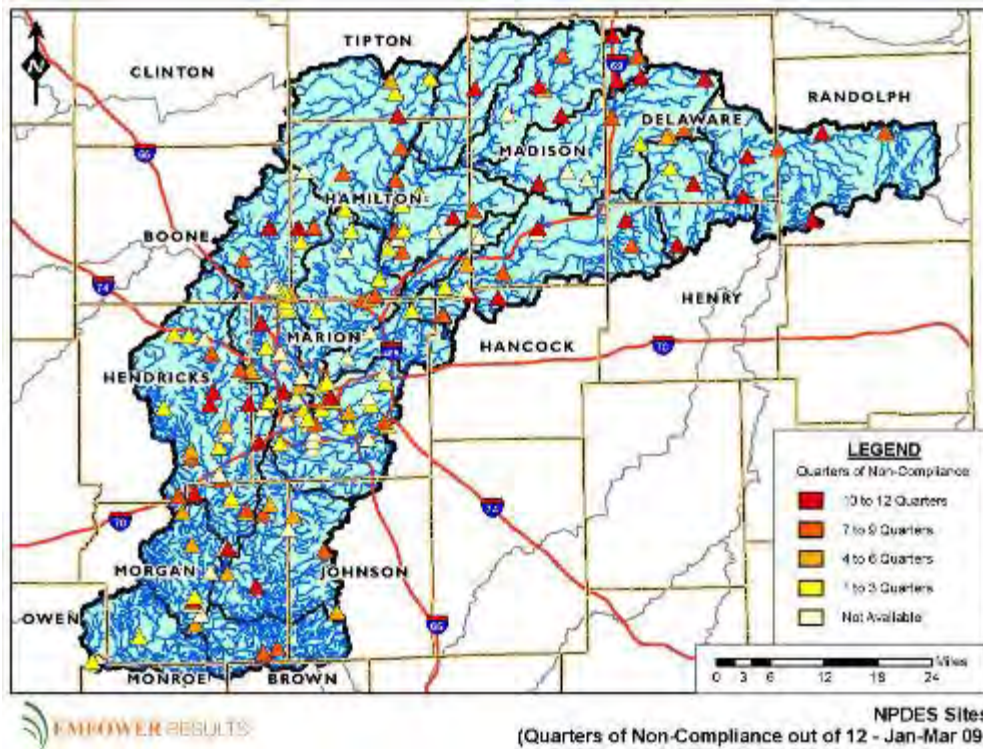


Figure 4.16 – Map showing the distribution of NPDES Dischargers color coded for permit non-compliance over a 12 quarter period.

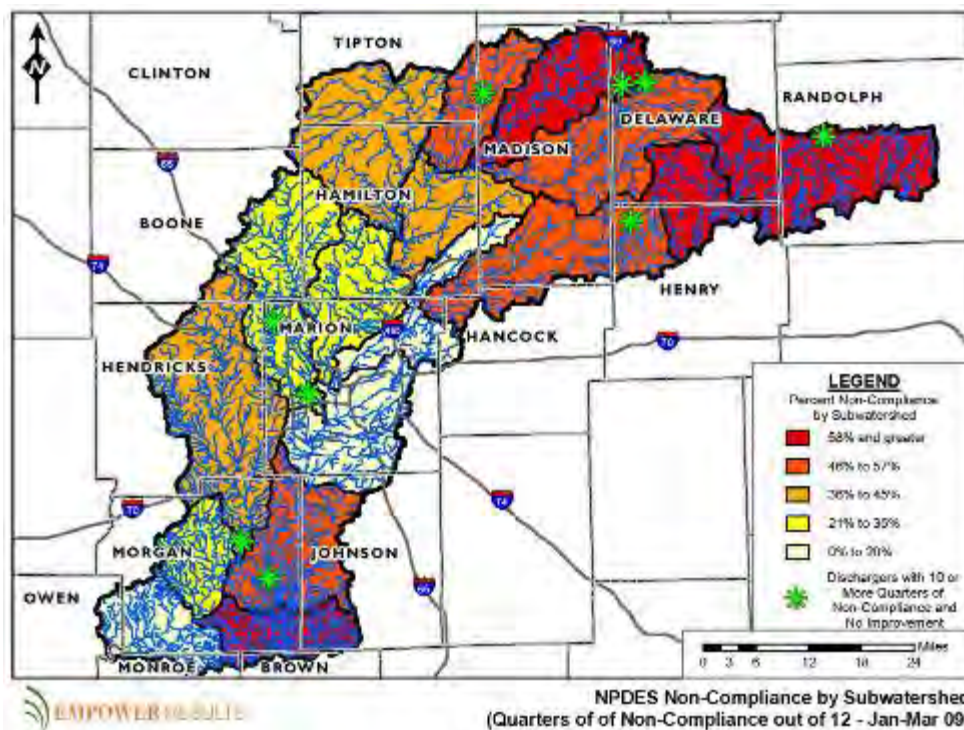


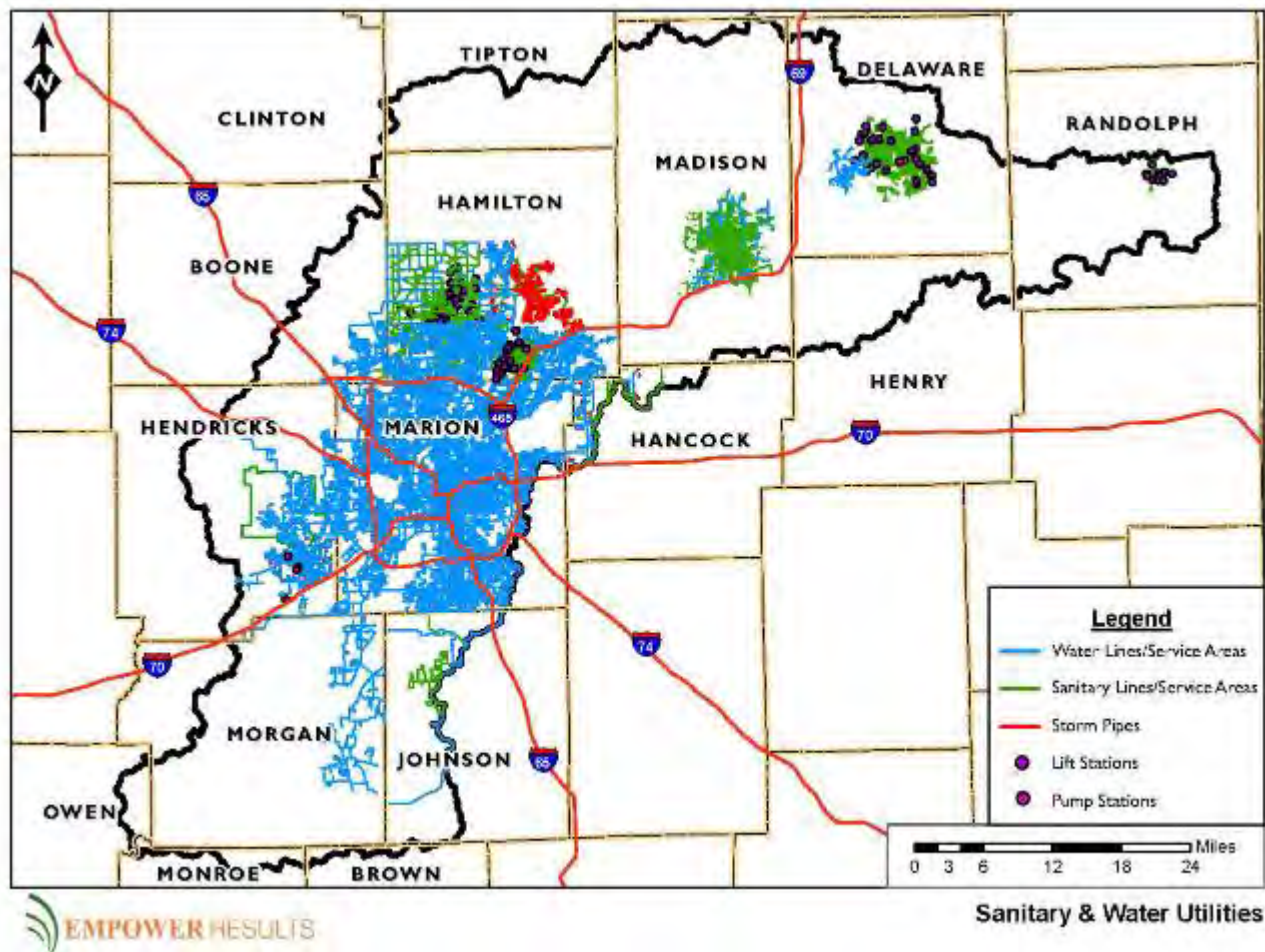
Figure 4.17 – Map showing the weighted non-compliance record of NPDES Dischargers for each HUC10 subwatershed color coded for permit non-compliance over a 12 quarter period.

#### 4.7 Sewered and Unsewered Areas

Human waste is managed in one of two ways: septic systems or sewers. Septic systems handle the wastewater on the same property where it is generated. The waste goes to an underground tank in which the solids settle and decompose. The residual liquid is allowed to trickle out into the surrounding soil from a finger system field (below ground forked drainage tiles) where remaining impurities decompose in the soil (if the system is functioning properly). However, due to the poorly drained nature of area soils, septic systems often release bacteria and other contaminants into ground water and/or local streams during high water table events.

Sewers channel waste in pipes to a waste treatment plant. In many cities, stormwater and sanitary sewer systems are combined resulting in capacity problems during wet weather events. These combined sewer systems, which are designed to overflow occasionally, are known as combined sewer overflows (CSO) or storm sewer overflows (SSO). CSOs are sewer pipes that receive waste water from homes and businesses as well as storm water from storm drains along the streets. The combined waste water and storm water flows through the system to a wastewater treatment plant. In heavy rainfall events, the volume of water in these pipes is too much for the treatment plant, so the excess is released directly into streams at different points in the sewer system without being treated. SSOs are pipes carrying *only waste water* from businesses and homes. Overflows of untreated sewage from these systems happen when there are equipment failures or when too much storm water gets into the system from downspouts and sump pumps that are illegally hooked to the wastewater system or from groundwater leakage into the pipe network. Untreated or partially treated sewage is sometimes released when a wastewater treatment plant exceeds its capacity.

Water and sewer utility providers throughout the watershed were contacted by phone and/or e-mail, depending on their responsiveness. Providers include cities, towns, regional water and/or sewer districts, and private entities. Mapping of existing systems, service area boundaries, and proposed areas of expansion were requested. Information was supplied in a variety of forms, including GIS, CAD and PDF. Figure 4.18 illustrates the extent of water and sanitary system mapping collected. Not all systems are represented on Fig. 4.18, but many of the largest systems are shown. Appendix IV provides a listing of service providers and a summary of water and sewer system mapping obtained from each.



**Figure 4.18 – Map showing some of the water and sewer systems in the Upper White River Watershed. Extent of mapping limited by data supplied by service providers.**

The Upper White River subwatersheds were prioritized in the weighted matrix (Section 7.0) based on the rough estimate of land that is currently not being served by a sewer or conservancy district within the area. Each subwatershed was then assigned a number with a one (1) signifying a low-priority subwatershed (30% or less still needing sewers), a two (2) indicating a medium priority subwatershed (30%-70% unsewered), and a three (3) signifying a high-priority subwatershed (over 70% unsewered). The estimates were drawn from the mapped Sanitary and Water Utilities information provided by local municipalities. Subwatersheds that had both “fringe” areas (near to sewers and/or sparsely populated unsewered areas) were designated as a medium priority. These areas then represent those likely impacted by failing septic systems.

## **4.8 Combined Sewer Impacts**

### **4.8.1 Combined Sewer Systems**

When our nation's sewer systems were first built years ago, they were designed to carry both sewage and storm/rainwater in the same pipes. As noted above, this type of sewer is called a "combined sewer system" because sewage and storm water are combined into one pipe. Although the construction of this type of sewer is no longer allowed, there are still portions of many systems that are impacted by a combined sewer system and its outfall/overflow events.



#### 4.8.2 Combined Sewer Overflows

At the time our nation's sewer systems were being built, it was common practice to include overflow points at which excess water can escape from the pipes into streams. Since combined sewer systems capture both storm water and sewage, heavy rains can cause the amount of water entering these pipes to exceed their capacity.

Information from the Indiana Department of Environmental Management (IDEM), Office of Water Quality shows that in the Upper White River Watershed, there are approximately 220 combined sewer outfalls. Figure 4.19 illustrates the location of the CSOs in the UWRW. The map shows that a number of the CSOs discharge into the White River and that some tributary streams are dominated by CSO discharge during overflow events

#### 4.8.3 The Clean Waterways Program and Combined Sewer Overflows

As Central Indiana and other cities grew, the negative health and environmental impacts of discharging sewage and storm water into rivers and streams became apparent. The Clean Water Act helped ensure that cities would not continue to build combined sewers and increase their associated overflows. Even so, there are more than 700 communities nationwide and 108 communities in Indiana that still have combined sewer systems and overflows. Of the 108 CSO communities in Indiana, 15 are located within the Upper White River Watershed (Figure 4.20). Like Indianapolis, most of these 700 communities are under state and federal mandates to make improvements that will dramatically reduce both the amount of sewage in each combined sewer overflow and the frequency with which these overflows occur.

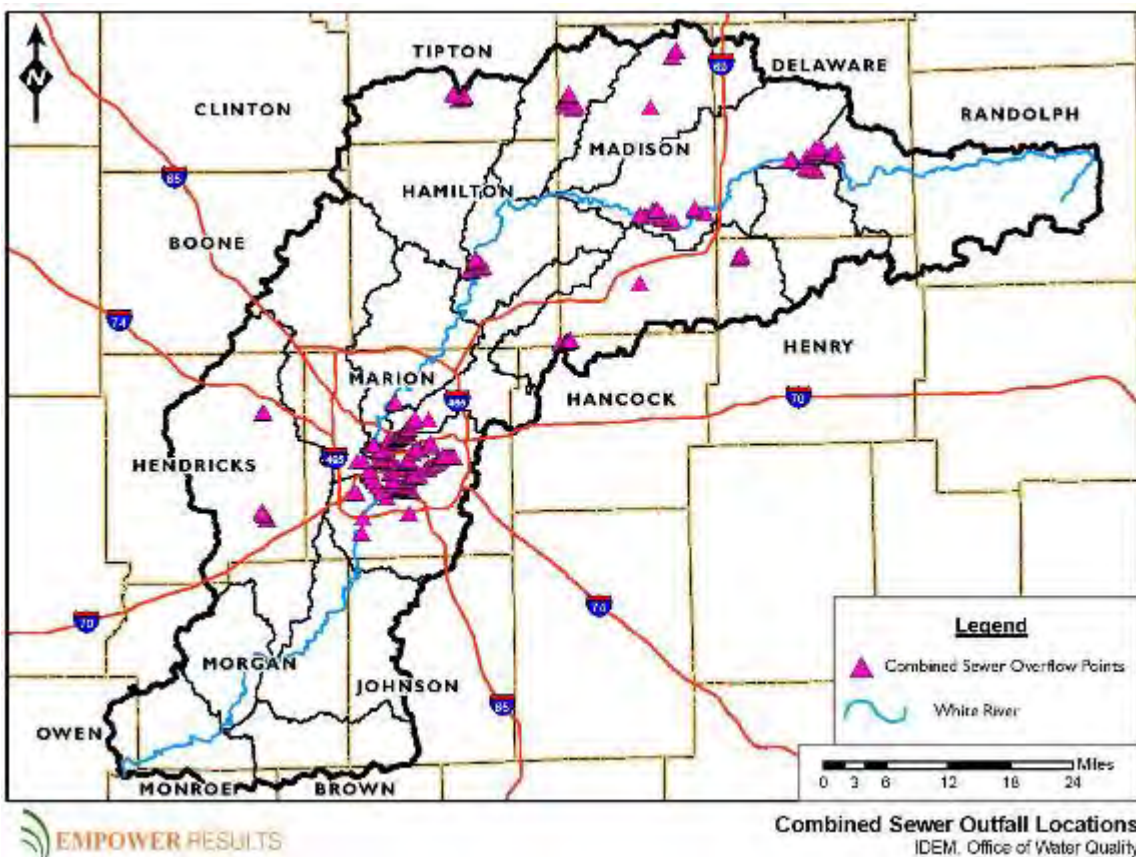
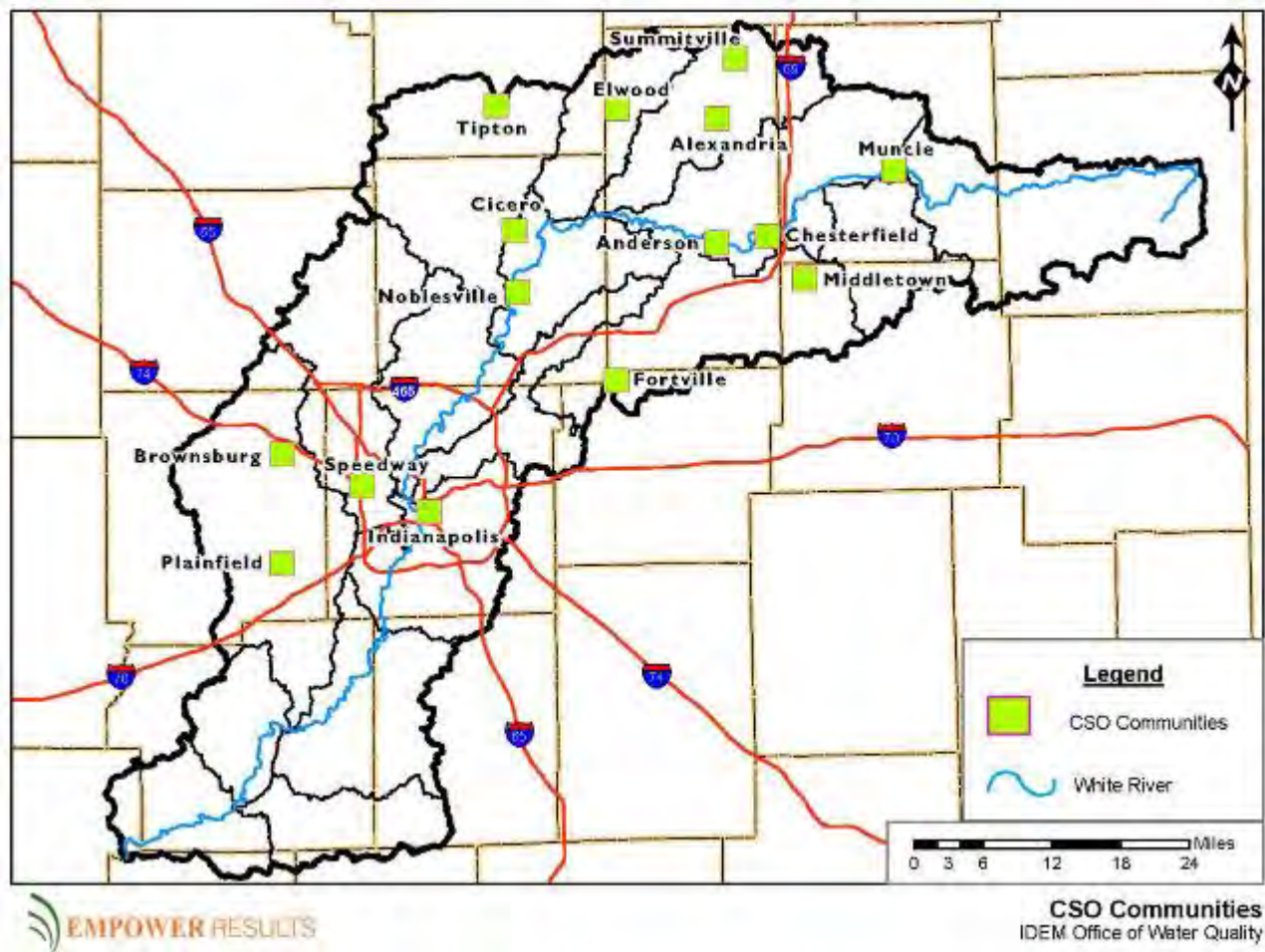


Figure 4.19 – Map of the distribution of combined sewer outfalls in streams in the Upper White River Watershed.



**Figure 4.20 - Map of combined sewer communities in the Upper White River Watershed.**

Subwatersheds have been prioritized in the weighted matrix (Section 7.0) based on the number of combined sewer overflow communities in a subwatershed. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the watershed has a high number of CSO communities in the subwatershed, while a one (1) indicates no CSO communities in the subwatershed. The breakdown for the weighted categories for the number of combined sewer overflows is:

- 1 – 0 combined sewer overflow communities per subwatershed
- 2 – 1 combined sewer overflow communities per subwatershed
- 3 – 2 or more combined sewer overflow communities per subwatershed

#### **4.9 MS4 Storm Pipe Outfalls**

Storm pipe outfalls are the points where a municipal separate storm sewer discharges to surface waters. The “point” could be a pipe, ditch, channel, tunnel, or any discernable, confined, and discrete conveyance. “Surface waters” are any and all rivers, streams, creeks, impoundments, ditches, water courses, lakes, reservoirs, ponds, springs, wetlands and all other bodies or channels of conveyance of surface water, whether artificial or natural. In most cases, storm water outfalls are pipes coming from an underground storm water collection system and discharging to a stream. Sometimes, a storm water outfall may be



from an entirely above-ground collection system, such as when road or parking lot runoff enters and flows in a ditch or other surface conveyance, and then enters a waterway as a point source.

Stormwater discharges impact stream water quality. For the most part, these stream impairments are being caused by the storm water discharges from municipal separate storm sewer system outfalls. The goals of the MS4 permit program are to reduce the discharge of pollutants from these outfalls, and to protect water quality in the receiving waterways. Identifying and inspecting the physical outfall structures themselves is an important element of this program. Municipal permittees will need to locate, map, and inspect these outfalls as part of their MS4 program activities. In addition, if these outfalls have dry weather flow discharging from them, then that flow will need to be sampled to assess whether it is clean or polluted.

Interviews were conducted with forty-three MS4 communities in the Upper White River Watershed. During the interviews, MS4 staff were asked if their stormwater outfalls were mapped and if they could provide copies of those maps. The table below summarizes the responses of the MS4's and whether or not they have maps of their outfalls. It is important to note that the interviewed MS4s that have outfall maps did not necessarily provide a copy of the maps at the time of the interview.

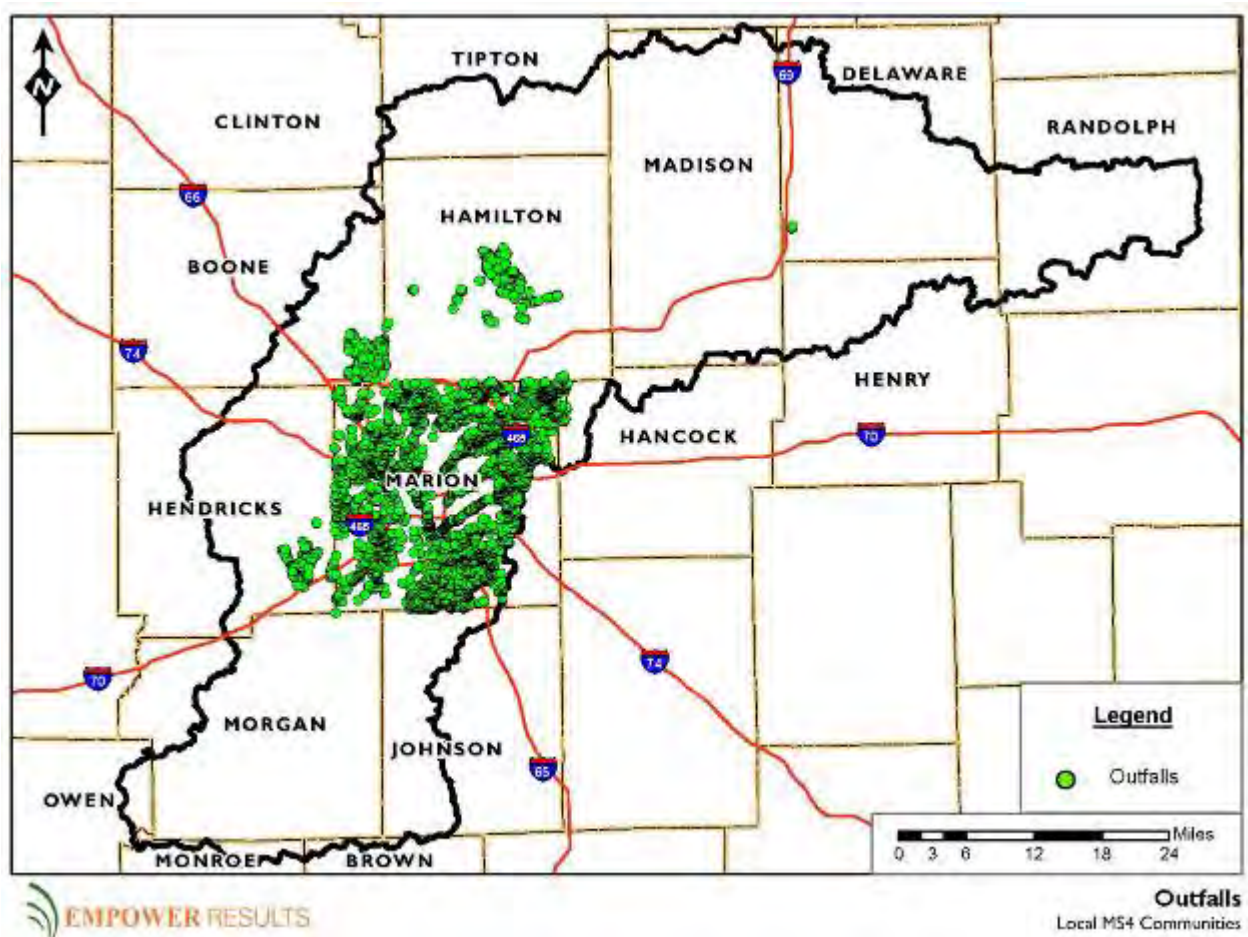
Out of the forty-three MS4 communities interviewed, twenty-four of them have mapped their storm water outfalls while three communities had not. Sixteen of the communities were unable to provide data on their outfalls at the time this report was drafted (Table 4.6). Outfall data provided is shown in Figure 4.21. The UWRWA will continue to try to build these outfalls into one GIS layer as data collection within the individual community's advances.

**Table 4.6 Interviewed MS4s and Outfall Map Availability**

	<b>Number of MS4s</b>
<b>Outfall system has been mapped</b>	<b>24</b>
<b>Outfall system has not been mapped</b>	<b>3</b>
<b>Information on outfall system was unavailable</b>	<b>16</b>

#### **4.10 Significant Water Users**

Significant Water Withdrawal Facilities (SWWF) came to be in 1983 as a part of the Water Resources Management Act (IC 14-25-7). The Natural Resources Commission is required to "take and maintain an inventory of significant uses of water withdrawn from the surface or ground". A significant water withdrawal facility is a high-capacity well capable of withdrawing a minimum 100,000 gallons of ground water, surface water, or combination of ground and surface water, in one day, regardless of how much water is actually pumped. SWWF are registered with the Indiana Department of Natural Resources Division of Water and withdrawals must be reported annually.



**Figure 4.21– Map of storm water outfalls in the Upper White River Watershed. Partial map based on provision of data by MS4 community representatives.**

The Indiana Department of Natural Resources Division of Water maintains a database of Significant Water Withdrawal Facilities. Data has been available from 2004 to 2008. The most recent data set (2008) was mapped and color coded in GIS for readability (Figure 4.22). The SWWF have also been mapped separately as wells and intakes (Figures 4.23 & 4.24). The facilities were broken down into seven categories based on total gallons pumped in 2008: 0 – 100,000 gallons; 100,000 – 1 million gallons; 1 million - 10 million gallons; 10 million – 100 million gallons; 100 million – 500 million gallons; 500 million – 1 billion gallons; and 1 billion plus gallons. Appendix V lists the SWWF in the Upper White River Watershed. The data is sorted by 10 digit HUC subwatershed and then by largest user to smallest user.

There are currently 141 different significant water users in the Upper White River Watershed, most having multiple sites for water withdrawal. Users obtain water by either surface intake or by wells for uses such as public supply, irrigation, energy production, and industry. The facilities withdraw an average of over 218 billion gallons of water annually. Six of the facilities listed in Appendix V pumped more than 10 billion gallons of water in 2008. This is equivalent to more than 27 million gallons a day. Consideration of these facilities aids in understanding demands and pressures on water supplies.

Six facilities that were listed in the 2004 to 2006 data set are no longer listed in the 2006 to 2008 data set. According to the Department of Natural Resources, this can happen for a number of reasons. A facility

may have ceased operation, failed to report, or closed altogether. If a facility has been sold, it may not have been operating during the short term period of the sale and its transfer to new owners. It is also possible that the facility has moved to a municipal water supply instead of a ground or surface water supply.

The significant water users within each of the Upper White River subwatersheds were prioritized and weighted (Section 7.0). The scale is based on the number of *high-capacity* wells each subwatershed contains. A separate weight was assigned to each subwatershed based on the number of surface intakes and also for the number of well withdraws contained in each subwatershed. A weighted score of three indicates a subwatershed with significant relative water demands, while a weighted score of one indicates a subwatershed with lower demands. The breakdown for the surface intakes per subwatershed weighted score is:

- 1 – 1 to 8 surface intakes per subwatershed
- 2 – 9 to 18 surface intakes per subwatershed
- 3 – 19 to 24 surface intakes per subwatershed

The breakdown for the wells per subwatershed weighted score is:

- 1 – 1 to 36 wells per subwatershed
- 2 – 37 to 72 wells per subwatershed
- 3 – 73 to 108 wells per subwatershed

The significant water users within each of the Upper White River subwatersheds were also prioritized and weighted by volume (Section 7.0). The scale is based on the volume of water pumped in 2008 by the *high-capacity* wells each in each subwatershed. A weighted score of three indicates a subwatershed with high water volume demands, while a weighted score of one indicates a subwatershed with lower volume demands. The breakdown for the intakes per subwatershed weighted score is:

- 1 – 0 to 1 billion gallons of water pumped annually per subwatershed
- 2 – 1 billion to 10 billion gallons of water pumped annually per subwatershed
- 3 – 10 billion or more gallons of water pumped annually per subwatershed

#### 4.10.1 Public Water Supplies

Many of the points on the aforementioned figures represent public water supplies. Much of the public water supply in the Upper White River Watershed is supplied by wells maintained by local municipalities or larger companies. Several of the suppliers maintain water from intakes, such as reservoirs, but the large majority of the public water supply comes from wells. Figure 4.25 depicts the location of the wells and intakes maintained for public drinking water.

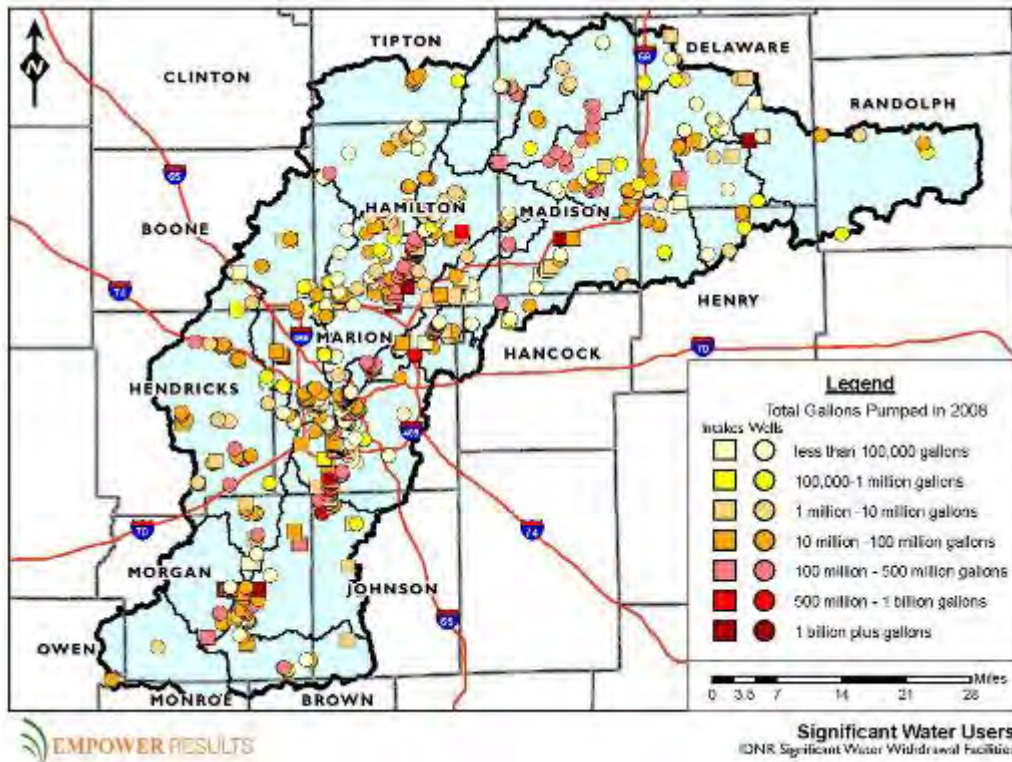


Figure 4.22 – Map of the distribution of significant water withdrawals and the volume of withdrawals for both surface intakes and wells (million gallons pumped annually) in the Upper White River Watershed.

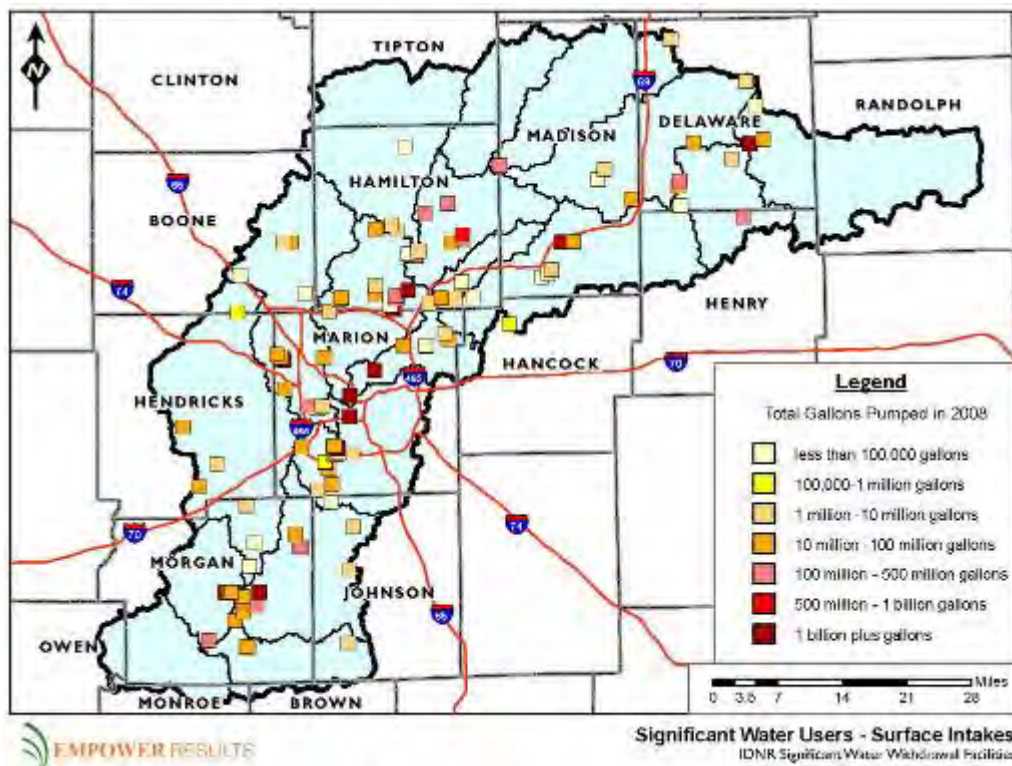


Figure 4.23 – Map of the distribution of significant water withdrawals and the volume of withdrawals for surface intakes (million gallons pumped annually) in the Upper White River Watershed.



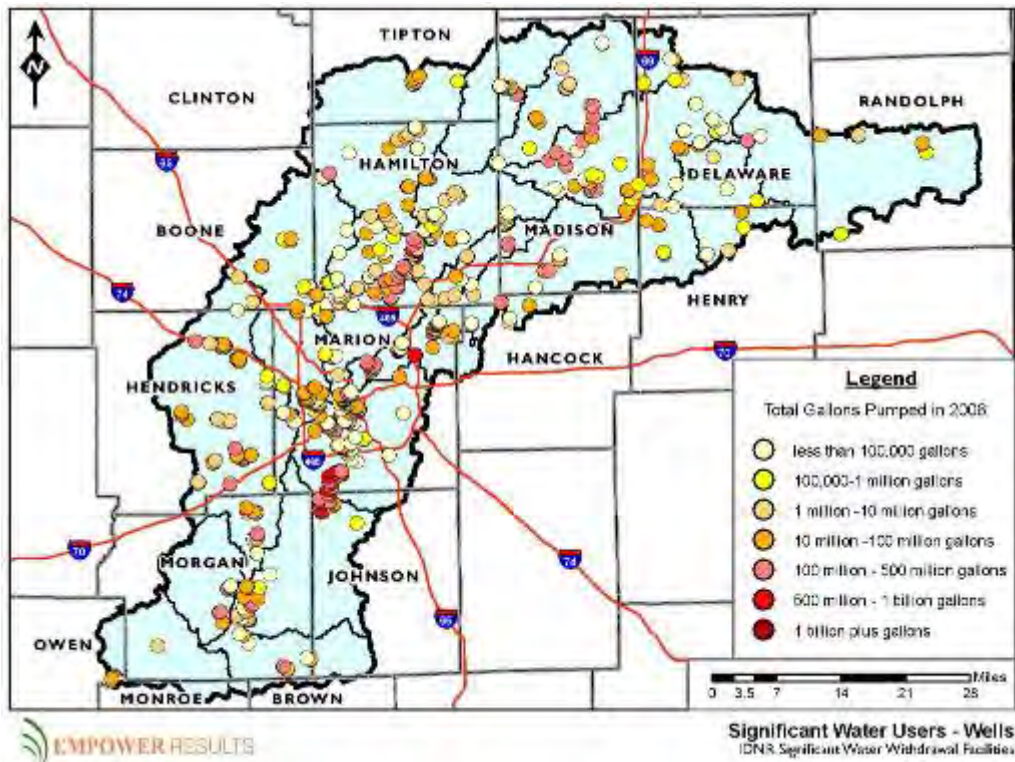


Figure 4.24 – Map of the distribution of significant water withdrawals and the volume of withdrawals for wells (million gallons pumped annually) in the Upper White River Watershed.

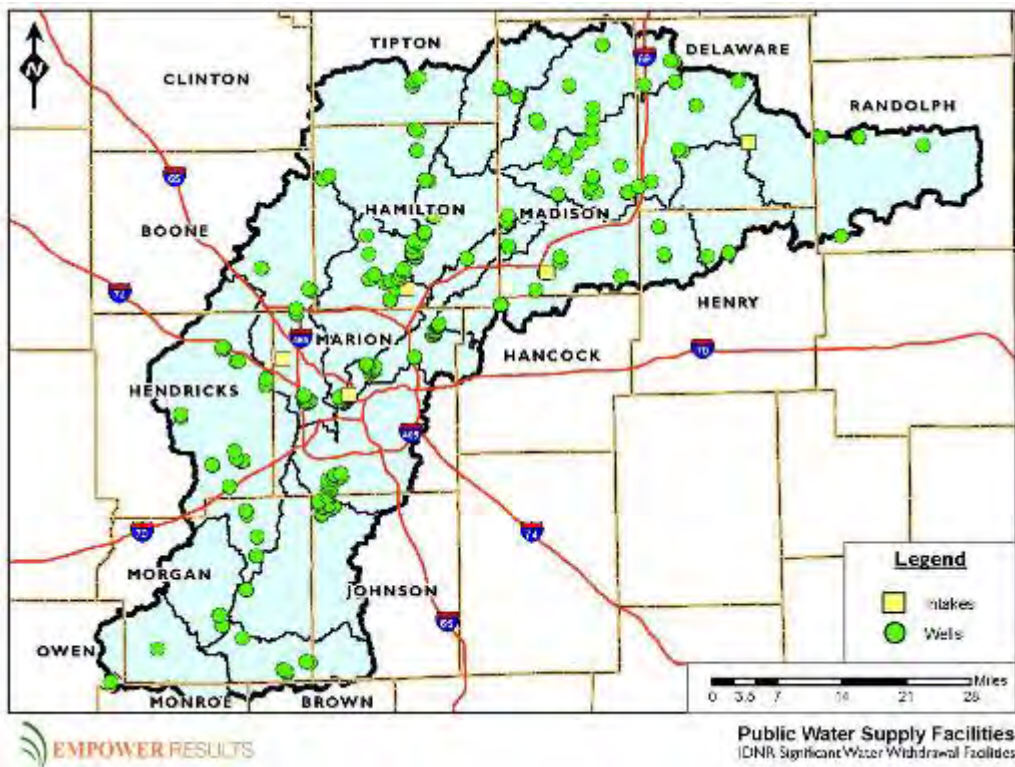


Figure 4.25 – Map of surface water intakes and wells utilized for public water supplies in the Upper White River Watershed.



#### **4.11 Utility Territories and Expansion**

The Indiana Utility Regulatory Commission (IURC), formerly known as the Public Service Commission, was originally created to oversee railroad activity. In the early 1900s, regulation of natural gas, water, electric, telephone, and transportation services were added to the agencies duties. Today, the IURC no longer regulates railroad or transportation services; however, they still continue to regulate electric, natural gas, steam, water and sewer utilities, as well as portions of telecommunications and video.

Indiana Code Title 8 provides the IURC with their regulatory authority. While the IURC regulates utilities that are municipal, investor-owned, not-for-profit, or cooperative utilities, they do not regulate municipal sewer utilities. Regulation by the Commission includes rates, financing, bonding, environmental compliance, and service territories, in addition to construction projects and acquisition of additional plants and equipment.

With an increase in population and development, many communities within the UWRW have expanded utility territories. If and how human drinking water, waste, and storm water services are provided will impact every aspect of the watershed. In short, providing a sustainable water cycle of use and reuse in a community is the essence of watershed planning. Through review of numerous interviews, maps, municipal web sites, and records, it was determined that due to the diversity of available information, there was no consistent way to map or display this information.

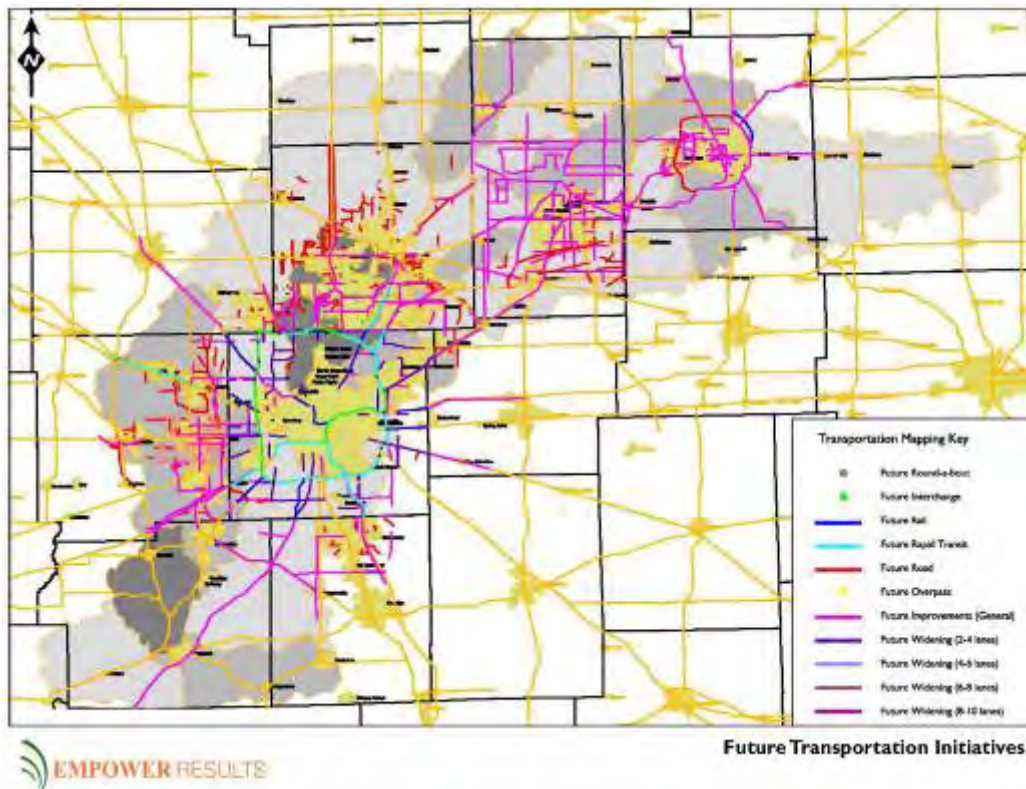
While the services indicate an orchestrated effort to protect civil water supply, the need for coordinated large scale planning is imperative. It is clear that target areas can be protected and planned for proactively in these development areas. Guided growth and regional planning throughout the watershed will play a large role in the long term health and cost of improving water quality within the UWRW.

#### **4.12 Transportation Initiatives**

With an increase in population and development, many communities within the UWRW have also increased streets and transportation. Understanding where community planners have established transportation corridors and expansions is vital to comprehensive planning. Opportunities to coordinate greenways, blue ways, pedestrian ways and other connectivity efforts are vital in this stage of development.

When implemented, these projects will impact the watershed at some level. The management of the initial projects and, more importantly, ensuing land development, will determine the significance of the impact. Information in some areas of the watershed was not available but in other areas this information can inform both opportunities for enhancements as well as identification of risks.

Planned state and municipal transportation improvements within the watershed were collected from INDOT and municipal thoroughfare plans. Information was provided in a variety of forms, including GIS, CAD and PDF. Collected mapping of planned improvements is included in Figure 4.26. A summary of collected thoroughfare plans, by municipality, is included in Table 4.7.



Future Transportation Initiatives

Figure 4.26 – Map of planned transportation expansion and improvements with the potential for environmental impact in the Upper White River Watershed.

Table 4.7 Thoroughfare Plans

County	Municipality	Source
Boone County		Boone County Thoroughfare Plan 1999
	Whitestown	*
	Zionsville	Zionsville Comprehensive Plan 2003
Brown County		
Clinton County		
Delaware County		Muncie-Delaware County Comp Plan Update 1999, 2005-2030 Delaware-Muncie Transportation Plan
	Daleville	*
	Gaston	*
	Muncie	Muncie-Delaware County Comp Plan Update 1999, 2005-2030 Delaware-Muncie Transportation Plan
	Yorktown	*
Grant County		

**Table 4.7** Thoroughfare Plans (cont)

<b>County</b>	<b>Municipality</b>	<b>Source</b>
Hamilton County		Hamilton County Thoroughfare Plan 2007
	Arcadia	*
	Atlanta	*
	Carmel	Carmel Comprehensive Plan 2008
	Cicero	Cicero-Jackson Township Comprehensive Plan 2004
	Fishers	*
	Noblesville	Noblesville Comprehensive Plan 2003
	Sheridan	*
	Westfield	Westfield Thoroughfare Map 2007, 2008
Hancock County		
	Fortville	*
	McCordsville	McCordsville Thoroughfare Plan (??? Year)
Hendricks County		Hendricks County Comprehensive Plan 2006
	Avon	Avon 2006 Thoroughfare Plan (2016)
	Brownsburg	Brownsburg 2020 Comprehensive Plan
	Danville	*
	Pittsboro	*
	Plainfield	*
Henry County		
	Middletown	*
	Mount Summit	*
	Springport	*
	Sulphur Springs	*
Johnson County		
	Bargersville	not mapped (no future projects in data)
	Greenwood	Greenwood Comprehensive Plan 2008
	Trafalgar	*
Madison County		Madison County Comprehensive Plan 2001, Anderson/Madison County 2030 Long Range Transportation Plan
	Alexandria	*
	Anderson	Madison County Comprehensive Plan 2001, Anderson/Madison County 2030 Long Range Transportation Plan
	Chesterfield	*
	Elwood	*
	Frankton	*

**Table 4.7** Thoroughfare Plans (cont)

<b>County</b>	<b>Municipality</b>	<b>Source</b>
	Ingalls	*
	Lapel	*
	Markleville	*
	Pendleton	*
Marion County		Recommended Thoroughfare Priority Improvements-City of Indianapolis 2002, 2030 Needs Plan Indianapolis MPO
	Beech Grove	*
	Clermont	*
	Indianapolis	Recommended Thoroughfare Priority Improvements-City of Indianapolis 2002, 2030 Needs Plan Indianapolis MPO
	Lawrence	*
	Speedway	*
Monroe County		
Morgan County		
	Bethany	*
	Brooklyn	*
	Lake Hart	*
	Martinsville	*
	Mooresville	*
	Morgantown	*
	Paragon	*
Owen County		
	Gosport	*
Randolph County		
	Farmland	*
	Parker City	*
	Winchester	*
Tipton County		
	Tipton	*
*Transportation Plan Information Not Available		

The Upper White River subwatersheds have been prioritized in the weighted matrix (Section 7.0) based on the presence of transportation expansion located within the area. Each subwatershed was assigned a score of one, two or three. A three (3) signifies that the subwatershed has more than one road

expansion in progress, making it a higher-priority for implementing comprehensive watershed planning. A two (2) indicates one road expansion in progress or planning. A one (1) indicates very little or no expansions in progress or planning.

- 1 – Very few to no road expansions in progress or in planning
- 2 – One road expansion in progress or planning
- 3 – More than one road expansion in progress or planning

#### **4.13 Impaired Streams**

The Indiana Department of Environmental Management (IDEM) provides a list of impaired waters, known as the 303(d) list, every two years for Indiana. The creation of this list is required by the federal Clean Water Act and is used to identify impairments for which a total daily maximum load (TMDL) study is warranted. Impaired waterways listings provide information about water quality degradation. These listings however are only for parameters for which there is a water quality standard. Thus, they do not provide a complete picture of the health of watershed streams. Further, the impairment listings suffer in some cases from a lack of information. For some stream reaches assessments have not been completed so that the impaired listings provide a minimum level of degradation for a given subwatershed. This assessment also does not include any weighting for the number of parameters for which any given stream or subwatershed is listed.

The Upper White River subwatersheds have been prioritized in the weighted matrix (Section 7.0) based on the percentage of stream miles that are listed as impaired. Each subwatershed was assigned a score of one, two or three. A three (3) signifies that the subwatershed has greater than 50% of the stream miles listed as impaired.

- 1 – 0 to 25% of stream miles are impaired
- 2 – 25.01 to 50% of stream miles are impaired
- 3 – 50.01% to 100% of stream miles are impaired



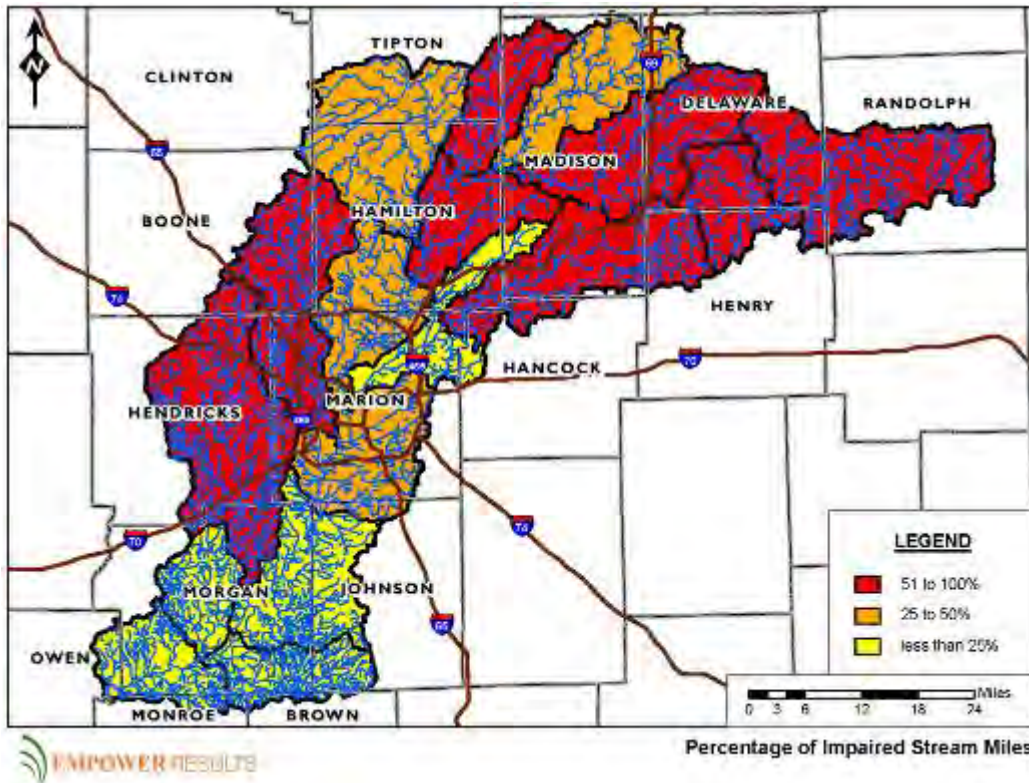


Figure 4.27 – Map of weighted subwatersheds based on percentage of steam miles that are impaired.

## **5.0 TOOL KIT FOR PLANNING AND REGULATORY MECHANISMS (OPPORTUNITIES FOR IMPROVEMENT)**

The third prong of the approach of this report creates a tool kit for planning that identifies both opportunities and barriers to implementation or water resource improvement and/or protection. These tools are linked to social indicators and existing resources. For some of these planning tools a three-tiered system that provides a relative ranking of opportunities was generated. These rankings were then incorporated into the assessment matrix (Section 7.0) to allow for additional side by side comparison of opportunities for improvement on a HUC 10 subwatershed basis. This matrix forms the basis for watershed management recommendations and opportunities for regional watershed planning.

### **5.1 TMDLs**

The Total Maximum Daily Load (TMDL) is the amount of a particular pollutant that a water body can receive without violating state water quality standards. IDEM teams are continuing to develop TMDLs as required by Section 303(d) of the Clean Water Act, to identify sources contributing to the impairment of Indiana's surface water. Appendix VI lists the TMDL name, waterbody name, 14-digit HUC, county, miles assessed, and approval date. Figure 5.1 highlights the 14-digit HUC subwatersheds listed in Appendix VI in which TMDL studies have been performed. This map does not however show the stream or stream reach on which the assessment was performed. With continued study of waters and their biological functions, more specific TMDLs may be developed. Clear and achievable goals may be set within communities impacting these waters.

### **5.2 Watershed Planning Initiatives**

#### *5.2.1 Existing and Current Watershed Management Plans (319 and LARE funded)*

There are twenty past or current smaller-scale watershed projects being conducted at the local level within the Upper White River Watershed (Figure 5.2) All of these watershed projects have various levels of planning or implementation projects pending or completed. Synthesis of these projects is difficult due to the fact that each group identifies critical areas utilizing a different set of criteria. Determining how these projects fits into the overall water quality picture of the Upper White River Watershed is a challenge. Current watershed groups could benefit from understanding if they are setting realistic targets based on upstream or instream conditions.

IDEM 319 Watershed Management Plans and IDNR LARE Watershed Management Plans within the Upper White River Watershed that have been completed or are a work in progress were gathered in order to look at critical areas that were identified on a smaller subwatershed scale. Critical areas have been identified as required by the guidelines for IDEM's 319 Watershed Management Plans. The areas however have been identified on various scales and water quality impact. Some plans identify critical areas down to a specific location such as a 500 foot section of stream at a specific crossroad location, while others identify them on a much broader scale, such as a subwatershed, agricultural areas, or topic such as septic systems. This broadness of concern makes it difficult to make comparisons or assumptions about the critical areas. It also makes it impossible to create one comprehensive map of these areas.

However, when considering the opportunities that exist in a given subwatershed for future project funding, as well as having a targeted approach to water quality projects, the presence or absence of a State-approved plan certainly makes a difference. For that reason, this information was included in the summary matrix. Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on the presence of a completed watershed management plan. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed

does not have any areas covered by an approved watershed management plan, while a one (1) signifies a subwatershed with more than one approved plan or is fully covered by a single plan.

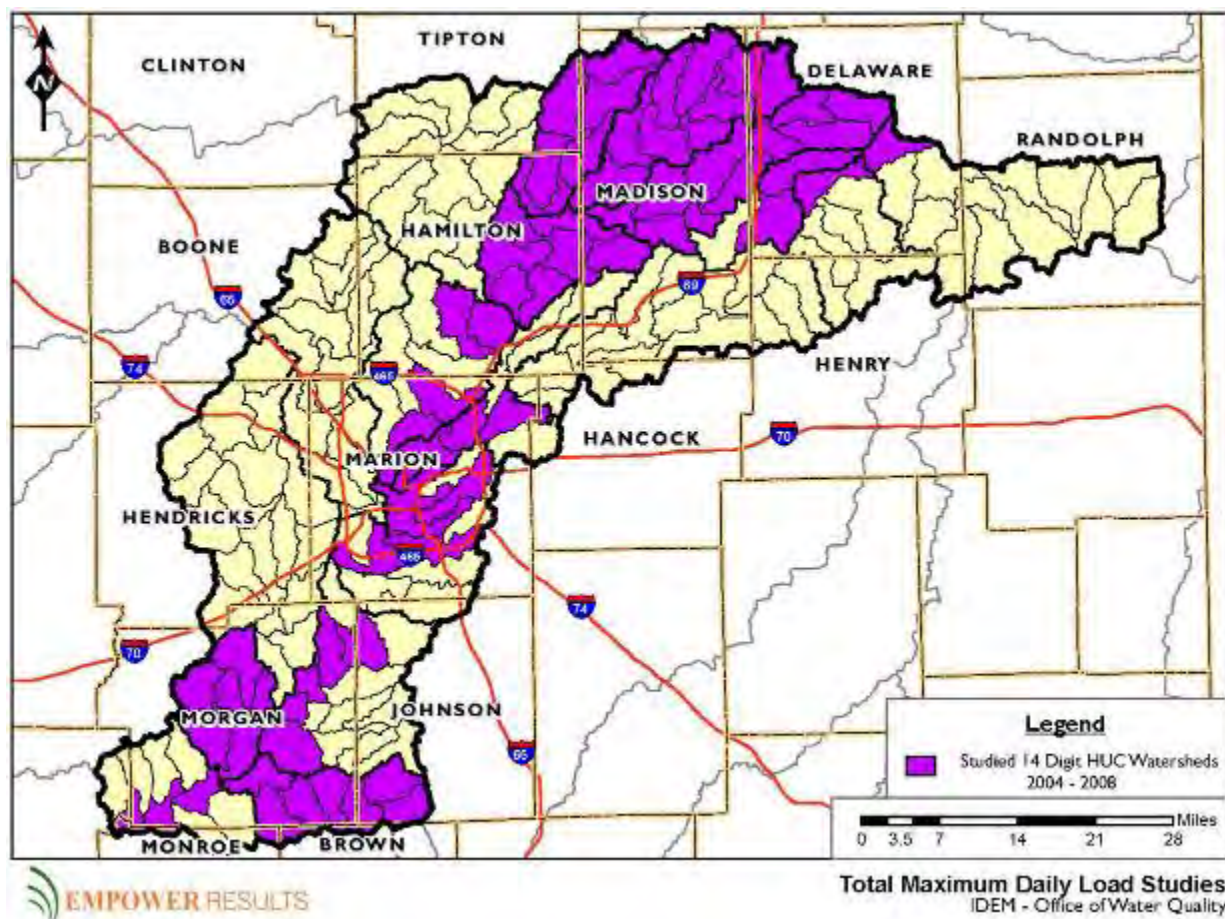


Figure 5.1 – Map of HUC14 subwatersheds in the Upper White River Watershed with TMDL load studies (2004-2008).



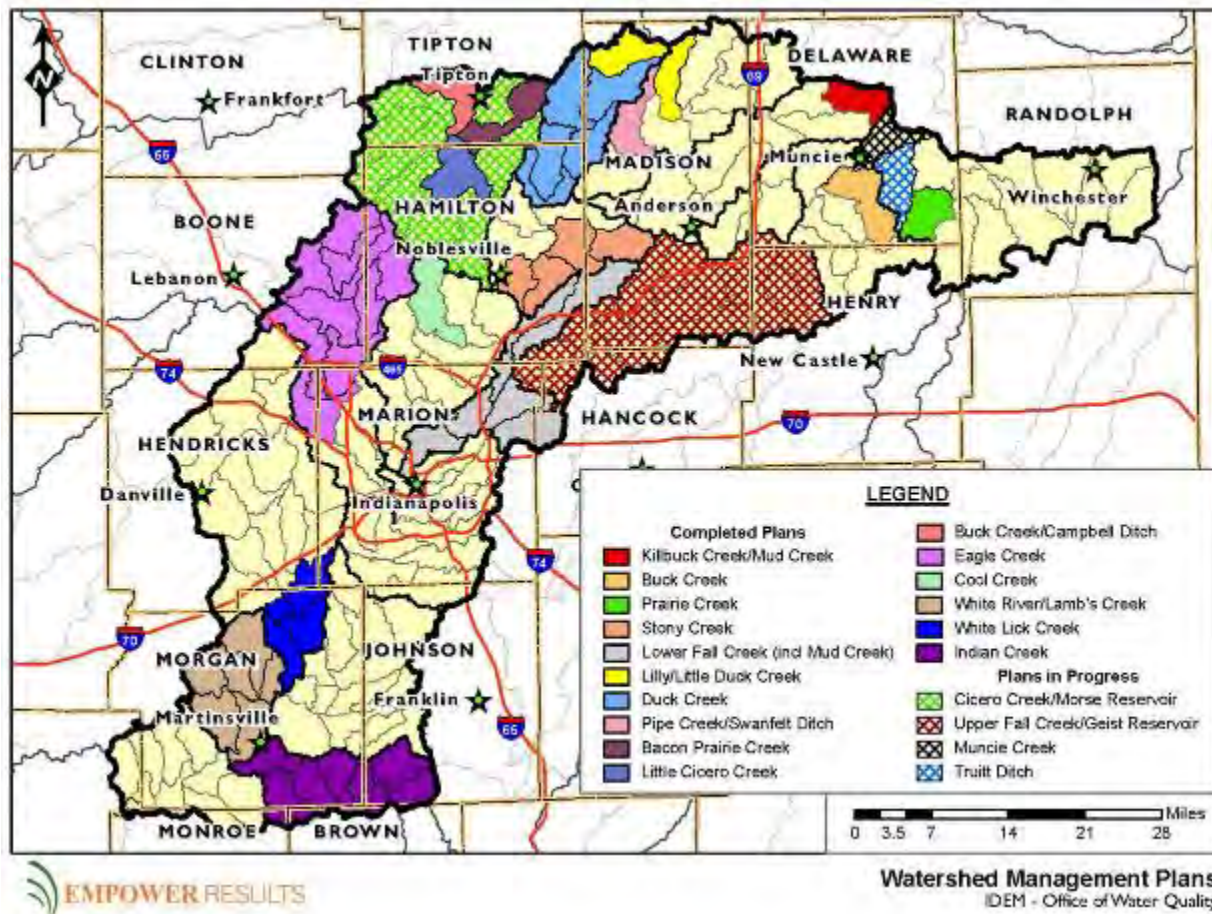


Figure 5.2 – Map showing completed and in progress (2010) watershed management plans for HUC 10 and HUC 14 subwatersheds in the Upper White River Watershed (IDEM/IDNR).

### 5.2.2 *Summary of MS4's with Active or Past Watershed Initiatives*

Local watershed planning efforts are initiated and undertaken by many types of local stakeholders; however, it is fairly commonplace that local municipalities are driving these efforts since watershed management complements many other local planning and regulatory efforts. Eighteen of the interviewed MS4 communities have active watershed initiatives or have had such initiatives in the past. Thirteen of the MS4s do not have any record of watershed initiatives past or present. Twelve of the forty-three MS4 communities interviewed were unable to provide data on their watershed initiatives.

## 5.3 **Comprehensive Plans**

A comprehensive plan provides a broad vision for the future growth of a community. It is a guide for officials when reviewing applications to rezone or develop individual sites. According to Indiana Code, the purpose of a comprehensive plan includes the “promotion of public health, safety, morals, convenience, order, or the general welfare and for the sake of efficiency and economy in the process of development” [Indiana Code 36-7-4-501]. Watershed planning is intimately tied to community growth and resource management if, how and where a community decides to alter its lands will have long term effects on the regional watershed. Nearly all existing comprehensive plans for communities in the UWRW have been collected for this report. As future planning efforts or funding opportunities arise, items such as economic initiatives or other relevant sections will also be analyzed. These items can often provide insights into future land use changes or the advancement of various landscape and social infrastructure associated with these changes or initiatives. An example of this may be a community's desire to draw more large commercial distribution centers for tax base and job creation reasons; thus resulting in rezoning, increasing stormwater infrastructure and expansion of highway infrastructure.

### 5.3.1 *Current Zoning*

Planners and community leaders make important land use decisions by permitting parcels within their jurisdiction by a change in zoning. Zoning ordinances in communities in Indiana are recorded as color coded maps and text. Each community adopts state and county ordinances, and adds its unique requirements and or restrictions to determine zoning of parcels. Historically, the land parcels across the watershed were primarily platted as agricultural zones by default. As more development has taken place throughout the state, many of these old zoning maps have been updated to reflect the changes to land use (e.g. from agricultural to commercial, residential, or industrial, etc.). A concerted effort to combine the zoning codes of each jurisdiction in the UWRW into one reference map has been conducted (Figure 5.3). Many specific details of individual areas were omitted to provide a large scale view of the general current zoning of parcels. Similar categories were lumped into a given category and colors were assimilated to create a universal color palate for the maps. Attempts were made to collect current zoning information from all municipal jurisdictions in the UWRW. However, not all municipalities had usable information or in some cases, they were unwilling to supply the files in a way that allowed for translation into GIS. For this reason, current zoning and future land use comparisons were focused on three smaller subwatersheds (see Section 5.3.3).

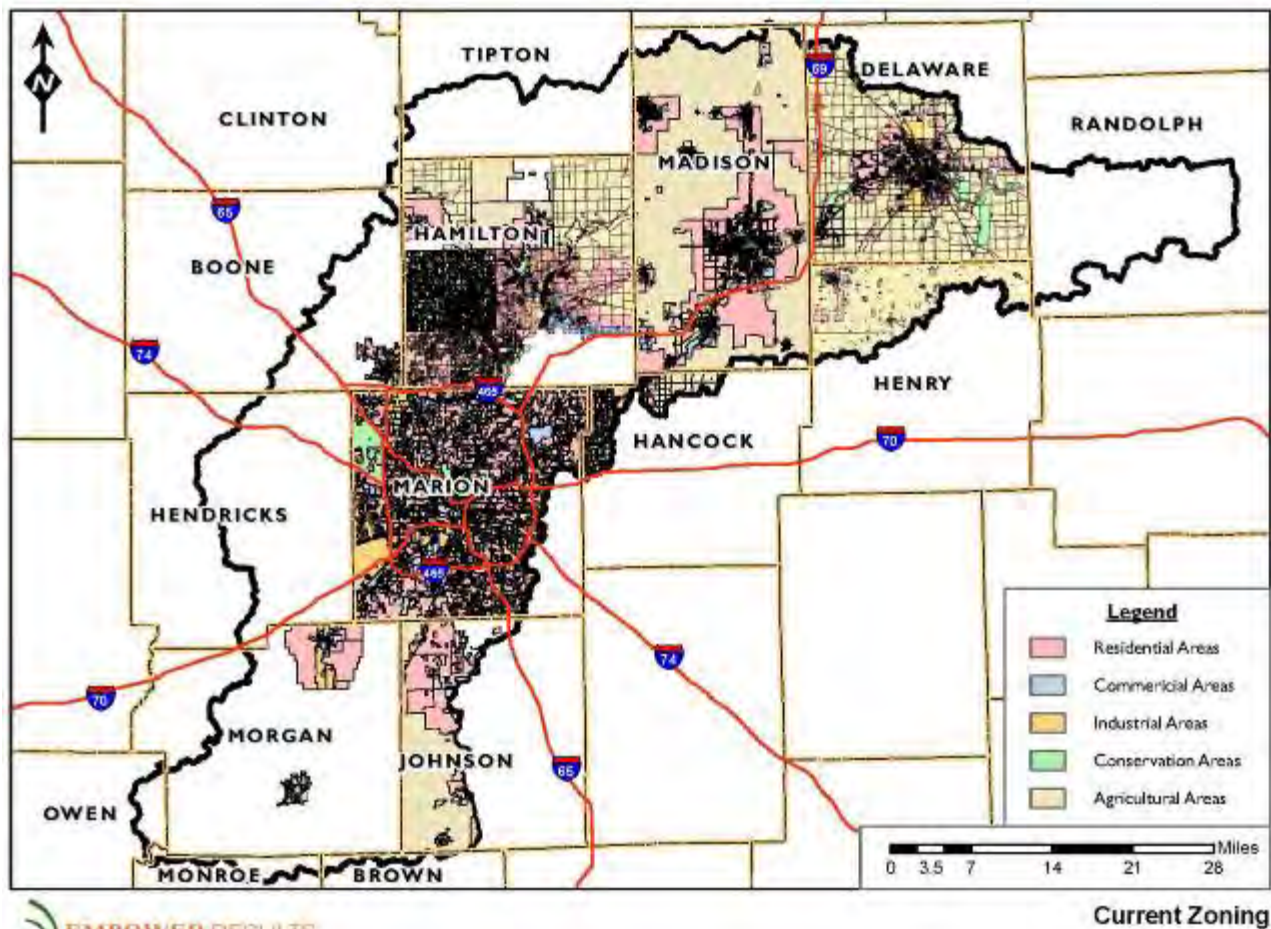
At the time this report was compiled, many zoning plans in the watershed had outdated and or unavailable zoning information readily available. This underscores the need for regional and unified planning efforts. A lack of clear restrictions and boundaries can make for inefficient and uncomplimentary growth patterns. If development is guided it can facilitate well thought out efficient plans that reflect a community's goals for long term land use. Though it is difficult to quantify, preventing future watershed pollutant impacts and utilizing assets within the watershed is far more economical and feasible when done at the planning stage.



### 5.3.2 *Future Land Use*

Land use change in the UWRW has been evaluated through several information gathering efforts. Spanning across sixteen counties, planning and zoning offices, historical maps, municipal officials, county surveyors, engineering firms and public websites were examined to determine the future land use within the watershed. As mentioned in the prior section, collecting information in a usable format was a difficult task. Future land use information was an even more difficult challenge. Due to these challenges, it was decided that a comparison would be made using the subwatersheds where the most information could be collected and mapped (see Section 5.3.3). These subwatersheds then represent a 'pilot study' of sorts for such a current/future comparison across jurisdictional boundaries. More land use changes will occur if the current trend in population (for the State, or this region in particular) continues. It is reasonable to expect more undeveloped land (that may be providing ecological services within the watershed) to be developed. Environmentally sensitive areas and connectivity of resources should be considered, as well as Low Impact Development (LID) practices when planning for this inevitable change. A concerted effort for land use planning that incorporates greater watershed and large-scale hydrology can reduce expensive treatments, mitigations, and remedies for flooding and many other problems associated with poor planning or a lack of planning

As indicated in the Current Zoning section, future land use depends heavily on well communicated goals and guidance from municipal jurisdictions. Further, coordination between bordering and regional jurisdictions can facilitate efficient land use and maximize public efforts to reduce negative impacts to its watershed. Ultimately, utilizing comprehensive watershed planning can achieve this goal.



**Figure 5.3 – Map showing zoning in the Upper White River Watershed. Areas of agriculture, residential, commercial, industrial, and conservation are shown.**

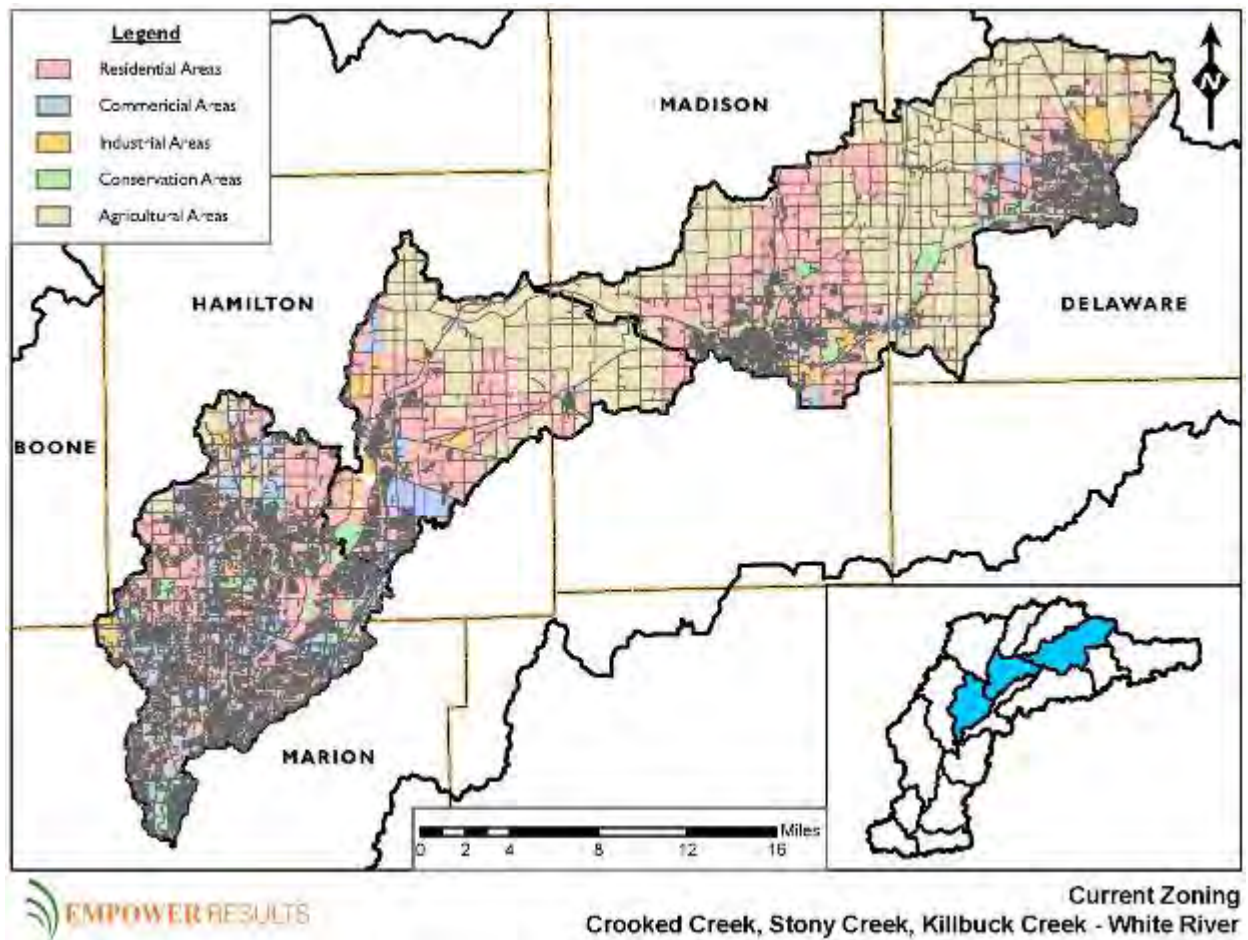
### 5.3.3 Current Zoning and Future Land Use Subwatershed Comparison

Difficulty in acquiring information from entities regarding current zoning and future land use made conducting a watershed wide comparison of this information a significant challenge. Several maps and summary pie charts were compiled to represent the changes between current zoning and future land use (Figures 5.4 – 5.12). Therefore, as noted above, data were collected and mapped for both current zoning and future land use in three subwatersheds for comparative purposes; Crooked Creek – White River, Killbuck Creek – White River, and Stony Creek – White River (Figures 5.4 – 5.11).

However, a few notable discrepancies did occur and are primarily related to planning and record upkeep by entities. Many of the entities have kept current zoning relatively up to date, but future land use plans tend to only be updated when comprehensive plans are updated. So it is possible to have a future land use plan that is five years older than the current zoning plan, for instance. Entities all had different categories of classification for areas. For ease of comparison, the entity categories were grouped into five groups – Agriculture, Commercial, Conservation, Industrial, and Residential.

At a cursory glance of current zoning for these three subwatersheds as a whole (Figure 5.4) and future land use (Figure 5.5) a few changes seem striking, namely the loss of agriculture and the gain of

conservation areas. Upon further investigation, the maps actually show a variety of unlikely and unrealistic land use outcomes, such as a shift from something that is currently zoned residential back to agriculture and/or to conservation uses. Since it is unlikely that residential or agricultural land use will revert to green space/conservation at the scale implied, the gains in the conservation category are therefore not in fact gains, but are more likely the remnants of out dated or unimplemented comprehensive plan objectives and forecasts. What may be more realistic when looking ahead at future land use is a likely intention shift/gain in the commercial land use category. Such commercial land use objectives are often tied to economic development initiatives and existing or planned social, manufacturing, and transportation infrastructure. Good examples of this are the commercial gains appearing along the US 31, SR 37, and I-69 corridors in each of the three subwatersheds.



**Figure 5.4 – Map of current zoning for 3 HUC 10 subwatersheds in the Upper White River Watershed (Crooked Creek – WR, Stony Creek – WR, and Killbuck Creek – WR).**



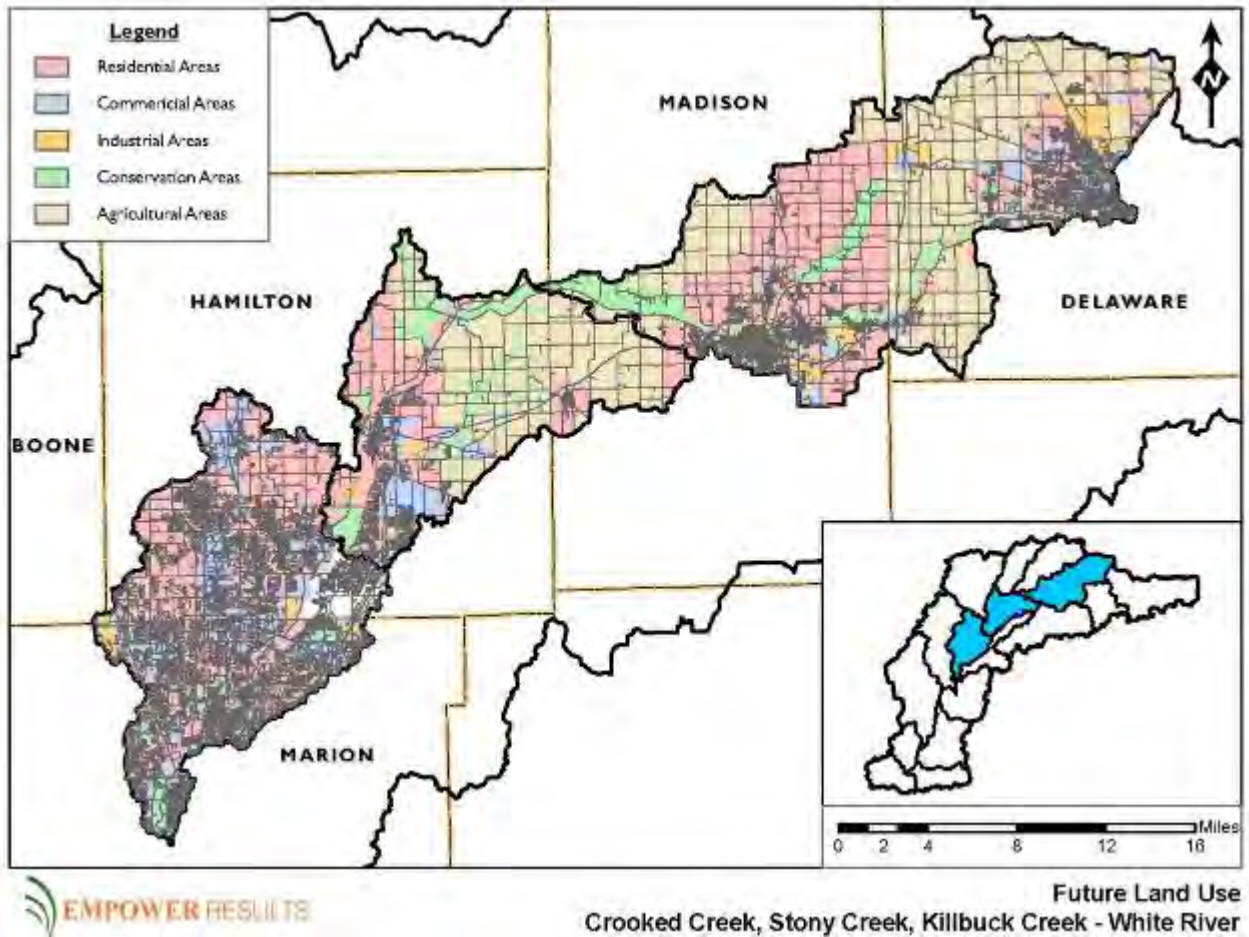
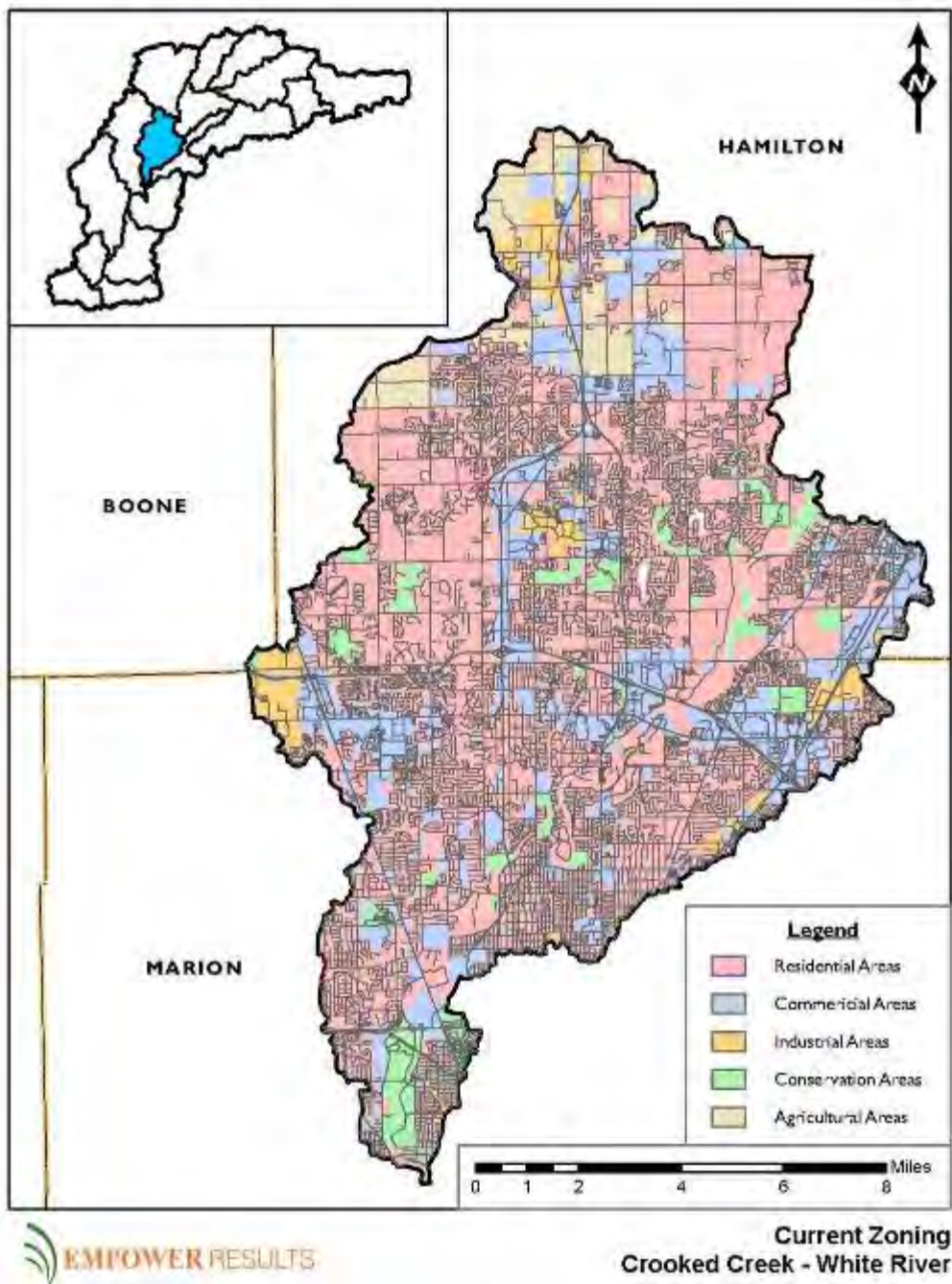


Figure 5.5 – Map of future land use for 3 HUC 10 subwatersheds in the Upper White River Watershed (Crooked Creek – WR, Stony Creek – WR, and Killbuck Creek – WR).

Crooked Creek – White River Subwatershed – This subwatershed includes a significant portion of Marion County. For the purposes of this comparison, Marion County has been understood to be built out, so there is no change from current zoning to future land use in Marion County. The largest changes planned to occur in this subwatershed include the near elimination of agriculture, a notable gain in commercial use, and a shift in the location and concentration of conservation areas (Figures 5.6 and 5.7). Commercial gains are focused around the US 31 corridor through the Hamilton County section.



**Figure 5.6 – Map of current zoning for Crooked Creek – White River subwatershed in the Upper White River Watershed.**



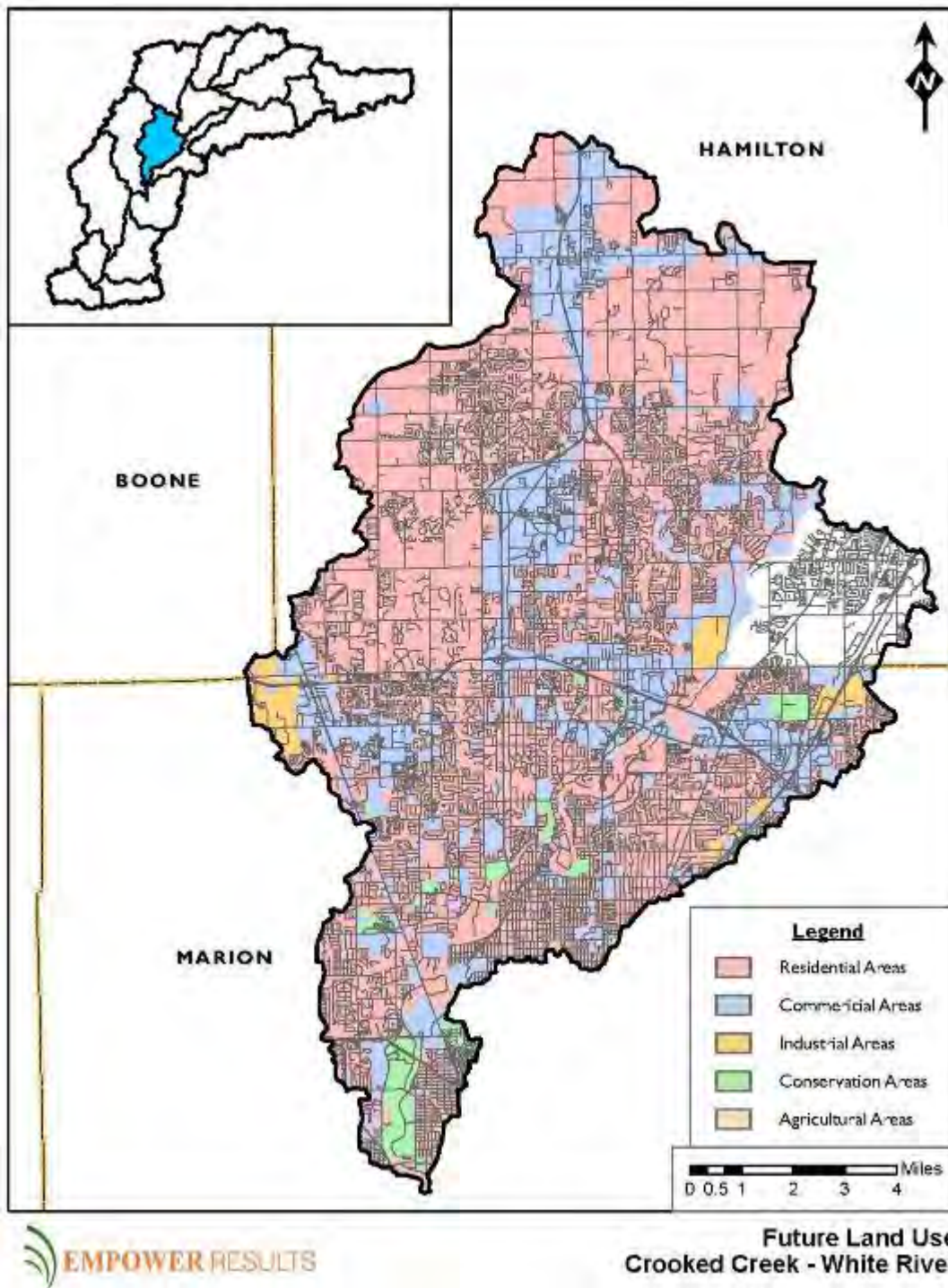
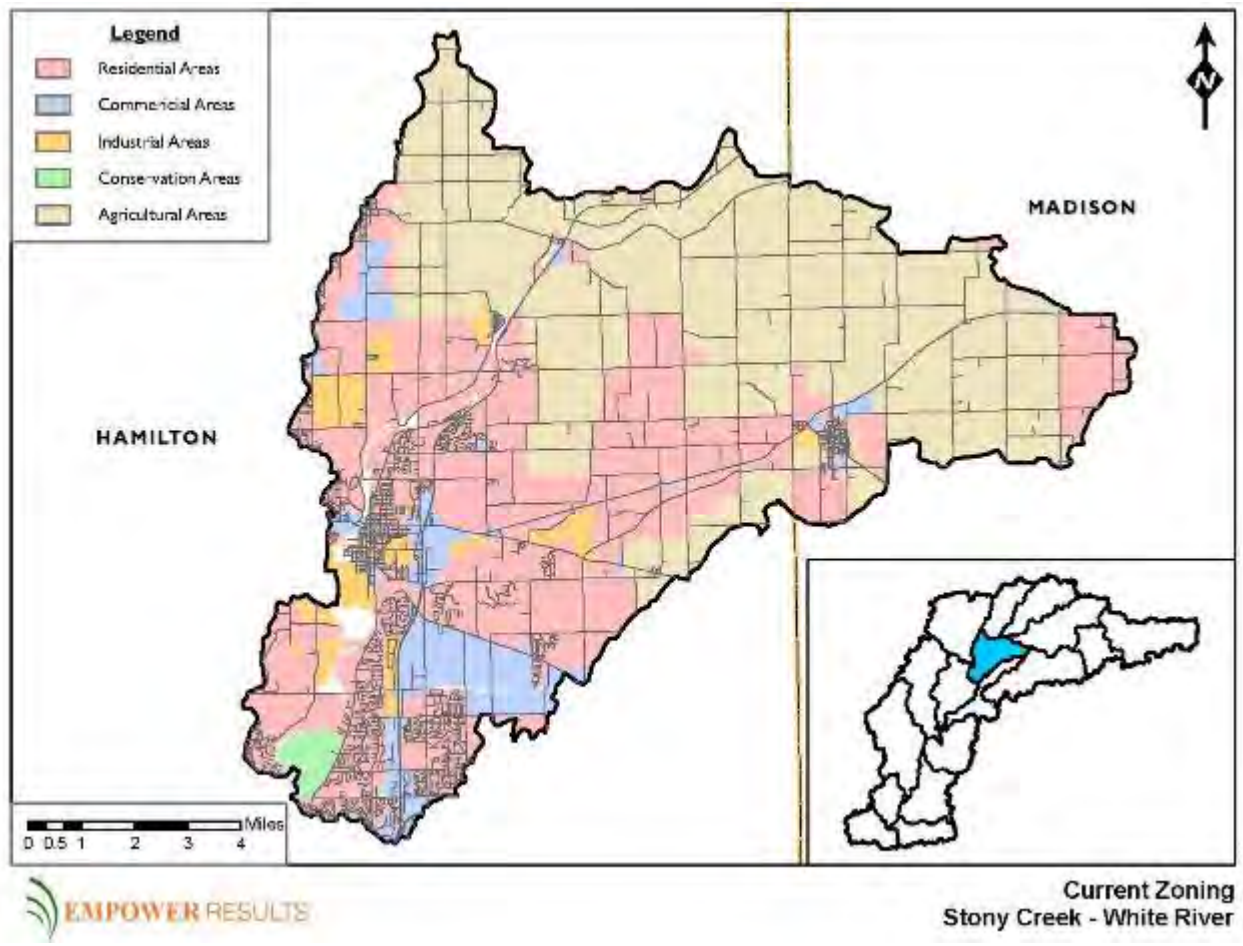


Figure 5.7 – Map of future land use for Crooked Creek – White River subwatershed in the Upper White River Watershed.

Stony Creek – White River Subwatershed – This subwatershed shows the greatest discrepancy and unrealistic future land use change of the three studied. Hamilton County’s current zoning in particular shows a large residential area in the central portion of the subwatershed, while its future land use shows this area as agriculture with some conservation areas along stream corridors (Figures 5.8 and 5.9). Deviation such as this from a comprehensive plan is common in fast growing communities such as Noblesville and the associated areas of Hamilton County. If the comprehensive plan is fully implemented, additional planned residential and commercial growth is expected along the SR 37 corridor in this subwatershed.



**Figure 5.8 – Map of current zoning for Stony Creek – White River subwatershed in the Upper White River Watershed.**

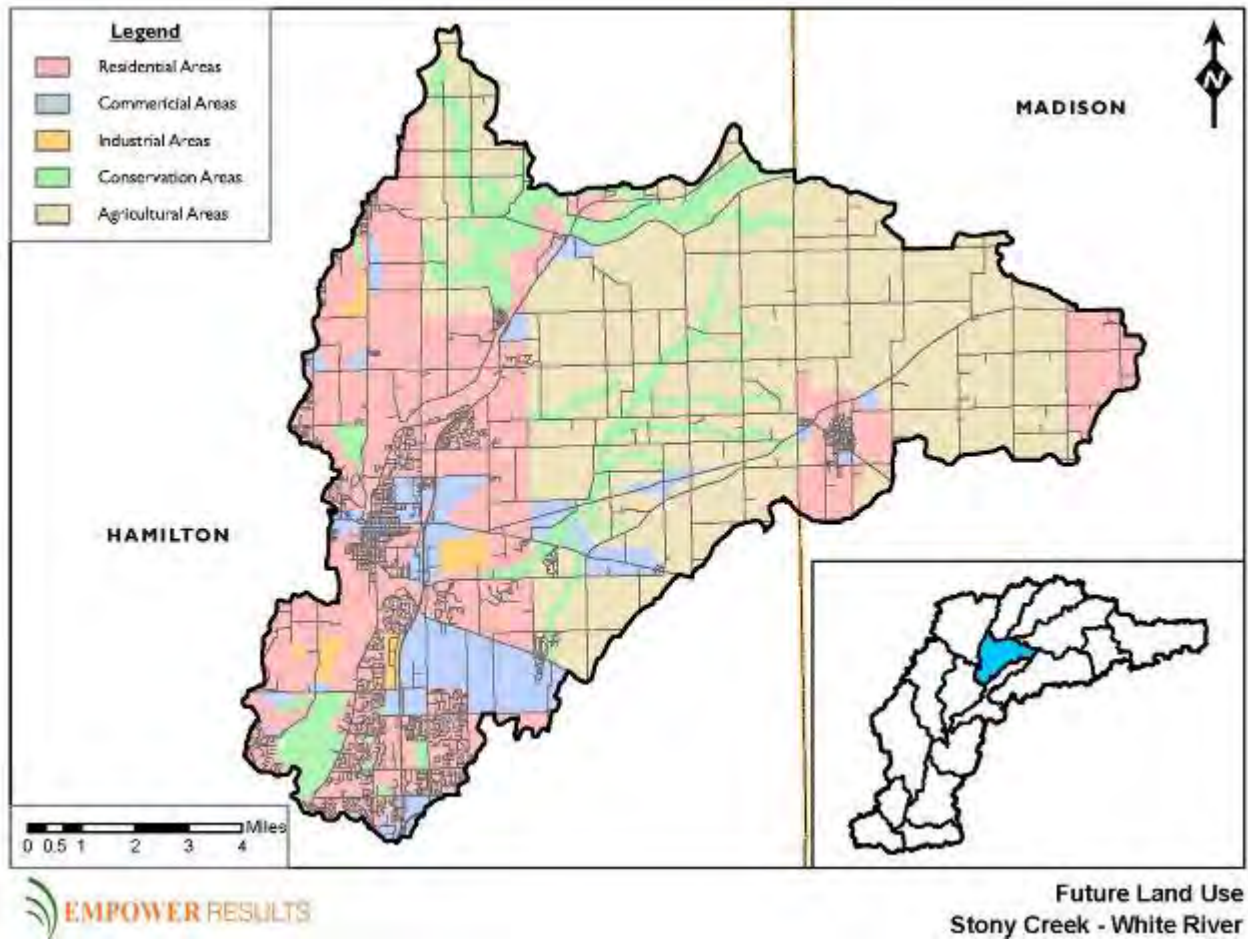
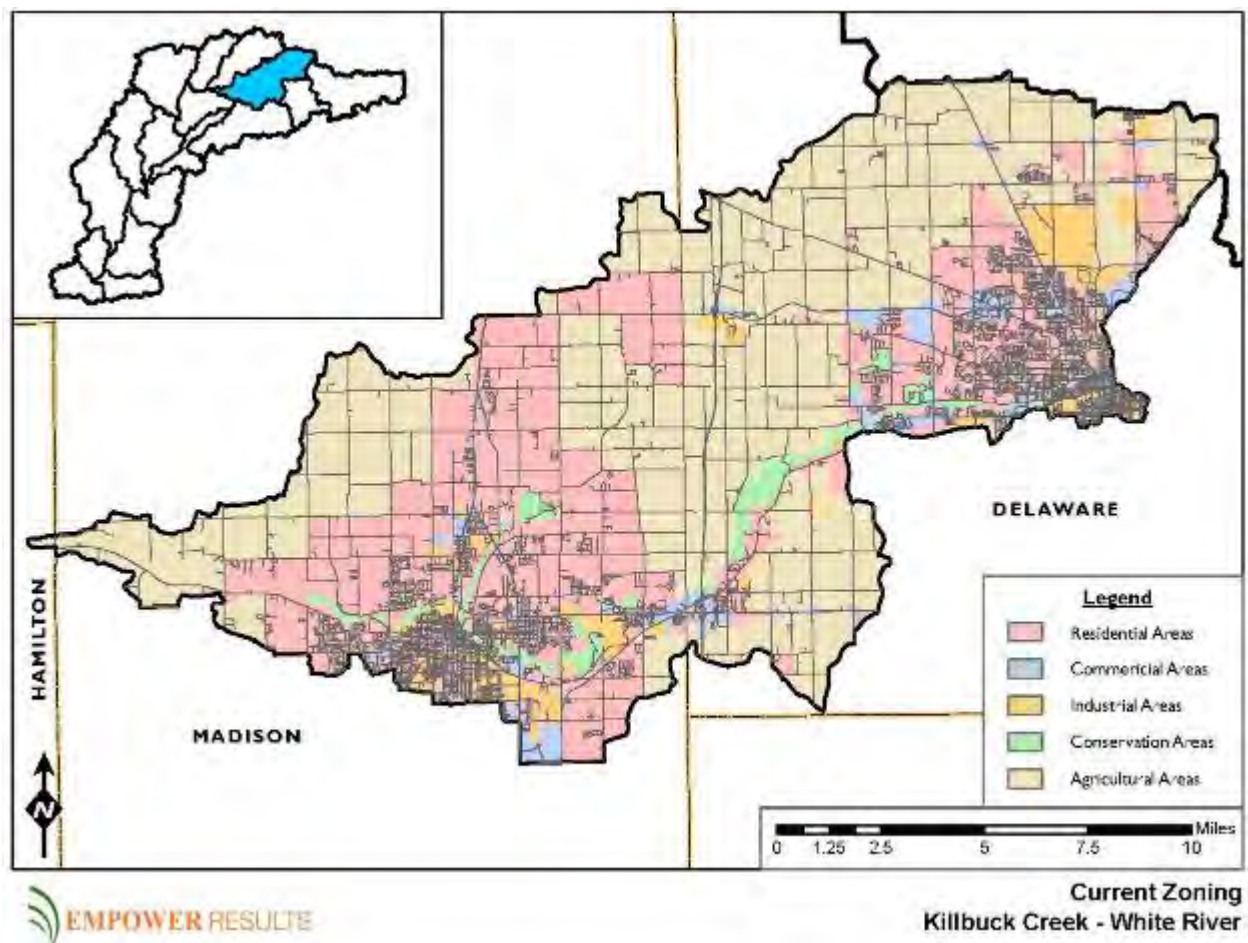


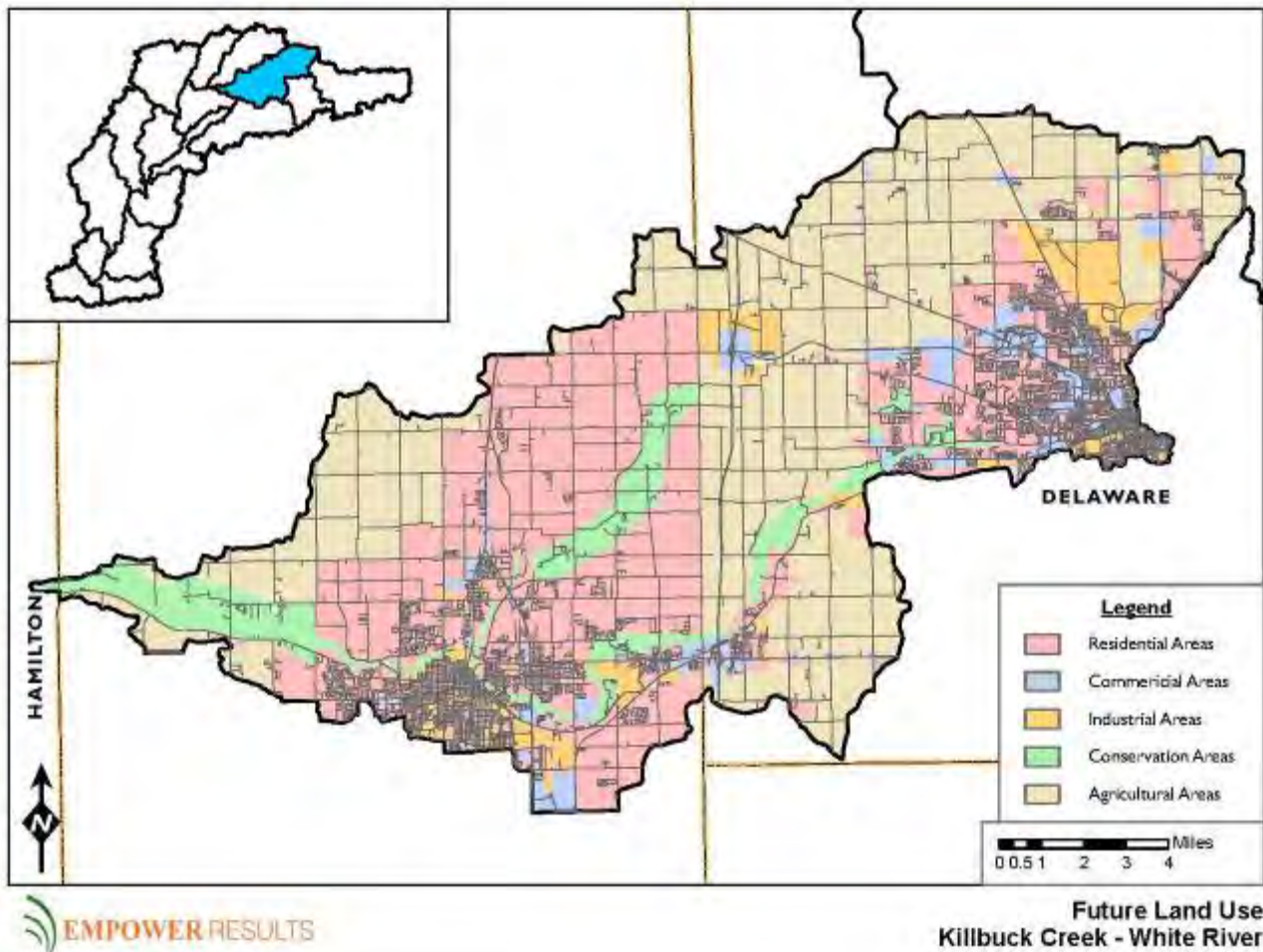
Figure 5.9 – Map of future land use for Stony Creek – White River subwatershed in the Upper White River Watershed.



Killbuck Creek – White River Subwatershed - This subwatershed's future land use show the most notable decline in agriculture among the three studied subwatershed's, a roughly 10% reduction (Figures 5.10 and 5.11). Most of this is associated with proposed/forecasted gains in residential and commercial land uses. Like in other subwatersheds, the commercial growth is planned around major roadways, namely I-69. According to the future land use map, conservation areas were planned along major stream corridors, yet current zoning already shows some of this zoned as residential. This is yet another example of how conservation objectives set forth in comprehensive plans via its future land use maps are often set aside when development of residential or commercial tax base is proposed. Some key areas where this has occurred include the western stretch of the White River and the northern section of Killbuck Creek in Madison County.



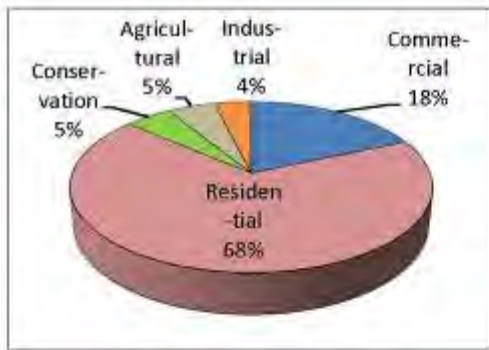
**Figure 5.10 – Map of current zoning for Killbuck Creek – White River subwatershed in the Upper White River Watershed.**



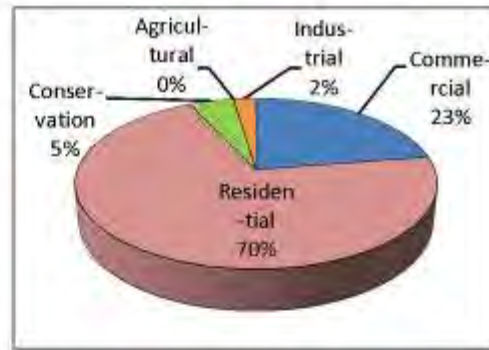
**Figure 5.11 – Map of future land use for Killbuck Creek – White River subwatershed in the Upper White River Watershed.**

Figure 5.12 shows the various land use type across the three study subwatersheds as numerical values (percentages) of either zoned or planned for a general future use. Comparison categories are reflective of the categories used in the preceding maps. When all three sets of pie charts are assimilated, some interesting overall shifts in land use can be highlighted, namely a significant loss of agriculture (11%) and significant gains in conservation areas and commercial land use (10% and 11% respectively). It is important to remember as noted and shown in the below maps and above comparisons, that while it would appear conservation areas are intended to increase according to future land use plans, current zoning shows many locations where residential land use has already moved in to these and surround these areas. Such residential zoning is unlikely to revert to conservation once zoned as such. Some opportunities exist within residential development to provide conservation-type land uses, but such opportunities are not the equivalent of zoning these areas into conservation. Also notable is the intended gain of commercial land use sought/intended by each planning entity. This shift is likely an intentional economic initiative associated with expanding tax base revenue and will therefore likely be realized to the extent the market will support it.

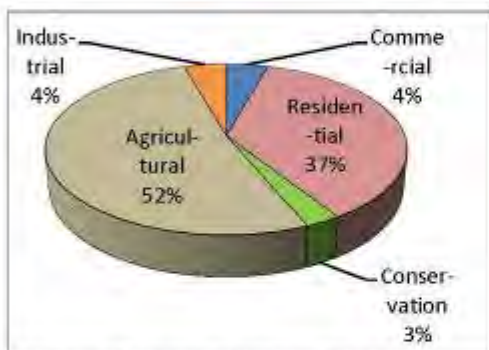




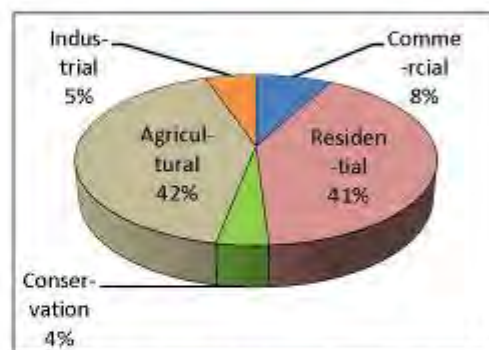
Current Zoning - Crooked Creek



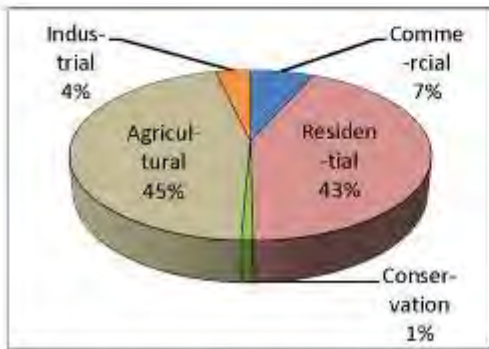
Future Land Use - Crooked Creek



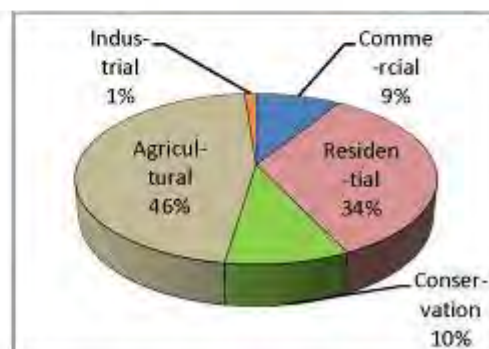
Current Zoning - Killbuck Creek



Future Land Use - Killbuck Creek



Current Zoning - Stony Creek



Future Land Use - Stony Creek

Current Zoning & Future Land Use Comparison

Figure 5.12 – Pie charts comparing current and future zoning for 3 HUC 10 subwatersheds in the Upper White River Watershed (Crooked Creek – WR, Stony Creek – WR, and Killbuck Creek – WR).

#### **5.4 Wellhead Protection Plans**

Wellhead Protection Areas (WHPAs) are areas designated to protect public water supply wells from contaminants that could be harmful to humans. These areas are protected by placing limitations on chemical storage and land use activities in the area that contributes water to the well or wellfield, known as Wellhead Protection Plans (WHPPs). WHPAs WHPPs are designed to protect all or part of the surrounding area from which a well's water is drawn on both a 1 year and 5 year travel time to the well basis. Wellhead protection areas are not made public and therefore not included as part of this report.

There are a reported 64 major public water supply systems that use an estimated 82,136,313 gallons of water annually from the UWRW. Section 4.7.1 discusses significant water withdrawal facilities used for the public water supply. Figure 4.13 illustrates these points and distinguishes between wells and intakes. Of these, the majority are using this water for drinking water. As part of the State required WHPP, each system must identify the area overlying ground water that can travel to the well in five years or less (the wellhead protection area), and identify potential sources of contamination within this area. The size of each WHPA varies depending on a number of factors including geologic and hydrologic features. Wellhead Protection Areas are regularly inventoried for potential sources, monitored for specific contaminants, and existing and future land uses are managed to protect the area as much as possible. There are significant flaws in this system most notably that the land use limitations are not readily transferred among owners when properties change hands and there are no mechanisms for enforcement associated with rental properties. Further, the program is education based.

#### **5.5 MS4 Programs**

Under NPDES Phase II stormwater regulations, several communities, universities, or other entities with concentrated populations were required to begin managing stormwater and reducing urban pollutant loads. These entities are referred to as Municipal Separate Storm Sewer Systems, or more commonly called MS4s. The name relates to the concept of understanding and managing stormwater influences from storm sewers that are not part of combine storm sewer systems therefore not routed to a treatment plant. This sort of storm sewer infrastructure and associated outfalls to local streams is widespread geographically and often quite diverse in engineering design. Because the systems are separate, inflows from such outfalls represent an untreated pollution source with direct discharge to watershed streams.

The Municipal Separate Storm Sewer System (MS4) regulation and subsequent municipal programs arose out of Indiana Administrative Code (327 IAC 15-13). MS4s' consist of a conveyance system that discharges to waters of the U.S. They are owned by a state, city, town, or other public entity and are designed for the purpose of collecting or moving stormwater. Conveyance systems can include things such as municipal streets, catch basins, curbs, storm drains, ditches, channels, etc., but do not include combined sewer overflows and publicly owned treatment works.

The City of Indianapolis is permitted under Phase I of the state's regulated stormwater program. Phase I required the entity to meet a population criteria of 100,000 persons. Under Phase I, IDEM issued the City of Indianapolis an individual stormwater permit. Phase II was written to regulate most MS4 entities. MS4 entities include areas located within mapped urbanized areas or areas serving an urban population of 7,000 or more as defined by the US Census Bureau. Cities, towns, universities, corrections facilities, military bases, are just a few of the types of entities that can be regulated under Phase II. Phase II is generally referred to Rule 13 and became effective in Indiana on August 6, 2003.

There are fifty (50) MS4 communities in the Upper White River Watershed (Figure 5.13). Forty-five of the MS4 communities were contacted for this report. Of the forty-five contacted, thirty-nine were

interviewed and asked twenty-one standardized questions. Interviews were conducted by phone, e-mail or in person. When the interviewee was unable to provide an answer to any of the standardized questions, due diligence was used to seek out the information. Instances in which the information could not be obtained are denoted with an asterisk (\*) to symbolize that either no response was collected or that the information was not available.

**5.5.1 MS4 Jurisdictional Boundaries & Responsible Staff**

MS4 boundaries must be established according to IDEM guidance. This is to provide the exact coverage area for the permit. Typically, the boundary is defined by the entity’s jurisdictional area, but can often be defined by an analogous urbanized area. Portions of a county may also be regulated. If this is the case, then the boundaries must be defined by the nearest township or section. In general, most MS4 boundaries are located within mapped urbanized areas, as delineated by the United States Census Bureau, or, for those MS4 areas outside of urbanized areas, serving an urban population greater than 7,000 people.

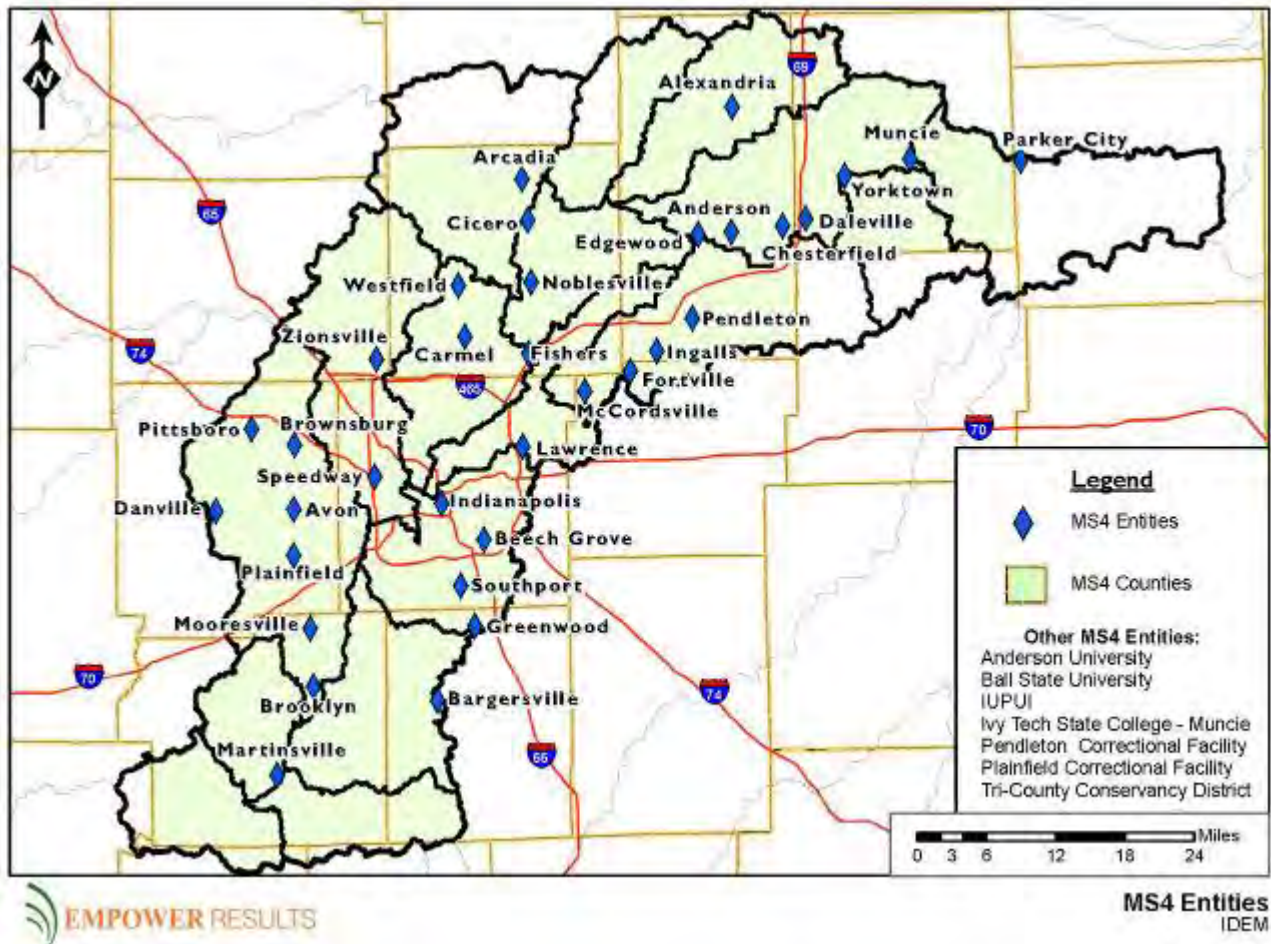
A staff member or local official from the entity has been named as the responsible party for permit compliance and implementation of the local program. However, depending upon what department within each entity took on responsibility for the MS4 Program, the amount and type of staff available to implement the permit/program can vary greatly. Available funding also greatly influences how many staff and what combination of technical disciplines participate in any given MS4 program.

Table 5.1 represents the number of staff working in all of the MS4 communities within the Upper White River Watershed at the time this report was drafted. Information was acquired through interviews with each MS4 office. A common theme throughout each interview was that the MS4s would hire more staff if more funds were made available to them. In some cases, part-time staff is dedicated to only MS4 programs. In many cases, staff from other departments is helping with the MS4 program. A number of full-time staff dedicated to the MS4 program also have other duties. Staff resources for MS4 programs were often low and many expressed a need for more technical resources to implement their programs. Very few MS4 staff had the diverse skill set of technical stormwater understanding paired with comprehensive project management and teaching experience.

**Table 5.1 MS4 Staff within the Upper White River Watersheds**

	Number of individuals
Full-time staff	38
Part-time staff	45
Other staff*	1
Consultants	2

\*Includes any staff members or specialists that may be involved in completing a project but are not assigned to MS4 directly.



**Figure 5.13 – Map of MS4 entities and counties in the Upper White River Watershed.**

### 5.5.2 Stormwater Utilities

The nature of stormwater management has changed dramatically since the first stormwater utilities were formed. Stormwater utilities are frequently founded for a particular purpose such as improving drainage within the community. However, other issues such as water quality improvement and environmental management may be included as part of the utility’s focus and project expenditures. Since MS4 regulations were handed down as an unfunded mandate, many MS4 entities have established utilities or are in the process of doing so to help defray costs of program implementation.

Of the Upper White River MS4 communities interviewed, fifteen are currently collecting stormwater utilities fees while two are in the process of implementing a stormwater utility program. Fourteen of the MS4s are not collecting these utilities, while thirteen of the MS4s did not report information on the existence or development of a utility. Many of the responses received throughout the interview process regarding program elements were affected by the presence or absence of a utility or other stable funding source. The most active and robust programs, Muncie and Noblesville, are occurring in areas where a utility has been generating revenues that can be directed toward staff, education, or enforcement programs. These MS4 areas present the greatest opportunity to further develop program elements and/or share resources and ideas across the region.

Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on the presence of MS4s with stormwater utilities in place. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has MS4s without stormwater utilities, while a one (1) signifies MS4s with more than one stormwater utilities and stormwater program support infrastructure.

### 5.5.3 Available Stormwater Planning Tools & Advancement of Programs

Each permitted MS4 entity needs to develop and submit to the State a Stormwater Quality Management Plan (SWQMP). Part C for the SWQMP, the Program Implementation Plan, is a working document. The purpose of Part C is to outline the priorities, goals, and implementation strategies that the MS4 will utilize to improve water quality. It is expected that this document will change as issues are solved, best management practices are utilized, and technology improvements are developed. The Program Implementation Plan needs to specifically address six (6) Minimum Control Measures (MCMs). Each MCM provides the MS4 an opportunity to affect behavior change either through regulation, such as ordinance development, or increased awareness of pollutant sources and subsequent pollution reduction. The six MCMs are listed below:

- Public Education Outreach
- Public Involvement
- Illicit Discharge Detection & Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Site Stormwater Runoff Control
- Pollution Prevention & Good Housekeeping

MS4 operators are required to develop, implement, manage, and enforce a program to address stormwater runoff and discharge related to post-construction activities. This program must, at a minimum, meet the requirements of Rule 5, which is the construction and land disturbance regulation for the State of Indiana. Rule 5 was established for the purpose of sediment pollution reduction associated with construction activities at sites where land disturbance is on one or more acres of land.

While developing a plan for stormwater during construction activities, one should also be planning for post-construction measures should be included with the development of the construction plan for the project. If post-construction measures have been planned for prior, then it is important that they are incorporated into the larger development plan. A number of the measures created for post-construction can be used during construction as sediment trapping devices. Then, once construction is completed, these measures become ready to make certain stormwater quality is maintained from the developed site.

As part of the MS4s responsibility, they must put in place a way to provide legal authority to enforce the noncompliance of any MS4 entity specifications that have been created.

Since these post-construction practices remain on the landscape and often discharge to local streams, their design and maintenance is critical to regional water quality. Post-construction storm water quality measures are long-term control systems that must be managed and maintained to ensure performance. To provide the greatest water quality benefits and to help reduce down-cutting and erosion in urban streams, practices that utilize Low Impact Development (LID) techniques provide the greatest water quality benefit.



Throughout the interview process, MS4 entities were asked about various ordinance development and ordinance updates, as well as whether or not they were incentivizing LID techniques. The responses are shown in Table 5.2. Total for all MS4s are tallied near the bottom of the table.

**Table 5.2 Development Tools for MS4 Communities**

<b>MS4 Entity</b>	<b>Pre Post Construction Ordinance</b>	<b>Tech Standards</b>	<b>Upcoming revisions planned for the ordinance</b>	<b>LID incentive programs in place</b>	<b>Part C for new/upcoming permit complete Y/N/IP</b>
Madison Co.	Yes	Yes	No	*	Yes
Boone Co.	Yes	Yes	Yes	No	No
Zionsville	Yes	Yes	Yes	Yes	Yes
Hendricks Co.	Yes	Yes	No	No	IP
Danville	Yes	Yes	No	No	Yes
Johnson Co. Greenwood	Yes	Yes	No	No	Yes
Mooresville	Yes	Yes	No	*	Yes
Hancock County	Yes	Yes	No	No	IP
Westfield	Yes	Yes	No	No	No
Hamilton County	Yes	Yes	No	No	*
Daleville	Yes	Yes	No	No.	Yes
Ball State	No	No	N/A	No	*
Pittsboro	Yes	Yes	No	No	IP
Brownsburg	Yes	Yes	Yes	Yes	*
Pendleton	Yes	Yes	No	*	Yes
Noblesville	Yes	Yes	Yes	No	IP
Fishers	Yes	Yes	No	No	IP
Fortville	*	*	*	*	*
Morgan County	*	*	*	No	*
Brooklyn	No	No	No	No	No
Arcadia	Yes	Yes	Yes	No	IP
McCordsville	Yes	Yes	Yes	Yes	Yes
Muncie					*
Yorktown	Yes	Yes	Yes	Yes	*
Anderson	*	*	No	No	*
Edgewood	*	*	*	*	*
Beech Grove	Yes	Yes	Yes	Yes	IP
Southport	*	*	*	*	*
Greenwood	Yes	Yes	No	No	IP
Speedway	Yes	Yes	No	Yes	No

**Table 5.2** Development Tools for MS4 Communities (cont)

<b>MS4 Entity</b>	<b>Pre Post Construction Ordinance</b>	<b>Tech Standards</b>	<b>Upcoming revisions planned for the ordinance</b>	<b>LID incentive programs in place</b>	<b>Part C for new/upcoming permit complete Y/N/IP</b>
Delaware County	Yes	Yes	Yes	Yes	*
Plainfield	*	*	*	*	*
Indy	Yes	Yes	In progress	No	*
Parker City	*	*	*	*	*
Chesterfield	*	*	*	*	*
Ingalls	No	No	No	No	IP
Alexandria	Yes	Yes	No	No	*
Cicero	Yes	Yes	No	No	*
Randolph County	*	*	*	*	*
Carmel	*	*	*	*	*
Cumberland	Yes	Yes	Yes	Yes	
Bargersville	Yes	Yes	Yes	No	IP

**Totals for the Upper White River Watersheds**

	<b>Pre Post Construction Ordinance</b>	<b>Tech Standards</b>	<b>Upcoming revisions planned for the ordinance</b>	<b>LID incentive programs in place</b>	<b>Part C for new/upcoming permit complete Y/N/IP</b>
<b>Yes</b>	<b>25</b>	<b>29</b>	<b>11</b>	<b>8</b>	<b>9</b>
<b>No</b>	<b>3</b>	<b>3</b>	<b>20</b>	<b>22</b>	<b>4</b>
<b>IP</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>
<b>*</b>	<b>14</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>19</b>

\* Indicates that information was unavailable at the time this report was drafted

**5.5.4 Water Quality Monitoring & Outfall Mapping**

MS4 conveyance systems are not allowed to carry anything but stormwater, with the exception of leaves or tree limbs. Anything other than stormwater is considered an illicit discharge. Hazardous household wastes, oil disposal, wastewater from car washing and laundry, roadway spills, and septic tank effluent are all considered illicit discharge. Because these types of discharges carry such pollutants as heavy metals, toxins, oil and grease, solvents, nutrients, and bacteria, they contribute considerably to high pollutant loads found in MS4 conveyance systems.

Often, illicit discharges are reported by the public or identified through outfall mapping. An attempt was made to gather all known/mapped outfalls as part of this project to assist in water quality data interpretation, see Section 4.6. As illicit discharge detection efforts increase, water quality monitoring will play a larger role in MS4 programs. Likewise, IDEM is encouraging MS4s to begin monitoring outfall water quality to help prioritize other MS4 program elements.

Although water quality testing is not required by law, eighteen of the Upper White River Watershed MS4s (Table 5.3) are currently performing some form of water quality testing voluntarily. Many of these MS4 communities are relying on training received from Hoosier Riverwatch volunteer training programs. These programs offer excellent citizen involvement and produce a lot of referential data. However, additional training programs and more standardized sampling will need to be implemented as water quality testing becomes required in the future. Parameters sampled, detection limits, and techniques vary significantly and no clear guidance is being provided by IDEM.

	Number of MS4s
MS4s conducting water quality testing	18
MS4s not conducting water quality testing	12
Information on water quality testing unavailable	13

#### 5.5.5 Construction Inspection, Enforcement, and Partners

MS4 operators are required to develop, implement, manage, and enforce a program to address erosion and sediment control related to construction activities. This program must, at a minimum, meet the requirements of Rule 5, which is the construction and land disturbance regulation for the State of Indiana. Rule 5 was established for the purpose of sediment pollution reduction associated with construction activities at sites where land disturbance is on one or more acres of land.

Program procedures must include construction plan review, site inspection, and enforcement. As part of the MS4s responsibility, they must put in place a way to provide legal authority to enforce the noncompliance of any MS4 entity specifications that have been created.

Stormwater training is necessary for MS4 personnel involved in the implementation of the construction site runoff control. Involved personnel must receive training annually. The UWRWA currently hosts an annual training workshop to help regional MS4s receive this training and has a comprehensive inspection form created and available on its website.

Table 5.4 shows information about the MS4 construction inspection and violation programs. The table lists the MS4, if an inspection program is in place or not, number of violations, and who is conducting the inspections.

**Table 5.4 MS4 Construction Inspection and Violations (as of 2009)**

<b>MS4 Entity</b>	<b>Inspection Program</b>	<b>Number of violations</b>	<b>Who is conducting the inspections</b>
Madison County	Yes	*	Water Conservation Dept.
Boone County	Yes	*	Three staff handle, enforced once, otherwise cooperation
Zionsville	Yes	*	Handled by interviewee. No official violation actions – mostly cooperation
Hendricks County office	Yes	*	Handled by inspectors, permitting process, must complete clean water program and permit fees, etc. Like to give developers a chance before fining, so few are levied, most cooperate.
Danville	Yes	36 no fines	handled by interviewee
Avon	Yes	4	MS4 Coordinator
Johnson Co, Greenwood	Yes	Usually all are in compliance; in '06 ALL developments were shut down due to # of infractions. Few problems since	Engineering Division
Mooresville	Yes	2	Inspector deals with construction superintendent, reports back to Coordinator
Hancock County	Yes	mostly construction little post construction	Hancock County Office
Westfield	Yes	24	3 Construction Inspectors; 2 Encroachment & Erosion Control Inspectors
Hamilton County	Yes	*	*
Daleville	Yes	*	Head of the Municipal Services Department is responsible for inspections, enforcement, and handling reported concerns.
Ball State	No	*	MS Coordinator assists with self-inspections
Pittsboro	Yes	2	Interviewee
Brownsburg	Yes	*	MS4 operator and Planning and Building Department personnel
Pendleton	Yes	*	Water conservation dept.

**Table 5.4 MS4 Construction Inspection and Violations (as of 2009)**

<b>MS4 Entity</b>	<b>Inspection Program</b>	<b>Number of violations</b>	<b>Who is conducting the inspections</b>
Noblesville	Yes	12	Noblesville Engineering / Inspectors file reports back to the Utility / MS4... we issue fines & Stop Work Orders / enforcement.
Fishers	Yes	*	2 Stormwater Inspectors
Fortville	*	*	
Morgan County	Yes	*	Coordinator
Brooklyn	Yes	0	Building Inspector does Volunteer Inspections
Arcadia	Yes	6 warning letters with 1 or 2 further enforced a year	Interviewee
McCordsville	Yes	*	*
Muncie	Yes	*	*
Yorktown	Yes	*	*
Anderson	Yes	*	*
Edgewood	*	*	*
Beech Grove	Yes	*	City of Indianapolis
Southport	*	*	*
Greenwood	Yes	2006 many violations therefore shut down all projects. Since then no violations	Interviewee
Speedway	Yes	*	*
Delaware County	Yes	*	Interviewee
Plainfield	*	*	*
Indy	Yes	*	*
Parker City	*	*	*
Chesterfield	*	*	*
Ingalls	*	*	*
Alexandria	Yes	*	*
Cicero	*	*	*
Randolph County	*	*	*
Carmel	Yes	*	*
Cumberland	Yes	*	Interviewee



**Table 5.4 MS4 Construction Inspection and Violations (as of 2009)**

<b>MS4 Entity</b>	<b>Inspection Program</b>	<b>Number of violations</b>	<b>Who is conducting the inspections</b>
Bargersville	Yes	6 warning letters with 1 or 2 further enforced a year	Interviewee

<b>Upper White River Subwatersheds with an Inspection Program - Totals</b>	
Yes	32
No	1
*	13

Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on MS4 stormwater enforcement programs. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has MS4s with a low number of enforcement actions or inspection staff, while a one (1) signifies MS4s with a high number of staff and relatively high number of enforcement actions.

*5.5.6 Public Education and Involvement Programs and Partners*

Residents, visitors, and employees located or operating within an MS4 area are informed about stormwater runoff impacts to water quality via the Public Education and Involvement MCMs.

Well-informed communities are crucial to the local stormwater program success. Public support for programs is easier to achieve when people understand the issue at hand. Fund-raising efforts and other compliance are types of programs that benefit from this type of support.

Citizens living within a MS4 are to be allowed the opportunity to participate and offer input into the progress and execution of the stormwater management program. Involved communities are necessary for a program’s success and often take an active role in getting other citizens involved.

Existing programs and other available resources are encouraged to be used by MS4s to aid in the delivery of this minimum control measure. Program rudiments do not need to be developed from scratch. MS4s are also encouraged to work with other MS4 areas to make use of materials which have already been developed.

Interviews with MS4 Coordinators highlighted the wide range of activities and partnerships that are being utilized to deliver MCMs for public education and involvement. Table 5.5 illustrates the findings of the interviews with the MS4s.

The UWRWA has an active and rapidly growing public education and involvement program available to all MS4 entities in the watershed. The program has a population-based fee structure. Currently nine MS4s are participating in the program. Efforts are actively underway to recruit more participation across the watershed.

**Table 5.5 MS4 Public Education and Involvement Programs and Partners**

<b>MS4 Entity</b>	<b>Staff assigned to education (y/n)</b>	<b>Individualized printed material</b>	<b>Utilizing SCWD programs</b>	<b>Public Activities (clean ups, workshops, festivals)</b>	<b>Report A Polluter program</b>
Madison Co.	Yes	X	X	X	X
Boone Co.	No		X		
Zionsville	No		X	X	
Hendricks Co.					
Danville	No			X	
Avon	No			X	
Greenwood	No				
Moorestown	Yes	X		X	
Hancock County	No		X		
Westfield	Yes	X	X	X	X
Hamilton County	Yes	X	X	X	X
Daleville	Yes	X		X	
Ball State	No				
Pittsboro	Yes	X		X	
Brownsburg	Yes	X		X	
Pendleton	Yes	X		X	
Noblesville	Yes	X	X	X	X
Fishers	Yes	X		X	X
Fortville	Yes	X	X	X	X
Morgan County	Yes	X	X	X	X
Brooklyn	Yes	X	X	X	
Arcadia	No			X	
McCordsville	Yes			X	
Muncie					
Yorktown	Yes		X	X	
Anderson				X	
Edgewood					
Beech Grove	Yes	X	X	X	X
Southport					

**Table 5.5** MS4 Public Education and Involvement Programs and Partners

Speedway	Yes		X	X	
Delaware County			X	X	
Plainfield					
Indy	Yes	X	X	X	X
Parker City					
Chesterfield					
Ingalls	Yes	X	X	X	
Alexandria				X	
Cicero			X	X	
Randolph County					
Carmel	No	X	X	X	
Cumberland	Yes	X	X	X	X
Bargersville			X	X	

### 5.5.7 Good Housekeeping Training and Programs

Changes to internal operations associated with the daily function of an MS4 can be made to reduce pollutants. This minimum control measure is known as Good Housekeeping Tasks such as litter pick up, cleaning and maintenance of stormwater systems, street sweeping, roadside shoulder and conveyance system maintenance, and scoured outfall remediation are just a few of the items that can be improved. Additional Good Housekeeping compliance efforts can also include flood management project modification to address stormwater quality and quantity or the development of procedures for disposal of storm sewer system materials removed during maintenance.

Based on MS4 interviews conducted, the majority of MS4 employees (representing 30 MS4 entities) in the Upper White River Watersheds have received Good Housekeeping training (in accordance with 327 IAC 15-13), while about 7 percent of the MS4s (3 entities) have not received this training. When this percentage is added to the percentage MS4 communities that did not provide training information during the interview (approximately 21 percent, 9 entities), the percentage of the communities whose employees are may not regularly receiving Good Housekeeping training is about 28 percent. Stormwater training is necessary for MS4 personnel involved in internal operational activities. Involved personnel must receive training annually.

### 5.5.8 Summary of MS4 Program Initiatives

Implementation of various Minimum Control Measures varies significantly across the MS4 entities in the watershed, yet all MS4s are facing the same regulatory requirements and water quality management challenges. As discussed in early sections of this report, the water quality impacts associated with urban stormwater are tremendous. Many MS4 entities are dealing with very limited budgets, staff, and aged infrastructure when trying to address and manage local stormwater quality. It is clear from the many interviews conducted that the presence of a stormwater utility (i.e. a steady funding source) can significantly advance management alternatives. Likewise, a strong enforcement program can also generate the fees to improve other aspects of the local MS4 program. Enforcement across the watershed on both construction and post-construction stormwater practices is highly variable. In many instances the variability can be attributed to associated ordinances and political will.

Similarly, a given community's interest and commitment to public education and involvement as it relates to stormwater also seems dependent upon the vision of its local leaders and the flexibility to coordinate across municipal departments and with outside partners. While the UWRWA is building a nationally-recognizable regional program to assist with standardized messaging and measureable outcomes, participation remains limited by lack of financial commitment from many entities that struggle to get resources allocated in the direction of education. Efforts are underway to increase flexibility of the regional program and market its value to local leaders. However, it remains a challenge for many MS4s to dedicate funds to these efforts regardless of the known return on investment. Part of what seem to limit such resource allocation is that many MS4 have sunk costs into mapping outfall locations, developing ordinances, and paying for good housekeeping training in order to meet the needs of other MCMs.

Some of these other MCMs seem to have clearer deliverables and therefore a clearer approach and commitment. Outfall mapping has advanced significantly throughout the watershed and monitoring of outfalls is even occurring in some places. Likewise, internal training has occurred in nearly all the MS4s on good housekeeping. It appears that when there is an easily identifiable goal and outcome MS4 programs respond more consistently. However a lot could be done to tie these outcomes together, and of course other coordinated initiatives as well. The inventory included in the above sections of this report provides a nice road map to pulling various pieces of MS4 programming together and provides some clear opportunities for coordinated advancement, which will be discussed in Section 8.

## **5.6 Green Infrastructure and Conservation Priorities**

During the course of this project the Central Indiana Land Trust (CILTI) helped to gather information about green infrastructure and conservation priority areas. CILTI has been working on a regional green infrastructure project to identify key areas to target for conservation. A green infrastructure network can be used as a skeleton to guide growth and development decisions, as well as land protection initiatives.

CILTI's focus area was Central Indiana, primarily Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, and Shelby Counties. This study area does not include all of the Upper White River Watershed but encompasses a core area of the watershed. Five habitat types and six species were the core areas of study for project. These areas were chosen because of the needs of key species to survive. The five studied habitat types were forested wetland, emergent wetland, aquatics, glaciated forest, and unglaciated forest. Within each of these habitat types, specific species were the focus. The six species were Indiana bat (*Myotis sodalis*), king rail (*Rallus elegans*), river otter (*Lontra canadensis*), mussels, wood thrush (*Hylocichla mustelina*), and ovenbird (*Seiurus aurocapillus*).

The study determined that the central Indiana green infrastructure network should cover 316,192 acres or 10 percent of the 3.1 million acres in the total study area if wholly implemented. A small portion of the green infrastructure network has already been protected. Unfortunately, there are still over 250,000 acres of land that need to be protected. Over 60,000 of the identified acres for the green infrastructure network are located within the floodplain. Floodplain areas could be turned into parks with recreational areas and also provide disaster resistance to flooding. The plan also identified many corridors which have been identified as proposed routes for trails.

The report goes on to provide a summary of each county studied. A map of the county is included and identifies the green infrastructure network, conservation and managed lands, water bodies, streams, interstates, and county boundary. It also gives a summary of the acres in the county, acres in the network, and protected acres in the network.

In order for the green infrastructure project to be a success, six goals were set to help with implementation. The goals are:

- Conserve significant contiguous natural habitat
- Identify and protect a network of stream and land corridors for wildlife movement and human enjoyment
- Help state and local planning become more environmentally sensitive
- Increase public awareness of the multiple benefits of a green infrastructure network
- Increase public support for green infrastructure
- Increase the coordination of green and gray infrastructure projects, particularly utility and road corridors, to maximize the benefits for nature and people

Much effort will be needed to implement the visions of this project. Collaboration between many different parties is necessary. The parties will range from private landowners to government agencies. Fortunately, central Indiana has many great resources and persons that are willing to help with this effort.

Figure 5.14 – 5.29 illustrates the findings of the project. The maps display the study areas within the Upper White River Watershed on an 8-digit HUC scale and then at the smaller 10-digit HUC scale. Corridors, network, core aquatics, core forest, core wetlands, and hubs are represented on the maps. These are the key areas that make up a green infrastructure network. A core is the center of the network where crucial habitat is provided for sensitive species. Hubs are major, non-fragmented areas of forest, wetlands, stream systems, or other native landscape. Corridors are the connections between the hubs and cores. Corridors not only allow for animal movement, but also plant and seed dispersal.

Greening the Crossroads recommended green infrastructure locations should serve as a roadmap for the protection of important natural areas, as well as the focus of restoration efforts in the watershed as such efforts center on wildlife and recreational enhancement. Green infrastructure locations that overlay already developed properties and locations should be considered when redevelopment of urban stormwater retrofits or beautification projects are undertaken by local government or special interest groups.



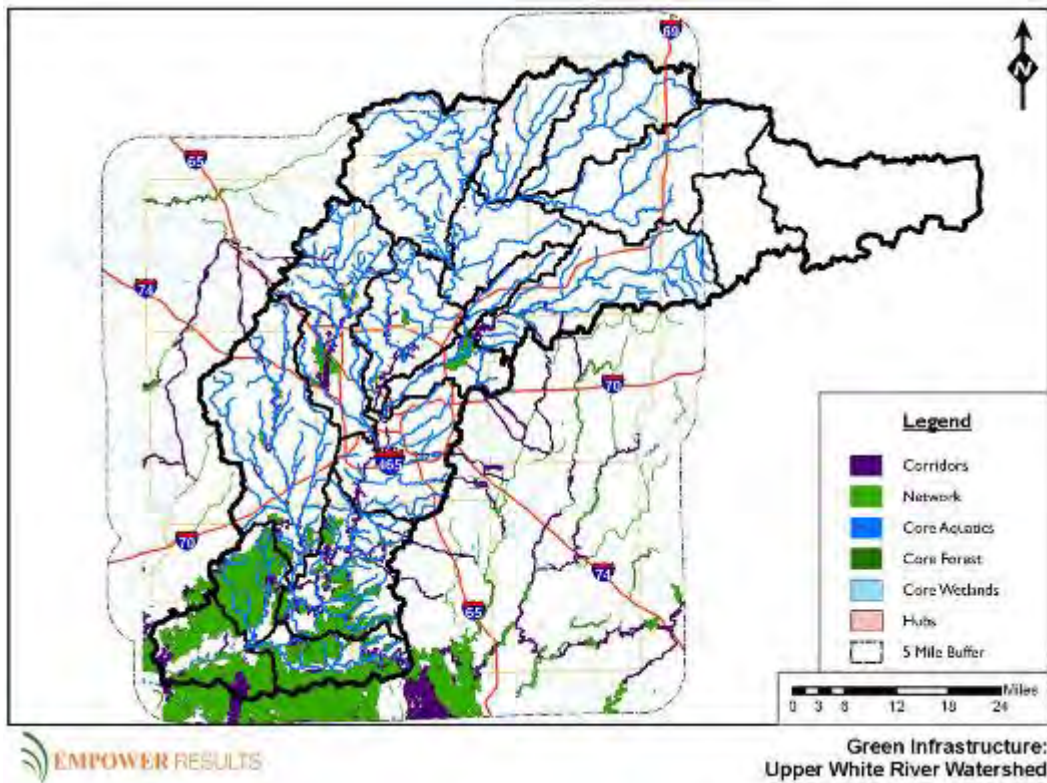


Figure 5.14 – Map of Central Indiana Land Trust Green Infrastructure Plan overlain on the map of the Upper White River Watershed.

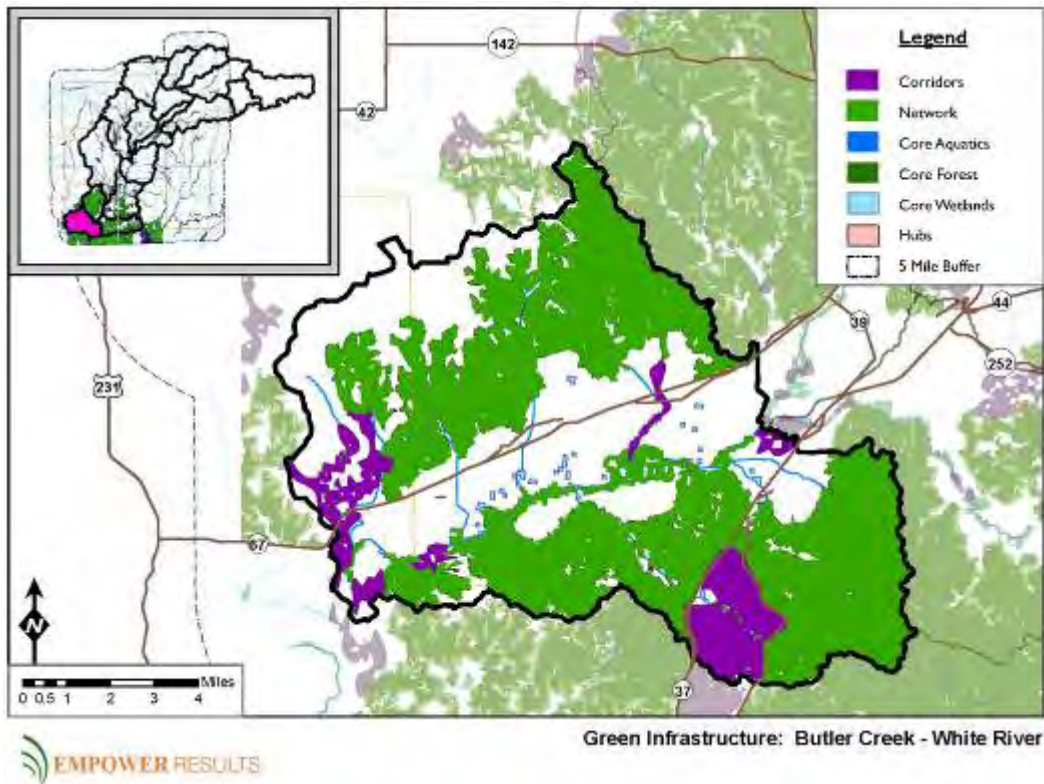


Figure 5.15 – Map of CILTI Green Infrastructure Plan for Butler Creek Subwatershed.

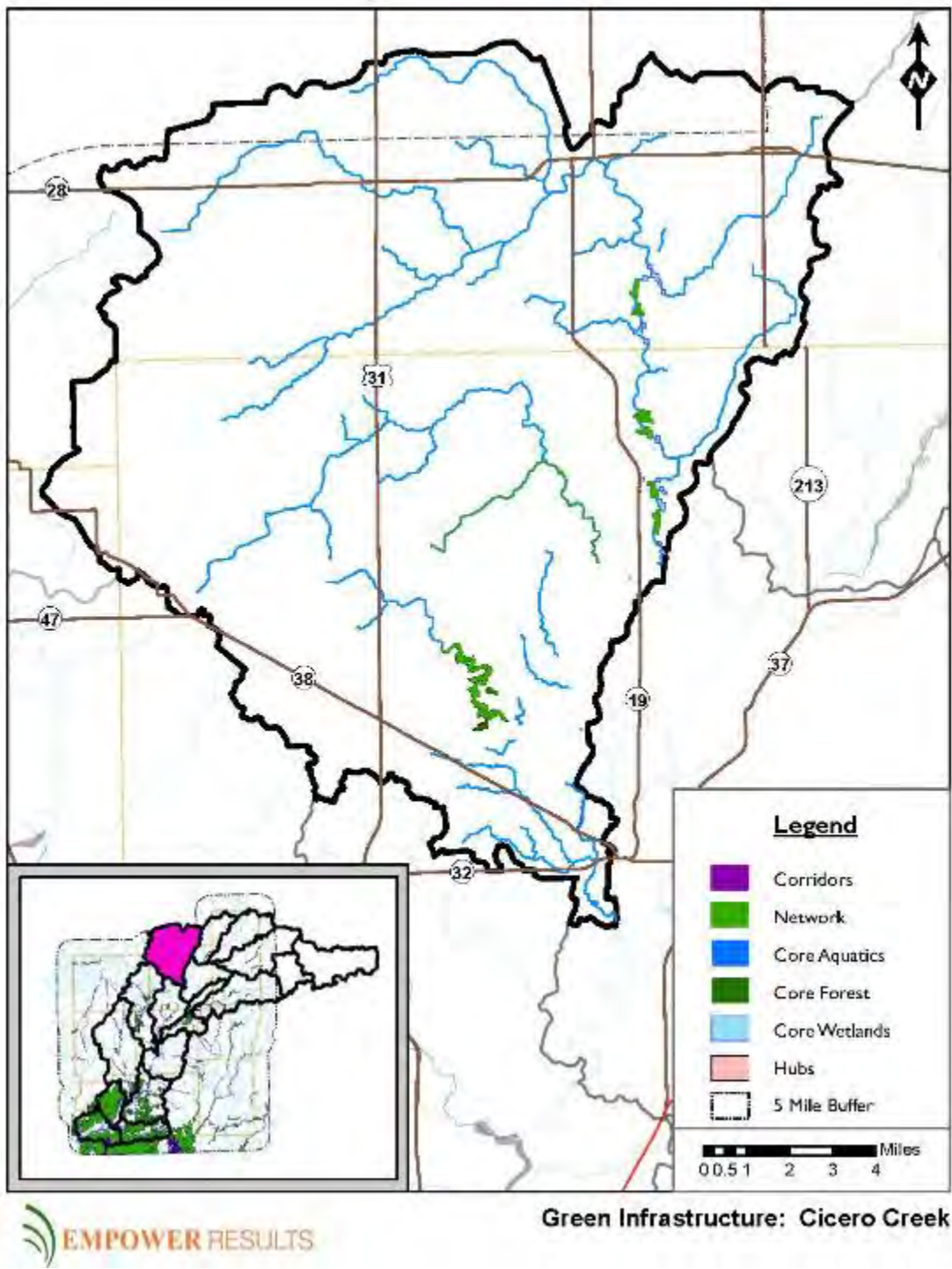


Figure 5.16 – Map of CILTI Green Infrastructure Plan for Cicero Creek Subwatershed.



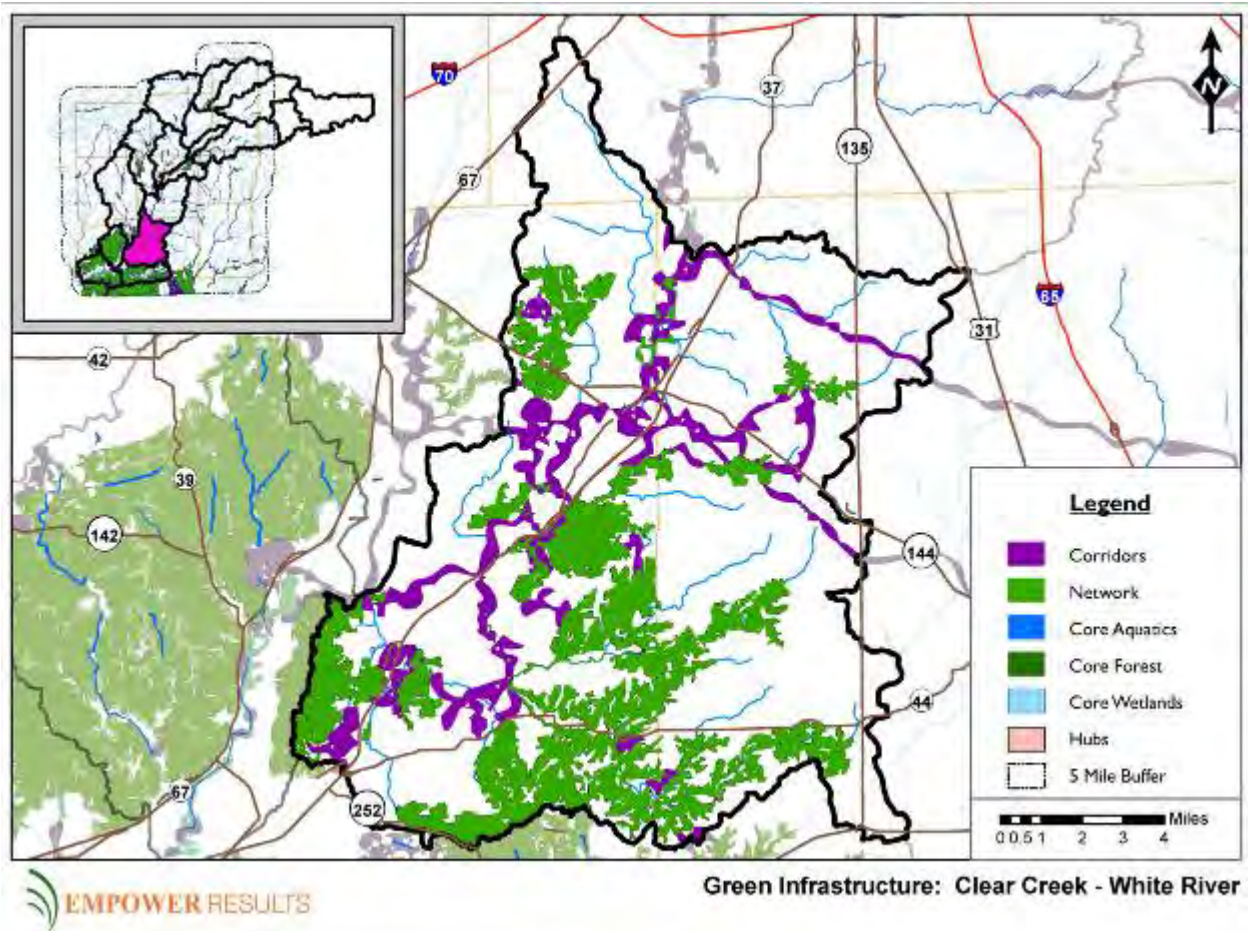


Figure 5.17 – Map of CILTI Green Infrastructure Plan for Clear Creek Subwatershed.

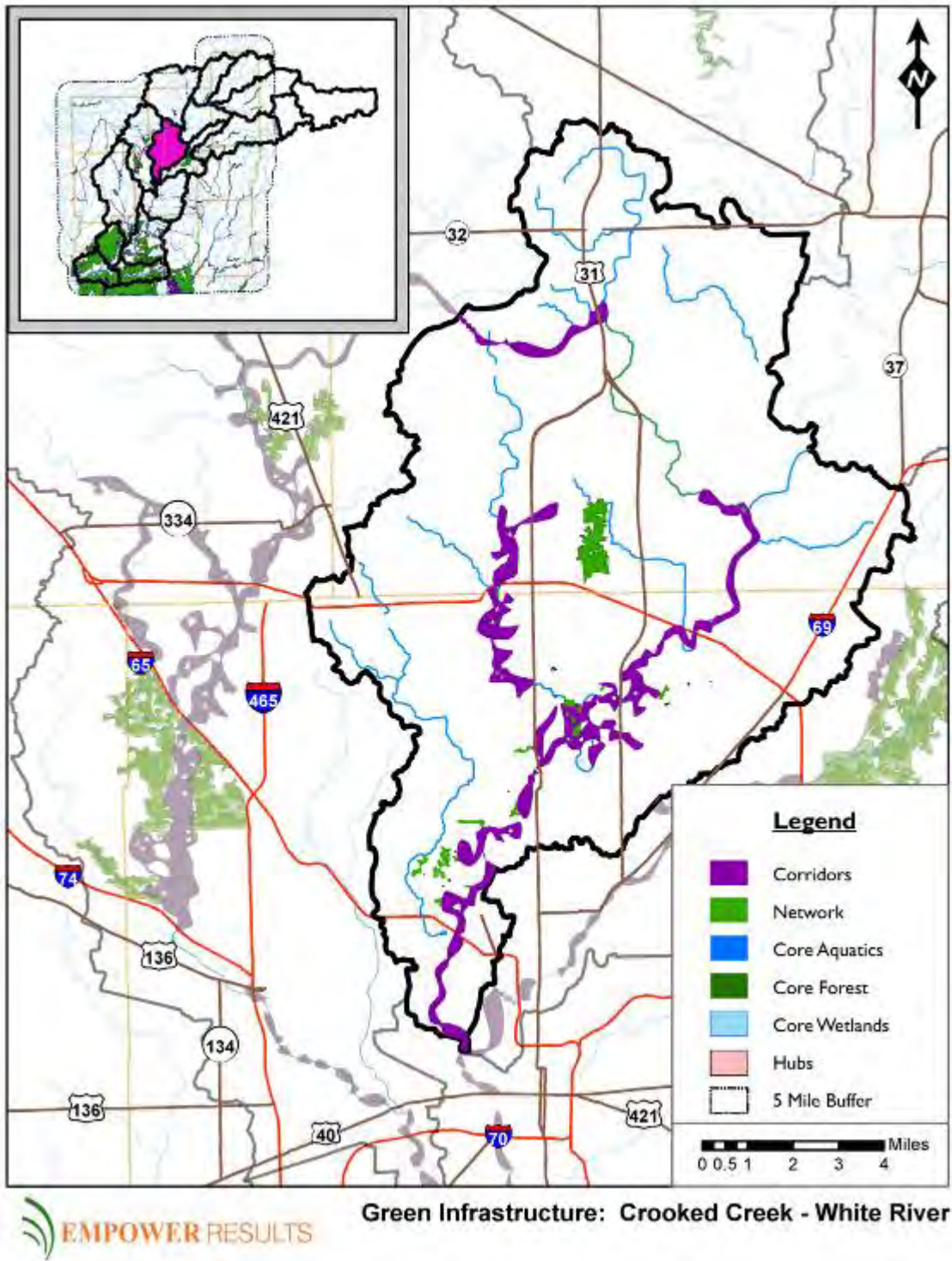
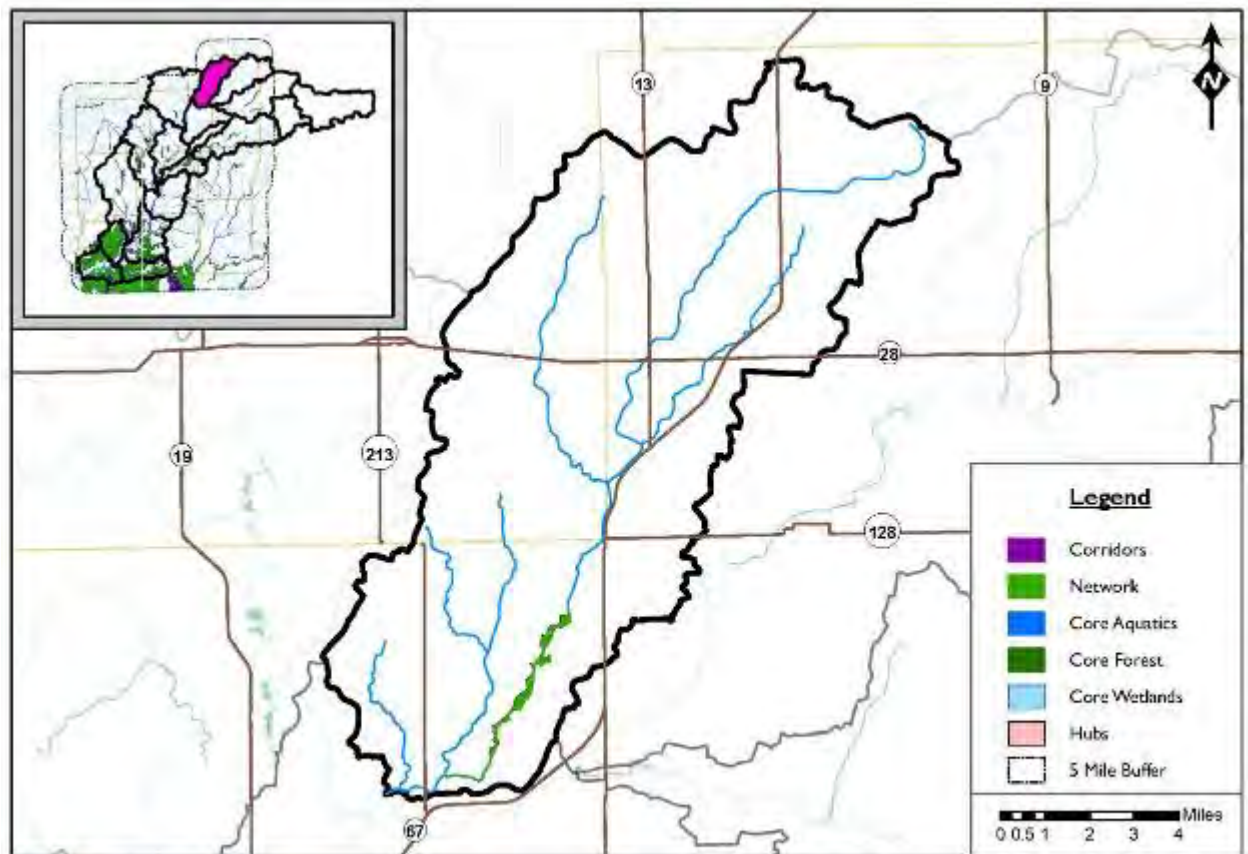


Figure 5.18 – Map of CILTI Green Infrastructure Plan for Crooked Creek Subwatershed.



EMPOWER RESULTS

Green Infrastructure: Duck Creek

Figure 5.19 – Map of CILTI Green Infrastructure Plan for Duck Creek Subwatershed.



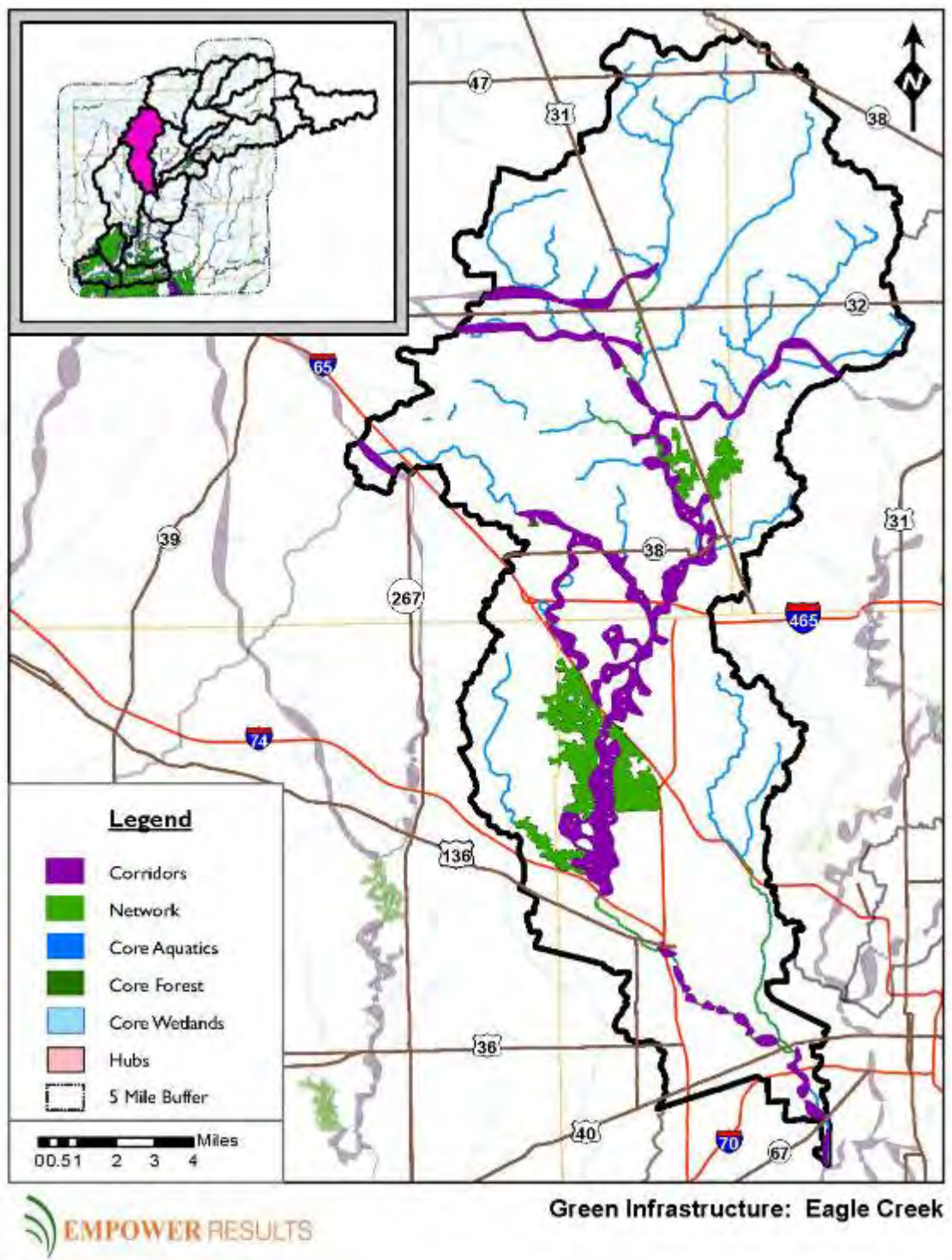


Figure 5.20 – Map of CILTI Green Infrastructure Plan for Eagle Creek Subwatershed.

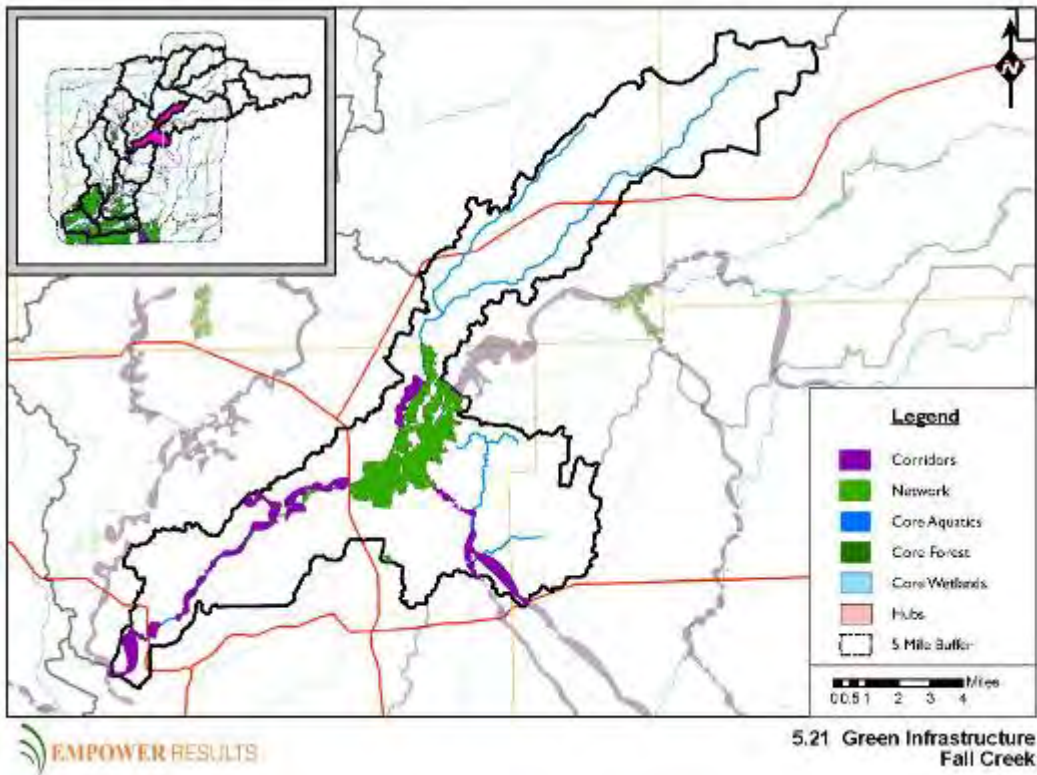


Figure 5.21 – Map of CILTI Green Infrastructure Plan for Fall Creek Subwatershed.

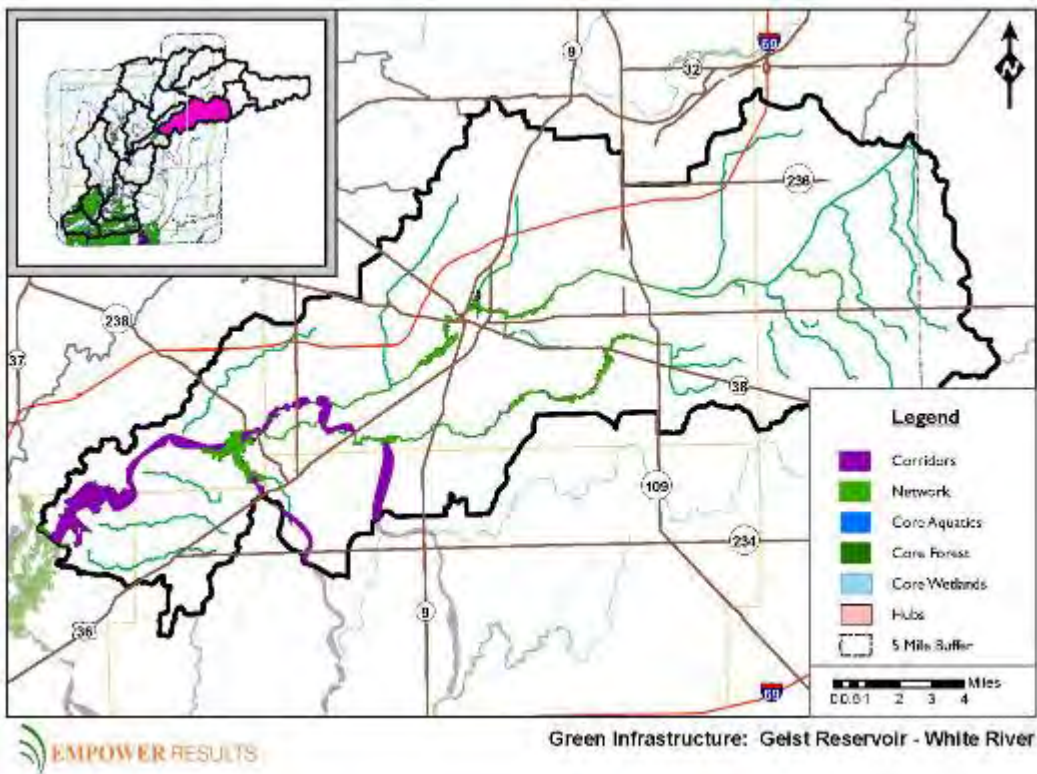


Figure 5.22 – Map of CILTI Green Infrastructure Plan for Geist Reservoir - Fall Creek Subwatershed.



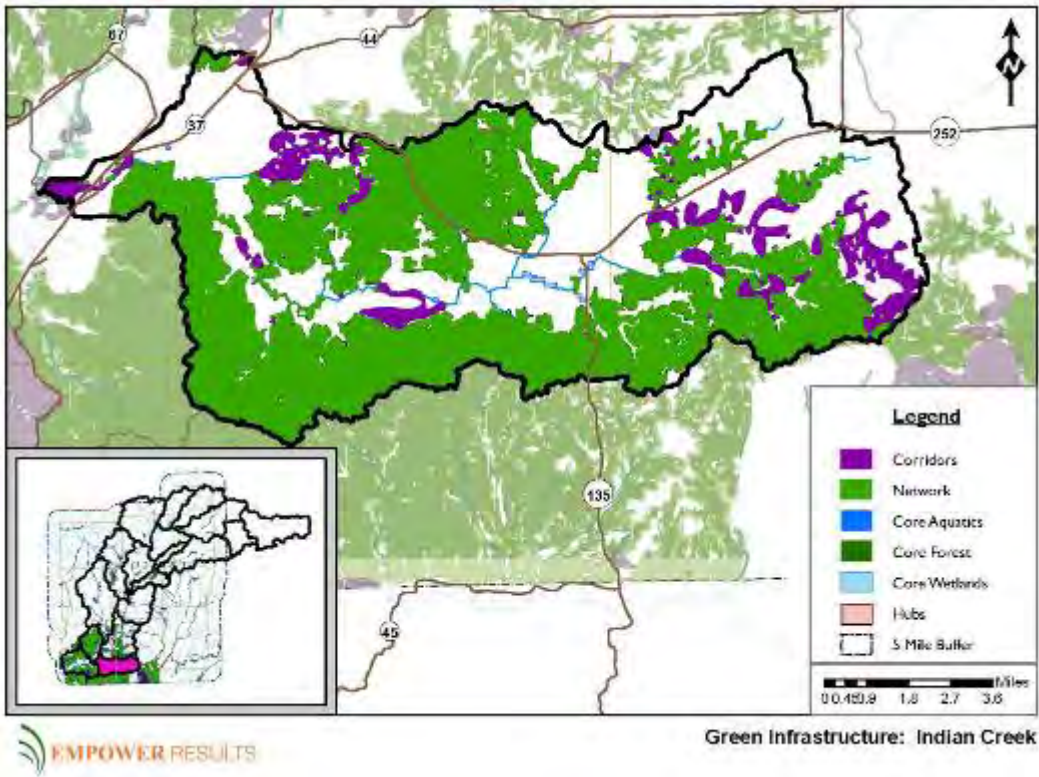


Figure 5.23 – Map of CILTI Green Infrastructure Plan for Indian Creek Subwatershed.

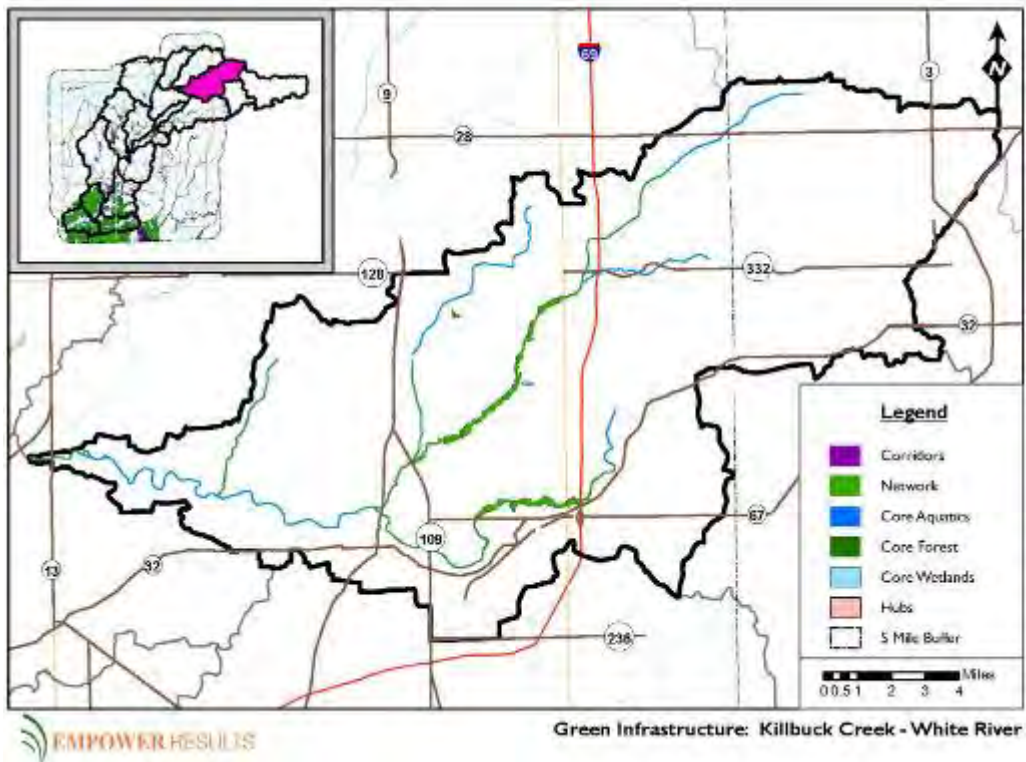


Figure 5.24 – Map of CILTI Green Infrastructure Plan for Killbuck Creek Subwatershed.

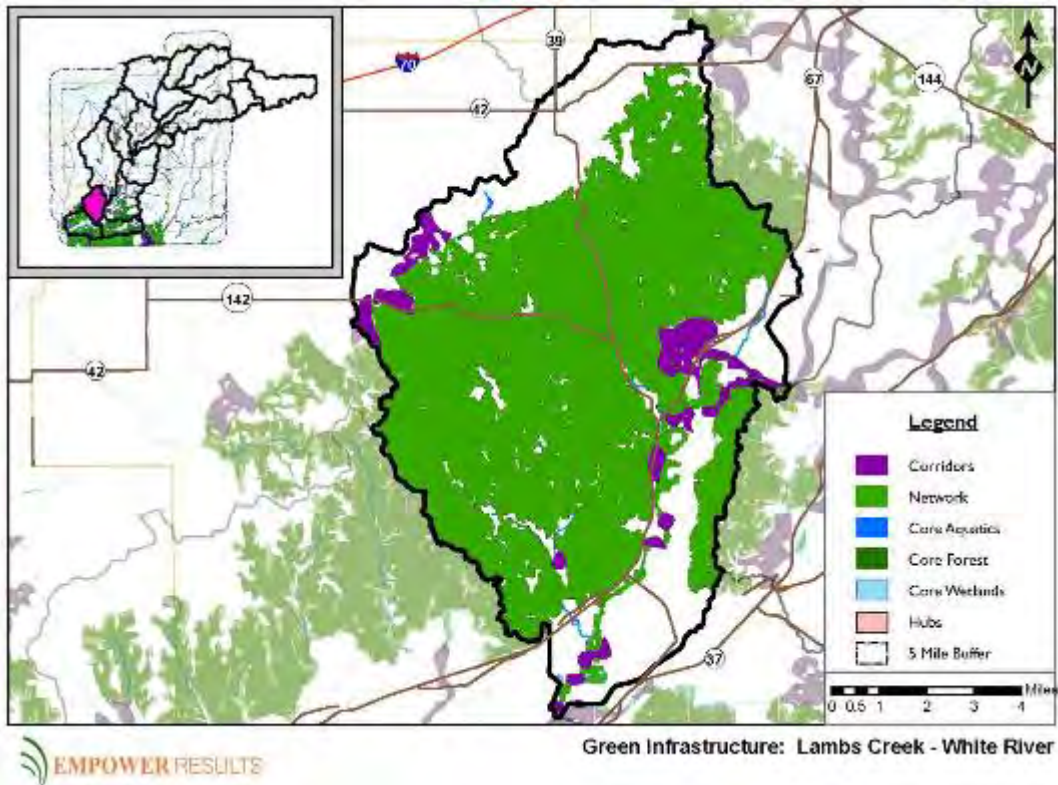


Figure 5.25 – Map of CILTI Green Infrastructure Plan for Lambs Creek Subwatershed.

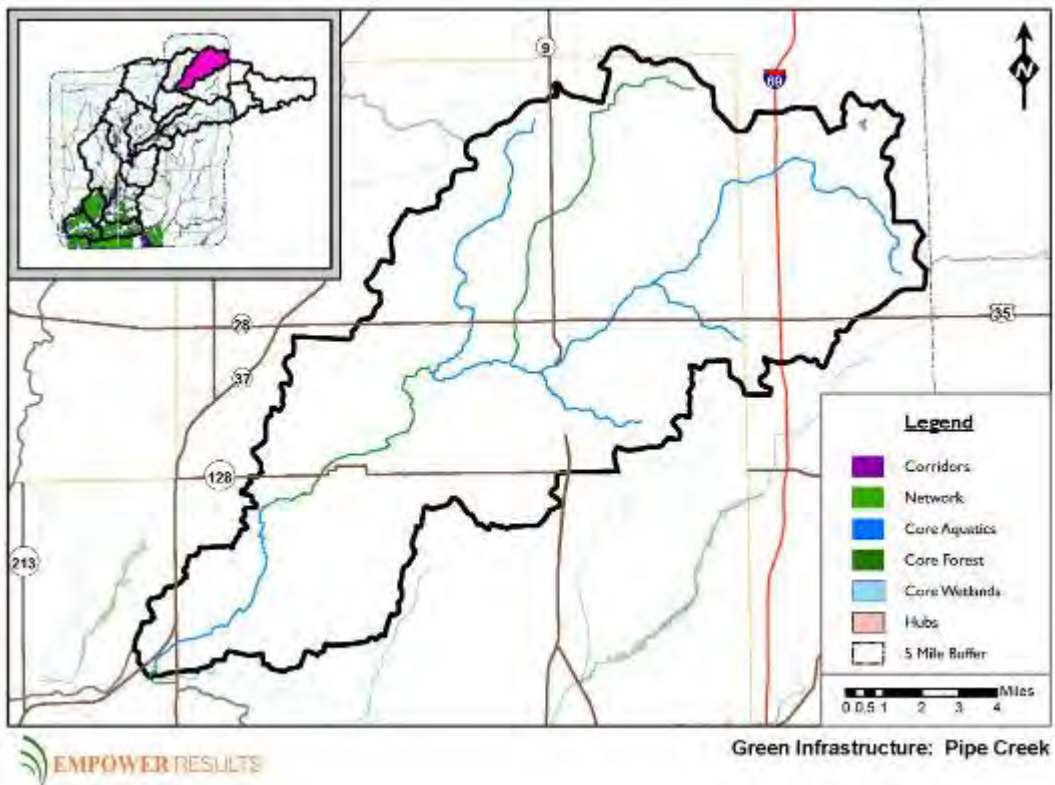


Figure 5.26 – Map of CILTI Green Infrastructure Plan for Pipe Creek Subwatershed.



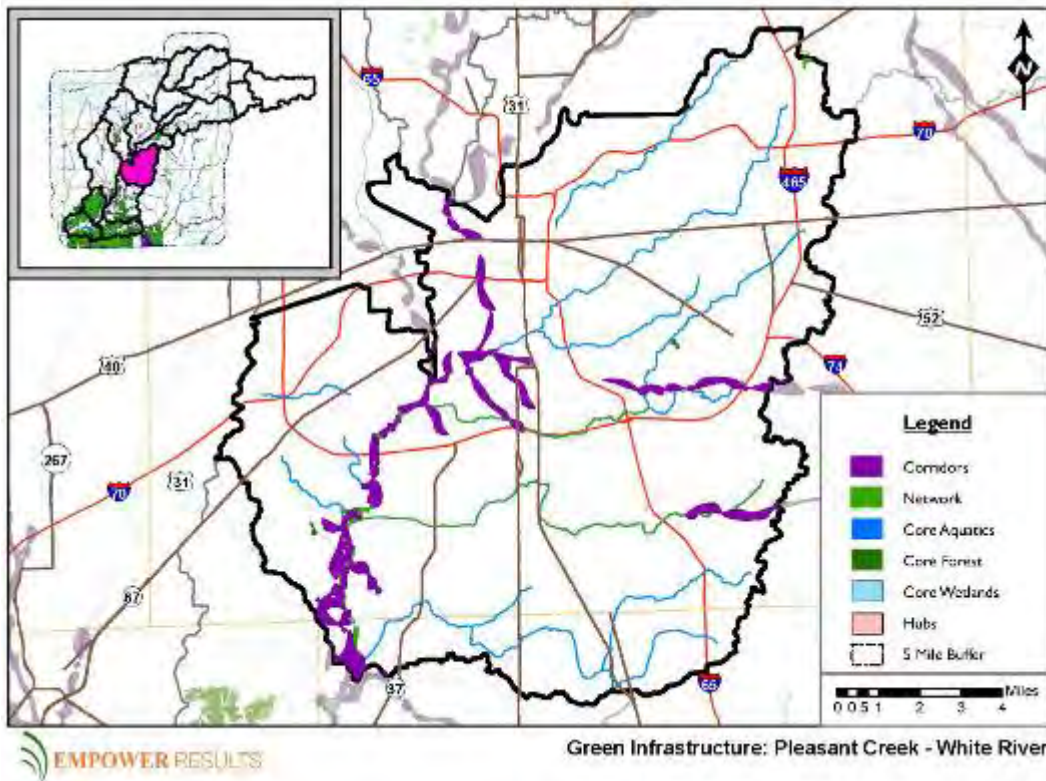


Figure 5.27 – Map of CILTI Green Infrastructure Plan for Pleasant Run Subwatershed.

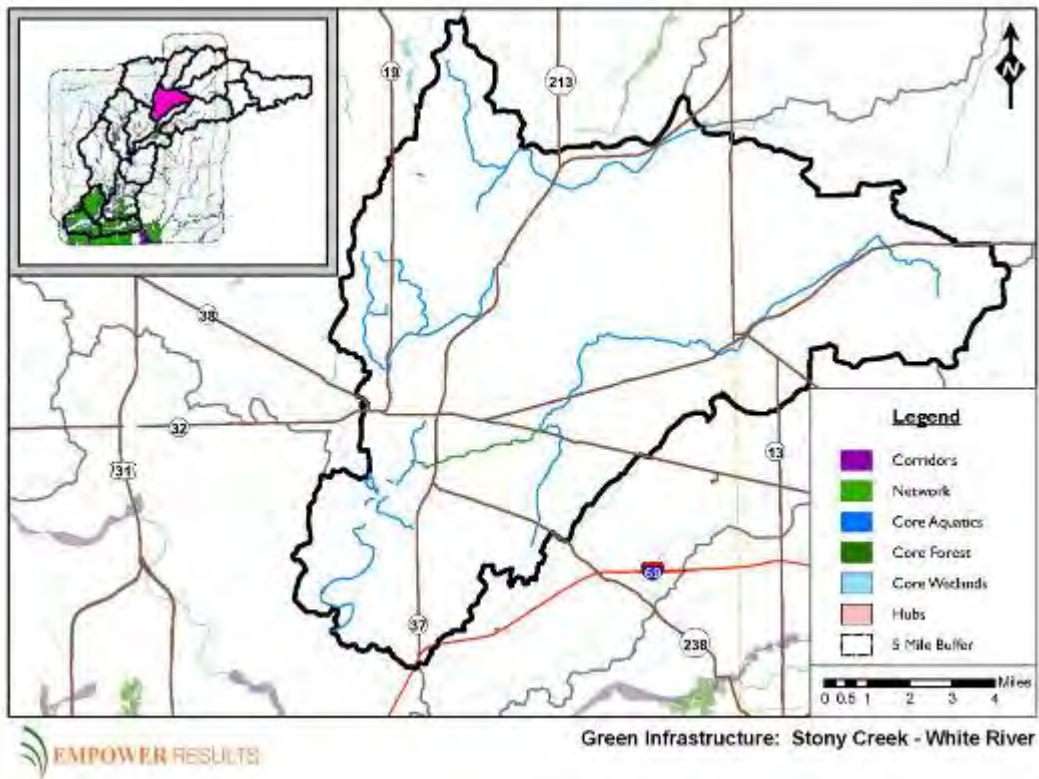
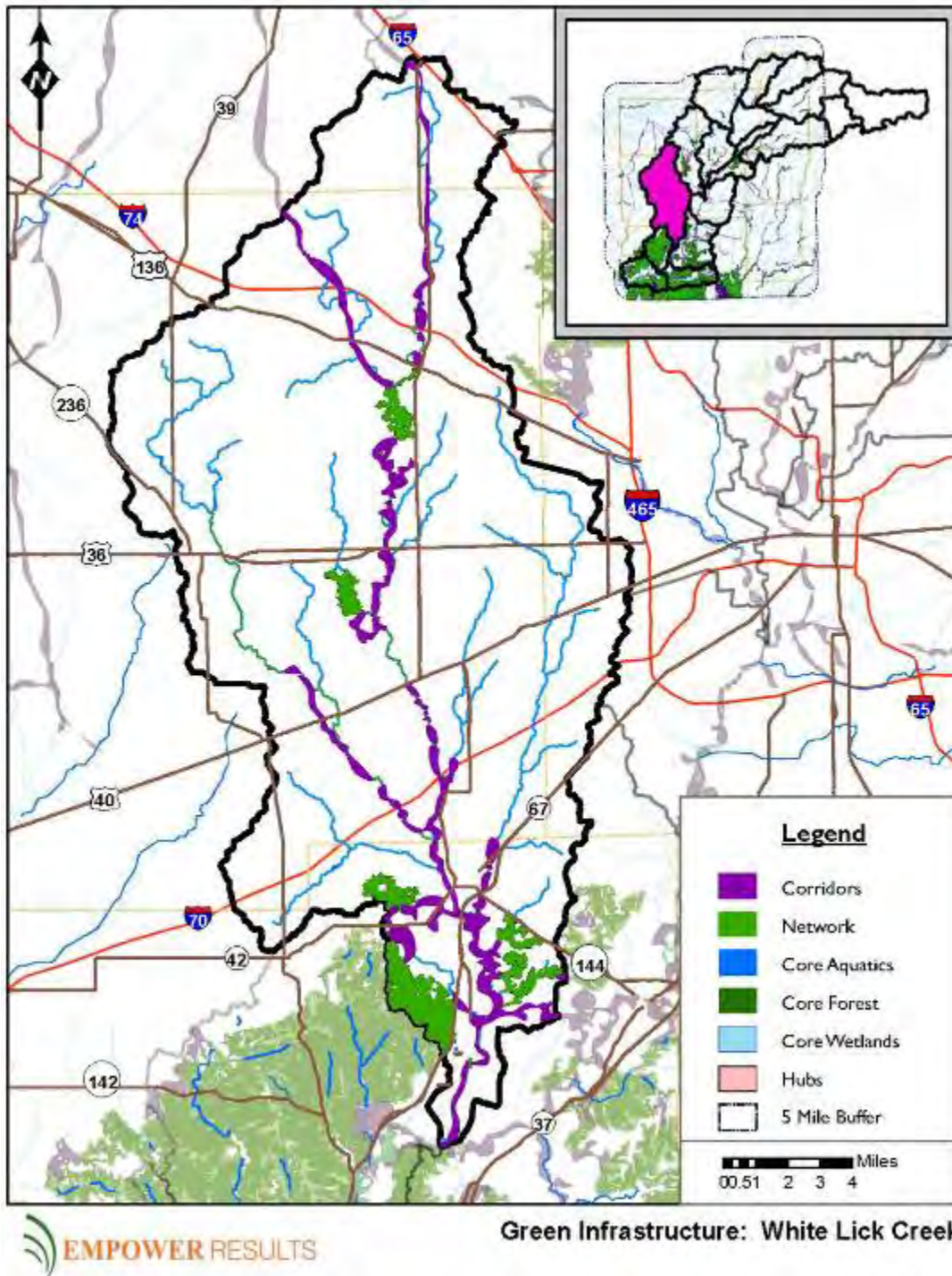


Figure 5.28 – Map of CILTI Green Infrastructure Plan for Stony Creek Subwatershed.





**Figure 5.29 – Map of CILTI Green Infrastructure Plan for White Lick Creek Subwatershed.**

Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on the opportunities for implementation of green infrastructure projects. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a low number of identified opportunities for green infrastructure projects or acres, while a one (1) signifies a high number of project opportunities or acres.

## **5.7 Conservation Reserve Enhancement Program (CREP)**

Environmental concerns caused by agriculture can be addressed through a natural resources conservation program known as the Conservation Reserve Enhancement Program (CREP). CREP is a federal-state program in which participants receive financial incentives for voluntarily removing land from agricultural production and planting native grasses, trees, or other vegetation, or installing wetlands for a period of 14 to 15 years.

CREP in Indiana is a partnership between the USDA and the State of Indiana. The program's recent expansion in Indiana allows for projects to be installed in 11 different watersheds with the goal of enrolling 26,250 acres. Conservation practice projects are designed to help alleviate concerns related to high nonpoint source sediment, nutrient, pesticide, and herbicide losses from agricultural land. Projects include conservation practices such as: filter strips, riparian forest buffers, wetland restoration, bottomland trees establishment, permanent native grasses, as well as several others.

The Upper White River Watershed is one of the 11 watersheds that is a part of the CREP program. Data for projects in the Upper White River Watershed were gathered from the Indiana State Department of Agriculture (ISDA). The data were analyzed and mapped as number of projects in a 10 digit subwatershed (Figure 5.30) and as number of acres in a 10 digit subwatershed (Figure 5.31). Most of the projects have occurred in the northern subwatersheds where agriculture is more common. CREP in the Upper White River Watershed has implemented 213 projects and converted 1387.2 acres from of agricultural production to conservation. Filter strips, bottomland trees establishment, and riparian forest buffers are the most common CREP conservation practices implemented in the watershed.

Subwatersheds within the Upper White River have been prioritized in the weighted matrix (Section 7.0) based on the percent adoption of no-till for soybeans and for corn in each subwatershed. Each subwatershed was assigned a score of one, two, or three. A three (3) signifies that the subwatershed has a low number of projects or acres, while a one (1) signifies a high number of projects or acres. Those subwatersheds with no projects or acreage have not been prioritized. The weighted breakdown for the number of CREP projects in a subwatershed is:

- 1 – 31 to 50 CREP projects per subwatershed
- 2 – 16 to 30 CREP projects per subwatershed
- 3 – 0 to 15 CREP projects per subwatershed

The weighted breakdown for the number of CREP acres in a subwatershed is:

- 1 – 201 or more CREP acres per subwatershed
- 2 – 101 to 200 CREP acres per subwatershed
- 3 – 0 to 100 CREP acres per subwatershed

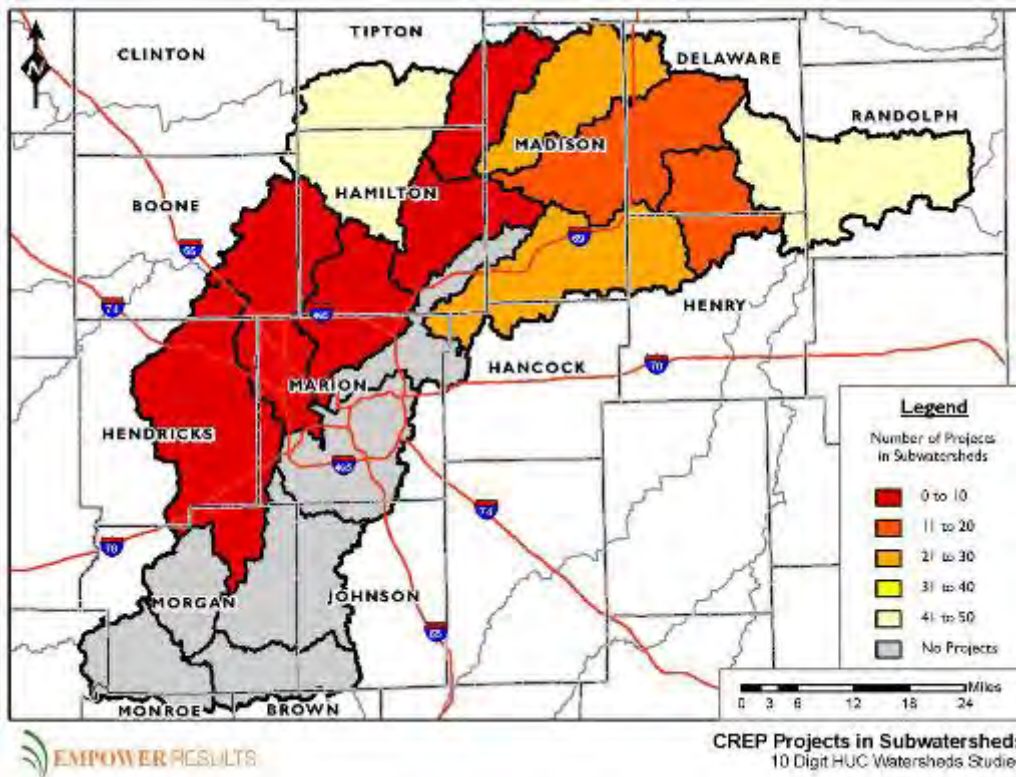


Figure 5.30 – Map showing the distribution of CREP projects in the Upper White River Watershed by HUC10 subwatershed.

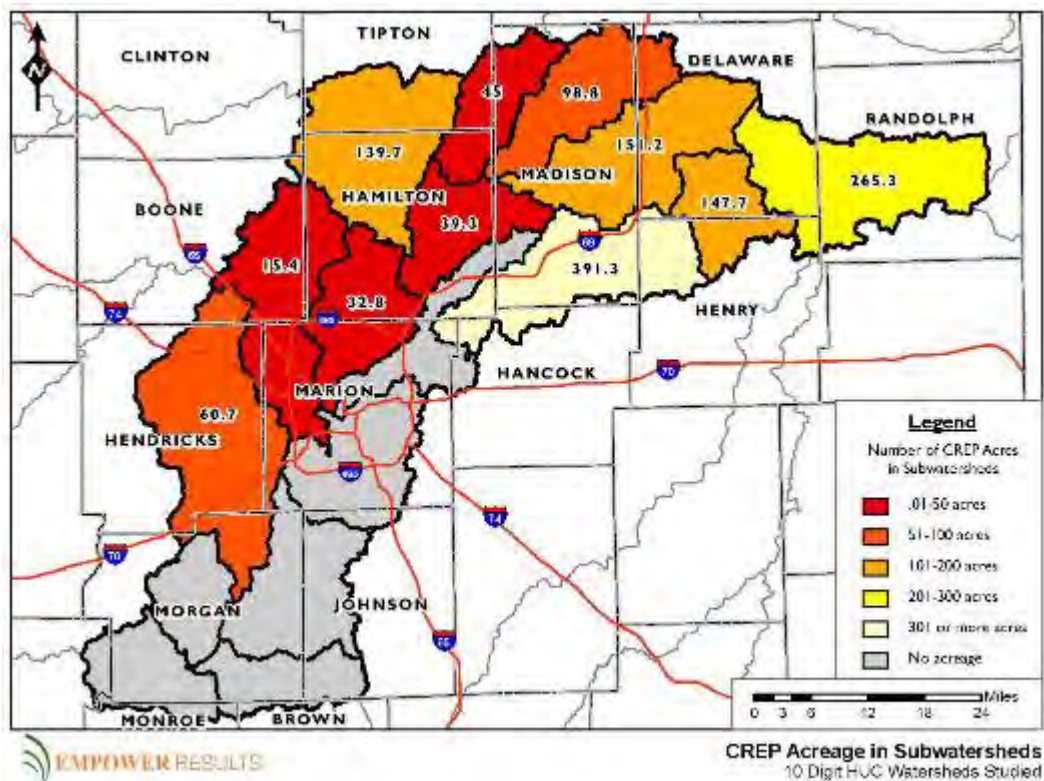


Figure 5.31 – Map showing the distribution of CREP conservation acreage in the Upper White River Watershed by HUC10 subwatershed.



## **6.0 SUMMARY AND HIGHLIGHTS OF EACH SUBWATERSHED**

The following summaries of the 17 subwatersheds of the larger Upper White River Watershed are organized roughly from northeast to southwest, from upstream to downstream.

### **6.1 Muncie Creek – White River**

Muncie Creek-White River Watershed (HUC: 0512020101) represents the easternmost extent of the Upper White River Watershed. The watershed contains the city of Winchester and the eastern portions of Muncie, Indiana. Prairie Creek Reservoir is entirely in this watershed along with a small tributary that is a captured portion of Fall Creek. The area remains primarily agricultural with 65.7% row crop and 12.5% herbaceous in 2008, with little change since 2000. The tributaries and upland block forest areas make up 10.3% up from 4.8% in 2000. Urban areas represent 12.2% in 2008, up significantly since 2000 even though the area exhibited low to no population growth from 1990-2008.

The agricultural areas show a high level of adoption of conservation practices and programs, including no-till farming and CREP. Randolph County (containing the majority of the Muncie Creek-WR Subwatershed) practices no-till on 39% of its corn fields and 89% of its soybean fields. Delaware County has 72% no-till corn fields and 71% no-till soybean fields. CREP projects cover 265 acres of this subwatershed, making it the subwatershed with the second highest CREP acreage in the Upper White River Watershed.

The Muncie Creek-White River Subwatershed contains six combined feeding operations (CFOs) and twelve concentrated animal feeding operations (CAFOs), the most of any county in the Upper White River Watershed. The uppermost portion of this subwatershed is very high in *E. coli* and sediment, influenced by its small drainage area and at least one CFO.

Sediment is a problem throughout the subwatershed. This could be caused by a variety of factors, including the significant urban development that has occurred since 2000, leading to 11.6% of streams in Muncie Creek-WR Subwatershed now being surrounded by urban land use. Agriculture and grass land use (dominated by pasture and hay, which are not effective buffers) surround approximately 45% of streams. This demonstrates that a lack of effective stream buffers is also playing a role in the high sediment loading of this subwatershed. The Muncie Creek - White River Subwatershed has a high percentage of impaired streams with 62% of the stream miles listed as impaired. This subwatershed accounts for greater than 5% of the impaired streams in the entire UWRW.

The Muncie Creek-WR Subwatershed also shows a high percentage of NPDES permits that are out of compliance (more than 57%). A few of these dischargers have shown little to no improvement since March 2009. All of these sites include violations of total suspended solids, contributing to the high amount of sediment in the subwatershed as mentioned above.

### **6.2 Buck Creek – White River**

Buck Creek-White River Subwatershed (HUC: 0512020102) includes the southern portion of Muncie, Indiana and much of the city's industrial areas. The creek's confluence with the White River is near Yorktown, Indiana. The upper reaches of the subwatershed include a captured stream from the Geist Reservoir-Fall Creek and Duck Creek-Big Blue River systems during the last glaciation. The subwatershed is primarily agricultural, with 72.8% of the area in 2008 in row crop (57.1%) or herbaceous (15.7%) grass and prairie land cover. Ag and grass land use border 45% of streams, showing that this subwatershed also lacks effective stream buffers to reduce erosion and filter pollutants.

The area has seen only a minor increase in urbanization since 2000 with a few new subdivisions and infill warehousing and manufacturing, and there has been no population growth since 1990. Urban land use now encompasses 16% of the subwatershed, but these urban areas are relatively open urban use. As Muncie continues to expand, these areas could become more densely developed, which could have a negative effect on water quality.

Several brownfield sites exist in this subwatershed. These sites are potentially harmful to soil and water quality and public health; they also restrict the land use options of those sites. The Buck Creek-White River Subwatershed also contains multiple NPDES violators, contributing *E. coli* and nitrogen, among other pollutants, to the subwatershed.

The Buck Creek - White River Subwatershed has a high percentage of impaired streams with 61% of the stream miles listed as impaired. This subwatershed accounts for approximately 2.5% of the impaired streams in the entire UWRW. Due to limits on the amount of data collected in the Buck Creek-WR Subwatershed by various entities and the fact that there are no IDEM fixed monitoring stations here, there is no solid water quality data to compare this subwatershed to others. However, a watershed management plan was developed for the Buck Creek-WR Subwatershed through a 319 grant administered from 2001-2004.

### **6.3 Killbuck Creek – White River**

Killbuck Creek-White River Subwatershed (HUC: 0512020103) contains much of the cities of Anderson and Muncie. The subwatershed is mostly agricultural with 48.9% row crop and 11.9% herbaceous grasslands and pastures in 2008. 28.3% of the area is urban and this has increased since 2000, mostly at the expense of agricultural lands surrounding the two cities. The area has 9.8% forest cover as of 2008, mostly along the White River and Killbuck Creek valleys, and scattered upland forest blocks in the upper reaches of the subwatershed. Wetland areas account for a higher percentage (0.40%) of this subwatershed than any other in the Upper White River (average 0.09%) as of 2008 and herbaceous wetlands buffer 8.5 miles of stream in this subwatershed, also the highest of any in the Upper White River Watershed.

The high percentage of urban land use is definitely causing an impact on water quality. There are a large number of combined sewer outfalls surrounding Muncie and Anderson, and there are few in Chesterfield as well. Future land use projections show a significant increase in residential land replacing current agricultural land northeast of Anderson. Along with this land use change, significant transportation improvements are also being planned. The construction involved in these initiatives as well as the resulting impervious surface area and shift in potential pollutants will need to be carefully addressed so they do not degrade water quality.

Turbidity in the Killbuck Creek-WR Subwatershed is the highest of all subwatersheds, and the large amount of stormwater downcutting streams is part of the cause. Inadequate buffers are also part of the cause; 17.6% of streams are bordered by agriculture and 18% are bordered by urban land use. Total nitrate, TKN, phosphorus, and COD all exceed benchmark values by at least 90%. Additionally, the percent exceedance of *E. coli* concentrations in the Muncie area are some of the highest in the entire Upper White River Watershed, a problem to which combined sewer overflows definitely contribute. The Killbuck Creek - White River Subwatershed has a high percentage of impaired streams with 90% of the stream miles listed as impaired. This subwatershed accounts for greater than 5% of the impaired streams in the entire UWRW.



There are a high number of significant groundwater users in the Killbuck Creek-WR Subwatershed, including the Anderson Water Department, the Towns of Chesterfield, Daleville, and Edgewood, Ball State University, and several golf courses, country clubs, and schools, collectively pumping over 3.3 billion gallons of groundwater per year. Wellhead protection should be of utmost importance here, especially since Wellhead Protection Plans tend to be mostly education-based.

There are several resources and opportunities for improvement in the Killbuck Creek-WR Subwatershed. TMDL studies have been completed, there are a high number of MS4s, and a watershed management plan was written for Mud Creek (in the northeast portion of the subwatershed) in 1997, showing that the desire and some of the basic resources are in place for water quality improvements. Several riparian areas along streams have been identified by the Greening the Crossroads study as areas crucial to sensitive species.

#### **6.4 Pipe Creek**

Pipe Creek Subwatershed (HUC: 0512020104) contains the cities of Alexandria and Frankton. The subwatershed is primarily agricultural - 73.0% row crop and 7.7% herbaceous grasses and pastures. It is poorly forested with only 6.8% in 2008; an increase since 2000. Urban areas represent another 12.0% in 2008, also up since 2000.

There are many opportunities in the agricultural sector for improvements to water quality. Of the 84 stream miles in the Pipe Creek subwatershed, 35% are bordered by agriculture, the third highest in the Upper White River Watershed. No-till is practiced on 77% of Madison County soybean fields, but only 10% of corn fields.

NPDES compliance is a definite issue in this subwatershed. Six dischargers have been out of compliance at least four of the last twelve quarters (table).

As with several other subwatersheds, limited data has been collected in the Pipe Creek Subwatershed by various entities and there are no IDEM fixed monitoring stations here; therefore, there is no strong water quality data to compare this subwatershed to others. The Pipe Creek Subwatershed has a moderate percentage of impaired streams with 46% of the stream miles listed as impaired. This subwatershed accounts for less than 2% of the impaired streams in the entire UWRW.

There are a few resources readily available to aid in improving the Pipe Creek Subwatershed. Alexandria is an MS4 community so they have a vested interest in improving water quality in their urban zone. TMDL studies have been performed, and two small watershed management plans have been developed for Swanfelt Ditch and Little Duck/Lily Creek.

#### **6.5 Duck Creek**

Duck Creek Subwatershed (HUC: 0512020105) contains the town of Elwood, Indiana. The subwatershed is primarily agricultural with 80.3% row crop and 4.3% herbaceous grass and pastures. The Duck Creek Subwatershed also contains the least amount of forest cover (4.0%) of any subwatershed in the Upper White River in 2008. Forest cover has slightly increased along the main channel of Duck Creek and in residential areas since 2000. Wetland areas are virtually non-existent with only about 0.02% in 2008, down since 2000.

The high percentage of agriculture land use means that agricultural conservation practices are necessary for a healthy subwatershed. The first obvious need is effective buffers. The large majority of streams

border agricultural and urban land uses, significantly higher than any other subwatershed in the Upper White River Watershed. No-till adoption is also lagging behind many other subwatersheds. In Madison, Hamilton, and Tipton Counties, no-till adoption for soybean fields is 77%, 60%, and 60%, respectively. No-till adoption for corn fields is much lower: 10% in Madison County, 15% in Hamilton County, and only 4% in Tipton County. Duck Creek Subwatershed also contains one CAFO and two CFOs.

Urban land use occupies 11.3% of the Duck Creek Subwatershed. Elwood is the major urban zone, but it is not a MS4 community. This means that they are not required to manage stormwater or reduce urban pollutant loads. Additionally, Elwood does contain several combined sewer outfalls, demonstrating that while urban land use is fairly small in comparison to agriculture, it can play a very significant role in water quality.

There is only one NPDES permitted discharger in the Duck Creek Subwatershed and it has have been out of compliance every quarter since April-June 2006, violating limits on BOD, chlorine, *E. coli*, nitrogen, DO, and TSS.

The Duck Creek Subwatershed contains the highest percentage of impaired streams of all the subwatersheds with nearly 100% of the stream miles listed as impaired. However, this subwatershed accounts for only 3% of the impaired streams in the entire UWRW. TMDL studies have been completed for this subwatershed, and a watershed management plan has also been developed for Duck Creek. However, there is no IDEM monitoring station in this subwatershed and limited data has been collected by a variety of entities, so there is no strong water quality data to compare to other Upper White River subwatersheds. A riparian area has been identified by the Greening the Crossroads study as crucial to sensitive species.

## **6.6 Cicero Creek**

Cicero Creek Subwatershed (HUC: 0512020106) includes the northwestern portions of Noblesville, most of Tipton, and part of the town of Cicero, as well as several other small towns. The subwatershed also includes Morse Reservoir, a drinking water supply reservoir for Indianapolis. The subwatershed is primarily agricultural, with 79.6% of the area in 2008 in row crop (71.9%) or herbaceous (7.7%) grass and pasture land covers. It is among the least forested of the subwatersheds in the Upper White River system with only 5.5% tree cover in 2008. The area has undergone moderate urbanization since 2000, increasing the subwatershed land use to 13% urban in 2008. The most widespread development occurred in the 1990s. The suburban lands particularly around Morse Reservoir and Noblesville have increased in density and matured from open grass lands to areas with more tree cover.

The Cicero Creek Subwatershed contains the second highest number of stream miles (almost 216) of any subwatershed in the Upper White River. Just over forty percent of these stream miles are bordered by agricultural land use, providing an opportunity for improvement of stream buffers. No-till adoption is also worse than many other subwatersheds. In the Hamilton County portion of the Cicero Creek Subwatershed, only 15% of corn fields are no-tilled and 60% of soybean fields. In the Tipton County portion, 4% of corn fields and 60% of soybean fields are in no-till systems.

Urban land use borders 17% of this subwatershed's stream miles, equating to nearly 37 miles of urban stream interfaces that can be improved. A watershed management plan has also been completed for the Cicero Creek Subwatershed with strong involvement from suburban/urban landowners around Morse Reservoir. This document provides guidance and opportunities for improvement in this subwatershed.

Cicero Creek Subwatershed exhibits the highest nitrate concentrations in the entire Upper White River Watershed, as well as high total organic carbon and turbidity. The high levels of inorganic nitrogen and sediment are reflective of the heavy agricultural land use in this subwatershed. Cicero Creek Subwatershed, however, exhibits only 50% exceedance for total phosphorus, similar to the Fall Creek Subwatershed and better than most other subwatersheds. There is no solid data on *E. coli* for this area, although sampling would be beneficial since this subwatershed contains the second highest concentration of CFOs and CAFOs of all the Upper White's subwatersheds as well as several combined sewer overflows.

Even with the second highest number of stream miles, the Cicero Creek Subwatershed has a moderate percentage of impaired streams of all the subwatersheds with 36% of the stream miles listed as impaired. This subwatershed accounts for about 3.5% of the impaired streams in the entire UWRW. Several riparian areas along streams have been identified by the Greening the Crossroads study as areas crucial to sensitive species.

### **6.7 Stony Creek – White River**

Stony Creek-White River Subwatershed (HUC: 0512020107) contains the town of Lapel and the rapidly urbanizing city of Noblesville. The subwatershed remains predominately agricultural with 54.4% row crops and 10.2% herbaceous grass and pastures in 2008. Row crop agriculture is down from 2000 as much of the land surrounding Noblesville is developed for suburban and urban uses. Urban land uses make up 26.9% in 2008. Wetlands account for 0.38% of this subwatershed, significantly higher than the average of 0.09% for the Upper White River Watershed, and 7% of land area is forested.

The Stony Creek Subwatershed contains a relatively low amount of stream miles, and does maintain some strong and effective buffers. A total of 28% of stream miles are bordered by forest. 17% of stream miles are bordered by agricultural land use while 21% is urban, so there are certainly opportunities for improvement.

There is not an IDEM fixed sampling site in the Stony Creek Subwatershed, so it is difficult to summarize water quality data, however, the core urban area around Noblesville has exhibited high levels of total suspended solids and turbidity, as well as increasing phosphorus levels. Noblesville also has combined sewer overflows adding nutrients and bacteria, including *E. coli*, to our waters. Along with this increasing urbanization come plans for future roads and general improvements, the construction and existence of which will have a direct impact on the subwatershed as well. Lastly, we have seen a moderately high number of construction in a floodway permits (between 251-500 permits from 1992-2008) as a result of the high population growth and urbanization in the Stony Creek Subwatershed.

There are a very large number of significant water withdrawal well users in the Stony Creek Subwatershed, including the towns of Lapel and Cicero, the cities of Carmel and Westfield, Indiana-American Water Company, Purgatory and Stony Creek Golf Courses, and Noblesville Soccer Club, among others. Wellhead protection should be a priority in this subwatershed.

The Stony Creek Subwatershed contains four combined feeding operations (CFOs), concentrated in the northeast portion of the subwatershed in or near Madison County. It also contains several NPDES permits with moderate compliance.

The Stony Creek Subwatershed has a high percentage of impaired streams of all the subwatersheds with 83% of the stream miles listed as impaired. This subwatershed accounts for 3% of the impaired streams in

the entire UWRW. There have been TMDL studies completed in this subwatershed and a watershed management plan was created in February 2007.

### **6.8 Geist Reservoir - Fall Creek**

Geist Reservoir-Fall Creek Subwatershed (HUC: 0512020108) contains a small portion of Marion County, recently annexed portions of Fishers, McCordsville, Fortville, and Pendleton; all areas that have experienced growth in urban zones since 2000. The most notable feature is that Geist Reservoir, a drinking water reservoir, is completely surrounded by highly manicured residential properties. The subwatershed is still primarily agricultural with 52.2% in 2008. Agricultural land use has decreased since 2000, with most of the change from agriculture to urban uses. Fall Creek and associated tributaries have significant forested reaches with about 9.3% of the total area forested in 2008.

As mentioned, urban areas have a high impact on the Geist Reservoir-Fall Creek Subwatershed. A total of 22% of the land use is urban and 20% of the stream miles are bordered by urban land use. This subwatershed has a high number of stream miles (168) and the highest amount of urban stream buffer area of all subwatersheds. Because of increasing populations and urbanization, this area also has plans for significant future road and transportation improvement projects. Combined sewer overflows (CSOs) in Fortville are contributing nutrients and bacteria like *E. coli* to the subwatershed. Because of the moderate population growth here, the area has also seen a fair number of construction in a floodway permits (between 101-250 permits from 1992-2008).

There are several opportunities for improvement in this subwatershed. The Geist Reservoir - Fall Creek Watershed Management Plan is being finalized this year, and multiple MS4s are operating here. The Central Indiana Land Trust has also identified notable green infrastructure sites through their "Greening the Crossroads" project.

There are a high number of significant surface intakes in the Geist Reservoir-Fall Creek Subwatershed, including several IMI sites, two country clubs, Mt. Vernon Community School Corporation, Ingalls Water Department, and Pendleton Correctional Farm. Regarding discharge, many NPDES permits have been out of compliance in the past, but most have cleaned up since March 2009.

Although water quality data available for the Geist Reservoir - Fall Creek Subwatershed does not display any unusual trends (this subwatershed exhibits high exceedances of most pollutants like all of the Upper White River's subwatersheds), it does have low total phosphorus content for an agricultural watershed, similar to the Cicero Creek Subwatershed (upstream of Morse Reservoir). The subwatershed has a high percentage of impaired streams of all the subwatersheds with 63% of the stream miles listed as impaired. This subwatershed accounts for 5% of the impaired streams in the entire UWRW.

### **6.9 Fall Creek**

Fall Creek Subwatershed (HUC: 0512020109) contains a large portion of Marion County, Indianapolis, and Lawrence extending up into Hamilton County along the narrow tributaries of Mud and Sand Creeks. The subwatershed is primarily urban with 58.4% in 2008, and continues to urbanize with losses in forest cover and herbaceous cover since 2000. The subwatershed is moderately forested (8.5%) mostly in Fort Harrison State Park, the surrounding neighborhoods, and along the Fall Creek and Mud Creek valleys. Large areas of agriculture (27.0%) still exist in Hancock County and the upper reaches of Mud Creek.

The high urban land use is having a definite impact on water quality. Indianapolis has a large number of combined sewer outfalls and this is reflected by the water quality data. The subwatershed exhibits very

high COD, TKN, TSS, and *E. coli*. Additionally, nearly all of the subwatershed is a MS4 area. This subwatershed does contain a small number of stream miles, but 38% of those miles are buffered by urban land use. The Fall Creek subwatershed has a low percentage of impaired streams of all the subwatersheds with 13% of the stream miles listed as impaired. This subwatershed accounts for less than 1% of the impaired streams in the entire UWRW.

Despite the huge impact of the urban areas, rural and agricultural land does have some effect on water quality in the subwatershed. There is one CFO in the northern part of the subwatershed and 11% of stream miles are bordered by agriculture.

There are a very high number of surface intakes and wells in the Fall Creek Subwatershed, including the cities of Indianapolis and Lawrence, Verizon Wireless Music Center, Hamilton Southeastern Schools, and several country clubs and golf courses, further demonstrating the need to protect water quality in this area.

There are several opportunities for action in the Fall Creek Subwatershed. The southern parts of the subwatershed have had TMDL studies completed, a watershed management plan was completed in May 2009 by Christopher B. Burke Engineering, Inc. and the Marion County Soil & Water Conservation District, several sites were identified as green infrastructure sites in the Greening the Crossroads project, and as stated above, most of the area is designated as MS4.

#### **6.10 Crooked Creek – White River**

Crooked Creek-White River Subwatershed (HUC: 0512020110) contains a significant portion of Marion County and the City of Indianapolis, extending north into Hamilton County and encompassing the cities of Carmel and Westfield. The subwatershed is primarily urban with 78.4% of the land cover in that class in 2008 and is bisected by the northern portion of Interstate Bypass I-465. Only 12.5% of the subwatershed was agriculture (5.4% row crop) in 2008, mostly in the upper reaches and along the White River valley. These areas have experienced significant urbanization since 2000. Forest cover is decreasing with only 6.4% remaining in 2008. Due to the width of the White River and numerous operational and former sand and gravel quarries, this subwatershed is behind only Geist Reservoir-Fall Creek (2432 acres) and Eagle Creek (2290 acres) in total area of open water with 2234 acres in 2008.

This subwatershed has exhibited the highest population growth of all in the Upper White River Watershed and also the highest number of construction in a floodway permits with more than 500 issued between 1992 and 2008. Next to the core of Indianapolis, it also contains the highest number of significant water users, mostly wells (including the cities of Carmel and Westfield, a few country clubs, Carmel Dad's Club, Fishers Parks and Recreation, Carmel-Clay Schools, and others) and also some surface intakes (by the city of Indianapolis, several golf courses, Martin Marietta Materials, and others).

The little agricultural and industrial areas left in the subwatershed (mostly in the north) will be zoned as residential and commercial in the future. The future also holds a few new roads and many transportation improvements in the upcoming years.

The water quality data collected in this area is difficult to interpret because it collects several different subwatersheds. However, it does reflect the increasing urbanization in the area through its increasing TSS, turbidity, and phosphorus. The Crooked Creek Subwatershed has a moderate percentage of impaired streams of all the subwatersheds with 37% of the stream miles listed as impaired. This subwatershed accounts for less than 3% of the impaired streams in the entire UWRW. Several areas



within the subwatershed have been identified by the Greening the Crossroads study as areas crucial to sensitive species. A portion of the subwatershed has had TMDL studies completed and a watershed management plan was completed for Cool Creek in 2003.

### **6.11 Eagle Creek**

Eagle Creek Subwatershed (HUC: 0512020111) includes the northwest corner of Marion County and the towns of Speedway, Zionsville, and Whitestown. In 2008, the subwatershed was a mix of row crop agriculture (36.2%) and urban areas (37.3%). Urban areas are rapidly expanding; the lower reaches are almost entirely urban. Herbaceous grass lands, pastures, parks and suburban spaces make up 14.2%. The subwatershed is fairly well forested, particularly in the central sections and along the main channel of Eagle Creek (10.3%). Two significant features dominate the central portion of the subwatershed, Eagle Creek Reservoir and Eagle Creek Park and Nature Sanctuaries. The middle to lower reaches contain numerous roadways including four significant sections of Interstate (I-65, I-70, I-465, & I-865).

This subwatershed contains the most stream miles (230) of any in the Upper White. Agriculture buffers 19% of those miles while urban land use borders 25%; effective buffers in these areas would be a benefit to water quality.

Water sampling upstream of the reservoir reveals very high nitrate, TKN, and Atrazine levels. Downstream of the town of Speedway, which has combined sewer overflows, *E. coli*, nitrate, TOC, COD, TKN, and total phosphorus levels are all high. TP levels are notably worse from the reservoir outlet to the creek's confluence with the White River. The Eagle Creek Subwatershed has a high percentage of impaired streams of all the subwatersheds with 67% of the stream miles listed as impaired. This subwatershed accounts for 7% of the impaired streams in the entire UWRW.

Several NPDES permittees are in violation in the Eagle Creek subwatershed. Violators are sending *E. coli*, TSS, BOD, and nitrogen, among other pollutants, into the watershed. There are also four CFOs in the northern portion of the watershed.

The Eagle Creek Subwatershed does offer some opportunities for improvement. A watershed management plan is currently in implementation phase. Several sites have also been identified as valuable sites by the Greening the Crossroads project. Numerous sites within the subwatershed have been identified by the Greening the Crossroads study as areas crucial to sensitive species.

### **6.12 Pleasant Run – White River**

Pleasant Run-White River Subwatershed (HUC: 0512020112) contains downtown Indianapolis and much of the southern portion of the city, as well as the cities of Beech Grove and Greenwood. The subwatershed is primarily urban with 81.7% in 2008 and continuing to urbanize since 2000 with infill and continued suburban development. The White River's natural floodplain area has received the greatest increase in urbanization, as this previously agricultural land is converted to suburban uses. The area is poorly forested with only 6.9% in 2008, though up slightly since 2000 as suburban areas mature. The forested areas are mainly in the White River valley and the eastern headwater areas. Agriculture is only a minor land use with 4.75% in row crop and 5.4% herbaceous. Much of the herbaceous land cover is suburban lawn and parks. Wetland areas are virtually non-existent with only about 0.02% in 2008, down since 2000.

This subwatershed moderately has 150 miles of stream 50% of which are urban buffered. Pleasant Run-White River Subwatershed has a significantly high numbers of combined sewer overflows (CSOs)

contributing nutrients and bacteria like *E. coli* to the subwatershed. The urbanization in the area is reflected through its increasing TSS, turbidity, and phosphorus. The Pleasant Run - WVR Subwatershed has a moderate percentage of impaired streams of all the subwatersheds with 48% of the stream miles listed as impaired. This subwatershed accounts for less than 3% of the impaired streams in the entire UWRW.

This watershed has shown minimal growth but is second highest of the subwatersheds in number of construction in a floodway permits with more than 500 issued between 1992 and 2008. Next to the core of Indianapolis, there are a very high number of surface intakes and wells in the Pleasant Run Subwatershed, including Eli Lilly & Company, Hoosier Concrete, and Indianapolis Power & Light and others, further demonstrating the need to protect water quality in this area. Several stretches of riparian corridor were identified by the Greening the Crossroads study as areas crucial to sensitive species.

### **6.13 White Lick Creek**

White Lick Creek Subwatershed (HUC: 0512020113) contains the towns of Danville, Mooresville, Pittsboro, Plainfield, and the western edge of Indianapolis, including the rapidly urbanizing areas around the Indianapolis International Airport. The area is still predominately agricultural with 37.0% row crop and 18.7% herbaceous grasses and pastures in 2008; both have decreased since 2000. The area is 28.7% urban and increasing rapidly. Forest cover represents 14.5% in 2008, also up since 2000 as suburban areas mature. Wetland areas are virtually non-existent with only about 0.02% in 2008, down since 2000.

White Lick Creek Subwatershed has 210 miles of stream which is third highest in the Upper White River Watershed. Over 50% of the streams in the White Lick Creek subwatershed are bordered by forested land cover.

There are 5 cities with populations over 5000 and even though urban land use occupies only 29% of the White Lick Creek subwatershed it is rapidly urbanizing and is top 3 of the subwatersheds for high growth between 1990 and 2008. There are also several transportation initiatives planned for the future. The urbanization in the area is reflected through its increasing TSS, turbidity, and phosphorus. Additionally there are a very high number of well users in this subwatershed including Hydraulic Press Brick, Town of Plainfield, and Indiana- American Water Company. This combined with moderate permit regulations is a concern in this subwatershed.

Over a dozen NPDES permittees are in violation in the White Lick Creek subwatershed. Of the violations six have been out of compliance 10 of the last 12 quarters. These and the other violators are sending *E. coli*, TSS, BOD, nitrogen, and chlorine among other pollutants, into the subwatershed. There are also one CAFO in the subwatershed. The White Lick Creek Subwatershed has a moderate percentage of impaired streams of all the subwatersheds with 56% of the stream miles listed as impaired. This subwatershed accounts for 5.5% of the impaired streams in the entire UWRW. Several sites and riparian areas within the subwatershed have been identified by the Greening the Crossroads study as areas crucial to sensitive species.

### **6.14 Clear Creek – White River**

Clear Creek-White River Subwatershed (HUC: 0512020114) contains portions of Greenwood and Indianapolis' ever expanding suburban areas. The subwatershed is primarily agricultural with 54.4% of the area in row crop (31.3%) or herbaceous pasture (23.2%) in 2008, down since 2000. The southern portions of this subwatershed are hillier and consequently maintain more forest cover than other portions of the subwatershed (29.2% in 2008). Both forest cover and herbaceous cover are increasing as agricultural lands are converted to suburban uses. This subwatershed also contains the Waverly

groundwater wellfields, a significant source of drinking water to the city of Indianapolis. The floodplain of the White River in this area has numerous lakes that were former sand and gravel excavations. These lakes (collectively larger than Morse Reservoir) increase the threat of groundwater contamination, providing more direct routes to the sand and gravel aquifer. Wetland areas are virtually non-existent in 2008, down since 2000.

Clear Creek-White River Subwatershed has 180 miles of stream 66% of which are buffered by forest. The streams buffered by forests work to filter the number of pollutants entering the water. The higher percentage agriculture pasture land would indicate that the subwatershed would benefit from a pasture management plan. The high percentage of agriculture land use also means that agricultural conservation practices are necessary for a healthy watershed. In Morgan and Johnson Counties, no-till adoption for soybeans is 66%, 35%, respectively. No-till adoption for corn is much lower: 14% in Morgan County, and only 12% in Johnson County. Clear Creek-White River Subwatershed also contains two CAFO's and two CFOs. The subwatershed has a low percentage of impaired streams of all the subwatersheds with 25% of the stream miles listed as impaired. This subwatershed accounts for 2% of the impaired streams in the entire UWRW.

This subwatershed has experienced minimal growth but the water quality is directly influenced by the City of Indianapolis. There are a very high number of surface intakes and wells in the subwatershed, including Indiana-American Water Company Inc., Bargsville Water Works, Ozark Fisheries Company Inc. and others, further demonstrating the need to protect water quality in this area. There are few NPDES permitted dischargers in the subwatershed; however, the few present have poor performance scores.

Several large areas and stretches of riparian corridor within the subwatershed have been identified by the Greening the Crossroads study as areas crucial to sensitive species. TMDL studies have been completed for almost half of this subwatershed.

### **6.15 Lambs Creek – White River**

Lambs Creek-White River Subwatershed (HUC: 0512020115) can be found in Morgan County and contains the western portion of Martinsville. Other than the White River valley and the extreme headwaters, much of the subwatershed contains steep ravines and is mostly forested (65.8%). The forest cover has increased since 2000 with the maturation of residential areas. Agricultural areas include 13.8% row crops and 11.3% herbaceous grass and pasture lands, both down since 2000. Wetland areas are virtually non-existent with only about 0.01% in 2008; down significantly since 2000.

Being the smallest subwatershed in terms of acreage in the Upper White, this subwatershed has minimal stream miles (74). Agricultural land buffers 5% of those miles, 61% of the streams are buffered by forests, while urban land use borders only 3% of the stream miles.

The Lambs Creek subwatershed has experienced minimal growth since 2008. Surprisingly, there are a very high number of significant water withdrawal facilities in the subwatershed. These include Indianapolis Power & Light Company, City of Martinsville, Rogers Group Inc., and others, further demonstrating the need to protect water quality in this area.

Sampling data is very limited in the southern subwatersheds of the Upper White. However, there is an IDEM Fixed Station located in the Lambs Creek subwatershed along the White River. The subwatershed has a low percentage of impaired streams of all the subwatersheds with 20% of the stream miles listed as

impaired. This subwatershed accounts for less than 2% of the impaired streams in the entire UWRW. TMDL studies have been completed for all of this subwatershed, as well as a watershed management plan.

The wooded areas in this highly forested subwatershed are mostly second or third growth forests, including some of Morgan-Monroe State Forest. Once cleared in an attempt to be farmed, the forest now known for some of the state's finest hardwoods. Steep slopes and thin soils make suitable and sustainable forestry practices an important consideration for water resource protection in this subwatershed. The large forested areas have also been identified by the Greening the Crossroads study as important network areas crucial to sensitive species.

### **6.16 Indian Creek**

Indian Creek Subwatershed (HUC: 0512020116) is located in southeastern Morgan County and southwestern Johnson County with a small portion in northern Brown County. This subwatershed should not be confused with the smaller Indian Creek/Indian Lake in Marion and Hancock Counties. The subwatershed contains the eastern portions of Martinsville and Morgantown. Due to the steep terrain, the subwatershed is primarily forested (54.7% in 2008) with very few residential areas. Forest cover has increased since 2000, as the existing residential areas mature. Agriculture is confined to the Indian Creek valley and the uppermost reaches in Johnson County (18.5% row crop, 17.8% herbaceous grasslands and pastures). Agricultural uses are down since 2000. Wetland areas are virtually non-existent with only about 0.01% in 2008, down since 2000.

Minimal growth has occurred in this subwatershed since 2008. This subwatershed comprised of 55% forest, 35% agricultural (half pasture), and 7% urban. Like Lambs Creek, urban/suburban areas are very limited, while the forestland present is typically second or third growth. Morgan-Monroe State Forest is present in the western portion of Indian Creek Subwatershed. Suitable and sustainable forestry practices are possible by steep slopes and thin soils and are an important consideration for water resource protection in this subwatershed.

Similar to the Lambs Creek subwatershed, this subwatershed also contains very few stream miles (75). The streams are buffered by 6% agricultural land use, 63% forested, and 2% urban. Several areas along the stream network have been identified as corridors by the Greening the Crossroads study. In addition, large forested areas have also been identified as important network areas crucial to sensitive species.

Limited water quality data is available for Indian Creek; however, there are several resources and opportunities for improvement. The subwatershed has the lowest percentage of impaired streams of all the subwatersheds with 2% of the stream miles listed as impaired. This subwatershed accounts for less than 0.1% of the impaired streams in the entire UWRW. TMDL studies have been completed and a watershed management plan was completed for the entire Indian Creek subwatershed indicating a desire for water quality improvements.

### **6.17 Butler Creek – White River**

Butler Creek – White River Subwatershed (HUC: 0512020117) is located in southwestern Morgan County with a small portion in northeastern Owen County and northern Monroe County. Steep terrain makes up this primarily forested (58% in 2008) subwatershed. Residential areas are minimal in the subwatershed.

Only 60 stream miles are present in this subwatershed, the second lowest in the Upper White. Butler Creek is also one of the five smallest in the Upper White. Agricultural land buffers 11% of the stream miles, 64% are buffered by forests, while 2.5% are buffered by urban land.

This subwatershed has experienced minimal growth since 2008. Significant water withdrawal facilities are few with only five surface intakes and wells in the subwatershed. Although agricultural production is limited in Morgan County, conservation tillage is at 66% for soybeans and 14% for corn.

The Butler Creek Subwatershed has a low percentage of impaired streams of all the subwatersheds with 24% of the stream miles listed as impaired. This subwatershed accounts for less than 1% of the impaired streams in the entire UWRW. TMDL studies have been completed in the eastern portion of this subwatershed, offering some opportunity for water quality improvement. The Greening the Crossroads study identified several areas of importance crucial to sensitive species for habit and migration. These identified areas include corridors along streams and forested land.

## **7.0 WEIGHTED ANALYSES OF FACTORS INFLUENCING WATER RESOURCES BY SUBWATERSHED**

The seventeen 10 digit HUC subwatersheds are diverse in both their characteristics and the risk factors impacting them. Similarly, a wide range of planning tools and water quality improvement opportunities exist in each. The combination of these elements creates a series of different ways to prioritize the subwatersheds relative to water quality threats and impacts, as well as potential management strategies and opportunities. To aid in this subwatershed analysis, a weighted matrix of key factors was developed (Table 7.1). This matrix was structured to provide a side-by-side relative comparison of individual factors, as well as comparative totals for groups of similar factors. The matrix is designed to reflect this report's three-pronged approach to watershed assessment – degradation, vulnerability, and opportunities.



**Table 7.1 Upper White River Watershed Weighted Matrix of Risk Factors and Opportunities**

HUC10 Subwatershed	Measures of Vulnerability											Social Infrastructure & Opportunities					Agricultural Infrastructure & Conservation Opportunities								
	Pop Growth % Change	CIF Permits	# NPDES Dischargers	NPDES Non-Compliance	# of CSO Communities	*Average Significant Water Use	CFOs	% Unsewered	Transportation Expansions	Impaired Streams	Suitable Stream Buffers	Total Vulnerability	Lack of Funding WMP Opportunities	Lack of SW Utilities Funding	SW MS4s Enforcement programs	Green Infrastructure Properties	Total Non-Ag Opportunities	Total (non Ag - vuln & opps)	No-Till Soybeans	No-Till Corn	CREP Projects	CREP Acreage	Tile Drainage	Sum of Ag Opps	Total for Ag Sheds
Butler Creek WR	1	2	1	1	1	1.0	1	3	1	1	1	14	1	3	3	1	8	22	+	+	+	+	2		
Clear Creek WR	1.5	2	1	1	1	1.7	1	3	1	1	1	15	2	3	2	1	8	23	3	3	+	+	2		
Indian Creek	1.5	2	1	1	1	1.0	1	3	1	1	1	15	1	3	3	1	8	23	+	+	+	+	+		
Buck Creek WR	1	1	1	1	1	1.0	1	3	2	3	2	17	2	2	1	2	7	24	2	2	2	2	3	11	35
Lambs Creek WR	1	2	1	1	1	1.7	1	3	2	1	1	16	3	3	2	1	9	25	+	+	+	+	+		
Duck Creek	1	1	1	1	2	1.0	1	3	1	3	3	18	2	3	3	3	11	29	2	3	3	3	3	14	43
Fall Creek	2.5	3	1	1	1	2.7	1	1	3	1	3	20	3	1	1	2	7	27	+	+	+	+	+		
Muncie Creek WR	1	1	2	2	2	1.3	3	3	1	3	2	21	2	2	2	2	8	29	1	1	1	1	2	6	35
Pleasant Run WR	1	3	3	1	2	3.0	1	1	1	2	3	21	2	2	1	2	7	28	+	+	+	+	+		
Crooked Creek WR	2.5	3	2	1	1	2.7	1	1	3	2	2	21	2	2	1	2	7	28	+	+	3	3	+		
Killbuck Creek WR	1	1	2	2	3	1.7	1	3	2	3	2	22	3	1	1	3	8	30	2	2	2	2	3	11	41
Pipe Creek WR	1	2	1	2	3	1.0	2	3	1	2	2	20	2	3	2	3	10	30	2	2	2	3	3	12	42
Geist Reservoir Fall Creek	1.5	2	2	2	3	1.7	1	3	3	3	2	24	3	1	1	2	7	31	1	3	2	1	3	10	41
Cicero Creek	1.5	2	1	1	3	1.7	3	3	3	2	3	24	3	2	1	3	9	33	3	3	1	2	3	12	45
Eagle Creek	2	2	3	2	2	2.3	2	3	3	3	2	26	3	1	1	2	7	33	2	3	3	3	3	14	47
Stony Creek WR	2.5	3	2	2	2	2.0	2	3	3	3	2	27	3	1	1	3	8	35	2	3	3	3	2	13	48
White Lick Creek	2.5	2	3	3	3	2.3	1	3	3	3	2	28	3	1	1	2	7	35	2	3	3	3	2	13	48
+	watersheds with insignificant agriculture																								
*	average weighting from significant water users (wells, intakes and volume)																								

## 7.1 Approach to Ranking System

The weighting system works on a 1, 2, 3 scale of assigned values. Distinctions between 1, 2, or 3 rankings were made based on natural data clusterings for numeric data (for those where numeric data was compiled) or based on more subjective interpretations of maps or narrative information (for factors that included presence/absence values) in a particular subwatershed. For factors/elements associated with the water quality degradation analysis, specific rankings by subwatershed are not possible based on the distribution of the water quality sampling stations (see Section 3). Instead, water quality degradation data were utilized to understand processes and pathways for water quality degradation and areas in the larger watershed where impacts are disproportional. These data were then used to recommend strategies for mitigating water quality impairments based on watershed management areas (see section 8).

For factors/elements associated with the vulnerability analysis, a “3” represents the most impacted/least ideal condition for water resource enhancement as it relates to the factor measured. Factors included in the vulnerability analysis are associated with indicators of change (e.g. population change and transportation initiatives), and the presence of landscape or land use features that impact water resources. These include construction in floodway permits, presence and number of CFOs, NPDES dischargers and their compliance records, CSO communities, impaired streams, stream buffering, etc.

For factors/elements associated with the social infrastructure and opportunities analysis, a “3” represented areas where there are challenges that could be reduced through the development of currently underutilized or available resources. Recommendations in these subwatersheds can include projects and programs that increase the development and utilization of appropriate tools that are already at work in some of the other HUC10 subwatersheds. For these analyses, the matrix was analyzed for factors that included agricultural measures separately from measures that are representative of existing social infrastructure for implementation. The primary reason for this was because not all subwatersheds contained significant amounts of agriculture.

Examples of the social infrastructure include a) the presence of existing watershed management plans, b) the existence of stormwater utilities, c) stormwater enforcement programs, and d) availability of identified green infrastructure opportunities. These factors provide an indication of the potential barriers to implementation of certain planning or management strategies, as well as opportunities.

Examples of agriculturally based indicators include a) measures of conservation tillage adoption, b) conservation project implementation, and c) rankings relative to the degree of tile drainage. These factors combined to provide an indication of the extent that management recommendations can focus on these tools to improve water resources.

Factors were totaled first by vulnerability factors to determine a ranking relative to vulnerability for each subwatershed. They were then ranked on the basis of social infrastructure. A separate analysis on a subset of agriculturally dominated subwatersheds was performed on the conservation measures. This analysis was not conducted for urban and urbanizing subwatersheds or those where row crop agriculture is not the dominant agricultural practice (e.g. some of the subwatersheds in the Southern Forested Hills).

## 7.2 Observations from Weighted Matrix

### 7.2.1 Summary of Vulnerability Risk Factors

HUC 10 subwatersheds in the UWRW displayed a large range of variability in weighted rankings relative to vulnerability (Table 7.1). Subwatersheds located in the Southern Forested Hills watershed management area all ranked low with respect to vulnerability followed by subwatersheds in the Agricultural Till Plain

Headwaters watershed management area, especially those dominated with row crop agricultural land use. The most highly vulnerable subwatersheds are those with mixed land use that are either in the Urban and Urbanizing Core watershed management area or subwatersheds that include both Agricultural Till Plain Headwaters and Urbanizing Core areas. This is expected given that some of the measures of vulnerability are linked to land use change and the results of urbanization. However, some of these measures are leading to/causing the land use change and/or are present because the mixed nature of the land use exhibits the full suite of environmental threats from both urban and agricultural land use. Highly vulnerable subwatersheds include White Lick Creek, Stony Creek, Eagle Creek, Cicero Creek, and Geist Reservoir-Fall Creek subwatersheds. These subwatersheds have a combination of risk factors associated with growth as well as existing risk factors from urban land use. Most of these highly vulnerable subwatersheds include CSO communities, as well as being home to a high concentration of significant water users and dischargers. Therefore, consideration of potential impacts to both water quality and quantity is paramount in these highly vulnerable subwatersheds on the fringe of the Urban and Urbanizing Core.

### *7.2.2 Summary of Conservation- and Enforcement-Based Social Infrastructure and Opportunities*

The analysis of conservations and enforcement-based social infrastructure and opportunities included evaluation of opportunities for funding (existence of state-approved watershed management plans and stormwater utilities), opportunities for targeted conservation on identified green infrastructure properties, as well as the level of enforcement related to stormwater impacts. This combination of factors yielded an interesting clustering of subwatersheds (Table 7.1). Four rural subwatersheds, three of which are dominated by agricultural land use, show little opportunity for conservation and implementation. These are Duck Creek, Pipe Creek, Cicero Creek, and Lambs Creek subwatersheds.

The remaining 13 subwatersheds cluster closely with differences in ranking being highly variable. Subwatersheds of the Urban and Urbanizing Core tend to rank well for enforcement and funding opportunities because they have stormwater utilities and sponsored watershed management plans. Opportunities for green infrastructure are concentrated in the Southern Forested Hills sections, but these more rural areas suffer from a relative lack of enforcement capabilities. There appears to be good opportunities for implementation of green infrastructure in the Urban and Urbanizing Core areas, however, closer inspection indicates that many of the forested and corridor areas are already protected in parks and green space. The Agricultural Till Plain Headwaters areas are variable. Those that are rural and most heavily dominated by agriculture tend to have few opportunities for green infrastructure implementation, low enforcement levels, and relatively few opportunities for funding. Some of these subwatersheds have portions that have concentrations of population that increases services and funding opportunities so that the overall rankings fall in the intermediate range.

### *7.2.3 Summary of Agriculturally Based Social Infrastructure and Opportunities*

The analysis of agriculturally based social infrastructure was limited to the subwatersheds that are partially or wholly in the Agricultural Till Plain Headwaters watershed management area. Subwatersheds in the Southern Forested Hills were not included, nor were those that are fully within the Urban and Urbanizing Core.

Muncie Creek WR subwatershed had the highest adoption of conservation tillage and highest utilization of conservation programs thereby resulting in it ranking strongly in this category and notably different from other agriculturally dominated subwatersheds in the Agricultural Till Plain Headwaters. The reasons for this higher rate of adoption may be linked to locally different soil types and drainage characteristics in the subwatershed. Muncie Creek WR subwatershed is in an area of the till plain that has well drained soils and a relatively low degree of tile drainage favoring conservation tillage adoption an important driver in the ranking.

The remaining ranked subwatersheds showed a relatively narrow range of variability in rankings. All of them have low adoption rates of agricultural conservation practices coupled with relatively high rates of tile drainage. Small differences in the relative ranking of some of the subwatersheds (Eagle Creek, Duck Creek, White Lick Creek, and Stony Creek) are not indicative of significantly different approaches being employed by producers.

## **8.0 STRATEGIES FOR WATERSHED MANAGEMENT REGIONS**

The extensive and comprehensive review of water resources in the Upper White River Watershed was organized into a three-prong approach that evaluated a) the level of water quality degradation from a spatial and temporal water quality basis, b) the level of vulnerability to impacts to water resources from a perspective of existing uses and stresses related to indicators of changing intensity or type of use, and c) the availability and utilization of social infrastructure to support water resource enhancements and improvements. This approach has provided a holistic overview of the status and trends of a major water resource for the State of Indiana and elucidated a set of observations about these water resources.

### **8.1 Overall Discussion and Conclusions**

A key finding of this report is that the relative water quality throughout the Upper White River Basin is very poor overall when compared to benchmarks related to ecosystem health and water quality standards. This result is in part due to the types of uses that the resource is subjected to; however, the UWRW suffers a disproportionate level of degradation when compared to watersheds with similar uses in neighboring states suggesting that change is possible, feasible and critical. This report does not evaluate impacts related to quality of life, economic impacts related to loss of use or enhanced treatment requirements, or usage limitations related to health and recreation. However, these factors all have a major impact on life in central Indiana and are all at risk if current water resource trends continue in the UWRW.

A second key finding of this report is that a very large discrepancy in social infrastructure and human resources across the watershed. Some areas have well developed planning tools and staff for the protection and management of key water resources, while other areas lack both the critical infrastructure and the recognition that despite these infrastructure limitations, a focus should be placed on enhancing the water resource for the long-term viability of the communities. Also missing from local programs and initiatives is the concept of the system as a WATERSHED with interconnected and interdependent elements that need to be managed comprehensively.

### **8.2 Agricultural Till Plain Headwaters**

The till plain natural regions have relatively flat topography and rich soils, albeit with typically poor drainage. With the aid of drainage systems, these areas are prime farm lands. The till plain areas, with their dominance of agricultural land use and rural character, are especially prevalent in the northern headwaters portions of the Upper White River Watershed. The agricultural signature on both water quality and water quantity and response is a dominant component of the Upper White River Watershed. This watershed management area includes: Muncie Creek, Buck Creek, Killbuck Creek, Duck Creek, Pipe Creek, Cicero Creek, Fall Creek, and agricultural areas of Stony Creek, Eagle Creek, and White Lick Creek.

The prevalence of row crop agriculture with a corn soybean rotation imparts a specific set of water quality impacts to the watershed. The most notable includes elevated nitrogen levels throughout area streams. These elevated nitrogen levels are far in exceedence of water quality guidelines and recommendations and are moving through tile drainage systems. Accompanying elevated levels of nitrogen, are elevated levels of

atrazine, a regulated corn herbicide. Peak values of atrazine measured in the White River far exceed drinking water standards and at times exceed aquatic health standards. Questions related to the effects of even low levels of atrazine on human health are mounting and raising additional concern about the high loads of atrazine being utilized in the UWRW and their occurrence in surface waters used for drinking water.

Both nitrogen and atrazine move off the agricultural landscape preferentially through tile drainage networks so that any recommended conservation practices for the Agricultural Till Plain Headwaters needs to recognize this transport pathway and focus on proven methods for reduction.

Accompanying the elevated dissolved load contaminants are elevated measures of turbidity and suspended sediment throughout the the Agricultural Till Plain Headwaters area. Headwater subwatersheds continue to have streams that lack effective buffers, however the use of extensive soil conservation practices in Indiana agricultural areas without mitigated effects may be an indicator that it is instream (ditch) erosion and even regulated drain maintenance that is contributing turbidity in the UWRW.

CSO effects are readily apparent in the water quality data as it passes through the CSO communities located in the Agricultural Till Plain Headwaters such as Muncie and Anderson. These effects generally transcend the watershed management areas and are tied directly to the occurrence of the discharges. CSOs affect *E. coli* measures and several of the impaired stream listings. CSO impacts are concentrated in the Agricultural Till Plain Headwaters and Urban and Urbanizing Core management area. The headwaters area in Randolph County is worth noting. In this area, elevated *E.coli* is not CSO related. This area has a high concentration of CFO's that may be a cause however, unsewered or failing septic communities are also potential causes, as are the septage waste sites that are found here.

As noted in Section 7.2.1, when risk factors for vulnerability are compared, the most highly vulnerable subwatersheds are those with mixed land use that are either in the Urban and Urbanizing Core watershed management area or subwatersheds that include both Agricultural Till Plain Headwaters and Urbanizing Core areas. Highly vulnerable subwatersheds include White Lick Creek, Stony Creek, Eagle Creek, Cicero Creek, and Geist Reservoir-Fall Creek subwatersheds. These subwatersheds stand out as a priority; yet, they require the most diverse set of solutions given the complexity of landuse impacts in these mixed-use subs. Their impact to the overall watershed cannot be mitigated without the implementation of both urban and agricultural Best Management Practices.

The Social Infrastructure and Opportunities Assessment indicated that for some of the rural subwatersheds in the Agricultural Till Plain Headwaters areas a lack of resources will pose a barrier to conservation and enforcement strategies, namely Duck, Pipe, and Cicero Creeks. For other subwatersheds in this management area, the variability in infrastructure and/or issues is so variable that it is difficult to make general statements about recommendations or barriers. However, some combination of the below barriers remains in all subwatersheds in this watershed management area.

#### 8.2.1 *Potential Barriers for Agricultural Till Plain Headwaters*

Several factors contribute to the current state of this watershed management area, more so even than the other areas. Some of the most obvious include the following:

- The lack of regional planning across political boundaries for zoning and landuse planning/management is a major concern. There also seems to be a notable disconnect between land use planning directions outlined in Comprehensive Plans and the current land use and/or zoning for that jurisdiction. This may be a reflection of new economic initiative taking priority, or the dated nature of the plans, or lack of commitment to the original plan;



regardless, land use changes (rezoning and development) are often not congruent with guidance planning documents and are not coordinated with adjacent planning/zoning authorities to any notable extent.

- The lack of digital mapping of regulated drains and the ‘moving-target’ nature of maintenance plan for these drains makes it hard to align drainage plans with conservation or mitigation efforts.
- In order to maintain easy access to legal drains (streams) many central Indiana county surveyors limit tree planting along legal drains (streams) reduces the restoration potential that exists for these streams.
- Drainage Boards and the Drainage Act are focused on moving water off of the landscape quickly and pushing it downstream. This can be in direct conflict with water quality objectives and long-term sustainable water resource management. A significant paradigm shift needs to take place to refocus drainage edicts on more sustainable water management strategies.
- Field technical support from the Indiana Conservation Partnership agencies and organizations is limited in both the amount of staff technical resources available and an individual’s ability and available time to work across programs that are not formally supported by their own agency. The CREP program and technical support to market and implement that program is a prime example. Likewise local 319 grant sponsors are challenged to find regular support for their watershed BMP technical design needs. Many watershed management plans that have been conducted are sitting on shelves unimplemented.
- A gap exists between rental farmers and owners when it comes to implementing conservation. Farmers/producers that are renting ground are either not in a position to make conservation commitments/decisions or are not as compelled to engage in conservation practices if they are not tied to the land’s long-term productivity. Some rental farmers have long-term relationships and arrangements with the property owners, but many do not.
- Many area farmers continue to rely on broad scale recommendations regarding fertilizer applications leading to areas of over application.
- Most human waste in these subwatersheds is managed by septic systems. Likewise, most soils in these areas are not conducive to septic systems and therefore lead to failed or poorly functioning systems.
- Many isolated MS4s located in these mostly agriculture subwatersheds do not participate in the UWRWA’s regional education program and have relatively low budgets due to county tax structures and/or lack of stormwater utilities. Many are therefore working with limited program support. This impacts their ability to aggressively enforce regulations such as Rule 5 or other requirements in Rule 13 related to education, illicit discharges, etc.

#### 8.2.2 *Strategies & Policy Solutions for Agricultural Till Plain Headwaters*

- 1.) Develop an outreach program and planning guidance to assist county or municipal transportation planners in lessening impacts associated with transportation projects such as induced sprawl, increased road runoff, and unintended utility expansion and rezoning.
- 2.) Develop outreach programs and tools for land use planners that promote watershed-wide planning. Utilize findings in this report and targeted conservation areas included in Greening the Crossroad’s green infrastructure maps to identify key areas for cross-jurisdictional land use planning and protection. Work with municipal and county planners to get targeted areas into local comprehensive plans and develop ordinances that help protect key floodplain areas and already degraded areas.

- 3.) Promote Low Impact Development strategies to key economic development professionals and stormwater staff that focus on infiltration and pollution reduction strategies in developed (urbanized) portions of the management area.
- 4.) Work on wide-scale promotion and implementation of agricultural conservation practices, particularly those targeting nitrogen and atrazine reduction such as nutrient management, cover crops, upland wetland restoration, and tile interception into bioretention cells. Secure funding to cost-share on these key practices.
- 5.) Coordinate with ISDA/NRCS to promote CREP funding for key agricultural practices and expansion of On-Farm network to aid in reduced fertilizer applications.
- 6.) Improve drainage management approaches in coordination with the county surveyors – focusing on management and planning at the subwatershed level. Conduct education and outreach events on drainage practice impacts with surveyors and landowners. Work toward policy shift with surveyors regarding forested buffers in certain locations. Develop a list of sensitive regulated drains that warrant special consideration and work with surveyors to develop alternative drainage maintenance strategies for these drains/streams.
- 7.) Develop and promote wide-spread coordination on septic system education and development of incentives or regulatory/enforcement change. Conduct outreach program for realtors and engage health department in coordinated septic education program. Work with health departments to address unsewered communities. Explore funding and regulatory options for improvements in these areas.
- 8.) Follow-up on habitual non-compliant NPDES dischargers. Work with IDEM on regular communication and enforcement

Portions of the Agricultural Till Plain Headwaters have concentrated areas of urban and urbanizing land use that provide both additional barriers and opportunities that are presented below in the Urban and Urbanizing Core areas discussion. Therefore, further solutions and strategies for this watershed management area's pockets of urban land use lie below (Section 8.3.2) and need to be considered.

### **8.3 Urban and Urbanizing Core Area**

The central portion of the Upper White River Watershed lies within the till plain natural area but has been extensively developed and is undergoing continued urbanization with the expansion of development into surrounding agricultural areas. The inherited landscape has been largely overprinted by urbanization and its associated modifications to water resources from both a water quality as well as quantity perspective. The fingerprint of urbanization is strong and is a dominant feature of the Upper White River Watershed. This watershed management area includes: Crooked Creek, Fall Creek, Pleasant Run, and urban areas of Stony Creek, Eagle Creek, White Lick Creek, and Clear Creek.

Streams in the Urban and Urbanizing Core have unique water quality characteristics that are derived from both inherited water quality sourced from the Agricultural Till Plain Headwaters and water quality and quantity challenges sourced from urban land use.

The Upper White River Watershed continues to see land use/land cover changes due mostly to changes in human activity. In general, areas of urbanization are increasing at the expense of agricultural and forested areas. This is occurring even in areas of urban decline as new developments are mostly occurring at the outer edges of urban zones and not in the existing declining cores. This change is most notable along the major transportation corridors such as interstates and state highways. Rapidly urbanizing areas are focused in Hamilton Johnson, Boone, and Hendricks counties.

Streams in the Urban and Urbanizing Core suffer from elevated levels of suspended sediment and turbidity with highly elevated levels occurring in areas of urban expansion and increasing stormwater contribution to stream discharge. This sediment is likely sourced from instream erosion, construction runoff, and stream adjustment and downcutting from stormwater volume increases. This increase in stormwater runoff is also contributing to flooding and flood erosion hazards in the Urban and Urbanizing Core.

Total phosphorus in the Upper White River Watershed is excessively high throughout the watershed. While agricultural land use contributes phosphorus but instream total phosphorus concentrations in agricultural areas are only slightly elevated relative to the EPA Reference Condition. In contrast, urban sourced phosphorus is elevating phosphorus levels in the White River and its tributaries to levels that so far exceed EPA Reference Conditions that it is hard to envision a strategy that can reduce phosphorus to levels that approach healthy stream ecosystem levels. USGS SPARROW models of phosphorus yield in the Upper White River Watershed attribute 50% of the phosphorus load to urban sources (Robertson et al., 2009). Urban sources of phosphorus include wastewater treatment plant discharge, CSOs, failing septic systems, stormwater and other industrial discharges. Stormwater is enriched in phosphorus due to fertilizer runoff, pet waste, and deicing agents among a host of other sources. Strategies for reducing phosphorus loads to streams will have to address the myriad sources of phosphorus to effectively impact the problem.

CSO effects are readily identified in the Urban and Urbanizing Core with a high concentration of discharges occurring here. Impacts from CSOs include *E. coli* contamination, elevated organic nitrogen and elevated chemical oxygen demand levels, among other things.

The risk factor/vulnerability assessment indicated that the subwatersheds with the highest vulnerability were found in the Urban and Urbanizing Core management area. These subwatersheds have a combination of risk factors associated with growth, as well as existing risk factors from urban land use. Most of these highly vulnerable subwatersheds include CSO communities, as well as being home to a high concentration of significant water users and dischargers. Therefore, consideration of potential impacts to both water quality and quantity is paramount in these highly vulnerable subwatersheds on the fringe of the Urban and Urbanizing Core.

As noted in Section 7.2.2, social infrastructure and opportunities are most abundant in this watershed management area. The presence of stormwater utilities and sponsored watershed management plans provide the financial framework and social understanding needed to positively impact water quality, or at least offset some of the urban impacts. However, challenges remain working across diverse populations and political boundaries. Likewise, not all communities have such utilities or programs, thus further hampering a coordinated approach across political boundaries to reduce urban impacts on water quality. A wide discrepancy arises when steady funding and planning is present. This discrepancy is realized in both physical infrastructure improvements and in social advancements such as public education.

### 8.3.1 *Potential Barriers for Urban and Urbanizing Core Areas*

- Stormwater ordinances currently in place were developed at a fairly rapid pace when new Rule 13 Phase II communities were thrust into the world of stormwater regulation in 2003. Many of these ordinances are based on a pollutant removal requirement of 80% Total Suspended Sediment. While sediment is a major concern in urban areas, particularly around construction site, this water quality standard does not address the many dissolved pollutants of concern. As long as this water quality standard remains the sole focus of stormwater regulation, little holistic improvement in urban water quality will be made.

- In general, there is a lack of Technical Standards for green (LID) stormwater practices across the region. Some communities have invested in outside consultants to help draft such standards, but they are not universal, nor wide-spread.
- The implementation of Low Impact Development (LID) practices and principles are often hampered by barriers that exist in local land use or subdivision ordinances. These barriers can related to parking requirements, landscape requirements, density requirement, and many, many more. Until holistic ordinance review and revision is completed in many municipalities, wide-spread urban landscape design cannot align completely with sustainable urban best management practices and LID.
- Many LID BMPs include the use of native plantings. While the social acceptability of more natural landscapes is improving, a significant barrier exists related to what is seen as the manicured, ideal landscape among the general public.
- Very few opportunities exist for urban cost-share funding. Without cost-share dollars it is difficult to persuade landowners in trying alternative practices.
- Many urbanizing areas are balancing both urban/suburban constituents and rural residents. Communication between urban and rural stakeholders, residents, and managers is challenged by difference in cultural perspective. Developing relatable messages about water quality and land use impacts needs careful planning and a diverse approach.
- There is a general lack of enforcement of NPDES permits by the State. Since many discharges are located in urban and urbanizing fringe areas, this impact further impairs urban streams.

### 8.3.2 *Strategies & Policy Solutions for Urban and Urbanizing Core Areas*

- 12.) Wide-spread promotion of LID (work to reduce the use of retention ponds to manage stormwater)
  - a. Develop core planning principles and promote/educate area planners/municipal staff
  - b. Help municipalities identify and reduce ordinance barriers to LID/green infrastructure adoption
  - c. Discuss and share LID BMP Technical Standards across municipal jurisdictions, work toward universal standards
  - d. Promote discussion and development of stormwater ordinances that set more diverse or different water quality standards targeted at dissolved pollutants like phosphorus
- 13.) Promote targeted conservation areas including Greening the Crossroad's green infrastructure sites. Work with municipal and county planners to get targeted areas into local comprehensive plans and develop ordinances that help protect key floodplain areas.
- 14.) Strengthen regional MS4 public education and involvement program
  - a. Expand program to assist with water quality monitoring efforts
  - b. Coordinate stormwater ordinances and expand understanding of needed changes to water quality requirements
  - c. Standardize messaging across municipalities; focus on individual behavior change and pollution source reduction, since the scale of the problem/pollution (as documented by this study) is beyond what structure BMPs can remedy
  - d. Leverage current program elements into additional funding opportunities
  - e. Focus messaging on shifting rainfall intensity patterns resulting in infrastructure failure, intense stream erosion – unsafe streams. These real life observations transcend many stakeholders and key audiences and will help bridge varying cultural perspective of stakeholders.
- 15.) Promote urban reforestation programs and residential forested buffers

- a. Create educational materials and outreach opportunities regarding heat island effects and other health, recreational, and economic benefits
  - b. Partner with regional conservation partners like Keep Indianapolis Beautiful, area land trusts, and The Nature Conservancy to provide education and trees for residential adoption of BMPs
- 16.) Work with master gardeners, habitat stewards, Indiana Wildlife Federation, and other groups to educate about benefits of urban conservation and native plantings. Develop standardized presentations and shared materials.
  - 17.) Host summits (panel discussions, host national experts, etc.) that help raise awareness water quality and quantity concerns facing Central Indiana
  - 18.) Coordinated well-head protection efforts to leverage messaging and awareness and work toward better planning and protection of these areas
  - 19.) Educate about the effects of invasive species and their role in impacting water quality and habitat
  - 20.) Continue stream cleanups and conduct float trips to get more people connected to the river, its uses, threats, conditions, and needs
  - 21.) Work with partner agencies to promote urban conservation and BMPs through the development of agency-approved technical standards for urban practices and increased or expanded cost-share funding
  - 22.) Implement existing watershed management plan recommendations and address key pollution sources in critical areas. Seek funding for implementation. Coordinate funding efforts across subwatersheds to insure greatest improvement of the UWRW as a whole.

#### **8.4 Southern Forested Hills**

The bedrock uplands and small area of karst bedrock natural areas are found in the southern portion of the watershed. Hill and valley topography, thin soils, and abundant bedrock outcrops limit agriculture in this portion of the watershed. With the exception of the broad fertile floodplain valleys of the White River, the region is heavily forested and rural. Where agriculture is important, the focus is on pasture and cattle rather than row crop agriculture. This watershed management area includes: Lambs Creek, Indian Creek, Butler Creek, and the forested areas of Clear Creek.

A separate assessment of water quality degradation in the Southern Forested Hills watershed management area is difficult because of a lack of data that isolates subwatershed contributions. Water quality data that is available is located on the WR trunk streams and carries the signature of all upstream influences.

Based on data collected for the risk factor/vulnerability assessment, the subwatersheds located in the Southern Forested Hills watershed management area all ranked low with respect to vulnerability relative to other areas in the watershed. However, the opportunities to protect key green infrastructure resources abound in the Southern Forested Hills. Protecting these important resources (floodplains and forests), however, is met with several challenges in this mostly rural area such as limited funding, regulation, and enforcement.



#### 8.4.1 *Potential Barriers for Southern Forested Hills*

- Landowners have highly variable views regarding tree management/maintenance verses forestry management.
- Forestry contractors receive limited education about other resource issues associated with forest management such as water quality impacts, cumulative land use change impacts and the like.
- There is a statewide-view of forests' primary value as an agricultural commodity leading to unsustainable harvest rates.
- No economic consideration or valuation of closed canopy forest other than as a harvested commodity. Other functional roles include critical habitat, bird conservation, heat island effect reduction, greenhouse gas sequestration, stormwater infiltration including flood prevention and water quality pollution prevention.
- Many cattle operations in this area are focused in floodplain areas with direct access to the streams due to steep slopes and limited alternative grazing spaces.

#### 8.4.2 *Strategies & Policy Solutions for Southern Forested Hills*

- 10.) Promote sustainable forestry practices among planning professionals. Promote/foster discussions on steep soil loss management and the development of protective ordinances for these areas.
- 11.) Wide-spread promotion of reforestation of over harvested areas
- 12.) Develop residential buffer program and promotions for buffers on pasture lands. Work on cattle-based BMP program implementation. Secure funding for such practices.
- 13.) Develop and promote wide-spread coordination on septic system education and development of incentives or regulatory/enforcement change. Conduct outreach program for realtors and engage health department in coordinated septic education program. Work with health departments to address unsewered communities. Explore funding and regulatory options for improvements in these areas.
- 14.) Promote targeted conservation areas including Greening the Crossroad's green infrastructure sites. Work with municipal and county planners to get targeted areas into local comprehensive plans and develop ordinances that help protect key floodplain areas.
- 15.) Focus new outreach effort on small reservoir management. Many of these reservoirs could benefit from naturalized edge plantings and other residential best management practices. Steep erodible ravines entering many of these reservoirs are being impacted by the stormwater from residential development around them.
- 16.) Engage the DNR's Forestry Division in discussions about sustainable harvests and protection of important ecological or ecosystem function locations. Utilize the DNR's public education efforts to raise awareness about forestry best management practices.
- 17.) Conduct workshops for forestry contractors on BMPs, sustainable practices, and the quality of the overall White River watershed
- 18.) Partner with TNC on Brown County Hills project (forest banking program), Sycamore Land Trust, and the Central Indiana Land Trust to target protection of floodplain properties

As with portions of the Agricultural Till Plain Headwaters, portions of the Southern Forested Hills have concentrated areas of urban and urbanizing land use that provide both barrier and opportunities that are presented above in the Urban and Urbanizing Core areas discussion. Therefore, further solutions and strategies for this watershed management area's pockets of urban land use are listed above (Section 8.3.2) and should be part of the plans to affect meaningful change in this area.

## **8.5 Summary Statement**

While the above lists include some monumental efforts and significant overall policy shifts, the UWRW cannot afford to wait to take immediate action on as many of the strategies as possible. The water resources in the UWRW are in peril; yet, they remain critical to sustaining the state's largest population and economic center. How human drinking water, waste management, and storm water services are provided will impact every aspect of the watershed for tens of years into the future. Finding a way to protect a sustainable water cycle of use and reuse in a community is the essence of watershed planning. This report has explored the current condition, the risks, and the opportunities to do just that.

## **9.0 WEB-BASED OUTREACH TOOLS AND PLATFORM**

The Indiana Water Information Network (IWIN) is a tool created by Indiana University Purdue University Indianapolis Center for Earth and Environmental Science (IUPUI CEES) which allows users to view Geographic Information System (GIS) natural and human-influenced element layers of the Upper White River Watershed using GoogleEarth. The site provides information such as stream flow paths, land use, confined feeding operation locations, NPDES facility and pipe locations, waste sites, underground storage tank sites, superfund sites, and many others. Directions on how to get started using the tool can be found at the Upper White River Watershed website, [www.uwrwa.org](http://www.uwrwa.org), under the 'Explore the Watershed', then Surf Our 'Shed tabs.

In addition to the interactive tool with GoogleEarth, the website will soon be hosting a map center. The map center will contain numerous static maps of different resources throughout the watershed.

## **10.0 MEETINGS SUMMARY**

The scale of assessment conducted for this project required dozens of face-to-face meetings with various municipal and state agency staff. Likewise, phone interviews provided dozens of additional touch-points and outreach opportunities regarding this project. In addition to these meetings and small group conversations, formal presentation of this report's findings and opportunity for public input and questions were conducted at the following meetings, conferences, and events:

- Elements of this project and evaluation were developed and presented at eight (8) UWRWA General Membership meetings. These dates included:
  - June 28, 2007
  - October 4, 2007
  - June 12, 2008
  - March 19, 2009
  - June 9, 2009
  - September 29, 2009
  - December 15, 2009
  - March 4, 2010
- Indiana Water Resources Association 2009 Conference – May 6-8, 2009, Holiday Inn, Columbus, IN
- Indiana Lakes Management Society 2008 Conference – Indianapolis, IN
- Indiana Association of Floodplain and Stormwater Managers 2009 Conference – Sept 16-18, Pokagon State Park Angola, IN
- White River Watchers Annual Meeting – 2009, Anderson Public Library, Anderson, IN

- Indiana Association of SWCDs 2010 Conference – Jan 11-13, Hyatt Regency Downtown, Indianapolis, IN
- NRCS State Technical Meeting 2010 – Mar 9, 2010, NRCS State Office Conference Room, Indianapolis, IN

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## **Appendix I**

### **Bibliography of Data Resources Relative to Physical, Chemical, and Biological Water Quality in the Upper White River Watershed, Central and East Central Indiana**

The following bibliography is a compilation of resources, dating through December 2007, concerning the Upper White River and its primary tributaries, located in central and east-central Indiana.

Where the article could be acquired, they have been linked electronically for download. The numbering refers to the numbering scheme utilized on the website for the file number. An asterisk means the file is available for download at: <http://www.cees.iupui.edu/iwin/References.htm>

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**Appendix II**

**NPDES Dischargers Non-Compliance Records**



<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
ADMIRAL PETROLEUM	INDIANAPOLIS	MARION	Pleasant Run - White River	2	Benzene
AIT LABORATORIES	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
ALEXANDRIA WWTP	ALEXANDRIA	MADISON	Pipe Creek	6	Not Listed
AMERICAN UNITED LIFE TOWER	INDIANAPOLIS	MARION	Pleasant Run - White River	11	Oil, Grease, TSS
AMOCO STATION 10067	PLAINFIELD	HENDRICKS	White Lick Creek	n/a	
ANDERSON WWTP	ANDERSON	MADISON	Killbuck Creek - White River	11	BOD, Chlorine, Copper, E coli, Nitrogen, TSS
ANR PIPELINE COMPANY	WINCHESTER	RANDOLPH	Muncie Creek - White River	1	Oil, Grease, TSS
ARCADIA WWTP	ARCADIA	HAMILTON	Cicero Creek	7	Chlorine, E coli, Nitrogen, DO, Phosphorus, TSS
ASHBURY RIDGE MOBILE HOME COURT	MOORESVILLE	MORGAN	White Lick Creek	7	Chlorine, E coli, Nitrogen, DO
ASPHALT MATERIALS INC	INDIANAPOLIS	MARION	Eagle Creek	n/a	
ATLANTA WWTP	ATLANTA	HAMILTON	Cicero Creek	10	pH, Nitrogen
BALL STATE UNIV COAL PILE	MUNCIE	DELAWARE	Killbuck Creek - White River	8	pH, Iron, TSS

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
BARGERSVILLE MUNICIPAL WWTP	BARGERSVILLE	JOHNSON	Clear Creek - White River	9	Chlorine, E coli, Nitrogen, TSS
BARRINGTON ESTATES WWTP	FISHERS	HAMILTON	Geist Reservoir - Fall Creek	4	pH, E coli, Nitrogen, DO
BELLEVILLE WWTP	CLAYTON	HENDRICKS	White Lick Creek	8	BOD, Chlorine, Nitrogen
BORG WARNER DTP, INC.	MUNCIE	DELAWARE	Killbuck Creek - White River	6	pH, Oil, Grease
BP AMOCO INDPLS TERMINAL	INDIANAPOLIS	MARION	Eagle Creek	n/a	
BP PRODUCTS NA INC. - 10117	INDIANAPOLIS	MARION	Crooked Creek - White River	1	Benzene
BRIDGESTONE/FIRESTONE INDUSTRIAL PRODUCTS	NOBLESVILLE	HAMILTON	Stony Creek - White River	2	Not Listed
BROOKLYN MUNICIPAL STP	BROOKLYN	MORGAN	White Lick Creek	11	BOD, Chlorine, E coli, Nitrogen, DO, TSS
BROWN COUNTY WATER UTILITY	MORGANTOWN	MORGAN	Indian Creek	7	pH
BROWNSBURG PUBLIC WATER SUPPLY	BROWNSBURG	HENDRICKS	White Lick Creek	n/a	
BROWNSBURG WWTP	BROWNSBURG	HENDRICKS	White Lick Creek	8	Copper, E coli, TSS
BUCKEYE PIPELINE COMPANY	INDIANAPOLIS	MARION	Eagle Creek	n/a	
BUCKEYE TERM INDIANAPOLIS TERM	INDIANAPOLIS	MARION	Eagle Creek	4	Not Listed

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
BUCKEYE TERMINAL LLC RACEWAY	CLERMONT	MARION	Eagle Creek	5	pH, TSS
BUCKEYE TERMINALS LLC MUNCIE	MUNCIE	DELAWARE	Killbuck Creek - White River	12	TSS
BUCKEYE TERMINALS LLC ZIONSVILLE	INDIANAPOLIS	MARION	Eagle Creek	2	TSS
BURCO MOLDING, INC.	NOBLESVILLE	HAMILTON	Stony Creek - White River	7	Water Temperature
CARMEL WWTP	INDIANAPOLIS	MARION	Crooked Creek - White River	5	Chlorine
CHESTERFIELD CSS	CHESTERFIELD	MADISON	Killbuck Creek - White River	n/a	
CICERO MUNICIPAL WWTP	CICERO	HAMILTON	Stony Creek - White River	9	BOD, E coli, TSS
CITIZENS GAS & COKE UTILITY	INDIANAPOLIS	MARION	Fall Creek	1	Benzene
CITIZENS THERMAL ENERGY, PERRY K	INDIANAPOLIS	MARION	Pleasant Run - White River	5	Chlorine, pH, TSS
CLAY TOWNSHIP RWD - MICHIGAN RD WWTP	ZIONSVILLE	BOONE	Eagle Creek	5	Nitrogen, Phosphorus, TSS
CONSECO FIELDHOUSE	INDIANAPOLIS	MARION	Pleasant Run - White River	1	Not Listed
COUNTRY VIEW ESTATES	MOORESVILLE	MORGAN	White Lick Creek	3	BOD, Nitrogen, E coli

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
COUNTRYMARK JOLITVILLE TERMINAL	WESTFIELD	HAMILTON	Eagle Creek	12	TSS
COWAN ELEM & HIGH SCHOOL	MUNCIE	DELAWARE	Buck Creek - White River	12	BOD, E coli, Nitrogen, DO, TSS
CVS PHARMACY #6557	INDIANAPOLIS	MARION	Eagle Creek	n/a	
DAIMLERCHRYSLER COMPANY, LLC	INDIANAPOLIS	MARION	Eagle Creek	1	Not Listed
DANVILLE, TOWN OF	DANVILLE	HENDRICKS	White Lick Creek	2	E coli, Nitrogen
DEER PATH UTILITIES INC	PLAINFIELD	HENDRICKS	White Lick Creek	8	BOD, Chlorine, Nitrogen
DOW CHEMICAL CO. ZIONSVILLE	ZIONSVILLE	BOONE	Eagle Creek	1	Not Listed
DUKE ENERGY CORP NOBLESVILLE GEN. STATION	NOBLESVILLE	HAMILTON	Stony Creek - White River	4	Copper
EAGLETOWN ESTATES MOBILE HOME	WESTFIELD	HAMILTON	Eagle Creek	5	BOD, Nitrogen, TSS
EAGLETOWN/LITTLE EAGLE CREEK ESTATES	WESTFIELD	HAMILTON	Eagle Creek	8	BOD, Nitrogen, Phosphorus, TSS
EASTERN HENDRICKS CO UTILITY	AVON	HENDRICKS	White Lick Creek	10	BOD, Chlorine, E coli, Nitrogen
ECHO LAKE LLC	MOORESVILLE	MORGAN	White Lick Creek	11	E coli, Nitrogen, TSS

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
ELI LILLY & COMPANY - LILLY TECHNOLOGY CENTER	INDIANAPOLIS	MARION	Pleasant Run - White River	2	Not Listed
ELWOOD UTILITIES STP	ELWOOD	MADISON	Duck Creek	12	BOD, Chlorine, E coli, Nitrogen, DO, TSS
EX-CELL-O CORP. AEROSPACE DIV.	ELWOOD	MADISON	Duck Creek	n/a	
FALL CREEK PLANT	INDIANAPOLIS	MARION	Fall Creek	n/a	
FALL CREEK RSD WWTP	PENDLETON	MADISON	Geist Reservoir - Fall Creek	7	E coli, Phosphorus
FARMLAND MUNICIPAL STP	FARMLAND	RANDOLPH	Muncie Creek - White River	12	pH, BOD, TSS
FISHERS CHEENEY CREEK WWTP	FISHERS	HAMILTON	Crooked Creek - White River	8	E coli, TSS
FLATFORK CREEK WWTP	NOBLESVILLE	HAMILTON	Geist Reservoir - Fall Creek		
FORMER CALUMET ASPHALT PAVING	INDIANAPOLIS	MARION	Crooked Creek - White River	1	Benzene
FORTVILLE MUNICIPAL WWTP	FORTVILLE	HANCOCK	Geist Reservoir - Fall Creek	12	E coli, Nitrogen
FRANKTON WWTP	FRANKTON	MADISON	Pipe Creek	n/a	
GAS AMERICA HINKLE CREEK	ARCADIA	HAMILTON	Cicero Creek	7	Chlorine, E coli, Nitrogen, DO

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
GASAMERICA 80	ANDERSON	MADISON	Geist Reservoir - Fall Creek	10	Benzene
GASTON WATER TREATMENT PLANT	GASTON	DELAWARE	Pipe Creek	1	Iron
GASTON WWTP, TOWN OF	GASTON	DELAWARE	Pipe Creek	9	BOD, Chlorine, E coli, Nitrogen, DO, TSS
GEIST STATION	INDIANAPOLIS	MARION	Fall Creek	1	Not Listed
GOSPORT MUNICIPAL STP	GOSPORT	OWEN	Butler Creek - White River	2	E coli
HANSON AGG HARDING PLANT 554	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
HENDRICKS CO RSD RACEWAY PLAZA	AVON	HENDRICKS	White Lick Creek	10	E coli, TSS
HIGHLAND LAKES BAPTIST CHURCH	MONROVIA	MORGAN	Lambs Creek - White River	4	BOD, Nitrogen, DO, TSS
HYDRAULIC PRESS BRICK COMPANY	MOORESVILLE	MORGAN	Lambs Creek - White River	n/a	
IMI ANDERSON	ANDERSON	MADISON	Killbuck Creek - White River	n/a	
IMI IRVING BROS STONE & GRAVEL	MUNCIE	DELAWARE	Muncie Creek - White River	n/a	
IMI MCCORDSVILLE	FORTVILLE	HANCOCK	Geist Reservoir - Fall Creek	1	TSS



<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
IMI STONY CREEK STONE CO	NOBLESVILLE	HAMILTON	Stony Creek - White River	n/a	
IMI/PENDLETON	ANDERSON	MADISON	Geist Reservoir - Fall Creek	n/a	
INDIANA AMERICAN WATER CO	NOBLESVILLE	HAMILTON	Stony Creek - White River	3	TSS
INDIANAPOLIS BELMONT AND SOUTHPORT ADVNCD WTP	INDIANAPOLIS	MARION	Pleasant Run - White River	7	Ceriodaphnia
INDIANAPOLIS INTERNATIONAL AIRPORT	INDIANAPOLIS	MARION	White Lick Creek	10	COD, Propylene Glycol, pH, DO, Propylene Glycol Monobutyl Ether
INDIANAPOLIS W 70 TRAVEL PLAZA	CENTER VALLEY	HENDRICKS	White Lick Creek	8	BOD, Chlorine, E coli, Nitrogen, TSS
INTERNATIONAL TRUCK AND ENGINE CORP	INDIANAPOLIS	MARION	Pleasant Run - White River	3	Chlorine
IPALCO EAGLE VALLEY STATION	MARTINSVILLE	MORGAN	Lambs Creek - White River	n/a	
IPALCO HARDING ST STATION	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
169 AUTO TRUCK PLAZA	GASTON	DELAWARE	Pipe Creek	12	BOD, E coli, Nitrogen, DO, TSS
JOHN M WOOLEY LUMBER CO INC	MOORESVILLE	MORGAN	White Lick Creek	2	BOD, Oil, Grease, TSS

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
KENNEDY ENTERPRISES, INC.	ALEXANDRIA	MADISON	Pipe Creek	11	BOD, E coli, Nitrogen
KENTUCKY AVE M MARTIN MARIETTA	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
KURTS FOOD MART	INDIANAPOLIS	MARION	Pleasant Run - White River	2	Benzene
LAPEL WWTP	LAPEL	MADISON	Stony Creek - White River	8	pH, BOD, E coli, Nitrogen, TSS
LIBERTY WATER COMPANY	CLAYTON	HENDRICKS	White Lick Creek	4	Chlorine, Iron, TSS
LUCENT TECHNOLOGIES INC	FORTVILLE	HANCOCK	Geist Reservoir - Fall Creek	12	Volatiles
MAPLE GROVE MOBILE HOME PARK	MARTINSVILLE	MORGAN	Clear Creek - White River	12	BOD, Chlorine, Nitrogen, TSS
MAPLETURN UTILITIES INC.	MARTINSVILLE	MORGAN	Clear Creek - White River	5	Chlorine, E coli, TSS
MARATHON ASHLAND MUNCIE TERM	MUNCIE	DELAWARE	Killbuck Creek - White River	7	TSS
MARATHON PETROLEUM CO - CLERMONT	INDIANAPOLIS	MARION	Eagle Creek	5	Volatiles
MARATHON PETROLEUM CO. LLC - INDIANAPOLIS	INDIANAPOLIS	MARION	Eagle Creek	3	Not Listed
MARATHON TOBACCO ROAD	MARTINSVILLE	MORGAN	Lambs Creek - White River	n/a	

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
MARTIN MARIETTA MATERIALS-BELMONT SAND PLANT	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
MARTIN MARIETTA NORTH INDPLS	INDIANAPOLIS	MARION	Crooked Creek - White River	7	TSS
MARTINSVILLE WWTP	MARTINSVILLE	MORGAN	Lambs Creek - White River	6	BOD, E coli, TSS
MCCORDSVILLE MUNICIPAL WWTP	MCCORDSVILLE	HANCOCK	Geist Reservoir - Fall Creek	7	E coli, Nitrogen, TSS
MIDDLETOWN WWTP	MIDDLETOWN	HENRY	Geist Reservoir - Fall Creek	10	Chlorine, TSS
MODOC, TOWN OF	MODOC	RANDOLPH	Muncie Creek - White River	12	pH, Chlorline, E coli, Nitrogen, DO, TSS
MONROVIA MUNICIPAL WWTP	MONROVIA	MORGAN	Lambs Creek - White River	6	E coli, Nitrogen, DO, Phosphorus, TSS
MOORESVILLE, TOWN OF	MOORESVILLE	MORGAN	White Lick Creek	2	TSS
MORGAN COUNTY RURAL WATER CORP	MARTINSVILLE	MORGAN	Lambs Creek - White River	1	TSS
MORGANTOWN WWTP	MORGANTOWN	MORGAN	Indian Creek	7	BOD, Dilution
MOUNT PLEASANT UTILITIES LLC	YORKTOWN	DELAWARE	Killbuck Creek - White River	8	BOD, E coli, Nitrogen, TSS

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
MUNCIE WWTP	MUNCIE	DELAWARE	Killbuck Creek - White River	5	Copper, E coli, DO, Cadmium, TSS
NICE-PAK PRODUCTS, INC.	MOORESVILLE	MORGAN	White Lick Creek	n/a	
NOBLESVILLE LANDFILL INC	NOBLESVILLE	HAMILTON	Stony Creek - White River	n/a	
NOBLESVILLE WWTP, CITY OF	NOBLESVILLE	HAMILTON	Stony Creek - White River	8	E coli
NUSTAR TERMINALS OPERATIONS PARTNERSHIP L.P.	INDIANAPOLIS	MARION	Eagle Creek	5	TSS
OAK HILLS WWTP	BARGERSVILLE	JOHNSON	Clear Creek - White River	n/a	
OAK MEADOWS MOBILE HOME COMMUN	GREENWOOD	JOHNSON	Clear Creek - White River	6	Chlorine
OAKHURST MOBILE HOME PARK	BROWNSBURG	HENDRICKS	White Lick Creek	8	BOD, Chlorine, Nitrogen, pH, TSS
OWENS BROCKWAY GLASS CONTAINER	LAPEL	MADISON	Stony Creek - White River	2	TSS
PANHANDLE EASTERN PIPELINE CO	INDIANAPOLIS	MARION	Eagle Creek	2	Chlorine
PARAGON WWTP	PARAGON	MORGAN	Butler Creek - White River	2	Nitrogen

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
PARKER CITY MUNICIPAL WWTP	PARKER CITY	RANDOLPH	Muncie Creek - White River	9	BOD, Chlorine, E coli, TSS
PAWS INC	ALBANY	DELAWARE	Muncie Creek - White River	12	BOD, E coli, Nitrogen, DO, TSS
PEERLESS PUMP	INDIANAPOLIS	MARION	Fall Creek	1	Not Listed
PERRY ELEMENTARY SCHOOL WWTP	SELMA	DELAWARE	Muncie Creek - White River	12	E coli, Nitrogen, DO, TSS
PETRO STOPPING CENTER 74	GASTON	DELAWARE	Pipe Creek	12	BOD, E coli, Nitrogen, DO, TSS
PINE RIDGE MOBILE HOME PARK	ZIONSVILLE	BOONE	Eagle Creek	11	BOD, Nitrogen, TSS
PIPE CREEK REST PARK 169	GASTON	DELAWARE	Pipe Creek	12	pH, E coli, Nitrogen
PITTSBORO WWTP	PITTSBORO	HENDRICKS	White Lick Creek	1	E coli
PLAINFIELD MUNICIPAL WATERWRKS	PLAINFIELD	HENDRICKS	White Lick Creek	n/a	
PLAINFIELD SOUTH WWTP, TOWN OF	PLAINFIELD	HENDRICKS	White Lick Creek	7	E coli
PLAINFIELD WATER POLLUTION CONTROL FACILITY	PLAINFIELD	HENDRICKS	White Lick Creek	1	E coli
POLLUTION ABATEMENT FACILITY	AVON	HENDRICKS	White Lick Creek	5	BOD, COD, Oil, Grease, pH, TSS

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
PORTER ENGINEERED SYSTEMS INC	WESTFIELD	HAMILTON	Crooked Creek - White River	1	Not Listed
PROPORTION AIR INC	MCCORDSVILLE	HANCOCK	Geist Reservoir - Fall Creek	11	BOD, E coli, DO, Trichloroethene
QEPI @ SJC BELLEVILLE MARATHON	BELLEVILLE	HENDRICKS	White Lick Creek	3	Benzene
QUEMETCO INC	INDIANAPOLIS	MARION	White Lick Creek	n/a	
QUIET ACRES MOBILE HOME PARK	SELMA	DELAWARE	Muncie Creek - White River	12	BOD, E coli, Nitrogen, DO
RAY BROTHERS & NOBLE CANNING C	HOBBS	TIPTON	Cicero Creek	3	pH
REALM	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
RED GOLD INC. - ORESTES	ORESTES	MADISON	Pipe Creek	12	Oil, Grease
REXNORD LINK BELT BEARIND DIV	INDIANAPOLIS	MARION	White Lick Creek	6	Water Temperature
RIVER AVENUE QUARRY & MINE	NOBLESVILLE	HAMILTON	Stony Creek - White River	1	TSS
ROLLING VISTA ESTATES	FIVE POINTS	MARION	Clear Creek - White River	9	BOD, Chlorine, E coli, Nitrogen, DO, TSS
ROLLS ROYCE CORP	INDIANAPOLIS	MARION	Pleasant Run - White River	1	Chlorine



<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
ROSS SAND CASTING INDUSTRIES, INC. - PLANT 3	WINCHESTER	RANDOLPH	Muncie Creek - White River	3	pH, Water Temperature
ROYAL FOOD PRODUCTS LLC	INDIANAPOLIS	MARION	Pleasant Run - White River	5	Oil, Grease, Water Temperature, pH
RUBY HILLS MOBILE HOME PARK	MARTINSVILLE	MORGAN	Lambs Creek - White River	12	BOD, Chlorine, E coli, Nitrogen, DO, TSS
SCHAFFER POWDER COATING, INC.	INDIANAPOLIS	MARION	Crooked Creek - White River	5	pH, Volatiles, Zinc
SHADELAND COMMERCE CENTER	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
SHADY HILLS UTILITY COMPANY, INC	INDIANAPOLIS	MARION	Eagle Creek	10	BOD, E coli, Nitrogen, Phosphorus, TSS
SHELL RETAIL GASOLINE STATION	WESTFIELD	HAMILTON	Crooked Creek - White River	n/a	
SHENANDOAH MIDDLE & HS	MIDDLETOWN	HENRY	Geist Reservoir - Fall Creek	8	E coli, Nitrogen, TSS
SHERIDAN WWTP	SHERIDAN	HAMILTON	Cicero Creek	n/a	
SOUTHERN MADISON UTILITIES WTP	LAPEL	MADISON	Fall Creek	n/a	
SPEEDWAY STATION #7770	INDIANAPOLIS	MARION	Pleasant Run - White River	1	Not Listed
SPEEDWAY STORE 7771	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
SPEEDWAY SUPERAMERICA STORE NO. 6124	INDIANAPOLIS	MARION	White Lick Creek	1	Benzene
SPEEDWAY WATER WORKS	SPEEDWAY	MARION	Eagle Creek	n/a	
SPEEDWAY WWTP	SPEEDWAY	MARION	Eagle Creek	10	BOD, Chlorine, Cyanide, E coli, Nitrogen, TSS
SPEEDWAY 5489	INDIANAPOLIS	MARION	Pleasant Run - White River	n/a	
SPEEDWAY 6014	MARTINSVILLE	MORGAN	Lambs Creek - White River	n/a	
SPEEDWAY 6136	INDIANAPOLIS	MARION	Pleasant Run - White River	1	Not Listed
SPEEDWAY 7887	INDIANAPOLIS	MARION	Crooked Creek - White River	n/a	
ST JOHNS EVANGELICAL LUTHERAN	INDIANAPOLIS	MARION	Pleasant Run - White River	9	BOD, E coli, Nitrogen, DO, TSS
STEEL DYNAMICS BAR PRODUCTS DI	PITTSBORO	HENDRICKS	White Lick Creek	3	Zinc
STOKELY-VAN CAMP INC	TIPTON	TIPTON	Cicero Creek	n/a	
SUBURBAN ESTATES MHP	NOBLESVILLE	HAMILTON	Stony Creek - White River	12	pH, Chlorine, E coli, Nitrogen, TSS
SUMMIT SPRINGS REGIONAL WASTE DISTRICT WWTP	MT. SUMMIT	HENRY	Buck Creek - White River	10	E coli, Nitrogen

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
SUMMITVILLE MUNICIPAL WWTP	SUMMITVILLE	MADISON	Pipe Creek	7	pH, BOD, TSS
TALL TIMBERS MOBILE HOME PARK	NOBLESVILLE	HAMILTON	Stony Creek - White River	10	BOD, Chlorine, E coli, Nitrogen, DO, TSS
TEPPCO INDIANAPOLIS TERMINAL	INDIANAPOLIS	MARION	Eagle Creek	1	Lead
TIPTON COUNTY LANDFILL	TIPTON	TIPTON	Cicero Creek	2	Iron
TIPTON WWTP	TIPTON	TIPTON	Cicero Creek	6	pH, E coli, Nitrogen, TSS
TRAFALGAR MUNICIPAL WWTP	TRAFALGAR	JOHNSON	Clear Creek - White River	5	Nitrogen
TRAVEL CENTERS OF AMERICA AUTO/TRUCK PLZ	CLAYTON	HENDRICKS	White Lick Creek	8	BOD, Chlorine, E coli, Nitrogen, TSS
TW MOSES PLANT	INDIANAPOLIS	MARION	Eagle Creek	1	TSS
VILLAGE PANTRY STATION 532	MUNCIE	DELAWARE	Buck Creek - White River	2	Benzene
VILLAGE PANTRY 467	WINCHESTER	RANDOLPH	Muncie Creek - White River	2	Benzene
VILLAGE PANTRY 471	ZIONSVILLE	BOONE	Eagle Creek	n/a	
WES-DEL JR-SR HIGH SCHOOL	GASTON	DELAWARE	Killbuck Creek - White River	12	BOD, Chlorine, Nitrogen, DO, TSS
WEST CENTRAL CONSERVANCY DIST	AVON	HENDRICKS	White Lick Creek	11	BOD, E coli, Nitrogen, DO, TSS

<b>DISCHARGER</b>	<b>CITY</b>	<b>COUNTY</b>	<b>10-Digit HUC Watershed</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>	<b>VIOLATION</b>
WESTFIELD - WESTSIDE WWTP	WESTFIELD	HAMILTON	Eagle Creek	2	BOD, Phosphorus
WESTFIELD WWTP	WESTFIELD	HAMILTON	Crooked Creek - White River	1	Not Listed
WHITE RIVER NORTH PLT	CARMEL	HAMILTON	Crooked Creek - White River	1	TSS
WHITE RIVER QUARRY	WAVERLY	MARION	Eagle Creek	n/a	
WHITE RIVER STATION PLANT	INDIANAPOLIS	MARION	Fall Creek	2	Chlorine, TSS
WHITESTOWN WWTP	WHITESTOWN	BOONE	Eagle Creek	8	E coli, DO, Phosphorus, TSS
WILDWOOD SHORES DEVELOPMENT	CAMBY	MARION	Clear Creek - White River	4	BOD, E coli, Nitrogen, TSS
WINCHESTER WWTP	WINCHESTER	RANDOLPH	Muncie Creek - White River	7	Chlorine, E coli
YORKTOWN WWTP	YORKTOWN	DELAWARE	Killbuck Creek - White River	2	Chlorine
ZIONSVILLE WWTP	ZIONSVILLE	BOONE	Eagle Creek	3	E coli, TSS

## **Appendix III**

### **NPDES Non-Compliance by Subwatershed**

<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
Buck Creek - White River	COWAN ELEM & HIGH SCHOOL	12
Buck Creek - White River	SUMMIT SPRINGS REGIONAL WASTE DISTRICT WWTP	10
Buck Creek - White River	VILLAGE PANTRY STATION 532	2
Butler Creek - White River	GOSPORT MUNICIPAL STP	2
Butler Creek - White River	PARAGON WWTP	2
Cicero Creek	ARCADIA WWTP	7
Cicero Creek	ATLANTA WWTP	10
Cicero Creek	GAS AMERICA HINKLE CREEK	7
Cicero Creek	RAY BROTHERS & NOBLE CANNING	3
Cicero Creek	SHERIDAN WWTP	n/a
Cicero Creek	STOKELY-VAN CAMP INC	n/a
Cicero Creek	TIPTON COUNTY LANDFILL	2
Cicero Creek	TIPTON WWTP	6
Clear Creek - White River	BARGERSVILLE MUNICIPAL WWTP	9
Clear Creek - White River	MAPLE GROVE MOBILE HOME PARK	12
Clear Creek - White River	MAPLETURN UTILITIES INC.	5
Clear Creek - White River	OAK HILLS WWTP	n/a
Clear Creek - White River	OAK MEADOWS MOBILE HOME COMMUNITY	6
Clear Creek - White River	ROLLING VISTA ESTATES	9
Clear Creek - White River	TRAFALGAR MUNICIPAL WWTP	5
Clear Creek - White River	WILDWOOD SHORES DEVELOPMENT	4
Crooked Creek - White River	BP PRODUCTS NA INC. - 10117	1
Crooked Creek - White River	CARMEL WWTP	5
Crooked Creek - White River	FISHERS CHEENEY CREEK WWTP	8
Crooked Creek - White River	FORMER CALUMET ASPHALT PAVING	1
Crooked Creek - White River	MARTIN MARIETTA NORTH INDPLS	7
Crooked Creek - White River	PORTER ENGINEERED SYSTEMS INC	1



<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
Crooked Creek - White River	SCHAFFER POWDER COATING, INC.	5
Crooked Creek - White River	SHELL RETAIL GASOLINE STATION	n/a
Crooked Creek - White River	SPEEDWAY 7887	n/a
Crooked Creek - White River	WESTFIELD WWTP	1
Crooked Creek - White River	WHITE RIVER NORTH PLT	1
Duck Creek	ELWOOD UTILITIES STP	12
Duck Creek	EX-CELL-O CORP. AEROSPACE DIV.	n/a
Eagle Creek	ASPHALT MATERIALS INC	n/a
Eagle Creek	BP AMOCO INDPLS TERMINAL	n/a
Eagle Creek	BUCKEYE PIPELINE COMPANY	n/a
Eagle Creek	BUCKEYE TERM INDIANAPOLIS TERM	4
Eagle Creek	BUCKEYE TERMINAL LLC RACEWAY	5
Eagle Creek	BUCKEYE TERMINALS LLC ZIONSVIL	2
Eagle Creek	CLAY TOWNSHIP RWD - MICHIGAN RD WWTP	5
Eagle Creek	COUNTRYMARK JOLITVILLE TERMINAL	12
Eagle Creek	CVS PHARMACY #6557	n/a
Eagle Creek	DAIMLERCHRYSLER COMPANY, LLC	1
Eagle Creek	DOW CHEMICAL CO. ZIONSVILLE	1
Eagle Creek	EAGLETOWN ESTATES MOBILE HOME	5
Eagle Creek	EAGLETOWN/LITTLE EAGLE CREEK ESTATES	8
Eagle Creek	MARATHON PETROLEUM CO - CLERMONT	5
Eagle Creek	MARATHON PETROLEUM CO. LLC - INDIANAPOLIS	3
Eagle Creek	NUSTAR TERMINALS OPERATIONS PARTNERSHIP L.P.	5
Eagle Creek	PANHANDLE EASTERN PIPELINE CO	2
Eagle Creek	PINE RIDGE MOBILE HOME PARK	11

<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
Eagle Creek	SHADY HILLS UTILITY COMPANY, INC	10
Eagle Creek	SPEEDWAY WATER WORKS	n/a
Eagle Creek	SPEEDWAY WWTP	10
Eagle Creek	TEPPCO INDIANAPOLIS TERMINAL	1
Eagle Creek	TW MOSES PLANT	1
Eagle Creek	VILLAGE PANTRY 471	n/a
Eagle Creek	WESTFIELD - WESTSIDE WWTP	2
Eagle Creek	WHITE RIVER QUARRY	n/a
Eagle Creek	WHITESTOWN WWTP	8
Eagle Creek	ZIONSVILLE WWTP	3
Fall Creek	CITIZENS GAS & COKE UTILITY	1
Fall Creek	FALL CREEK PLANT	n/a
Fall Creek	GEIST STATION	1
Fall Creek	PEERLESS PUMP	1
Fall Creek	SOUTHERN MADISON UTILITIES WTP	n/a
Fall Creek	WHITE RIVER STATION PLANT	2
Geist Reservoir - Fall Creek	BARRINGTON ESTATES WWTP	4
Geist Reservoir - Fall Creek	FALL CREEK RSD WWTP	7
Geist Reservoir - Fall Creek	FLATFORK CREEK WWTP	n/a
Geist Reservoir - Fall Creek	FORTVILLE MUNICIPAL WWTP	12
Geist Reservoir - Fall Creek	GASAMERICA 80	10
Geist Reservoir - Fall Creek	IMI MCCORDSVILLE	1
Geist Reservoir - Fall Creek	IMI/PENDLETON	n/a
Geist Reservoir - Fall Creek	LUCENT TECHNOLOGIES INC	12
Geist Reservoir - Fall Creek	MCCORDSVILLE MUNICIPAL WWTP	7
Geist Reservoir - Fall Creek	MIDDLETOWN WWTP	10
Geist Reservoir - Fall Creek	PROPORTION AIR INC	11
Geist Reservoir - Fall Creek	SHENANDOAH MIDDLE & HS	8
Indian Creek	BROWN COUNTY WATER UTILITY	7
Indian Creek	MORGANTOWN WWTP	7

<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
Killbuck Creek - White Rive	ANDERSON WWTP	11
Killbuck Creek - White Rive	BALL STATE UNIV COAL PILE	8
Killbuck Creek - White Rive	BORG WARNER DTP, INC.	6
Killbuck Creek - White Rive	BUCKEYE TERMINALS LLC MUNCIE	12
Killbuck Creek - White Rive	CHESTERFIELD CSS	n/a
Killbuck Creek - White Rive	IMI ANDERSON	n/a
Killbuck Creek - White Rive	MARATHON ASHLAND MUNCIE TERM	7
Killbuck Creek - White Rive	MOUNT PLEASANT UTILITIES LLC	8
Killbuck Creek - White Rive	MUNCIE WWTP	5
Killbuck Creek - White Rive	WES-DEL JR-SR HIGH SCHOOL	12
Killbuck Creek - White Rive	YORKTOWN WWTP	2
Lambs Creek - White River	HIGHLAND LAKES BAPTIST CHURCH	4
Lambs Creek - White River	HYDRAULIC PRESS BRICK COMPANY	n/a
Lambs Creek - White River	IPALCO EAGLE VALLEY STATION	n/a
Lambs Creek - White River	MARATHON TOBACCO ROAD	n/a
Lambs Creek - White River	MARTINSVILLE WWTP	6
Lambs Creek - White River	MONROVIA MUNICIPAL WWTP	6
Lambs Creek - White River	MORGAN COUNTY RURAL WATER CORP	1
Lambs Creek - White River	RUBY HILLS MOBILE HOME PARK	12
Lambs Creek - White River	SPEEDWAY 6014	n/a
Muncie Creek - White River	ANR PIPELINE COMPANY	1
Muncie Creek - White River	FARMLAND MUNICIPAL STP	12
Muncie Creek - White River	IMI IRVING BROS STONE & GRAVEL	n/a
Muncie Creek - White River	MODOC, TOWN OF	12
Muncie Creek - White River	PARKER CITY MUNICIPAL WWTP	9
Muncie Creek - White River	PAWS INC	12
Muncie Creek - White River	PERRY ELEMENTARY SCHOOL WWTP	12
Muncie Creek - White River	QUIET ACRES MOBILE HOME PARK	12

<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
Muncie Creek - White River	ROSS SAND CASTING INDUSTRIES, INC. - PLANT 3	3
Muncie Creek - White River	VILLAGE PANTRY 467	2
Muncie Creek - White River	WINCHESTER WWTP	7
Pipe Creek	ALEXANDRIA WWTP	6
Pipe Creek	FRANKTON WWTP	n/a
Pipe Creek	GASTON WATER TREATMENT PLANT	1
Pipe Creek	GASTON WWTP, TOWN OF	9
Pipe Creek	I69 AUTO TRUCK PLAZA	12
Pipe Creek	KENNEDY ENTERPRISES, INC.	11
Pipe Creek	PETRO STOPPING CENTER 74	12
Pipe Creek	PIPE CREEK REST PARK I69	12
Pipe Creek	RED GOLD INC. - ORESTES	12
Pipe Creek	SUMMITVILLE MUNICIPAL WWTP	7
Pleasant Run - White River	ADMIRAL PETROLEUM	2
Pleasant Run - White River	AIT LABORATORIES	n/a
Pleasant Run - White River	AMERICAN UNITED LIFE TOWER	11
Pleasant Run - White River	CITIZENS THERMAL ENERGY, PERRY K	5
Pleasant Run - White River	CONSECO FIELDHOUSE	1
Pleasant Run - White River	ELI LILLY & COMPANY - LILLY TECHNOLOGY CENTER	2
Pleasant Run - White River	HANSON AGG HARDING PLANT 554	n/a
Pleasant Run - White River	INDIANAPOLIS BELMONT AND SOUTHPORT ADVNCD WTP	7
Pleasant Run - White River	INTERNATIONAL TRUCK AND ENGINE CORP	3
Pleasant Run - White River	IPALCO HARDING ST STATION	n/a
Pleasant Run - White River	KENTUCKY AVE M MARTIN MARIETTA	n/a
Pleasant Run - White River	KURTS FOOD MART	2

<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
Pleasant Run - White River	MARTIN MARIETTA MATERIALS-BELMONT SAND PLANT	n/a
Pleasant Run - White River	REALM	n/a
Pleasant Run - White River	ROLLS ROYCE CORP	1
Pleasant Run - White River	ROYAL FOOD PRODUCTS LLC	5
Pleasant Run - White River	SHADELAND COMMERCE CENTER	n/a
Pleasant Run - White River	SPEEDWAY STATION #7770	1
Pleasant Run - White River	SPEEDWAY STORE 7771	n/a
Pleasant Run - White River	SPEEDWAY 5489	n/a
Pleasant Run - White River	SPEEDWAY 6136	1
Pleasant Run - White River	ST JOHNS EVANGELICAL LUTHERAN	9
Stony Creek - White River	BRIDGESTONE/FIRESTONE INDUSTRIAL PRODUCTS	2
Stony Creek - White River	BURCO MOLDING, INC.	7
Stony Creek - White River	CICERO MUNICIPAL WWTP	9
Stony Creek - White River	DUKE ENERGY CORP NOBLESVILLE GEN. STATION	4
Stony Creek - White River	IMI STONY CREEK STONE CO	n/a
Stony Creek - White River	INDIANA AMERICAN WATER CO	3
Stony Creek - White River	LAPEL WWTP	8
Stony Creek - White River	NOBLESVILLE LANDFILL INC	n/a
Stony Creek - White River	NOBLESVILLE WWTP, CITY OF	8
Stony Creek - White River	OWENS BROCKWAY GLASS CONTAINER	2
Stony Creek - White River	RIVER AVENUE QUARRY & MINE	1
Stony Creek - White River	SUBURBAN ESTATES MHP	12
Stony Creek - White River	TALL TIMBERS MOBILE HOME PARK	10
White Lick Creek	AMOCO STATION 10067	n/a
White Lick Creek	ASHBURY RIDGE MOBILE HOME CRT	7
White Lick Creek	BELLEVILLE WWTP	8
White Lick Creek	BROOKLYN MUNICIPAL STP	11
White Lick Creek	BROWNSBURG PUBLIC WATER SUPPLY	n/a
White Lick Creek	BROWNSBURG WWTP	8

<b>10-Digit HUC Watershed</b>	<b>DISCHARGER</b>	<b>Quarters of Non-Compliance (out of 12 qtrs - as of Jan-Mar 09)</b>
White Lick Creek	COUNTRY VIEW ESTATES	3
White Lick Creek	DANVILLE, TOWN OF	2
White Lick Creek	DEER PATH UTILITIES INC	8
White Lick Creek	EASTERN HENDRICKS CO UTILITY	10
White Lick Creek	ECHO LAKE LLC	11
White Lick Creek	HENDRICKS CO RSD RACEWAY PLAZA	10
White Lick Creek	INDIANAPOLIS INTERNATIONAL AIRPORT	10
White Lick Creek	INDIANAPOLIS W 70 TRAVEL PLAZA	8
White Lick Creek	JOHN M WOOLEY LUMBER CO INC	2
White Lick Creek	LIBERTY WATER COMPANY	4
White Lick Creek	MOORESVILLE, TOWN OF	2
White Lick Creek	NICE-PAK PRODUCTS, INC.	n/a
White Lick Creek	OAKHURST MOBILE HOME PARK	8
White Lick Creek	PITTSBORO WWTP	1
White Lick Creek	PLAINFIELD MUNICIPAL WATERWRKS	n/a
White Lick Creek	PLAINFIELD SOUTH WWTP, TOWN OF	7
White Lick Creek	PLAINFIELD WATER POLLUTION CONTROL FACILITY	1
White Lick Creek	POLLUTION ABATEMENT FACILITY	5
White Lick Creek	QEPI @ SJC BELLEVILLE MARATHON	3
White Lick Creek	QUEMETCO INC	n/a
White Lick Creek	REXNORD LINK BELT BEARIND DIV	6
White Lick Creek	SPEEDWAY SUPERAMERICA STORE NO. 6124	1
White Lick Creek	STEEL DYNAMICS BAR PRODUCTS DI	3
White Lick Creek	TRAVEL CENTERS OF AMERICA AUTO/TRUCK PLZ	8
White Lick Creek	WEST CENTRAL CONSERVANCY DIST	11



## **Appendix IV**

### **Water and Wastewater Providers and Source of Data**

<b>Service Providers</b>			
<b>County</b>	<b>Municipality</b>	<b>Provider</b>	<b>Source</b>
Boone County			
	Whitestown		
	Zionsville	Indianapolis Water (parts)	2009-Ind. Water Website
		Town of Zionsville Wastewater Dept.	2003-Comp Plan
Brown County			
Clinton County			
Delaware County			
	Daleville		
	Gaston		
	Muncie	Indiana-American Water	
		Muncie Sanitary District	1999-Comp Plan, Muncie San. Dist. Website, Muncie San. District-2009
	Yorktown	Town of Yorktown	Brad Eaton @ Butler, Fairman, & Siefert
		Town of Yorktown	Brad Eaton @ Butler, Fairman, & Siefert
Grant County			
Hamilton County			
	Arcadia		
	Atlanta		
	Carmel	Indianapolis Water (parts)	2009-Ind. Water Website
		City of Carmel Water-Wastewater Utilities (majority)	Pat Rigdon
		City of Carmel Water-Wastewater Utilities	Pat Rigdon
		Clay Township Regional Wastewater District	2009 Master Plan Update + GIS files from Jeff Martin
	Cicero	Town of Cicero	Town of Cicero
		Town of Cicero	Town of Cicero
	Fishers	Indianapolis Water (parts)	2009-Ind. Water Website
		Town of Fishers (central portions W of Lantern Rd. & S of I26th St. )	2008-Town of Fishers GIS
		Hamilton Southeastern Utilities (majority)	2007-HSE Master Plan

<b>Table 4.4.I Service Providers (cont)</b>			
<b>County</b>	<b>Municipality</b>	<b>Provider</b>	<b>Source</b>
	Noblesville	Indianapolis Water (parts)	2009-Ind. Water Website
		Indiana American Water (parts)	
		City of Noblesville (contact GIS Dept. 317-776-6353)	Town of Noblesville
		Hamilton Southeastern Utilities (parts)	2007-HSE Master Plan
	Sheridan	Town of Sheridan	
		Town of Sheridan	
	Westfield	Westfield Public Works (parts)	Leane Welsch (City)
		Town of Westfield (parts)	2007 Westfield-Wash. Twp. Comp Plan, Leane Welsch (City)
<b>Hancock County</b>			
	Fortville	Town of Fortville (Street & Distribution Department)	
		Town of Fortville (Sewer Maintenance Division)	
	McCordsville	Hancock County GIS	John Milburn-Hancock County GIS Coord.
		McCordsville Public Works	San. Sewer Master Plan 2006, John Milburn-Hancock Country GIS Coord.
<b>Hendricks County</b>			
	Avon	Indianapolis Water (parts)	2009-Ind. Water Website
		West Central Conservancy District	John Arnold/Debbie Sillery WCCD
	Brownsburg		
	Danville		
	Pittsboro		
	Plainfield	Public Works	Butler, Fairman and Seufert, Inc.
		Public Works	Butler, Fairman and Seufert, Inc.
<b>Henry County</b>			
	Middletown		
	Mount Summit		
	Springport		
	Sulphur Springs		

<b>Table 4.4.I Service Providers (cont)</b>			
<b>County</b>	<b>Municipality</b>	<b>Provider</b>	<b>Source</b>
Johnson County			Johnson County GIS Dept.
	Bargersville	Town of Bargersville	
		Town of Bargersville	
	Greenwood		
	Trafalgar		
Madison County			
	Alexandria		
	Anderson	City of Anderson	City of Anderson
		City of Anderson	City of Anderson
	Chesterfield		
	Elwood		
	Frankton		
	Ingalls		
	Lapel		
	Markleville		
	Pendleton		
Marion County			
	Beech Grove		
	Clermont		
	Indianapolis	Indianapolis Water	2009-Ind. Water Website, Mitch Osika @ IMAGIS 2009
		City of Indianapolis Public Works	Mitch Osika @ IMAGIS 2009
	Lawrence	Lawrence Utilities	City of Lawrence
		Lawrence Utilities	City of Lawrence
	Speedway		
Monroe County			
Morgan County			
	Bethany		
	Brooklyn		
	Lake Hart		
	Martinsville		
	Mooresville		
	Morgantown		
	Paragon		

<b>Table 4.4.I Service Providers (cont)</b>			
<b>County</b>	<b>Municipality</b>	<b>Provider</b>	<b>Source</b>
Owen County			
	Gosport		
Randolph County			
	Farmland		
	Parker City		
	Winchester	Indiana American Water	
		City of Winchester	Winchester WWTP (Chris Martin)
Tipton County			
	Tipton		
<b>KEY</b>			
	Water		
	Sanitary Sewer		
SA = Service Area			

**Appendix V**

**Significant Water Withdrawal Facilities**



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Power & Light Company	00475	EP	INTAKE	50 60	2008	35338000	Pleasant Run - White River
49	Indianapolis Department of Waterworks	01377	PS	INTAKE	1	2008	25059200	Fall Creek
55	Indianapolis Power & Light Company	00476	EP	INTAKE	6	2008	21979000	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	INTAKE	5	2008	16409000	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	INTAKE	4	2008	13355000	Lambs Creek - White River
49	Citizens Thermal Energy	00473	EP	INTAKE	1	2008	13190000	Pleasant Run - White River
55	Indianapolis Power & Light Company	00476	EP	INTAKE	3	2008	7956000	Lambs Creek - White River
49	Indianapolis Department of Waterworks	01378	PS	INTAKE	1	2008	6312600	Fall Creek
29	Indianapolis Department of Waterworks	03422	PS	INTAKE	1	2008	4385700	Crooked Creek - White River
49	Indianapolis Department of Waterworks	01379	PS	INTAKE	1	2008	3885400	Eagle Creek
18	Indiana-American Water Company, Inc.	02364	PS	INTAKE	1	2008	2785007	Muncie Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	IMI/McCordsville	02432	IN	INTAKE	1	2008	1894700	Geist Reservoir - Fall Creek
48	IMI/Pendleton	02440	IN	INTAKE	2	2008	1544700	Geist Reservoir - Fall Creek
49	Indianapolis Power & Light Company	00475	EP	INTAKE	3-4	2008	1510000	Pleasant Run - White River
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	2A	2008	1393300	Stony Creek - White River
49	Eli Lilly & Company	01004	IN	WELL	8	2008	1072400	Pleasant Run - White River
29	Indiana-American Water Company, Inc.	04181	PS	WELL	1	2008	1037882	Stony Creek - White River
49	Hanson Aggregates Midwest, Inc.	02013	IN	INTAKE	4	2008	878400	Pleasant Run - White River
29	Stony Creek Stone Company	02709	IN	INTAKE	3	2008	849700	Stony Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	3	2008	839100	Crooked Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	2	2008	802100	Crooked Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-13	2008	794200	Pleasant Run - White River
41	Indiana-American Water Company, Inc.	04148	PS	WELL	WRE1	2008	712400	Clear Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	4	2008	688500	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-16	2008	662000	Pleasant Run - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-10	2008	650500	Pleasant Run - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	2A	2008	650300	Crooked Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	3B	2008	648400	Crooked Creek - White River
29	Town of Westfield	02731	PS	WELL	8	2008	636100	Stony Creek - White River
29	Carmel Municipal Water	04109	PS	WELL	20	2008	612390	Crooked Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-02	2008	575600	Pleasant Run - White River
29	Martin Marietta Materials, Inc.	04326	IN	INTAKE	4	2008	574100	Crooked Creek - White River
41	Indiana-American Water Company, Inc.	04148	PS	WELL	WRE2	2008	573000	Clear Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-11	2008	570400	Pleasant Run - White River
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC18	2008	560400	Fall Creek
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	6	2008	547400	Stony Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
55	Hydraulic Press Brick	00717	IN	INTAKE	1A	2008	524900	White Lick Creek
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-18	2008	518900	Pleasant Run - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-07	2008	518600	Pleasant Run - White River
29	Town of Westfield	02731	PS	WELL	5	2008	516600	Stony Creek - White River
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWf-7	2008	515800	Fall Creek
41	Bargersville Water Works	02307	PS	WELL	9	2008	507100	Clear Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-15	2008	489100	Pleasant Run - White River
29	Martin Marietta Materials, Inc.	04326	IN	INTAKE	1	2008	473300	Crooked Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-03	2008	468800	Pleasant Run - White River
29	Town of Westfield	02731	PS	WELL	6	2008	458400	Stony Creek - White River
49	Martin Marietta Materials, Inc.	01914	IN	INTAKE	2	2008	457100	Pleasant Run - White River
49	Indianapolis Department of	03054	PS	WELL	SWF-12	2008	455100	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
	Waterworks							
55	Indianapolis Power & Light Company	00476	EP	WELL	4	2008	448000	Lambs Creek - White River
48	Anderson Water Department	00863	PS	WELL	2	2008	446200	Killbuck Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	3A	2008	438500	Crooked Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-01	2008	437000	Pleasant Run - White River
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC11	2008	436700	Fall Creek
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-08	2008	428700	Pleasant Run - White River
29	Bridgeston American Tire Operations	03688	MI	WELL	EW-4	2008	401200	Stony Creek - White River
18	Irving Bros Stone & Gravel	02710	IN	INTAKE	1	2008	399600	Muncie Creek - White River
29	Bridgeston American Tire Operations	03688	MI	WELL	EW-5	2008	398000	Stony Creek - White River
48	Anderson Water Department	00864	PS	WELL	1E	2008	397500	Killbuck Creek - White River
48	Anderson Water Department	00864	PS	WELL	1R	2008	389200	Killbuck Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-06	2008	371600	Pleasant Run - White River
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC2	2008	367700	Fall Creek
49	Town of Speedway	00300	PS	INTAKE	1	2008	358400	Eagle Creek
29	Carmel Municipal Water	00041	PS	WELL	22	2008	358140	Crooked Creek - White River
55	Ozark Fisheries Company, Inc.	03557	RU	INTAKE	CK	2008	353200	Clear Creek - White River
49	City of Lawrence Utilities	03396	PS	WELL	12	2008	337890	Fall Creek
29	Town of Westfield	02731	PS	WELL	12	2008	335300	Stony Creek - White River
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	3A	2008	332500	Stony Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS7	2008	331600	Pleasant Run - White River
29	Town of Westfield	02731	PS	WELL	7	2008	331600	Stony Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RSC	2008	318200	Fall Creek
29	Indiana-American Water Company, Inc.	00569	PS	WELL	2	2008	317880	Stony Creek - White River



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	McIntire Concrete Inc.	04421	IN	INTAKE	P-2	2008	315360	Killbuck Creek - White River
49	City of Lawrence Utilities	02670	PS	WELL	10	2008	314520	Fall Creek
29	Carmel Municipal Water	04109	PS	WELL	14	2008	312528	Crooked Creek - White River
49	Martin Marietta Materials, Inc.	03125	IN	INTAKE	1	2008	289100	Pleasant Run - White River
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-6	2008	285100	Fall Creek
55	City of Martinsville	02628	PS	WELL	3	2008	284910	Lambs Creek - White River
29	Town of Westfield	02731	PS	WELL	9	2008	284800	Stony Creek - White River
29	Town of Westfield	02731	PS	WELL	10	2008	277100	Stony Creek - White River
29	Duke Energy Indiana	01151	EP	INTAKE	1	2008	265700	Stony Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-19	2008	263000	Pleasant Run - White River
48	Anderson Water Department	00863	PS	WELL	1	2008	248500	Killbuck Creek - White River
29	Indianapolis Department of Waterworks	04673	PS	WELL	WRN 4	2008	245600	Cicero Creek
29	Indianapolis Department of Waterworks	04673	PS	WELL	WRN 5	2008	241300	Cicero Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	Indiana-American Water Company, Inc.	02364	PS	WELL	9	2008	240034	Muncie Creek - White River
49	City of Lawrence Utilities	00010	PS	WELL	1	2008	238950	Fall Creek
49	American United Life Insurance Company	00366	EP	WELL	1E	2008	238440	Pleasant Run - White River
41	Bargersville Water Works	02307	PS	WELL	7	2008	234700	Clear Creek - White River
18	Indiana-American Water Company, Inc.	02364	PS	WELL	1	2008	232776	Muncie Creek - White River
32	Town of Plainfield	04631	PS	WELL	5	2008	231892	White Lick Creek
32	Town of Plainfield	04631	PS	WELL	6	2008	231892	White Lick Creek
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-4	2008	228400	Fall Creek
41	Indiana-American Water Company	03437	PS	WELL	1	2008	227500	Pleasant Run - White River
41	Indiana-American Water Company	03437	PS	WELL	2	2008	227500	Pleasant Run - White River
41	Bargersville Water Works	02307	PS	WELL	8	2008	227000	Clear Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	WR9	2008	226100	Fall Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	Indiana-American Water Company, Inc.	02364	PS	WELL	6	2008	225090	Muncie Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS9	2008	223700	Pleasant Run - White River
29	Town of Westfield	02731	PS	WELL	11	2008	215200	Stony Creek - White River
41	Indiana-American Water Company, Inc.	00565	PS	WELL	1M	2008	214800	Pleasant Run - White River
48	Anderson Water Department	00863	PS	WELL	8	2008	214000	Killbuck Creek - White River
49	Central Parking System	02747	MI	WELL	1	2008	207000	Pleasant Run - White River
49	Central Parking System	02747	MI	WELL	2	2008	207000	Pleasant Run - White River
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4 6	2008	205600	Clear Creek - White River
49	City of Lawrence Utilities	00010	PS	WELL	2	2008	200380	Fall Creek
49	City of Lawrence Utilities	03396	PS	WELL	9	2008	199400	Fall Creek
49	City of Lawrence Utilities	02670	PS	WELL	08	2008	198150	Fall Creek
29	Carmel Municipal Water	00040	PS	WELL	6	2008	198090	Crooked Creek - White River
55	Martin Marietta Materials, Inc.	03998	IN	INTAKE	1	2008	197900	Clear Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	4	2008	197400	Stony Creek - White River
49	Rolls-Royce Corporation	01894	IN	WELL	1B	2008	194000	Pleasant Run - White River
49	Rolls-Royce Corporation	01894	IN	WELL	2A	2008	194000	Pleasant Run - White River
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC8	2008	193700	Fall Creek
48	Anderson Water Department	00863	PS	WELL	3	2008	189300	Killbuck Creek - White River
29	Carmel Municipal Water	04109	PS	WELL	21	2008	189012	Crooked Creek - White River
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC5	2008	187700	Fall Creek
55	Brown County Water Utility Inc.	00224	PS	WELL	3	2008	187300	Indian Creek
48	Anderson Water Department	00863	PS	WELL	4	2008	187200	Killbuck Creek - White River
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	2	2008	187100	Stony Creek - White River
48	Anderson Water Department	00864	PS	WELL	5R	2008	185900	Killbuck Creek - White River
48	Elwood Water Utility	02557	PS	WELL	5	2008	184464	Duck Creek
29	Martin Marietta Materials, Inc.	04326	IN	INTAKE	2	2008	184100	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Martin Marietta Materials, Inc.	04326	IN	INTAKE	3	2008	184100	Crooked Creek - White River
29	Carmel Municipal Water	04109	PS	WELL	17	2008	182490	Crooked Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS27	2008	181700	Fall Creek
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC19	2008	180700	Fall Creek
29	Carmel Municipal Water	00040	PS	WELL	5	2008	180522	Crooked Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-05	2008	179500	Pleasant Run - White River
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC20	2008	179400	Fall Creek
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC21	2008	175700	Fall Creek
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4 5	2008	171200	Clear Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS2	2008	168500	Fall Creek
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	1	2008	167800	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
33	Irving Materials, Inc.	01261	IN	INTAKE	1L	2008	167475	Buck Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RSB	2008	165900	Crooked Creek - White River
49	American United Life Insurance Company	00366	EP	WELL	4S	2008	163400	Pleasant Run - White River
32	Town of Plainfield	00411	PS	WELL	1	2008	160805	White Lick Creek
55	City of Martinsville	02628	PS	WELL	4	2008	160233	Lambs Creek - White River
48	Alexandria Water Works	00002	PS	WELL	2	2008	158818	Pipe Creek
48	Elwood Water Utility	02369	PS	WELL	9	2008	158672	Duck Creek
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-3	2008	155400	Fall Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS17	2008	153700	Crooked Creek - White River
48	Alexandria Water Works	00002	PS	WELL	1	2008	152773	Pipe Creek
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-17	2008	151900	Pleasant Run - White River
55	Indiana-American Water Company	00037	PS	WELL	4	2008	150400	White Lick Creek
32	Town of Plainfield	00412	PS	WELL	3	2008	146475	White Lick Creek



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
32	Town of Plainfield	00412	PS	WELL	4	2008	146475	White Lick Creek
32	Town of Plainfield	00412	PS	WELL	7	2008	146475	White Lick Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	WR8	2008	145400	Fall Creek
49	Martin Marietta Materials, Inc.	03125	IN	INTAKE	10	2008	144400	Pleasant Run - White River
32	Town of Brownsburg	02589	PS	WELL	5	2008	143100	White Lick Creek
55	Martin Marietta Materials, Inc.	03998	IN	INTAKE	2	2008	143000	Clear Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS26	2008	139700	Fall Creek
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC7	2008	138700	Fall Creek
29	Carmel Municipal Water	04109	PS	WELL	19	2008	138276	Stony Creek - White River
29	Stony Creek Stone Company	02709	IN	INTAKE	1	2008	137000	Stony Creek - White River
32	Steel Dynamics, Inc,	04675	IN	WELL	1	2008	135300	White Lick Creek
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4 1	2008	129600	Clear Creek - White River
48	Ingalls Water Department	04579	PS	WELL	4	2008	128800	Geist Reservoir - Fall Creek
49	Indianapolis Department of Waterworks	00365	PS	WELL	FRW-1	2008	127800	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Willow Glen Apartments South	01833	EP	WELL	1	2008	126923	Pleasant Run - White River
41	Indiana-American Water Company, Inc.	00565	PS	WELL	2M	2008	126200	Pleasant Run - White River
48	Anderson Water Department	00864	PS	WELL	1N	2008	126000	Killbuck Creek - White River
48	Anderson Water Department	00864	PS	WELL	2N	2008	126000	Killbuck Creek - White River
32	Town of Brownsburg	00583	PS	WELL	1	2008	125800	White Lick Creek
29	Carmel Municipal Water	04109	PS	WELL	15	2008	125664	Crooked Creek - White River
48	Southern Madison Utilities	04749	PS	WELL	3	2008	125534	Fall Creek
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-1	2008	125200	Fall Creek
29	John Reppening	03104	IN	INTAKE	2	2008	124524	Stony Creek - White River
49	National Starch, LLC	00414	IN	WELL	RSP-15	2008	122723	Pleasant Run - White River
48	Anderson Water Department	00864	PS	WELL	2R	2008	122200	Killbuck Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-04	2008	120500	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Department of Waterworks	01377	PS	WELL	WR7	2008	119300	Fall Creek
48	Anderson Water Department	00864	PS	WELL	4R	2008	119200	Killbuck Creek - White River
55	Rogers Group Inc	02777	IN	INTAKE	1	2008	116000	Lambs Creek - White River
48	US Aggregates, Inc.	04644	IN	INTAKE	P-1	2008	115620	Pipe Creek
55	Brown County Water Utility Inc.	00224	PS	WELL	4	2008	114100	Indian Creek
68	Indiana-American Water Company	00038	PS	WELL	2A	2008	112710	Muncie Creek - White River
30	Town of Fortville	02071	PS	WELL	3	2008	112056	Geist Reservoir - Fall Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	WR3	2008	111600	Fall Creek
55	Morgan County Rural Water Company	00004	PS	WELL	3	2008	111526	Lambs Creek - White River
55	Morgan County Rural Water Company	00004	PS	WELL	4	2008	110554	Lambs Creek - White River
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-2	2008	110400	Fall Creek
49	City of Lawrence Utilities	02670	PS	WELL	09	2008	109850	Fall Creek
55	Hill Water Corporation	04004	PS	WELL	1	2008	109411	White Lick Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Anderson Water Department	00863	PS	WELL	5	2008	108300	Killbuck Creek - White River
48	Alexandria Water Works	00002	PS	WELL	3	2008	108197	Pipe Creek
30	Town of Fortville	02071	PS	WELL	2	2008	107313	Geist Reservoir - Fall Creek
55	Hill Water Corporation	04004	PS	WELL	2	2008	106682	White Lick Creek
29	Carmel Municipal Water	04109	PS	WELL	16	2008	106432	Crooked Creek - White River
48	Elwood Water Utility	02557	PS	WELL	3	2008	105440	Duck Creek
29	Sheridan Water Works	02244	PS	WELL	5	2008	104505	Cicero Creek
29	Indianapolis Department of Waterworks	04673	PS	WELL	WRN 6	2008	104000	Cicero Creek
41	Indiana-American Water Company, Inc.	00565	PS	WELL	10	2008	103900	Clear Creek - White River
55	Indiana-American Water Company	00037	PS	WELL	1ROBSN	2008	103600	White Lick Creek
49	City of Lawrence Utilities	02670	PS	WELL	11	2008	102460	Fall Creek
32	Town of Plainfield	00412	PS	WELL	2	2008	101620	White Lick Creek
32	Town of Plainfield	00412	PS	WELL	9	2008	101620	White Lick Creek
49	Central Parking System	02747	MI	WELL	3	2008	100000	Pleasant Run - White River
48	Ingalls Water Department	04579	PS	WELL	1	2008	96700	Geist Reservoir - Fall Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Ingalls Water Department	04579	PS	WELL	2	2008	96700	Geist Reservoir - Fall Creek
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-8	2008	94800	Fall Creek
48	IMI/Pendleton	02440	IN	INTAKE	1	2008	91300	Geist Reservoir - Fall Creek
48	Elwood Water Utility	02557	PS	WELL	4	2008	87456	Duck Creek
49	National Starch, LLC	00414	IN	WELL	14	2008	86130	Pleasant Run - White River
49	Indianapolis Power & Light Company	00475	EP	WELL	50-1	2008	85000	Pleasant Run - White River
29	Firestone Industrial Products	00420	IN	WELL	3A	2008	84997	Stony Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS22	2008	84300	Fall Creek
29	Town of Cicero Utilities	02306	PS	WELL	3	2008	81670	Stony Creek - White River
55	Brown County Water Utility Inc.	00224	PS	WELL	6	2008	81661	Indian Creek
48	Elwood Water Utility	02369	PS	WELL	10	2008	79893	Duck Creek
49	Indianapolis Marion County	00275	EP	WELL	3	2008	78840	Pleasant Run - White River
49	Indianapolis Department of Waterworks	00365	PS	WELL	FRW-4	2008	78800	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Carmel Municipal Water	04109	PS	WELL	18	2008	77868	Crooked Creek - White River
18	The Players Club Golf Course	03288	IR	INTAKE	1	2008	77000	Killbuck Creek - White River
32	Town of Brownsburg	00583	PS	WELL	3	2008	76500	White Lick Creek
29	Carmel Municipal Water	00041	PS	WELL	10	2008	75951	Crooked Creek - White River
18	Town of Yorktown	00204	PS	WELL	2	2008	75800	Buck Creek - White River
49	Indianapolis Department of Waterworks	00365	PS	WELL	FRW-3	2008	75800	Eagle Creek
32	Stafford Pointe Apartments	02850	EP	WELL	1	2008	73226	White Lick Creek
29	Carmel Municipal Water	00040	PS	WELL	7	2008	72472	Crooked Creek - White River
49	Martin Marietta Materials, Inc.	03125	IN	INTAKE	11	2008	72200	Pleasant Run - White River
49	Indianapolis Motor Speedway Golf Course	00180	IR	WELL	1	2008	72000	Eagle Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	RSA	2008	71400	Fall Creek
55	City of Martinsville	02628	PS	WELL	5	2008	70327	Lambs Creek - White River
32	Plainfield Educational Facility	00400	PS	WELL	1	2008	69220	White Lick Creek



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
32	Plainfield Educational Facility	00400	PS	WELL	2	2008	69220	White Lick Creek
49	Morning Side of College Park	02992	EP	WELL	1	2008	68103	Crooked Creek - White River
49	Town of Speedway	00300	PS	WELL	6	2008	68100	Eagle Creek
48	Town of Chesterfield	00277	PS	WELL	1	2008	65164	Killbuck Creek - White River
49	Martin Marietta Materials, Inc.	01914	IN	INTAKE	1	2008	64900	Pleasant Run - White River
48	Ingalls Water Department	04579	PS	WELL	3	2008	64300	Geist Reservoir - Fall Creek
48	Town of Edgewood	00019	PS	WELL	1	2008	63735	Killbuck Creek - White River
55	US Aggregates, Inc.	04389	IN	INTAKE	01	2008	63188	Clear Creek - White River
55	US Aggregates, Inc.	04389	IN	INTAKE	02	2008	63188	Clear Creek - White River
55	Ozark Fisheries Company, Inc.	03556	RU	INTAKE	LK 3	2008	62100	Indian Creek
48	Prairie Farms Dairy Products	00267	IN	WELL	1	2008	61960	Killbuck Creek - White River
49	American United Life Insurance Company	00366	EP	WELL	5W	2008	61910	Pleasant Run - White River
18	McIntire Concrete Inc.	04421	IN	INTAKE	P-1	2008	61668	Killbuck Creek - White River
32	Danville Water Company	00032	PS	WELL	3	2008	60610	White Lick Creek
32	Town of Brownsburg	02589	PS	WELL	6	2008	59500	White Lick Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Rolls-Royce Corporation	01895	IN	WELL	01	2008	57900	Eagle Creek
55	Indiana-American Water Company	00037	PS	WELL	3	2008	57700	White Lick Creek
32	Town of Brownsburg	02589	PS	WELL	4	2008	57600	White Lick Creek
55	Indiana-American Water Company	00037	PS	WELL	2	2008	57300	White Lick Creek
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-14	2008	57000	Pleasant Run - White River
55	Ozark Fisheries Company, Inc.	03556	RU	INTAKE	PD DAM	2008	55900	Indian Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS19	2008	55800	Crooked Creek - White River
68	Indiana-American Water Company	00038	PS	WELL	4A	2008	54986	Muncie Creek - White River
80	Tipton Municipal Water Utility	01646	PS	WELL	6	2008	54855	Cicero Creek
33	Town of Middletown	00799	PS	WELL	6	2008	54477	Geist Reservoir - Fall Creek
49	Coca-Cola Bottling Company of Indianapolis	04532	IN	WELL	1	2008	53700	Eagle Creek
49	Coca-Cola Bottling Company of Indianapolis	04532	IN	WELL	2	2008	53700	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Pendleton Municipal Water Utility	02163	PS	WELL	1	2008	53438	Geist Reservoir - Fall Creek
55	Mapleturn Utilities	02313	PS	WELL	1W	2008	53280	Clear Creek - White River
49	Town of Speedway	00300	PS	WELL	11	2008	53000	Eagle Creek
80	Tipton Municipal Water Utility	01646	PS	WELL	4	2008	52468	Cicero Creek
49	Indianapolis Power & Light Company	00475	EP	WELL	6-1	2008	52000	Pleasant Run - White River
32	Danville Water Company	00032	PS	WELL	4	2008	51831	White Lick Creek
80	Tipton Municipal Water Utility	01646	PS	WELL	7	2008	51324	Cicero Creek
48	Town of Chesterfield	00277	PS	WELL	4	2008	51020	Killbuck Creek - White River
33	Town of Middletown	00799	PS	WELL	5	2008	50932	Geist Reservoir - Fall Creek
41	Indiana-American Water Company, Inc.	00565	PS	WELL	20	2008	50900	Clear Creek - White River
18	Town of Yorktown	00204	PS	WELL	1	2008	50800	Buck Creek - White River
32	Danville Water Company	00032	PS	WELL	1	2008	50669	White Lick Creek
29	Town of Cicero Utilities	02306	PS	WELL	1	2008	50254	Stony Creek - White River
48	Elwood Water Utility	02369	PS	WELL	11	2008	49932	Duck Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Lapel Municipal Water Company	00203	PS	WELL	FORD	2008	49804	Stony Creek - White River
29	Arcadia Water Department	00234	PS	WELL	1	2008	49300	Cicero Creek
49	Rolls-Royce Corporation	01895	IN	WELL	03	2008	49000	Eagle Creek
49	American United Life Insurance Company	00366	EP	WELL	2N	2008	48240	Pleasant Run - White River
49	Town of Speedway	00300	PS	WELL	13	2008	48200	Eagle Creek
49	Rexnord Bearing Division	01178	IN	WELL	1	2008	48100	White Lick Creek
49	Allison Transmission	01115	IN	WELL	11	2008	47708	Eagle Creek
18	Town of Yorktown	00204	PS	WELL	3	2008	47600	Buck Creek - White River
49	Schafer Technologies, Inc.	00493	IN	WELL	1	2008	47343	Pleasant Run - White River
49	Town of Speedway	00300	PS	WELL	3	2008	46500	Eagle Creek
32	Danville Water Company	00032	PS	WELL	2	2008	46315	White Lick Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	RSD	2008	46100	Fall Creek
68	Indiana-American Water Company	00038	PS	WELL	5	2008	45299	Muncie Creek - White River
29	Town of Westfield	01601	PS	WELL	4	2008	45050	Crooked Creek - White River
49	Town of Speedway	00300	PS	WELL	14R	2008	44400	Eagle Creek
49	Rolls-Royce Corporation	01895	IN	WELL	02	2008	44100	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	Town of Daleville	04533	PS	WELL	2	2008	43794	Killbuck Creek - White River
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS8	2008	43200	Fall Creek
49	Indianapolis Marion County	00275	EP	WELL	2	2008	42066	Pleasant Run - White River
49	Town of Speedway	00300	PS	WELL	2	2008	41800	Eagle Creek
49	Town of Speedway	00300	PS	WELL	4	2008	41300	Eagle Creek
80	Tipton Municipal Water Utility	01646	PS	WELL	3	2008	40995	Cicero Creek
55	Foxcliff Golf Club	03551	IR	WELL	1	2008	39800	Clear Creek - White River
33	Irving Materials, Inc.	01261	IN	WELL	1	2008	39600	Buck Creek - White River
49	CB Richard Ellis	02613	MI	WELL	3	2008	39600	Pleasant Run - White River
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4 4	2008	38700	Clear Creek - White River
49	Magnode Corporation	01927	IN	WELL	2	2008	38300	Eagle Creek
41	Indiana-American Water Company, Inc.	00565	PS	WELL	30	2008	38100	Clear Creek - White River
49	Industrial Anodizing Company, Inc.	01177	IN	WELL	2	2008	37776	Pleasant Run - White River
49	Indianapolis Airport Authority	04401	MI	INTAKE	SEERLY	2008	37101	Pleasant Run - White River
80	Tipton Municipal Water Utility	01646	PS	WELL	2	2008	36973	Cicero Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Eagle Creek Golf Course	00885	IR	INTAKE	2	2008	36347	Eagle Creek
49	Colors, Inc.	00243	IN	WELL	1	2008	36000	Pleasant Run - White River
48	Town of Frankton	00838	PS	WELL	4	2008	35800	Pipe Creek
48	Red Gold, Inc.	03439	IN	WELL	4	2008	35700	Pipe Creek
80	Tipton Municipal Water Utility	01646	PS	WELL	5	2008	34819	Cicero Creek
80	Tipton Municipal Water Utility	01646	PS	WELL	1	2008	34800	Cicero Creek
49	CB Richard Ellis	02613	MI	WELL	4	2008	34800	Pleasant Run - White River
49	City of Lawrence Utilities	00010	PS	WELL	3	2008	34750	Fall Creek
55	Ozark Fisheries Company, Inc.	03555	RU	INTAKE	LK DET	2008	34200	Clear Creek - White River
29	Town of Cicero Utilities	02306	PS	WELL	2	2008	34018	Stony Creek - White River
55	Indianapolis Power & Light Company	00476	EP	INTAKE	1	2008	34000	Lambs Creek - White River
49	Town of Speedway	00300	PS	WELL	12	2008	33600	Eagle Creek
55	Town of Brooklyn	02512	PS	WELL	1	2008	33228	White Lick Creek
55	Indianapolis Power & Light Company	00476	EP	INTAKE	2	2008	33000	Lambs Creek - White River
55	Indiana Department of Natural Resources	02566	RU	WELL	2	2008	31645	Clear Creek - White River
30	Alcatel_Lucent	04374	MI	WELL	1	2008	31500	Geist Reservoir - Fall Creek



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Indiana-American Water Company, Inc.	00571	PS	WELL	1	2008	31358	Pipe Creek
29	Brehob Nursery Inc.	04313	IR	WELL	8	2008	30954	Cicero Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS29	2008	30300	Pleasant Run - White River
29	Carmel Municipal Water	00041	PS	WELL	12	2008	30127	Crooked Creek - White River
49	Indianapolis Power & Light Company	00475	EP	WELL	4-1	2008	30000	Pleasant Run - White River
49	Rexnord Bearing Division	01178	IN	WELL	2	2008	29900	White Lick Creek
49	Town of Speedway	00300	PS	WELL	10R	2008	29700	Eagle Creek
48	Lapel Municipal Water Company	00203	PS	WELL	SR 13	2008	29588	Fall Creek
48	Red Gold, Inc.	03439	IN	WELL	3	2008	29400	Pipe Creek
29	Stony Creek Stone Company	02709	IN	INTAKE	2	2008	29200	Stony Creek - White River
48	Warrens Turf Group	04397	IR	WELL	1	2008	29160	Geist Reservoir - Fall Creek
32	Town of Brownsburg	00583	PS	WELL	2	2008	29000	White Lick Creek
49	Town of Speedway	00300	PS	WELL	9	2008	28900	Eagle Creek
6	Whitestown Utilities	01901	PS	WELL	3	2008	28283	Eagle Creek
6	Whitestown Utilities	01901	PS	WELL	4	2008	28283	Eagle Creek
29	Stony Creek Golf Course	03837	IR	WELL	1	2008	28130	Stony Creek - White River
29	Purgatory Golf Course	04761	IR	WELL	5	2008	28100	Stony Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Harbor Trees Golf Club	01990	IR	WELL	2	2008	27553	Cicero Creek
49	Coca-Cola Bottling Company of Indianapolis	04532	IN	WELL	3	2008	26800	Eagle Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS18	2008	26700	Crooked Creek - White River
49	Town of Speedway	00300	PS	WELL	8	2008	26600	Eagle Creek
29	Brookshire Golf Club	00919	IR	WELL	3	2008	26460	Crooked Creek - White River
49	Hanson Aggregates Midwest, Inc.	02013	IN	INTAKE	1	2008	26340	Pleasant Run - White River
18	Town of Gaston	01117	PS	WELL	2	2008	26316	Pipe Creek
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	5	2008	25800	Stony Creek - White River
18	Borg Warner DTP	03275	IN	WELL	3	2008	25739	Killbuck Creek - White River
48	Anderson Country Club	02652	IR	WELL	1	2008	25700	Killbuck Creek - White River
29	Woodland Country Club	00259	IR	INTAKE	1	2008	25674	Crooked Creek - White River
49	Indianapolis Department of Waterworks	03054	PS	WELL	SWF-09	2008	25200	Pleasant Run - White River
48	Town of Frankton	00838	PS	WELL	5	2008	25100	Pipe Creek
60	Town of Gosport	02320	PS	WELL	3	2008	25000	Butler Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Bridgeston American Tire Operations	03688	MI	WELL	EW-1	2008	25000	Stony Creek - White River
49	Southern Dunes Golf Course	04691	IR	INTAKE	1	2008	24700	Pleasant Run - White River
49	Town of Speedway	00300	PS	WELL	7R	2008	24600	Eagle Creek
29	Firestone Industrial Products	00420	IN	WELL	4	2008	24190	Stony Creek - White River
18	Town of Daleville	04533	PS	WELL	1	2008	24173	Killbuck Creek - White River
32	Town of Plainfield	04281	PS	WELL	01	2008	24090	White Lick Creek
32	Town of Plainfield	04281	PS	WELL	02	2008	24090	White Lick Creek
49	Vertellus Industries	03983	MI	WELL	PW-1A	2008	23778	Eagle Creek
55	Painted Hills Utilities	02250	PS	WELL	2	2008	23695	Indian Creek
55	Painted Hills Utilities	02250	PS	WELL	1	2008	23694	Indian Creek
49	Brehob Nursery, Inc.	02170	IR	WELL	1	2008	23544	Pleasant Run - White River
68	Town of Parker City	00112	PS	WELL	1	2008	23400	Muncie Creek - White River
49	Winding Ridge Golf Course	04746	IR	INTAKE	1	2008	22740	Fall Creek
49	Eagle Creek Golf Course	00885	IR	INTAKE	1	2008	22680	Eagle Creek
29	Town of Westfield	02731	PS	WELL	13	2008	22400	Stony Creek - White River
48	Anderson Water Department	00863	PS	WELL	6	2008	22300	Killbuck Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Marion County	00275	EP	WELL	1B	2008	22267	Pleasant Run - White River
29	Atlanta Water Department	00374	PS	WELL	4	2008	22166	Cicero Creek
32	HG Properties	04155	IR	INTAKE	1	2008	22100	White Lick Creek
29	Gray Eagle Golf Club	03372	IR	INTAKE	2	2008	21674	Fall Creek
48	Red Gold, Inc.	03439	IN	WELL	1	2008	21600	Pipe Creek
29	Town of Westfield	04737	PS	WELL	4	2008	21400	Crooked Creek - White River
29	Crooked Stick Golf Club	00043	IR	INTAKE	1	2008	21100	Crooked Creek - White River
18	Borg Warner DTP	03275	IN	WELL	4A	2008	20640	Killbuck Creek - White River
29	Becks Superior Hybrids	02881	IR	WELL	4 EH	2008	20526	Cicero Creek
48	Red Gold, Inc.	03106	IN	WELL	1	2008	20450	Duck Creek
49	Saddle Brook Golf Course	03859	IR	INTAKE	1	2008	20400	Crooked Creek - White River
49	Allison Transmission	01115	IN	WELL	7A	2008	20273	Eagle Creek
18	James Treadway	04280	MI	WELL	1	2008	20200	Killbuck Creek - White River
29	Stony Creek Golf Course	03837	IR	INTAKE	1	2008	19900	Stony Creek - White River
49	Broadmoor Country Club	02096	IR	WELL	1	2008	19839	Crooked Creek - White River
68	Indiana-American Water Company	00038	PS	WELL	6	2008	19793	Muncie Creek - White River
33	Warrens Turf Group	04662	IR	WELL	2	2008	19656	Geist Reservoir - Fall Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Town of Frankton	00838	PS	WELL	3	2008	19500	Pipe Creek
55	Brown County Water Utility Inc.	00224	PS	WELL	2	2008	19461	Indian Creek
48	Southern Madison Utilities	04749	PS	WELL	1	2008	19452	Fall Creek
55	Indiana Department of Natural Resources	02566	RU	WELL	5	2008	19437	Clear Creek - White River
32	Town of Brownsburg	02589	PS	WELL	7	2008	19300	White Lick Creek
49	Rolls-Royce Corporation	01894	IN	WELL	4A	2008	18900	Pleasant Run - White River
29	Stony Creek Golf Course	03837	IR	WELL	2	2008	18749	Stony Creek - White River
49	Cloverleaf Enterprises Inc.	02575	EP	WELL	1	2008	18594	White Lick Creek
29	Carmel Municipal Water	00041	PS	WELL	11	2008	18372	Crooked Creek - White River
29	Ironwood Golf Club	03760	IR	INTAKE	1	2008	18142	Fall Creek
49	CB Richard Ellis	02613	MI	WELL	2	2008	18000	Pleasant Run - White River
48	Warrens Turf Group	00103	IR	INTAKE	1	2008	17910	Killbuck Creek - White River
80	Tipton Terrace Apartments	02576	EP	WELL	1	2008	17719	Cicero Creek
49	National Starch, LLC	00414	IN	WELL	11	2008	17687	Pleasant Run - White River
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4 3	2008	17600	Clear Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Peaper Brothers, Inc.	01060	IR	WELL	1	2008	17418	Pleasant Run - White River
49	Allison Transmission	01115	IN	WELL	12	2008	17404	Eagle Creek
48	Yule Golf Club	03310	IR	WELL	1	2008	17400	Pipe Creek
68	Farmland Municipal Water Works	00977	PS	WELL	1	2008	17304	Muncie Creek - White River
49	Hillcrest Country Club	01626	IR	WELL	4	2008	17089	Fall Creek
29	Carmel Municipal Water	00040	PS	WELL	8	2008	16821	Crooked Creek - White River
32	Charles Roark	03473	IN	WELL	1	2008	16632	White Lick Creek
29	Carmel Municipal Water	04109	PS	WELL	13	2008	16416	Crooked Creek - White River
48	Red Gold, Inc.	03439	IN	WELL	2	2008	16300	Pipe Creek
49	Fort Golf Resort	02659	IR	WELL	1	2008	16272	Fall Creek
48	Red Gold, Inc.	03106	IN	WELL	3	2008	16090	Duck Creek
32	Hole in One Inc.	04141	IR	WELL	1	2008	16038	White Lick Creek
29	Woodland Country Club	00259	IR	WELL	1CH	2008	15984	Crooked Creek - White River
48	Red Gold, Inc.	03439	IN	WELL	5	2008	15900	Pipe Creek
41	Bargersville Water Works	02307	PS	WELL	6	2008	15700	Clear Creek - White River
49	Fort Golf Resort	02659	IR	INTAKE	1	2008	15209	Fall Creek
49	City of Lawrence Utilities	00010	PS	WELL	4	2008	15170	Fall Creek
29	Town of Cicero Utilities	02306	PS	WELL	4	2008	15153	Stony Creek - White River
6	Wolf Run Golf Club	02960	IR	INTAKE	1	2008	15099	Eagle Creek
6	Wolf Run Golf Club	02960	IR	WELL	1	2008	14805	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
68	Town of Parker City	00112	PS	WELL	3	2008	14200	Muncie Creek - White River
49	Old Oakland Golf Club	00129	IR	WELL	5	2008	14050	Fall Creek
49	General Motors	00747	IN	WELL	4	2008	14008	Pleasant Run - White River
55	Thiesing Veneer Company, Inc.	03033	IN	WELL	1	2008	13893	White Lick Creek
29	Heartland Growers	03394	IR	INTAKE	1	2008	13206	Crooked Creek - White River
49	Eagle Creek Golf Course	00885	IR	INTAKE	3	2008	13176	Eagle Creek
55	Town of Morgantown	00208	PS	WELL	2	2008	13029	Indian Creek
48	Grandview Golf Course	02640	IR	WELL	1	2008	13000	Killbuck Creek - White River
55	Martinsville Golf Club	01410	IR	INTAKE	1	2008	12797	Clear Creek - White River
49	Eagle Creek Golf Course	00885	IR	INTAKE	4	2008	12771	Eagle Creek
49	Indianapolis Country Club	00749	IR	INTAKE	1	2008	12766	Eagle Creek
29	Dana Gibson	04164	IR	WELL	1	2008	12582	Eagle Creek
32	HG Properties	04155	IR	WELL	1	2008	12400	White Lick Creek
18	Delaware Country Club	02181	IR	INTAKE	1	2008	12200	Muncie Creek - White River
29	Becks Superior Hybrids	02881	IR	WELL	5 BL	2008	12060	Cicero Creek
48	Southern Madison Utilities	04749	PS	WELL	2	2008	11970	Fall Creek



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Home City Ice	00866	IN	WELL	1	2008	11862	Fall Creek
55	Indiana Department of Natural Resources	02566	RU	WELL	6	2008	11834	Clear Creek - White River
29	Crooked Stick Golf Club	00043	IR	WELL	1	2008	11800	Crooked Creek - White River
29	Bear Slide Golf Club	03562	IR	WELL	2	2008	11779	Cicero Creek
29	Bear Slide Golf Club	03562	IR	WELL	1	2008	11619	Cicero Creek
49	Hillcrest Country Club	01626	IR	INTAKE	1	2008	11604	Fall Creek
49	Old Oakland Golf Club	00129	IR	WELL	6	2008	11500	Fall Creek
29	The Bridgewater Club	04351	IR	WELL	2	2008	11366	Crooked Creek - White River
55	Foxcliff Golf Club	03551	IR	INTAKE	1	2008	11250	Clear Creek - White River
55	Foxcliff Golf Club	03551	IR	INTAKE	2	2008	11250	Clear Creek - White River
55	Town of Morgantown	00208	PS	WELL	1	2008	11236	Indian Creek
49	Indianapolis Airport Authority	04401	MI	INTAKE	MARS D	2008	11122	Pleasant Run - White River
32	Deer Creek Golf Course	03460	IR	INTAKE	1	2008	11070	White Lick Creek
29	Fishers Parks & Recreation Department	03102	IR	WELL	1	2008	10636	Fall Creek
49	Indianapolis Marion County	00275	EP	WELL	4	2008	10512	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Princeton Lakes Apartments	04725	IR	WELL	1	2008	10400	Stony Creek - White River
32	Clarian West Medical Center	04589	IR	WELL	3	2008	10336	White Lick Creek
49	Diamond Chain Company	00364	IN	WELL	1	2008	10033	Pleasant Run - White River
55	Town of Morgantown	00208	PS	WELL	3	2008	9964	Indian Creek
55	Indiana Department of Natural Resources	02566	RU	WELL	4	2008	9793	Clear Creek - White River
55	Ozark Fisheries Company, Inc.	03555	RU	WELL	1 7	2008	9600	Clear Creek - White River
55	Town of Paragon	02511	PS	WELL	1	2008	9580	Butler Creek - White River
49	Vertellus Industries	03983	MI	WELL	PW-2S	2008	9560	Eagle Creek
18	Rock-Tenn Company	04666	IN	INTAKE	1	2008	9473	Killbuck Creek - White River
55	Town of Paragon	02511	PS	WELL	2	2008	9450	Butler Creek - White River
29	Porter Engineered Systems	03520	IN	WELL	1	2008	9430	Crooked Creek - White River
18	Bill & Hele Long	04611	MI	WELL	2	2008	9288	Killbuck Creek - White River
55	Hopkins Gravel, Sand & Concrete	03219	IN	INTAKE	1	2008	9275	White Lick Creek
29	Becks Superior Hybrids	02881	IR	WELL	2 MO	2008	9210	Cicero Creek
29	Purgatory Golf Course	04761	IR	WELL	8	2008	9200	Stony Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
55	Indiana Department of Natural Resources	02566	RU	WELL	1	2008	9135	Clear Creek - White River
18	Country View Farms	02444	PS	WELL	1	2008	8920	Killbuck Creek - White River
29	Pebble Brook Golf Course	00109	IR	INTAKE	2N	2008	8865	Cicero Creek
49	Indianapolis Department of Waterworks	00365	PS	WELL	FRW-2	2008	8800	Eagle Creek
49	Hanson Aggregates Midwest, Inc.	02013	IN	INTAKE	5	2008	8760	Pleasant Run - White River
18	Warrens Turf Group	04359	IR	WELL	1	2008	8580	Geist Reservoir - Fall Creek
49	Indianapolis Marion County	00275	EP	WELL	1A	2008	8395	Pleasant Run - White River
55	Thiesing Veneer Company, Inc.	03033	IN	WELL	2	2008	8190	White Lick Creek
49	Indianapolis Department of Public Works	04536	IN	WELL	1	2008	8161	Pleasant Run - White River
29	Sunbeam Development Corporation	03745	IR	INTAKE	1	2008	8100	Fall Creek
55	Indiana-American Water Company	00037	PS	WELL	5	2008	8100	White Lick Creek
49	Allison Transmission	01115	IN	INTAKE	A 3 01	2008	8051	Eagle Creek
29	Pebble Brook Golf Course	00109	IR	INTAKE	1S	2008	8036	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Woodland Country Club	00259	IR	WELL	6	2008	7992	Crooked Creek - White River
48	Town of Orestes	04358	PS	WELL	2	2008	7973	Pipe Creek
68	Farmland Municipal Water Works	00977	PS	WELL	3A	2008	7964	Muncie Creek - White River
29	Hawthorns Golf & Country Club	04032	IR	INTAKE	1	2008	7927	Geist Reservoir - Fall Creek
29	Ironwood Golf Club	03760	IR	INTAKE	2	2008	7836	Fall Creek
48	Town of Orestes	04358	PS	WELL	1	2008	7816	Pipe Creek
48	Red Gold, Inc.	03439	IN	WELL	6	2008	7500	Pipe Creek
29	Sunbeam Development Corporation	03745	IR	WELL	1	2008	7400	Fall Creek
49	Allison Transmission	01115	IN	INTAKE	A 3 02	2008	7122	Eagle Creek
33	Mt. Summit Water Utility	02236	PS	WELL	1	2008	7108	Buck Creek - White River
68	L & M Regional Water	02290	PS	WELL	2	2008	7051	Muncie Creek - White River
68	Farmland Municipal Water Works	00977	PS	WELL	3	2008	7022	Muncie Creek - White River
33	Mt. Summit Water Utility	02236	PS	WELL	2	2008	6980	Buck Creek - White River
18	Crestview Golf Club	03211	IR	INTAKE	A	2008	6950	Buck Creek - White River
32	Friendswood Golf Course	00359	IR	WELL	E	2008	6696	White Lick Creek
29	Firestone Industrial Products	00420	IN	WELL	5A	2008	6555	Stony Creek - White River
29	Kyle Spencer	00480	IR	WELL	1	2008	6412	Stony Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
68	L & M Regional Water	02290	PS	WELL	1	2008	6300	Muncie Creek - White River
29	Mohawk Hills Golf Club	03536	IR	INTAKE	1	2008	6280	Crooked Creek - White River
55	Ozark Fisheries Company, Inc.	03555	RU	WELL	1 3	2008	6000	Clear Creek - White River
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4-7	2008	6000	Clear Creek - White River
48	G & E Farms	03476	IR	WELL	1	2008	5900	Pipe Creek
48	Idelwold Country Club	03264	IR	INTAKE	1	2008	5800	Geist Reservoir - Fall Creek
55	Eagle Pines Golf Club	01696	IR	WELL	2	2008	5760	White Lick Creek
49	Gary Greenhouse, Inc.	04574	IR	WELL	1	2008	5758	Pleasant Run - White River
29	MA-RI-AL	03090	IN	WELL	1	2008	5587	Stony Creek - White River
6	Golf Club of Indiana	00122	IR	WELL	1	2008	5500	White Lick Creek
6	Golf Club of Indiana	00122	IR	WELL	2	2008	5500	White Lick Creek
29	Wood Wind Golf Club	03282	IR	WELL	2	2008	5400	Eagle Creek
29	Sunbeam Development Corporation	03745	IR	INTAKE	2	2008	5300	Crooked Creek - White River
55	G-R Wood, Inc	03888	IN	WELL	4	2008	5300	White Lick Creek
29	Ironwood Golf Club	03760	IR	WELL	1	2008	5100	Fall Creek
55	G-R Wood, Inc	03888	IN	WELL	3	2008	5100	White Lick Creek
49	Indianapolis Power & Light Company	00475	EP	WELL	70A	2008	5000	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
41	Town of Bargersville	04365	IR	INTAKE	001	2008	4926	Clear Creek - White River
55	G-R Wood, Inc	03888	IN	WELL	2	2008	4900	White Lick Creek
29	Mohawk Hills Golf Club	03536	IR	WELL	1	2008	4880	Crooked Creek - White River
48	Killbuck Golf Course	02739	IR	INTAKE	1	2008	4710	Killbuck Creek - White River
29	Twin Lakes Golf Club	03531	IR	INTAKE	2	2008	4639	Crooked Creek - White River
49	National Starch, LLC	00414	IN	WELL	16	2008	4588	Pleasant Run - White River
32	Quail Creek Land Development, Inc.	04120	IR	WELL	2	2008	4550	White Lick Creek
29	Verizon Wireless Amphitheater	03025	PS	WELL	1	2008	4333	Fall Creek
29	Carmel Dad's Club	04261	IR	WELL	4	2008	4234	Crooked Creek - White River
29	Carmel Dad's Club	04261	IR	WELL	3	2008	4234	Eagle Creek
49	Winding Ridge Golf Course	00963	IR	INTAKE	1	2008	4180	Pleasant Run - White River
49	Sumco, Inc.	04150	IN	WELL	1	2008	4081	White Lick Creek
49	Allison Transmission	01115	IN	INTAKE	A 12 1	2008	4049	Eagle Creek
29	Prairie Group Inc.	03543	IN	WELL	1	2008	3850	Stony Creek - White River
29	Carmel Municipal Water	00040	PS	WELL	9	2008	3807	Crooked Creek - White River
49	Indian Lake Country Club	03599	IR	INTAKE	1	2008	3779	Fall Creek
32	Clarian West Medical Center	04589	IR	WELL	1	2008	3740	White Lick Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Verizon Wireless Amphitheater	03025	PS	WELL	2	2008	3736	Fall Creek
18	Ball State University	03916	IR	WELL	1	2008	3728	Killbuck Creek - White River
49	Peaper Brothers, Inc.	01062	IR	INTAKE	1	2008	3696	Pleasant Run - White River
29	Noblesville Soccer Club	00328	IR	WELL	1	2008	3469	Stony Creek - White River
32	RH West Management	01658	IR	INTAKE	1	2008	3429	White Lick Creek
41	Indian Springs Golf, Inc.	03334	IR	INTAKE	1	2008	3400	Indian Creek
29	Twin Lakes Golf Club	03531	IR	INTAKE	1	2008	3360	Crooked Creek - White River
55	Eagle Pines Golf Club	01696	IR	INTAKE	2	2008	3059	White Lick Creek
49	Winding Ridge Golf Course	04746	IR	WELL	1	2008	3015	Fall Creek
29	Meadows Property Owner Association	04098	MI	WELL	2	2008	2868	Stony Creek - White River
29	Beaver Gravel Corporation	03089	IN	INTAKE	3	2008	2794	Stony Creek - White River
41	Royal Oak Country Club, Inc	03301	IR	INTAKE	1	2008	2769	Clear Creek - White River
18	GKN Aerospace	01629	IN	WELL	2	2008	2731	Buck Creek - White River
29	Fishers Parks & Recreation Department	04269	IR	WELL	COMMTY	2008	2703	Crooked Creek - White River



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Vertellus Industries	03983	MI	WELL	PW-1S	2008	2669	Eagle Creek
32	Deer Creek Golf Course	03460	IR	WELL	5	2008	2620	White Lick Creek
18	GKN Aerospace	01629	IN	WELL	1	2008	2589	Buck Creek - White River
29	Beaver Gravel Corporation	03089	IN	INTAKE	2	2008	2540	Stony Creek - White River
29	Beaver Gravel Corporation	03089	IN	INTAKE	1	2008	2532	Stony Creek - White River
55	Millhon Farms (Valley Farms)	04314	IR	WELL	1	2008	2520	Clear Creek - White River
29	Pebble Brook Golf Course	00109	IR	WELL	2N	2008	2472	Cicero Creek
29	Prairie View HOA	04718	MI	WELL	1	2008	2439	Stony Creek - White River
29	Prairie View HOA	04718	MI	WELL	2	2008	2439	Stony Creek - White River
49	St. Francis Hospital Center	01870	IN	WELL	1	2008	2379	Pleasant Run - White River
29	Pebble Brook Golf Course	00109	IR	WELL	1S	2008	2378	Crooked Creek - White River
29	Duke Energy Indiana	01151	EP	WELL	1	2008	2348	Stony Creek - White River
32	Prestwick Golf Course, Inc.	00976	IR	WELL	2	2008	2288	White Lick Creek
32	Prestwick Golf Course, Inc.	00976	IR	WELL	5	2008	2288	White Lick Creek
29	Becks Superior Hybrids	02881	IR	WELL	3 PN	2008	2274	Cicero Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Hawthorns Golf & Country Club	04032	IR	WELL	1	2008	2208	Geist Reservoir - Fall Creek
29	Harbor Trees Golf Club	01990	IR	WELL	1	2008	2169	Cicero Creek
29	Twin Lakes Golf Club	03531	IR	WELL	1	2008	2150	Crooked Creek - White River
29	Brehob Nursery Inc.	04313	IR	WELL	9	2008	2117	Cicero Creek
29	Conner Prairie	03617	IR	WELL	1	2008	2055	Stony Creek - White River
49	CB Richard Ellis	02613	MI	WELL	1	2008	2040	Pleasant Run - White River
49	Brendonwood Country Club, Inc.	02732	IR	WELL	10	2008	2036	Fall Creek
18	Organic Enterprise	03500	MI	INTAKE	1	2008	2000	Pipe Creek
49	Indian Lake Country Club	03599	IR	WELL	1	2008	1980	Fall Creek
32	Deer Creek Golf Course	03460	IR	WELL	3	2008	1965	White Lick Creek
80	Ray Bros & Noble Canning	01303	IN	WELL	2	2008	1943	Cicero Creek
48	Red Gold, Inc.	03106	IN	WELL	2	2008	1940	Duck Creek
49	RN Thompson & Associates, Inc.	02790	IR	WELL	1	2008	1856	Crooked Creek - White River
32	Prestwick Golf Course, Inc.	00976	IR	WELL	1	2008	1833	White Lick Creek
18	Delaware Acres M H Community	01392	PS	WELL	1	2008	1829	Killbuck Creek - White River
29	Coppergate Property Owners	03753	IR	WELL	1	2008	1728	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	Warrens Turf Group	00101	IR	WELL	2	2008	1728	Killbuck Creek - White River
29	Fishers Parks & Recreation Department	04269	IR	WELL	CUMBER	2008	1697	Fall Creek
29	Technology Center Association	02894	IR	WELL	1	2008	1640	Crooked Creek - White River
29	Technology Center Association	02894	IR	WELL	2	2008	1640	Crooked Creek - White River
32	Quail Creek Land Development, Inc.	04120	IR	WELL	1	2008	1620	White Lick Creek
29	Biddle Precision Components	00371	IN	WELL	1	2008	1611	Eagle Creek
6	Zionsville Golf Club	01401	IR	WELL	3	2008	1600	Eagle Creek
49	Dammann's Lawn & Garden	00468	IR	WELL	1	2008	1596	Eagle Creek
49	Meyer & Humes	00899	IR	WELL	2	2008	1540	Pleasant Run - White River
29	Conner Prairie	03617	IR	WELL	2	2008	1525	Stony Creek - White River
49	August Wiegman	02056	IR	WELL	1	2008	1503	Pleasant Run - White River
29	Becks Superior Hybrids	02881	IR	WELL	1 GR	2008	1494	Cicero Creek
29	Twin Lakes Golf Club	03531	IR	WELL	4	2008	1469	Crooked Creek - White River
29	Carmel Clay Schools	03618	IR	WELL	1	2008	1408	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Irving Materials, Inc.	02435	IN	WELL	1	2008	1352	Geist Reservoir - Fall Creek
6	Wolf Run Golf Club	02960	IR	WELL	2	2008	1323	Eagle Creek
32	Deer Creek Golf Course	03460	IR	WELL	4	2008	1305	White Lick Creek
49	Brehob Nursery, Inc.	02173	IR	WELL	3	2008	1292	Pleasant Run - White River
48	Warrens Turf Group	00102	IR	WELL	1	2008	1290	Killbuck Creek - White River
6	Builders Concrete & Supply Company	04212	IN	WELL	1	2008	1265	White Lick Creek
32	RH West Management	01658	IR	WELL	1 Golf	2008	1221	White Lick Creek
29	Town of Westfield	01601	PS	WELL	2	2008	1215	Crooked Creek - White River
30	Mt. Vernon Community School Corporation	01246	IR	WELL	1	2008	1200	Geist Reservoir - Fall Creek
29	Beaver Gravel Corporation	03089	IN	INTAKE	4	2008	1191	Stony Creek - White River
6	Hickory Bend Golf Course	04208	IR	INTAKE	1	2008	1179	Eagle Creek
80	Ray Bros & Noble Canning	01303	IN	WELL	1	2008	1161	Cicero Creek
18	Rock-Tenn Company	04666	IN	WELL	1	2008	1140	Killbuck Creek - White River
29	Bear Slide Golf Club	03562	IR	WELL	3	2008	1133	Cicero Creek
49	Indianapolis Country Club	00749	IR	WELL	1	2008	1085	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
30	Proportion-Air Inc.	01108	IN	WELL	1	2008	1049	Geist Reservoir - Fall Creek
32	Prestwick Golf Course, Inc.	00976	IR	WELL	4	2008	1034	White Lick Creek
48	Southern Madison Community School	02145	PS	WELL	1	2008	1029	Geist Reservoir - Fall Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-12	2008	973	Eagle Creek
55	Martinsville Golf Club	01410	IR	WELL	1	2008	933	Clear Creek - White River
29	Irving Materials, Inc.	02442	IN	WELL	1	2008	931	Crooked Creek - White River
48	IMI-Anderson	04126	IN	WELL	1	2008	900	Killbuck Creek - White River
33	Shenandoah School Corporation	01206	PS	WELL	1	2008	897	Geist Reservoir - Fall Creek
33	Shenandoah School Corporation	01207	PS	WELL	1	2008	897	Geist Reservoir - Fall Creek
33	Shenandoah School Corporation	03155	PS	WELL	1	2008	897	Geist Reservoir - Fall Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	602S3	2008	864	Eagle Creek
49	Cargill, Inc.	01023	IN	WELL	2	2008	850	Pleasant Run - White River
29	Noblesville Schools	03585	IR	WELL	2	2008	839	Stony Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Country Club	00749	IR	WELL	2	2008	837	Eagle Creek
49	Schuster's Block, Inc.	03908	IN	WELL	1	2008	829	Pleasant Run - White River
29	Noblesville Schools	03585	IR	WELL	1	2008	792	Stony Creek - White River
29	The Bridgewater Club	04351	IR	WELL	1	2008	779	Crooked Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	602S2B	2008	779	Eagle Creek
18	McIntire Concrete Inc.	04421	IN	WELL	W-2	2008	735	Killbuck Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	603S3	2008	728	Eagle Creek
32	Prestwick Golf Course, Inc.	00976	IR	WELL	3	2008	691	White Lick Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	502S2B	2008	649	Eagle Creek
29	Carmel Dad's Club	04261	IR	WELL	2	2008	635	Crooked Creek - White River
29	Carmel Dad's Club	04261	IR	WELL	1	2008	635	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Governors Pointe Home Owners Association	04534	MI	WELL	1	2008	630	Pleasant Run - White River
18	R & L Transfer Inc.	04210	PS	WELL	95IN15	2008	621	Pipe Creek
41	Dye's Walk Country Club	03301	IR	WELL	1	2008	600	Clear Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	604S3	2008	596	Eagle Creek
48	Anderson Community Schools (Killbuck Elementary)	00736	PS	WELL	1	2008	592	Killbuck Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	605S3	2008	589	Eagle Creek
49	Allison Transmission	01115	IN	WELL	10	2008	588	Eagle Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	501S3	2008	574	Eagle Creek
18	Wes Del High School	01166	PS	WELL	1	2008	572	Killbuck Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	203S2A	2008	549	Eagle Creek



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
6	Hickory Bend Golf Course	04208	IR	WELL	1	2008	528	Eagle Creek
49	Skaggs	02796	IR	INTAKE	1	2008	513	Pleasant Run - White River
33	Irving Materials, Inc.	02436	IN	WELL	1	2008	503	Buck Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	604S2B	2008	501	Eagle Creek
49	Clarian Health Partners, Inc.	02773	EP	WELL	9	2008	479	Pleasant Run - White River
49	Clarian Health Partners, Inc.	02773	EP	WELL	10	2008	479	Pleasant Run - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	501S2B	2008	449	Eagle Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	204205	2008	440	Eagle Creek
48	Warrens Turf Group	00100	IR	WELL	2	2008	432	Killbuck Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-10	2008	383	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	Wes Del High School	01166	PS	WELL	2	2008	376	Killbuck Creek - White River
55	Millhon Farms (Valley Farms)	04314	IR	WELL	2	2008	360	Clear Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-7	2008	349	Eagle Creek
48	Willemson Dairy, LLC	04651	RU	WELL	1	2008	336	Pipe Creek
29	Sheridan Water Works	02244	PS	WELL	4	2008	333	Cicero Creek
48	Willemson Dairy, LLC	04651	RU	WELL	2	2008	332	Pipe Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-6	2008	330	Eagle Creek
6	Wolf Run Golf Club	02960	IR	WELL	4	2008	324	Eagle Creek
18	Wes Del High School	01166	PS	WELL	3	2008	317	Killbuck Creek - White River
30	Mt. Vernon Community School Corporation	01246	IR	INTAKE	1	2008	304	Geist Reservoir - Fall Creek
49	Skaggs	02796	IR	INTAKE	2	2008	289	Pleasant Run - White River
32	Friendswood Golf Course	00359	IR	WELL	B	2008	283	White Lick Creek
49	Clarian Health Partners, Inc.	04345	MI	WELL	DW-4	2008	276	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
55	Brown County Water Utility Inc.	00224	PS	WELL	5	2008	252	Indian Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-8	2008	248	Eagle Creek
18	Elks Country Club	00729	IR	WELL	1	2008	239	Killbuck Creek - White River
48	Bubbling Springs Mobile Home Park	00192	PS	WELL	1	2008	233	Killbuck Creek - White River
18	Ball State University	03916	IR	WELL	2	2008	230	Killbuck Creek - White River
6	White Lick Golf Course	03498	IR	INTAKE	1	2008	199	White Lick Creek
49	Allison Transmission	01115	IN	WELL	2	2008	196	Eagle Creek
49	Hafer Brothers Inc.	01387	IR	WELL	1	2008	193	Pleasant Run - White River
18	Maplewood Golf Club	03128	IR	WELL	1	2008	169	Buck Creek - White River
49	Saddle Brook Golf Course	03859	IR	WELL	1	2008	160	Crooked Creek - White River
49	Saddle Brook Golf Course	03859	IR	WELL	2	2008	160	Crooked Creek - White River
6	Wolf Run Golf Club	02960	IR	WELL	3	2008	144	Eagle Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	202S2A	2008	136	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-5	2008	136	Eagle Creek
68	Klem Golf Club	03289	IR	WELL	1	2008	130	Muncie Creek - White River
68	Klem Golf Club	03289	IR	WELL	2	2008	130	Muncie Creek - White River
68	Klem Golf Club	03289	IR	WELL	3	2008	130	Muncie Creek - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	201S2A	2008	128	Eagle Creek
6	Zionsville Golf Club	01401	IR	WELL	1	2008	123	Eagle Creek
18	Elks Country Club	00729	IR	WELL	3	2008	118	Killbuck Creek - White River
32	O'Reilly Raceway Park	03554	PS	WELL	1	2008	106	White Lick Creek
29	Stony Creek Stone Company	02709	IN	WELL	1	2008	100	Stony Creek - White River
29	Stony Creek Stone Company	02709	IN	WELL	2	2008	100	Stony Creek - White River
18	McIntire Concrete Inc.	04421	IN	WELL	W-1	2008	96	Killbuck Creek - White River
32	O'Reilly Raceway Park	03554	PS	WELL	17	2008	90	Eagle Creek
29	Hamilton Southeastern Schools	03657	IR	WELL	1	2008	76	Fall Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Hoosier Concrete, LLC	04540	IN	WELL	1	2008	69	Pleasant Run - White River
18	Monroe Township Volunteer Fire Department	03052	MI	WELL	1	2008	61	Buck Creek - White River
49	Hillcrest Country Club	01626	IR	WELL	3	2008	61	Fall Creek
18	Maplewood Golf Club	03128	IR	WELL	2	2008	56	Buck Creek - White River
49	Peerless Pump Company, LLC	00544	IN	WELL	1	2008	56	Fall Creek
48	US Aggregates, Inc.	04644	IN	WELL	W-1	2008	51	Pipe Creek
29	K & S Lawnscape	04246	IR	WELL	1	2008	50	Cicero Creek
33	Chris Wisehart	04599	PS	WELL	1	2008	48	Buck Creek - White River
49	Adrian Orchards	00759	IR	WELL	2	2008	46	Pleasant Run - White River
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-9	2008	43	Eagle Creek
6	Highgrove Development Inc	04551	PS	WELL	3	2008	36	Eagle Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-4	2008	14	Eagle Creek
55	Ozark Fisheries Company, Inc.	03557	RU	WELL	4 2	2008	12	Clear Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
55	Ozark Fisheries Company, Inc.	03556	RU	WELL	3 2	2008	12	Indian Creek
55	Indiana Department of Natural Resources	02566	RU	WELL	3	2008	7	Clear Creek - White River
6	Perry Township Volunteer Fire Department	02611	MI	INTAKE	1	2008	4	Eagle Creek
6	Highgrove Development Inc	04551	PS	WELL	2	2008	4	Eagle Creek
6	Highgrove Development Inc	04551	PS	WELL	1	2008	2	Eagle Creek
55	G-R Wood, Inc	03888	IN	WELL	1	2008	2	White Lick Creek
49	Praxair Surface Technologies	03296	EP	WELL	1	2008	1	Eagle Creek
18	David Howell	02588	IR	INTAKE	1	2008	0	Buck Creek - White River
18	Borg Warner DTP	03275	IN	WELL	2A	2008	0	Buck Creek - White River
18	David Howell	02515	IR	WELL	1	2008	0	Buck Creek - White River
60	Town of Gosport	02320	PS	WELL	1	2008	0	Butler Creek - White River
60	Town of Gosport	02320	PS	WELL	2	2008	0	Butler Creek - White River
29	Becks Superior Hybrids	02881	IR	INTAKE	2	2008	0	Cicero Creek
29	Arcadia Water Department	00234	PS	WELL	2	2008	0	Cicero Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Atlanta Water Department	00374	PS	WELL	1	2008	0	Cicero Creek
29	Atlanta Water Department	00374	PS	WELL	2	2008	0	Cicero Creek
29	Atlanta Water Department	00374	PS	WELL	3	2008	0	Cicero Creek
80	Tipton Terrace Apartments	02576	EP	WELL	2	2008	0	Cicero Creek
80	Tipton Terrace Apartments	02576	EP	WELL	3	2008	0	Cicero Creek
80	Tipton Terrace Apartments	02576	EP	WELL	4	2008	0	Cicero Creek
41	Bargersville Water Works	02307	PS	WELL	5	2008	0	Clear Creek - White River
41	Bargersville Water Works	02307	PS	WELL	4A	2008	0	Clear Creek - White River
55	Mapleturn Utilities	02313	PS	WELL	2E	2008	0	Clear Creek - White River
55	Martinsville Golf Club	01410	IR	WELL	2	2008	0	Clear Creek - White River
55	Millhon Farms (Valley Farms)	04314	IR	WELL	3	2008	0	Clear Creek - White River
55	Ozark Fisheries Company, Inc.	03555	RU	WELL	1 1	2008	0	Clear Creek - White River
29	Crooked Stick Golf Club	00043	IR	INTAKE	2	2008	0	Crooked Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	8	2008	0	Crooked Creek - White River
29	Martin Marietta Materials, Inc.	02025	IN	INTAKE	9	2008	0	Crooked Creek - White River



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Carmel Municipal Water	00039	PS	WELL	1	2008	0	Crooked Creek - White River
29	Carmel Municipal Water	00039	PS	WELL	2	2008	0	Crooked Creek - White River
29	Carmel Municipal Water	00039	PS	WELL	3	2008	0	Crooked Creek - White River
29	Carmel Municipal Water	00039	PS	WELL	4	2008	0	Crooked Creek - White River
29	Crooked Stick Golf Club	00043	IR	WELL	2	2008	0	Crooked Creek - White River
29	Crooked Stick Golf Club	00043	IR	WELL	3	2008	0	Crooked Creek - White River
29	Crooked Stick Golf Club	00043	IR	WELL	4	2008	0	Crooked Creek - White River
29	Crooked Stick Golf Club	00043	IR	WELL	5	2008	0	Crooked Creek - White River
29	Heartland Growers	03394	IR	WELL	738	2008	0	Crooked Creek - White River
29	REI Real Estate Services	04061	IR	WELL	1	2008	0	Crooked Creek - White River
29	REI Real Estate Services	04061	IR	WELL	2	2008	0	Crooked Creek - White River
29	The Bridgewater Club	04351	IR	WELL	3	2008	0	Crooked Creek - White River
29	Twin Lakes Golf Club	03531	IR	WELL	2	2008	0	Crooked Creek - White River
29	Twin Lakes Golf Club	03531	IR	WELL	3	2008	0	Crooked Creek - White River
29	Village of West Clay HOA	04613	MI	WELL	PW 1	2008	0	Crooked Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Village of West Clay HOA	04613	MI	WELL	PW 2	2008	0	Crooked Creek - White River
29	Wood Wind Golf Club	03282	IR	WELL	1	2008	0	Crooked Creek - White River
49	Broadmoor Country Club	02096	IR	WELL	3	2008	0	Crooked Creek - White River
49	Broadmoor Country Club	02096	IR	WELL	4	2008	0	Crooked Creek - White River
49	Morning Side of College Park	02992	EP	WELL	2	2008	0	Crooked Creek - White River
49	Morning Side of College Park	02992	EP	WELL	3	2008	0	Crooked Creek - White River
48	Elwood Water Utility	02557	PS	WELL	1	2008	0	Duck Creek
48	Elwood Water Utility	02557	PS	WELL	2	2008	0	Duck Creek
48	Elwood Water Utility	02557	PS	WELL	6	2008	0	Duck Creek
6	Zionsville Golf Club	01401	IR	INTAKE	1	2008	0	Eagle Creek
29	Sheridan Water Works	02244	PS	WELL	2	2008	0	Eagle Creek
29	Sheridan Water Works	02244	PS	WELL	3	2008	0	Eagle Creek
29	Walker Turf Farm	03251	IR	WELL	1	2008	0	Eagle Creek
49	Allison Transmission	01115	IN	WELL	5A	2008	0	Eagle Creek
49	DOW Agrosiences	00270	IN	WELL	2	2008	0	Eagle Creek
49	Environmental Corporate Remediation Company	04814	MI	WELL	BW-11	2008	0	Eagle Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Country Club	00749	IR	WELL	3	2008	0	Eagle Creek
49	Vertellus Industries	03983	MI	WELL	PW-3	2008	0	Eagle Creek
49	Vertellus Industries	03983	MI	WELL	PW-4	2008	0	Eagle Creek
29	Gray Eagle Golf Club	03372	IR	INTAKE	1	2008	0	Fall Creek
29	Gray Eagle Golf Club	03372	IR	WELL	1	2008	0	Fall Creek
49	Fort Golf Resort	02659	IR	INTAKE	2	2008	0	Fall Creek
49	Fort Golf Resort	02659	IR	INTAKE	3	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	1	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	2	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	3	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	4	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	5	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	6	2008	0	Fall Creek
49	Brendonwood Country Club, Inc.	02732	IR	WELL	7	2008	0	Fall Creek
49	City of Lawrence Utilities	03396	PS	WELL	8E	2008	0	Fall Creek
49	Hillcrest Country Club	01626	IR	WELL	1	2008	0	Fall Creek
49	Home City Ice	00866	IN	WELL	2	2008	0	Fall Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Indianapolis Department of Waterworks	01377	PS	WELL	RS28	2008	0	Fall Creek
49	Indianapolis Department of Waterworks	01377	PS	WELL	WR6	2008	0	Fall Creek
49	Indianapolis Department of Waterworks	01378	PS	WELL	FC17	2008	0	Fall Creek
49	Indianapolis Department of Waterworks	03053	PS	WELL	GWF-5	2008	0	Fall Creek
29	IMI/McCordsville	02432	IN	INTAKE	2	2008	0	Geist Reservoir - Fall Creek
29	IMI/McCordsville	02432	IN	INTAKE	3	2008	0	Geist Reservoir - Fall Creek
29	IMI/McCordsville	02432	IN	INTAKE	4	2008	0	Geist Reservoir - Fall Creek
29	IMI/McCordsville	02432	IN	INTAKE	5	2008	0	Geist Reservoir - Fall Creek
30	Mt. Vernon Community School Corporation	01246	IR	WELL	2	2008	0	Geist Reservoir - Fall Creek
30	Proportion-Air Inc.	01108	IN	WELL	2	2008	0	Geist Reservoir - Fall Creek
30	Proportion-Air Inc.	01108	IN	WELL	3	2008	0	Geist Reservoir - Fall Creek
30	Town of Fortville	02071	PS	WELL	4	2008	0	Geist Reservoir - Fall Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
48	Ingalls Water Department	04579	PS	INTAKE	3	2008	0	Geist Reservoir - Fall Creek
48	Pendleton Correctional Farm	03246	IR	INTAKE	1	2008	0	Geist Reservoir - Fall Creek
48	Ingalls Water Department	04579	PS	WELL	7	2008	0	Geist Reservoir - Fall Creek
48	Ingalls Water Department	04579	PS	WELL	8	2008	0	Geist Reservoir - Fall Creek
48	Pendleton Municipal Water Utility	02163	PS	WELL	2	2008	0	Geist Reservoir - Fall Creek
48	Pendleton Municipal Water Utility	02163	PS	WELL	3	2008	0	Geist Reservoir - Fall Creek
48	Pendleton Municipal Water Utility	02163	PS	WELL	4	2008	0	Geist Reservoir - Fall Creek
55	Town of Morgantown	00208	PS	WELL	4	2008	0	Indian Creek
55	Voyles Farms, Inc.	00927	IR	WELL	1	2008	0	Indian Creek
18	Ball State University	03916	IR	WELL	3	2008	0	Killbuck Creek - White River
18	Ball State University	03916	IR	WELL	4	2008	0	Killbuck Creek - White River
18	Ball State University	03916	IR	WELL	5	2008	0	Killbuck Creek - White River
18	Ball State University	03916	IR	WELL	6	2008	0	Killbuck Creek - White River
18	Ball State University	03916	IR	WELL	7	2008	0	Killbuck Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
18	Country View Farms	02444	PS	WELL	2	2008	0	Killbuck Creek - White River
18	Delaware Acres M H Community	01392	PS	WELL	2	2008	0	Killbuck Creek - White River
18	Elks Country Club	00729	IR	WELL	2	2008	0	Killbuck Creek - White River
48	IMI-Anderson	04126	IN	INTAKE	2	2008	0	Killbuck Creek - White River
48	Anderson Country Club	02652	IR	WELL	2	2008	0	Killbuck Creek - White River
48	Anderson Water Department	00863	PS	WELL	7	2008	0	Killbuck Creek - White River
48	Edgewood Golf and Dining	02660	IR	WELL	1	2008	0	Killbuck Creek - White River
48	Prairie Farms Dairy Products	00267	IN	WELL	3	2008	0	Killbuck Creek - White River
48	Town of Chesterfield	00277	PS	WELL	3	2008	0	Killbuck Creek - White River
48	Town of Edgewood	00019	PS	WELL	2	2008	0	Killbuck Creek - White River
48	Town of Edgewood	00019	PS	WELL	3	2008	0	Killbuck Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	1	2008	0	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	2	2008	0	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	3	2008	0	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	51	2008	0	Lambs Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
55	Indianapolis Power & Light Company	00476	EP	WELL	52	2008	0	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	53	2008	0	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	54	2008	0	Lambs Creek - White River
55	Indianapolis Power & Light Company	00476	EP	WELL	55	2008	0	Lambs Creek - White River
18	Indiana-American Water Company, Inc.	02364	PS	INTAKE	1 AUX	2008	0	Muncie Creek - White River
18	Irving Bros Stone & Gravel	02710	IN	INTAKE	2	2008	0	Muncie Creek - White River
18	Delaware Country Club	02181	IR	WELL	1	2008	0	Muncie Creek - White River
68	Town of Parker City	00112	PS	WELL	2	2008	0	Muncie Creek - White River
18	Town of Gaston	01117	PS	WELL	3	2008	0	Pipe Creek
48	Indiana-American Water Company, Inc.	00571	PS	WELL	2	2008	0	Pipe Creek
41	Bruce Waterman	01890	IR	INTAKE	4	2008	0	Pleasant Run - White River
41	Bruce Waterman	01890	IR	INTAKE	5	2008	0	Pleasant Run - White River
49	Hanson Aggregates Midwest, Inc.	02013	IN	INTAKE	6	2008	0	Pleasant Run - White River
49	Peaper Brothers, Inc.	01061	IR	INTAKE	2	2008	0	Pleasant Run - White River



COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	American United Life Insurance Company	00366	EP	WELL	3W	2008	0	Pleasant Run - White River
49	Arthur Quebe	01614	IR	WELL	1	2008	0	Pleasant Run - White River
49	August Wiegman	02056	IR	WELL	2	2008	0	Pleasant Run - White River
49	Clarian Health Partners, Inc.	04345	MI	WELL	DW-1	2008	0	Pleasant Run - White River
49	Clarian Health Partners, Inc.	04345	MI	WELL	DW-2	2008	0	Pleasant Run - White River
49	Clarian Health Partners, Inc.	04345	MI	WELL	DW-3	2008	0	Pleasant Run - White River
49	Clarian Health Partners, Inc.	04345	MI	WELL	DW-5	2008	0	Pleasant Run - White River
49	Clarian Health Partners, Inc.	04345	MI	WELL	DW-6	2008	0	Pleasant Run - White River
49	Diamond Chain Company	00364	IN	WELL	2	2008	0	Pleasant Run - White River
49	Diamond Chain Company	00364	IN	WELL	3	2008	0	Pleasant Run - White River
49	Diamond Chain Company	00364	IN	WELL	4	2008	0	Pleasant Run - White River
49	Eli Lilly & Company	01004	IN	WELL	9	2008	0	Pleasant Run - White River
49	Eli Lilly & Company	01004	IN	WELL	10	2008	0	Pleasant Run - White River
49	Eli Lilly & Company	01004	IN	WELL	11	2008	0	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Eli Lilly & Company	01004	IN	WELL	12	2008	0	Pleasant Run - White River
49	Hafer Brothers Inc.	01387	IR	WELL	2	2008	0	Pleasant Run - White River
49	Hoosier Concrete, LLC	04540	IN	WELL	2	2008	0	Pleasant Run - White River
49	Indianapolis Power & Light Company	00475	EP	WELL	3	2008	0	Pleasant Run - White River
49	Indianapolis Power & Light Company	00475	EP	WELL	7	2008	0	Pleasant Run - White River
49	Indianapolis Power & Light Company	00475	EP	WELL	60	2008	0	Pleasant Run - White River
49	Indianapolis Power & Light Company	00475	EP	WELL	70-1	2008	0	Pleasant Run - White River
49	Industrial Anodizing Company, Inc.	01177	IN	WELL	3	2008	0	Pleasant Run - White River
49	Meyer & Humes	00899	IR	WELL	1	2008	0	Pleasant Run - White River
49	Peaper Brothers, Inc.	01060	IR	WELL	2	2008	0	Pleasant Run - White River
49	Schuster's Block, Inc.	03908	IN	WELL	2	2008	0	Pleasant Run - White River
49	St. Francis Hospital Center	01870	IN	WELL	2	2008	0	Pleasant Run - White River
49	Willow Glen Apartments South	01833	EP	WELL	4	2008	0	Pleasant Run - White River
49	Willow Glen Apartments South	01833	EP	WELL	14	2008	0	Pleasant Run - White River
49	Willow Glen Apartments South	01833	EP	WELL	16	2008	0	Pleasant Run - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
49	Willow Glen Apartments South	01833	EP	WELL	19	2008	0	Pleasant Run - White River
49	Willow Glen Apartments South	01833	EP	WELL	24	2008	0	Pleasant Run - White River
29	Martin Marietta Materials, Inc.	02981	IN	INTAKE	1	2008	0	Stony Creek - White River
29	Bridgeston American Tire Operations	03688	MI	WELL	EW-2	2008	0	Stony Creek - White River
29	Bridgeston American Tire Operations	03688	MI	WELL	EW-3	2008	0	Stony Creek - White River
29	Indiana-American Water Company, Inc.	00569	PS	WELL	3	2008	0	Stony Creek - White River
29	Indiana-American Water Company, Inc.	00569	PS	WELL	4	2008	0	Stony Creek - White River
29	Indiana-American Water Company, Inc.	04181	PS	WELL	2	2008	0	Stony Creek - White River
29	Indiana-American Water Company, Inc.	04181	PS	WELL	3	2008	0	Stony Creek - White River
29	Indiana-American Water Company, Inc.	04181	PS	WELL	4	2008	0	Stony Creek - White River
29	Meadows Property Owner Association	04098	MI	WELL	1	2008	0	Stony Creek - White River

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
29	Purgatory Golf Course	04761	IR	WELL	6	2008	0	Stony Creek - White River
48	Lapel Municipal Water Company	00203	PS	WELL	1	2008	0	Stony Creek - White River
48	Lapel Municipal Water Company	00203	PS	WELL	MAIN	2008	0	Stony Creek - White River
6	White Lick Golf Course	03498	IR	WELL	3	2008	0	White Lick Creek
32	Deer Creek Golf Course	03460	IR	WELL	1	2008	0	White Lick Creek
32	Deer Creek Golf Course	03460	IR	WELL	2	2008	0	White Lick Creek
32	Deer Creek Golf Course	03460	IR	WELL	6	2008	0	White Lick Creek
32	O'Reilly Raceway Park	03554	PS	WELL	21	2008	0	White Lick Creek
32	Stafford Pointe Apartments	02850	EP	WELL	2	2008	0	White Lick Creek
32	Stafford Pointe Apartments	02850	EP	WELL	3	2008	0	White Lick Creek
32	Steel Dynamics, Inc,	04675	IN	WELL	2	2008	0	White Lick Creek
49	Cloverleaf Enterprises Inc.	02575	EP	WELL	3	2008	0	White Lick Creek
49	Sumco, Inc.	04150	IN	WELL	2	2008	0	White Lick Creek
55	Hydraulic Press Brick	00717	IN	INTAKE	3	2008	0	White Lick Creek
55	Hydraulic Press Brick	00717	IN	INTAKE	1B	2008	0	White Lick Creek
55	Eagle Pines Golf Club	01696	IR	WELL	1	2008	0	White Lick Creek

COUNTY NUMBER	NAME	REGISTRATION NUMBER	WATER USE CODE*	SOURCE	SOURCE IDENTIFICATION NUMBER	YEAR	PUMPED ANNUALLY (IN 1000 OF GALLONS)	SUBWATERSHED
55	Town of Brooklyn	02512	PS	WELL	2	2008	0	White Lick Creek

## **Appendix VI**

### **TMDL Studies Conducted in the Upper White River Watershed**

<b>TMDL Name</b>	<b>Waterbody Name</b>	<b>14 Digit HUC ID</b>	<b>County</b>	<b>Miles</b>	<b>Approval Date</b>
Duck/Pipe/Killbuck/Stony Creek	Sugar Run and other Tributaries	05120201070020	Hamilton	3.87	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Little Duck Creek Basin	05120201060020	Madison	2.76	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Duck Creek - Elwood to Little Duck Creek	05120201060010	Madison	2.63	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Polywog Creek	05120201060030	Tipton	8.19	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek	05120201040010	Delaware	7.13	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Duck Creek	05120201060040	Hamilton	4.48	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Bear Creek - West Fork Bear Creek	05120201060050	Hamilton	11.37	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Duck Creek	05120201060060	Hamilton	1.71	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Duck Creek - Todd Ditch	05120201060010	Madison	13.04	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Long Branch	05120201060060	Hamilton	4.28	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Big Duck Creek	05120201060010	Madison	6.81	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Stony Creek - Headwaters	05120201070040	Madison	6.58	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Stony Creek - William Lock Ditch Tributaries	05120201070050	Hamilton	4.78	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Stony Creek	05120201070050	Hamilton	3.81	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	William Lehr Ditch and other tributaries	05120201070060	Hamilton	3.61	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Stony Creek	05120201070060	Hamilton	2.70	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	North Trib - Noblesville	05120201070070	Hamilton	1.12	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Stony Creek	05120201070070	Hamilton	4.29	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Duck Creek	05120201060060	Hamilton	4.14	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek - to mouth	05120201040070	Madison	1.87	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek - Thurston Ditch	05120201040020	Delaware	6.44	23-Apr-08



<b>TMDL Name</b>	<b>Waterbody Name</b>	<b>14 Digit HUC ID</b>	<b>County</b>	<b>Miles</b>	<b>Approval Date</b>
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek - Thurston Ditch	05120201040020	Delaware	6.44	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Jakes Creek - Eagle Branch	05120201040030	Delaware	7.10	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek - Pleasant Run Creek	05120201040040	Delaware	7.35	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek	05120201040050	Delaware	0.91	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Duck Creek - Little Duck Creek to Polywog Creek	05120201060030	Madison	1.22	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Little Killbuck Creek - Nelson Brook	05120201040060	Madison	10.13	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek - Swanfelt Ditch to County Line	05120201050090	Madison	6.33	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Indian Creek (Madison)	05120201040090	Madison	4.80	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek - Yeager Finley Menard Ditch	05120201005010	Delaware	9.53	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050080	Madison	2.86	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Killbuck Creek	05120201040050	Madison	7.59	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek - Hamilton County	05120201050090	Hamilton	1.05	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050020	Delaware	1.54	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050070	Madison	4.19	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050060	Madison	2.45	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050040	Madison	0.95	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050030	Madison	4.08	23-Apr-08
Duck/Pipe/Killbuck/Stony Creek	Pipe Creek	05120201050020	Madison	4.16	23-Apr-08
Fall Creek	Fall Creek	05120201110020	Marion	4.58	31-Mar-04
Fall Creek	Fall Creek	05120201110050	Marion	15.75	31-Mar-04
Fall Creek	Fall Creek	05120201110060	Marion	7.60	31-Mar-04

<b>TMDL Name</b>	<b>Waterbody Name</b>	<b>14 Digit HUC ID</b>	<b>County</b>	<b>Miles</b>	<b>Approval Date</b>
Indian Creek	Oliver Creek, Crooked Creek	05120201170040	Morgan	13.12	19-Jul-05
Indian Creek	Indian Creek Below Lamb Lake	05120201170010	Johnson	2.06	19-Jul-05
Indian Creek	Indian Creek	05120201170010	Johnson	3.28	19-Jul-05
Indian Creek	Goose Creek	05120201170020	Johnson	19.28	19-Jul-05
Indian Creek	Indian Creek - Goose/Barnes Creeks	05120201170020	Johnson	0.47	19-Jul-05
Indian Creek	Sand Creek	05120201170070	Morgan	6.60	19-Jul-05
Indian Creek	Indian Creek - Bear Creek	05120201170030	Morgan	0.00	19-Jul-05
Indian Creek	Indian Creek - Bear Creek	05120201170030	Johnson	3.80	19-Jul-05
Indian Creek	Indian Creek - Sand Creek	05120201170070	Morgan	4.73	19-Jul-05
Indian Creek	Indian Creek - Robertson Creek	05120201170060	Morgan	5.32	19-Jul-05
Indian Creek	Indian Creek - Camp Creek	05120201170050	Morgan	3.75	19-Jul-05
Indian Creek	Camp Creek	05120201170050	Morgan	7.06	19-Jul-05
Indian Creek	Pike Creek	05120201170040	Morgan	7.24	19-Jul-05
Indian Creek	Crooked Creek	05120201170040	Morgan	11.74	19-Jul-05
Indian Creek	Indian Creek - Crooked/Oliver Creek	05120201170040	Morgan	1.77	19-Jul-05
Lamb's Creek	Goose Creek	05120201160050	Morgan	3.94	01-Mar-06
Lamb's Creek	Lamb's Creek	05120201160050	Morgan	7.00	01-Mar-06
Lamb's Creek	Lamb's Creek - Patton Lake	05120201160040	Morgan	6.79	01-Mar-06
Middle West Fork White River	West Fork White River	05120201160060	Morgan	8.95	21-Jul-05
Middle West Fork White River	Sycamore Creek	05120201160020	Morgan	13.36	21-Jul-05
Middle West Fork White River	White River - Paragon Bridge	05120201180030	Morgan	6.06	21-Jul-05
Middle West Fork White River	West Fork White River	05120201180090	Owen	5.09	21-Jul-05
Middle West Fork White River	White River - Highland Creek	05120201160030	Morgan	0.41	21-Jul-05
Middle West Fork White River	Highland Creek	05120201160030	Morgan	4.37	21-Jul-05

<b>TMDL Name</b>	<b>Waterbody Name</b>	<b>14 Digit HUC ID</b>	<b>County</b>	<b>Miles</b>	<b>Approval Date</b>
Middle West Fork White River	Clear Creek - East/West/Grassy Forks	05120201140140	Morgan	17.23	21-Jul-05
Middle West Fork White River	White River - Henderson Bridge	05120201140130	Morgan	3.90	21-Jul-05
Middle West Fork White River	White River - North Trib (Centenary Church)	05120201140060	Morgan	2.70	21-Jul-05
Middle West Fork White River	West Fork White River	05120201140040	Morgan	4.56	21-Jul-05
Middle West Fork White River	West Fork White River	05120201140030	Morgan	8.44	21-Jul-05
Middle West Fork White River	White River - Pocket Hollow	05120201180060	Morgan	3.74	21-Jul-05
Middle West Fork White River	West Fork White River	05120201160010	Morgan	3.93	21-Jul-05
Pleasant Run	Pleasant Run	05120201130030	Marion	9.73	31-Mar-04
Pleasant Run	Pleasant Run	05120201130040	Marion	1.65	31-Mar-04
West Fork White River (Marion County to Waverly)	Lick Creek - Beech Creek	05120201130060	Marion	0.60	31-Mar-04
West Fork White River (Marion County to Waverly)	White River - Hide Creek	05120201130080	Marion	4.41	31-Mar-04
West Fork White River (Marion County to Waverly)	White River - Pleasant Run - Bean Creek	05120201130040	Marion	3.41	31-Mar-04
West Fork White River (Marion County to Waverly)	White River - Broadripple	05120201090080	Marion	3.48	31-Mar-04
West Fork White River (Marion County to Waverly)	White River - Haverstick Creek/Howland Ditch	05120201090050	Marion	4.41	31-Mar-04
West Fork White River (Marion County to Waverly)	West Fork White River	05120201130020	Marion	2.55	31-Mar-04
West Fork White River (Marion County to Waverly)	White River - Mann Creek/Harness Ditch	05120201130100	Marion	3.77	31-Mar-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Shoemaker Ditch	05120201030020	Delaware	5.26	09-Apr-04

<b>TMDL Name</b>	<b>Waterbody Name</b>	<b>14 Digit HUC ID</b>	<b>County</b>	<b>Miles</b>	<b>Approval Date</b>
West Fork White River (Muncie to Hamilton/Marion)	West Fork White River	05120201090010	Hamilton	6.51	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Mallory Granger Ditch	05120201070030	Hamilton	6.91	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Duck Creek to Riverwood	05120201070020	Hamilton	3.83	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Perkinsville	05120201040100	Madison	8.67	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Pipe Creek to Duck Creek	05120201070010	Hamilton	5.51	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Turkey Creek	05120201030030	Madison	8.05	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - York Prairie Creek	05120201030010	Delaware	3.13	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Buck Creek (Lower)	05120201020060	Delaware	7.69	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Muncie Creek	05120201010130	Delaware	1.74	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Vestal Ditch/Michener Ditch	05120201090020	Hamilton	2.15	09-Apr-04
West Fork White River (Muncie to Hamilton/Marion)	White River - Edgewood	05120201040080	Madison	6.02	09-Apr-04

**Appendix VII**

**IDEM Fixed Station Water Quality Data**

IDEM Fixed Station Water Quality Data is available in electronic format. Please contact Lisa Bihl at Empower Results to obtain this data.

Email: [lbihl@empowerresults.com](mailto:lbihl@empowerresults.com)









1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	3/10/1993 15:30	D11444	192	12	<0.005	40	256	<0.1	2.7	7.8	0.09	1	0.7	391	35		
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	4/12/1993 13:20	D11439	195	15	<0.005	180	252	<0.1	2.9	7.7	0.1		0.8	373	40		
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	5/27/1993 14:00	D11450	197	17	<0.005	80	254	<0.1	1.4	8.3	0.07	2.9	1.1	356	15		
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	6/24/1993 12:00	D11462	183	12	<0.005	130	248	<0.1	1.6	7.7	0.07		1.1	338	18		
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	8/23/1993 14:50	D11508	220	22	<0.005	160	268	<0.1	0.8	7.9	0.2		1.4	417	34		
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	10/7/1993 14:00	D11366	212	17	<0.005	710	264	<0.1	0.8	7.9	0.12		1.8	343	9		
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	11/1/1993 12:30	D11571	229	17	<0.005	70	288	<0.1	0.9	8.2	0.14		2.7	1	405	7	
1993 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-96	10	36.43610085	4403855.742	570492.8149	11/30/1993 13:00	D11576	177	14	<0.005	70	226	<0.1	1.6	8.1	0.15		2	1	315	17	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	1/22/1993 12:40	D11385	193	14	<0.005	1200	0.2	254	<0.1	3.3	7.8	0.24	4.6	1.1	349	0.9	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	2/10/1993 15:00	D11422	269	12	<0.005	50	0.3	344	<0.1	2.6	7.8	0.11	73	0.4	804	0.5	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	3/10/1993 14:30	D11417	149	16	<0.005	460	0.2	206	<0.1	3.8	7.6	0.19	32	2.3	293	0.9	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	4/12/1993 12:35	D11432	167	22	<0.005	260	0.2	222	<0.1	3.2	7.6	0.17	35	2.95	1.2	422	53
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	5/27/1993 13:20	D11453	195	16	<0.005	250	0.009	250	<0.2	2.80	0.2	2.80	0.1	1.8	0.21	371	1.1
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	6/19/1993 13:00	D114625	265	19	<0.005	240	0.2	270	<0.1	5	7.7	0.22	40	1.7	371	1.4	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	8/23/1993 13:00	D115085	287	18	<0.005	240	0.3	316	<0.1	1.8	8.1	0.21	4.8	0.1	371	1.4	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	10/7/1993 12:50	D115369	285	11	<0.005	250	0.4	363	<0.1	2.4	8	0.27	9.4	0.6	525	0.6	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	11/1/1993 11:50	D115574	289	12	<0.005	30	0.3	363	<0.1	1.9	8.1	0.29	7.8	1.3	503	0.7	
1993 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	11/30/1993 13:50	D115719	220	13	<0.005	350	0.2	296	<0.1	2.6	8.1	0.14	42	1.7	362	0.7	
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	1/22/1993 12:20	D113836	187	17	<0.005	1100	248	<0.1	3.1	7.8	0.25		2	402	47		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	2/10/1993 14:35	D114023	271	13	<0.005	140	344	<0.1	2.6	7.8	0.11		3	554	6		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	3/9/1993 13:55	D11418	241	22	<0.005	1100	186	<0.1	3.7	7.7	0.26	2.6	2	377	92		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	4/12/1993 12:15	D114323	275	23	<0.005	90	236	<0.1	3.3	7.6	0.2		3	392	69		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	5/27/1993 13:00	D11454	209	15	<0.005	240	0.2	262	<0.1	4.8	7.2	0.22	3.5	2	447	31	
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	6/24/1993 13:25	D114626	249	17	<0.005	170	260	<0.1	5	7.6	0.17		3.1	406	48		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	8/2/1993 13:00	D115086	245	17	<0.005	190	319	<0.1	2.3	7.9	0.32		1.4	516	20		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	10/7/1993 12:30	D115370	289	8	<0.005	20	375	<0.1	2.3	8	0.27		6	561	9		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	11/1/1993 11:30	D115576	297	12	<0.005	110	365	<0.1	1.8	8.2	0.27		1.8	522	<4		
1993 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	11/30/1993 14:20	D115720	229	13	<0.005	240	236	<0.1	2.6	8.2	0.15		1.1	398	19		
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	1/27/1993 10:00	D113892	259	10	<0.005	1600	0.3	336	<0.1	3.4	7.7	0.09	74	1.4	431	0.6	
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	3/3/1993 12:00	D114079	259	13	<0.005	1500	0.2	294	<0.1	1.8	7.2	0.08	43	1.9	375	0.6	
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	3/24/1993 13:50	D114204	191	23	<0.005	1700	0.2	250	<0.2	3.1	7.2	0.23	49	3.1	330	1.1	
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	4/8/1993 10:20	D114379	277	12	<0.005	1400	0.3	346	<0.1	2	7.6	0.07	87	6.1	465	0.6	
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	5/6/1993 8:00	D114510	275	8	<0.005	40	0.3	348	<0.1	1.4	7.9	0.06	100	1.3	488	0.6	
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	6/15/1993 13:20	D114682	73	65	<0.005	29000	0.2	160	<0.2	4.1	7.1	0.82	31	2.34	3.6	883	600
1993 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	61																	

1994 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	5/27/1994 14.30	D116539	201	27	0.013	390	286	1.7	2.4	8.1	0.26	1.6	2.6	481	6		
1994 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	6/27/1994 16.45	D116689	171	26	<-0.005	800	225	0.1	0.3	8	0.13			344	24		
1994 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/4/1994 7.30	D117055	224	15	<-0.005	93	282	0.1	0.3	8.2	<-0.03	2.1	1.8	408	12		
1994 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/24/1994 11.00	D117523	196	13	<-0.005		264	0.2	0.1	8.4	0.05	0.6	368	13			
1994 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	10/11/1994 14.40	D117799	211	11.3	<-0.005	40	260	<0.1	0.1	8.3	<-0.03	1.5	0.9	383	<4		
1994 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	11/3/1994 12.40	D117894	211	13.1	<-0.005	10	217	<0.1	0.2	8.3	<-0.03	0.7	0.7	413	10		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	1/3/1994 13.00	D115844	261	11	<-0.005	190	337	<0.1	2.3	8	0.15	<1	0.6	462	9		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	2/17/1994 12.20	D116106	180	17	0.005		233	0.1	2.5	8	0.08		348	30			
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	3/11/1994 13.00	D116220	186	18	0.01	<-10	231	0.8	1.9	8.1	0.55	3.9	1.5	405	5		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	4/8/1994 10.25	D116387	194	13	<-0.005	110	232	0.1	1.4	8.1	0.08		1	546	14		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	5/27/1994 9.00	D116540	203	19	0.005	1500	270	0.2	2.5	8.1	0.14	4.6	2.0	382	22		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	6/27/1994 17.00	D116690	167	42	<-0.005	1700	229	0.2	0.3	8	0.3			506	204		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	8/4/1994 7.00	D117056	246	23	0.008	830	337	0.2	4	7.8	0.1	1.4	638	16			
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	8/24/1994 10.30	D117524	240	14	<-0.005	40	278	0.5	0.3	7.9	0.09	2.9	2.2	342	12		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	10/11/1994 14.20	D117800	193	17.6	0.015		286	0.4	4.4	8	0.19	0.2	1.2	570	6		
1994 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	5120201120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	11/3/1994 12.00	D117895	203	20.7	0.013	2300	317	0.8	5	8.2	0.2	2.1	664	7			
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	1/3/1994 15.00	D115838	250	11	0.2	310	<0.1	1.8	8.2	0.04	43	<1	350	381	6		
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	2/17/1994 14.15	D116101	186	17	<-0.005		0.2	240	0.1	1.6	8	0.05	34	300	322	20	
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	3/11/1994 11.00	D116214	228	7	<-0.005	<10	0.2	276	<0.1	1.5	8.3	0.04	38	1.9	328	7	
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	4/8/1994 12.10	D116381	226	12	<-0.005	40	0.2	294	<0.1	1.1	8.3	0.06	42	370	17		
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	5/26/1994 13.00	D116534	192	18	<-0.005	1800	0.2	250	0.1	1	7.9	0.09	42	2.5	307	338	16
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	6/27/1994 15.20	D116684	167	22	<-0.005	2600	0.2	213	<0.1	0.2	8	0.1	32	281	334	27	
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	8/4/1994 9.30	D117050	196	26	<-0.005	280	0.2	248	<0.1	0.2	8.3	0.08	39	5.1	306	369	41
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	8/24/1994 13.00	D117518	163	17	<-0.005		0.2	235	0.2	<0.1	8.4	0.08	37	292	325	17	
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	10/11/1994 16.00	D117794	218	15.2	<-0.005	10	0.2	238	<0.1	<0.1	8.3	0.09	41	7	349	20	
1994 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	11/4/1994 14.00	D117889	183	16.1	<-0.005	110	0.2	233	<0.1	<0.1	8.2	0.08	42	2.8	305	305	17
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	1/3/1994 15.30	D115837	233	12	<-0.005	<10	300	<0.1	1.9	8.2	0.06	<1	0.7	376	7		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	2/17/1994 14.45	D116100	192	25	0.009		250	0.2	2.8	8	0.03	0.6	1.4	360	47		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	3/11/1994 10.40	D116213	247	10	<-0.005		0.2	286	0.2	2	8.3	0.08	2.7	0.5	390	5	
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	4/8/1994 12.40	D116380	245	16	<-0.005	50	323	<0.1	1.6	8.2	0.16	0.9	0.9	465	31		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	5/26/1994 12.30	D116533	209	18	0.006	880	288	0.4	5	7.9	0.24	5.1	1.4	434	40		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	6/27/1994 15.00	D116683	184	22	<-0.005	1100	244	0.2	0.5	8	0.15	1.2	1.2	376	31		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	8/4/1994 10.00	D117049	196	17	<-0.005	720	264	0.2	0.8	8.1	0.19	4.4	1.3	461	25		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	8/24/1994 13.30	D117517	180	19	<-0.005	80	240	0.2	0.2	8.3	0.1	1	1	355	10		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	10/11/1994 16.30	D117793	218	18	<-0.005	80	276	<0.1	0.3	8.4	0.14	3	1.1	485	6		
1994 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	11/4/1994 14.20	D117888	229	13.1	<-0.005	140	292	<0.1	1	8.2	0.28	1.1	504	22			
1994 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201090080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	1/3/1994 14.40	D115840	267	11	<-0.005	380	0.3	359	<0.1	2.5	8.2	0.15	69	468	<4		
1994 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201090080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	2/17/1994 13.55	D116102	201	25	<-0.005	201	0.2	260	0.2	2.2	8	0.08	53				







1996 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	207	40	13.3	<0.005	220	242	<0.1	1.1	8.2	0.08	44	1.5	342	0.7	3.6	359	6			
1996 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	12/16/1996 11:15	D122904	203	36	13.6	<0.005	150	260	<0.1	2.5	7.8	0.07	46	347	0.6	3.7	370	16		
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	1/11/1996 11:30	D120847	296	12.2	0.008	3300	0.4	398	0.3	2.7	8.2	0.39	115	<1	666	0.8	683	<4		
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	2/12/1996 12:00	D120751	296	0.3	10.4	<0.005	180	398	0.2	3.2	8.3	0.21	57	471	0.7	493	5			
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	4/21/1996 11:45	D121055	188	48	17.1	<0.005	150	0.2	276	<0.1	6.1	8.2	0.15	57	1.1	401	0.6	4	424	20
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	4/15/1996 17:50	D121159	225	60	15.4	<0.005	200	0.4	310	<0.1	3.8	8.4	0.17	76	468	0.7	4.1	485	14	
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	5/13/1996 16:10	D121464	221	30	23.2	<0.005	980	0.2	300	0.1	7	7.9	0.22	38	2.2	465	1.1	5.1	479	13
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	6/10/1996 16:10	D121568	188	31	21.4	0.007	4200	0.2	312	0.1	6.2	7.9	0.26	44	377	1	3.8	471	82	
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	7/8/1996 15:30	D121917	120	68	25.2	<0.005	110	0.3	178	<0.1	1.6	8.2	0.24	86	8.4	465	1.7	4.5	521	54
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	8/12/1996 12:10	D122040	120	84	27.3	<0.005	290	0.3	180	<0.1	1.1	8.1	0.2	88	505	1.9	4.3	551	39	
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	9/10/1996 16:30	D122487	255	110	22.2	<0.005	140	0.4	328	0.1	1.7	8.1	0.47	110	6.6	627	1.4	4.3	666	27
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	10/7/1996 8:30	D122695	227	73	11.8	0.008	470	0.3	306	<0.1	2.4	8.3	0.34	82	524	0.7	3.1	566	20	
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	11/19/1996 9:10	D122799	253	58	12.9	<0.005	370	0.3	334	<0.1	3.4	8.2	0.25	91	510	0.6	3.4	538	<4	
1996 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	5120201900800	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	12/16/1996 7:30	D122907	186	39	16.7	<0.005	860	0.2	268	0.1	5.2	7.8	0.17	48	<1	370	0.9	4.2	405	30
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	11/1/1996 12:00	D120648	294	10.6	0.80	380	0.2	388	0.2	2.8	8.3	0.36	38	<1	370	0.9	4.2	405	30	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	2/12/1996 11:30	D120752	294	10.4	0.80	380	0.2	388	0.2	3.2	8.3	0.18	60	388	0.2	3.2	8.3	0.18	465	6
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	4/21/1996 18:15	D121056	192	47	18	0.008	270	274	<0.1	6.3	8.2	0.15	60	1.3	403	0.9	4.3	436	32	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	4/15/1996 12:20	D121160	231	60	14.1	<0.005	180	320	<0.1	3.6	8.4	0.18	81	2	480	0.8	4.1	492	11	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	5/13/1996 15:30	D121465	235	30	22	0.008	10	328	<0.1	7.2	8	0.2	40	2	489	1	5	503	12	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	6/10/1996 15:30	D121569	165	29	34.4	0.008	8000	314	0.1	6.5	7.9	0.38	38	345	1.4	4.8	487	120		
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	7/8/1996 14:45	D121918	123	71	23.2	0.008	20	186	<0.1	1.9	8.4	0.23	96	8	513	1.4	4.3	558	43	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	8/12/1996 12:50	D122041	123	87	27.3	<0.005	110	190	<0.1	1.4	8.3	0.3	98	34	545	1.4	3.9	581	30	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	9/10/1996 16:00	D122488	251	92	15.4	<0.005	330	316	0.2	2.5	7.9	0.51	120	2.8	626	0.9	5.7	659	22	
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	10/7/1996 8:30	D122696	247	90	9.8	0.008	140	332	<0.1	2.6	8.2	0.46	90	370	0.6	3	626	17		
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	11/9/1996 9:10	D122800	255	56	12.5	<0.005	86	0.3	324	<0.1	3.2	8.2	0.23	85	<1	500	0.6	3.3	531	5
1996 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	5120201900500	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	12/16/1996 8:10	D122908	199	39	16.7	<0.005	2800	264	0.1	5.3	7.8	0.17	51	377	0.8	4.1	408	20		
1996 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	5120201300300	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	1/29/1996 12:00	D120708	223	14.1	<0.005	3800	0.2	306	0.2	4	8.3	0.13	81	1.2	426	0.7	459	12		
1996 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	5120201300300	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	2/22/1996 12:10	D120810	290	10.2	<0.005	30	0.4	388	<0.1	2.8	8.3	0.2	130	2	584	0.5	598	12		
1996 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	5120201300300	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	4/3/1996 11:30	D121114	188	29	18.2	<0.005	260	0.2	258	<0.1	6.6	8.3	0.2	58	2	384	1.1	4.8	436	21
1996 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	5120201300300	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	5/2/1996 12:15	D121218	169	21	25.2	<0.005	690	0.2	246	0.1	4	7.9	0.24	45	2	330	1.1	5	404	68
1996 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	5120201300300	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	5/30/1996 13:00	D121523	165	19	25	<0.005	5300	0.2	228	0.2	4	7.8	0.31	37	2	315	1.6	5.2	470	153
1996 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	5120201300300	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	6/24/1996 12:45	D121627	274	37	14.3	<0.005	280	0.3	332	<0.1	2									



1997 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	8/7/1997 9:50	D123793	225	130	10.4	<0.005	250	322	<0.1	4.8	7.9	0.09	53			590	0.5	3.2	619	11	
1997 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	9/11/1997 8:55	D123794	226	70	14.7	<0.005	800	221	<0.1	2.6	7.9	0.16	44	1		386	0.8	3.9	415	26	
1997 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	10/9/1997 9:00	D124159	204	185	15.5	<0.005	640	307	<0.1	8	7.9	0.14	64			677	0.6	4.3	713	17	
1997 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	11/6/1997 9:15	D123423	216	135	10.3	<0.005	190	303	<0.1	5.8	7.8	0.1	57	<1		574	0.5	3.7	578	<4	
1997 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	12/4/1997 9:10	D124509	225	97	11	<0.005	130	293	<0.1	3.1	8.1	0.06	52			485	0.4	3.5	514	<4	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	1/21/1997 9:50	D123024	238	130	12.5	<0.005	130	298	<0.1	2.5	7.8	0.04	45	1.4		527	0.5	2.8	536	5	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	2/11/1997 9:40	D123126	169	44	13.2	<0.005	40	224	<0.1	3.1	7.9	0.12	32			317	0.7	3.3	333	13	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	3/12/1997 9:50	D123238	169	47	9.7	<0.005	< 10	210	<0.1	1.9	7.6	0.11	34	<1		330	0.6	2.3	357	18	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	4/16/1997 10:00	D123345	207	34	12.5	<0.005	40	248	<0.1	2.7	7.7	0.05	33			284	0.5	2.6	307	13	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	5/13/1997 9:40	D123459	228	44	12.6	<0.005	300	236	<0.1	1.5	7.9	0.03	39	1.4		333	0.4	2.4	344	<4	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	6/12/1997 11:00	D123574	211	46	9.2	<0.005	370	222	<0.1	1.6	8.1	<0.03	41			361	0.4	2.5	386	6	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	7/10/1997 10:10	D123688	196	50	8.1	<0.005	300	212	<0.1	1.3	8.1	<0.03	41	1.1		368	0.4	3.1	396	10	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/7/1997 10:25	D123794	193	49	11.2	<0.005	190	262	<0.1	0.8	8.1	<0.03	37			361	0.5	2.9	381	17	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	9/11/1997 9:50	D123826	102	44	15.3	<0.005	1400	210	<0.1	0.5	7.8	0.1	38	1.6		299	0.6	3.1	333	31	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	10/9/1997 9:30	D123920	106	52	15.1	<0.005	190	233	<0.1	0.2	8	<0.05	35			334	0.6	3.7	363	18	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	11/6/1997 9:40	D124324	170	52	11.9	<0.005	140	233	<0.1	0.2	7.9	<0.03	44	1.3		337	0.5	3.3	349	9	
1997 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	12/4/1997 9:40	D124510	174	57	12.6	<0.005	1000	235	<0.1	0.2	8.1	<0.03	45			332	0.5	3.6	357	6	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	1/21/1997 9:15	D123025	257	280	13.2	<0.005	70	368	<0.1	2.5	7.7	0.06	62	1.7		822	0.6	3.2	835	5	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	2/11/1997 9:00	D123127	186	56	13.3	<0.005	60	250	<0.1	2.8	7.9	0.11	37			368	0.7	3	385	14	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	3/12/1997 10:20	D123239	160	60	9.7	<0.005	140	224	<0.1	2.2	7.6	0.09	46	<1		392	0.5	2.5	418	10	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	4/16/1997 10:30	D123346	195	46	12.9	<0.005	70	256	<0.1	2.3	7.6	0.05	39			336	0.7	2.8	349	8	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	5/13/1997 10:10	D123460	211	76	13.1	<0.005	140	266	<0.1	2.8	7.7	0.04	66	1.9		448	0.7	3.6	456	<4	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	6/12/1997 11:30	D123575	247	74	13.6	<0.005	260	264	<0.1	2.3	7.9	0.08	53			453	0.9	3.9	497	7	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	7/10/1997 10:50	D123689	219	100	18.5	<0.005	570	276	<0.1	2.9	8	0.1	67	2.3		532	1.1	6.1	545	7	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	8/7/1997 10:55	D123790	220	105	19.1	<0.005	460	270	<0.1	1.4	8.1	0.19	62	4.4		546	0.6	1.1	5.4	556	9
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	9/11/1997 9:50	D123826	106	67	16.7	<0.005	1400	225	<0.1	2	7.8	0.19	54	1.5		395	0.8	4.4	407	10	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	10/9/1997 9:55	D124161	208	125	15.9	<0.005	100	285	<0.1	1.9	7.9	0.36	62			523	0.7	4.3	549	7	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	11/6/1997 10:10	D124325	197	140	28.4	<0.005	600	318	<0.1	5.1	7.8	0.59	99	6.4		625	1.7	7.8	641	4	
1997 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	12/4/1997 10:10	D124511	195	81	14.7	<0.005	1300	268	<0.1	2.3	8	0.04	55			423	0.6	4.4	422	<4	
1997 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8008395	4409739.792	575136.4603	2/11/1997 12:00	D123121	199	35	10.8	<0.005	50	0.1	252	<0.1	2.6	7.9	0.09	32			326	0.7	2.7	349	19
1997 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8008395	4409739.792	575136.4603	3/12/1997 7:30	D123233	182	28	10.5	<0.005	20	0.1	194	<0.1	3	7.7	0.09	29	1						

1997 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	7/10/1997 11:20	D123669	188	96	29.7	0.009	780	254	0.2	1.8	8	0.56	130	5.2	600	2.7	5.9	670	66	
1997 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	8/7/1997 11:35	D123776	244	175	27.5	0.014	100	362	<0.1	3.8	7.6	1.75	125	1.776	1.4	6.5	804	28		
1997 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	9/11/1997 11:30	D123908	187	100	22	0.013	6700	254	0.3	1.6	7.4	0.67	110	2.9	540	1.4	4.9	580	32	
1997 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	10/9/1997 11:30	D124141	248	210	27.7	0.015	60	378	<0.1	3.6	7.4	1.42	270	6.0	1035	1.3	7.8	1082	21	
1997 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	11/6/1997 11:40	D124305	257	195	23.9	0.011	280	369	0.2	4.2	7.3	1.26	225	3.3	941	1.4	7.1	996	26	
1997 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	12/4/1997 11:40	D124491	261	170	18	0.01	610	374	0.2	4	7.7	1.09	185	3.7	880	1.2	6.2	905	22	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	1/15/1997 7:45	D123006	272	68	12.4	<0.005	420	314	0.1	3.6	7.6	0.31	76	1.2	520	0.8	3	544	20	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	2/13/1997 8:20	D123108	259	59	11.2	<0.005	240	300	0.2	3.2	7.7	0.15	65	4.61	0.9	2.8	483	17		
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	3/18/1997 6:30	D123220	186	33	17.2	<0.005	880	156	0.2	3.2	7.6	0.09	38	2.2	310	0.9	9.1	384	74	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	4/23/1997 7:40	D123327	251	64	16	<0.005	50	258	<0.1	2.4	8	0.18	74	4.58	0.8	3.9	485	8		
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	5/15/1997 12:00	D123441	249	76	22	<0.005	80	258	<0.1	2.7	8.5	0.37	80	5.1	524	1.3	4.5	600	27	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	6/10/1997 7:30	D123556	184	37	20.4	<0.005	260	200	<0.1	5.4	7.9	0.35	42	1.0	373	1	4.3	447	71	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	7/8/1997 7:50	D123670	96	80	27.7	<0.005	110	100	0.5	2.6	8.5	0.45	68	6.2	517	1.6	5	598	68	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	8/6/1997 7:30	D123776	250	140	22.7	0.005	300	366	<0.1	3.8	7.9	0.82	115	2.3	68	1.5	6.2	722	23	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	9/11/1997 10:45	D123907	159	92	27.4	0.009	2100	229	0.3	2.1	7.6	0.69	100	6.2	400	1.2	4.6	529	31	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	10/9/1997 11:00	D124142	244	180	13.1	0.007	230	348	<0.1	3.1	8	1.19	240	933	1.2	6.8	990	39		
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	11/6/1997 11:10	D124306	248	145	22.2	0.009	100	339	0.2	3.8	7.8	0.74	190	2.7	797	1.3	5.9	859	18	
1997 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	12/4/1997 11:15	D124492	246	135	13.9	<0.005	290	334	<0.1	3.3	8.1	0.8	180	7.61	0.8	4.8	789	11		
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	1/23/1997 12:15	D123080	90	15	42	<0.005	4100	122	0.3	2.2	7.3	0.64	22	6.7	198	2.1	2.3	389	188	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	2/17/1997 12:15	D123184	172	69	8.4	<0.005	150	352	<0.1	2.9	7.9	0.07	135	610	0.4	2.6	621	<4		
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	3/18/1997 11:30	D123296	257	33	18.4	<0.005	15000	240	0.2	3.1	7.7	0.2	77	4.6	403	1.1	3.6	440	37	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	4/17/1997 11:30	D123403	228	40	11.6	<0.005	240	236	<0.1	3.3	8.3	0.07	125	236	0.1	3.3	8.3	0.07	125	<4
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	5/19/1997 12:40	D123518	186	45	24.1	<0.005	80000	206	<0.1	3.6	1.6	7.8	0.36	145	5.23	1.3	5.1	550	15	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	6/23/1997 12:45	D123633	219	31	16.3	<0.005	650	254	<0.1	4.1	8	0.18	69	1.6	420	0.6	3.9	464	40	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	7/14/1997 12:40	D123747	240	56	11.1	<0.005	240	282	<0.1	2.2	9.1	0.24	75	1.4	473	0.6	3.5	500	9	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	8/11/1997 12:10	D123853	257	98	14.5	<0.005	130	386	<0.1	3.8	7.9	0.82	115	6.2	400	0.8	4.1	1135	8	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	9/16/1997 12:50	D123984	245	105	15.4	<0.005	820	349	0.1	6	7.8	1.09	380	<1	1055	1	4.9	1084	7	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	10/14/1997 12:35	D124219	193	74	23.6	<0.005	19000	262	0.9	2.6	7.8	1.35	270	2.7	786	1.8	6.6	803	5	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	11/13/1997 12:50	D124384	259	100	15.5	<0.005	1100	348	<0.1	5.4	7.7	1.3	595	<1	1267	0.7	5.4	1297	<4	
1997 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020120060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	12/22/1997 13:00	D124569	214	88	13.2	<0.005	1300	315	0.2	5.2	8	0.94	400	1019	0.9	4.4	1050	<4		
1997 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020110020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	1/23/1997 13:40	D123082	84	12	29.2	<0.005	1000	110	0.2	3	7.5	0.49	14	4.8	180	0.8	7.5	257	74	
1997 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020110020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	2/17/1997 13:50	D123186	259	26	6.8	<0.005	150	326	<0.1	3.7	8	0.04	38	373	0.3	1.9	383	<4		
1997 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020110020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	3/18/1997 12:50	D123298	199	21	9.6	<0.005	640	254	<0.1	4										



1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	4/13/1999 11:45	D127106	200	51	9.8	<0.005	40	0.2	280	<0.1	2.2	7.9	0.03	41	<1	380	0.4	3	398	22	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	5/6/1999 10:35	D127172	196	52	17.6	<0.005	13000	0.2	262	<0.1	1.7	8.1	0.04	39	<1	358	0.5	5.2	362	10	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/3/1999 11:00	D127370	130	49	<5	<0.005	108 (B)	0.19	220	<0.1	2.5	0.1	45	2	290	0.89	3.8	400	26		
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	7/6/1999 12:25	D127553	184	54	16.1	<0.005	100 (B)	0.2	238	<0.1	0.7	8.2	0.05	37	3	357	0.6	3.5	384	23	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/3/1999 13:20	D127558	180	54	13.3	<0.005	150	0.2	236	<0.1	0.6	8.3	0.05	33	1.7	338	0.7	3.3	372	21	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	9/14/1999 13:20	D127968	191	51	12.1	<0.005	25	0.2	228	<0.1	0.9	8.2	0.05	28	4.2	324	0.8	4.1	348	18	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	10/22/1999 10:45	D128180	170	55	17.2	<0.005	160	0.3	226	<0.1	0.3	8	0.06	39	2.5	316	0.8	3.9	341	16	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	11/16/1999 11:10	D128383	167	54	14.9	<0.005	20	0.2	207	<0.1	0.4	8	<0.03	40	3.2	320	0.6	4.3	328	6	
1999 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	12/2/1999 13:30	D128561	161	55	13.5	<0.005	20	0.4	217	<0.1	0.4	8.1	0.03	36	1.7	311	0.6	4.2	326	4	
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	1/15/1999 10:15	D128555	194	190	18	<0.005	400	1.8	290	<0.2	2.4	7.7	0.07	49	1.4	601	1.2	5.4	650	6	
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	2/2/1999 9:40	D128694	122	47	23.7	<0.005	70	1.70	0.1	2.4	7.6	0.16	32	1.4	290	0.9	4.2	343	20		
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	2/2/1999 12:25	D128630	154	44	13.3	<0.005	600	2.14	0.1	3.1	7.9	0.08	34	4.2	296	0.8	4	322	8		
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	4/13/1999 12:30	D127107	226	85	10.2	<0.005	40	0.2	296	<0.1	2.2	7.8	0.04	44	1.9	497	0.6	4.9	490	<4	
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	5/6/1999 10:10	D127173	160	58	19.2	<0.005	18500	0.2	266	<0.1	1.8	8	0.06	39	3.7	345	0.6	6.1	378	10	
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	8/3/1999 11:35	D127371	140	51	20	<0.005	420 (B)	0.2	230	<0.1	2.5	8	0.12	46	3	290	0.84	4.1	400	30	
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	7/6/1999 13:10	D127554	176	93	17.2	<0.005	200	264	<0.1	2.2	8.3	0.05	58	4.2	469	0.9	5.2	478	4		
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	8/3/1999 14:00	D127759	196	115	23.8	0.011	110	280	2.3	5.8	8.3	0.1	5.9	4.2	540	4.3	7.2	568	8		
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	9/14/1999 12:10	D127969	189	155	17.1	<0.005	0.008	31	302	0.5	5	8.2	0.33	89	6.03	603	1.6	6.6	647	6	
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	10/22/1999 11:10	D128181	201	110	11	0.008	150	268	0.1	3.9	8	0.09	70	1.7	529	1.4	6.4	533	5		
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	11/16/1999 12:00	D128384	193	185	19.6	<0.005	70	272	<0.1	4.7	8.3	0.17	67	3.6	641	1.1	5.6	667	5		
1999 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Corn Belt Plains	5120201120140	EC-1	WVU120-0001	Marion	39	44	7.00588549	-86	11	47.67184265	4398685.059	568844.5813	12/2/1999 14:00	D128562	197	125	21.8	<0.005	921	0.008	921	0.2	3.3	6.8	8.1	0.14	78	3.3	556	1.6	7.6	570	4
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	1/13/1999 13:40	D126549	183	210	16.1	<0.005	2	0.2	220	0.2	0.6	7.5	0.07	42	4.2	596	0.8	4	639	30	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	2/2/1999 12:20	D126688	138	37	18	<0.005	100	0.2	196	0.1	3.4	7.8	0.12	32	1.4	296	1	4.1	309	20	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	3/3/1999 9:45	D126824	178	33	10.1	<0.005	70	0.2	252	<0.1	3.4	8	0.06	37	3.12	0.5	3.5	335	7		
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	4/13/1999 13:00	D127162	202	39	10.2	<0.005	20	0.2	274	<0.1	2.2	7.8	0.04	44	<1	360	0.4	3	360	7	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	5/6/1999 12:40	D127168	190	36	12.9	<0.005	700	0.2	266	<0.1	2.4	8.3	0.05	44	3.70	0.6	3.7	370	10		
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	6/3/1999 9:15	D127368	170	42	9	<0.005	400 (B)	0.22	230	<0.1	0.76	8.3	0.13	47	3	320	0.8	4	400	16	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	7/6/1999 10:25	D127549	160	35	21.6	<0.005	570	0.2	218	<0.1	0.5	8.2	0.1	36	3	294	0.9	4.3	333	33	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	8/3/1999 11:00	D127554	148	42	20.2	<0.005	130	0.2	200	<0.1	<0.1	8.4	0.12	35	3.6	281	1.2	3.9	316	26	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	9/14/1999 10:00	D127964	148	45	18.3	<0.005	100	0.2	210	<0.1	0.2	8.3	0.08	35	3.6	277	0.9	4.7	307	17	
1999 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Corn Belt Plains	5120201110060	FC-7	WVU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	10/22/1999 8:45	D12817																			



1999 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WUU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	7/8/1999 15:05	D127704	198	100	20.6	0.009	274	0.6	3.7	0.47	125	598	2.4	6.7	636	23			
1999 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WUU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	8/5/1999 12:00	D127794	200	200	24.7	0.005	360	<0.1	0.2	7.9	0.88	190	932	1.3	6.5	954	15		
1999 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WUU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	9/3/1999 10:50	D128117	231	225	25.7	<0.005	266	<0.1	1.1	7.7	1.04	265	1059	1.7	7.5	1109	20		
1999 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WUU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	10/20/1999 14:00	D128329	242	180	24.2	0.005	386	0.2	5.7	7.8	1.01	235	2.3	878	1.5	7.5	941	22	
1999 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WUU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	11/10/1999 12:30	D128514	259	210	29.2	0.009	335	0.3	8.3	8	1.1	230	973	2.2	8.2	1055	29		
1999 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WUU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	12/8/1999 14:00	D128691	246	165	28.3	0.005	339	0.2	4.5	7.7	0.82	230	1.9	871	1.3	7.1	897	6	
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	1/7/1999 16:30	D126536	264	135	15.2	0.006	320	<0.1	2.9	7.7	0.33	125	696	0.7	4.8	712	4		
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	2/18/1999 11:10	D126675	210	61	16.1	<0.005	960	290	0.1	3.6	7.7	0.14	56	1	441	0.7	3.3	481	24
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	3/18/1999 11:40	D126811	220	68	13.1	<0.005	260	300	<0.1	3	7.4	0.17	64	6	467	0.9	3.5	522	53
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	4/8/1999 10:20	D127050	230 (J)	80	19.2	<0.005	150	310	<0.1	2.3	8	0.26	87	5	499	1	4.5	560	25
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	5/6/1999 8:20	D127325	222	66	16.9	<0.005	130	308	<0.1	3.5	8.1	0.23	73	4	474 (B)	0.8	3.8	534	34
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	6/17/1999 11:20	D127523	200	94	25	<0.005	33	270	<0.1	4.4	2.5	0.47	95	4	700	1.4	4.8	750	32
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	7/8/1999 13:52	D127704	162	70	23.4	0.006	336	0.1	2.9	7.8	0.35	66	4	405	2.5	6.2	446	34	
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	8/5/1999 11:00	D127912	152	150	14.1	<0.005	60	236	<0.1	4.6	8.3	0.54	145	2.6	756	1.2	5.6	781	17
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	9/3/1999 9:50	D128115	233	180	16.6	<0.005	40	358	<0.1	7.2	8.2	0.73	200	2	876	1.6	5.6	939	29
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	10/20/1999 12:50	D128327	223	150	18.6	<0.005	61	290	0.1	5	8	0.75	165	2.3	774	1.2	5.6	810	24
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	11/10/1999 11:10	D128512	265	200	33.6	0.006	800	359	0.1	5.8	8	0.81	225	987	2.1	7.8	1037	35	
1999 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WUU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	12/8/1999 12:50	D128689	212	125	15.6	0.005	2000	300	0.4	3.4	7.9	0.55	160	2.7	656	1.6	6.3	671	12
1999 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	1/22/1999 9:06	D126639	88	19	43.3	<0.005	5000	114	0.1	2.2	8	0.64	20	1	186 (J)	2.4	6	414	216
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	2/3/1999 11:40	D126714	222	36	7.4	<0.005	630	306	0.1	3	7.6	0.11	78	1	433	0.6	3.2	459	8
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	3/19/1999 10:15	D126879	210	33	10.6	<0.005	720	32	0.3	3.9	7.8	0.11	83	4	426 (B)	0.8	3.7	449	14
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	4/21/1999 10:30	D127115	194	35	22	<0.005	2	272	0.3	3.7	8.1	0.28	74	6.7	403	1.5	4.4	448	36
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	5/27/1999 9:10	D127163	170	48	8.2	<0.005 (J)	186	340	<0.1 (J)	3.9	3	0.23	120	3	560	0.72	4.3	580	10
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	6/23/1999 9:15	D127361	210	97	13	<0.005	330	470	0.17	4	0.81	410	3	1100 (H)	1.1	4.3	1000	8	
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	7/21/1999 9:15	D127544	230	77	12	<0.005	600	320	0.1	2.9	7.8	0.35	71	510	0.9	4.6	531	10	
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	8/28/1999 9:58	D127749	229	120	15.4	<0.005	50	238	0.1	5.9	7.7	1.26	535	<1	1305	0.9	5.7	1303	8
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	9/21/1999 9:30	D127959	229	110	16.6	<0.005	80	316	0.7	4.6	7.8	2.01	580	1	1269	1.9	6	1293	8
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	10/21/1999 9:45	D128171	240	110	16	<0.005	150	318	0.1	3.5	7.8	1.29	555	<1	1224	1.1	6.3	1248	5
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	11/23/1999 9:50	D128374	271	95	16.4	0.005	2	335	3.5	2	7.7	1.19	620	1	1272	5.4	6.6	1286	5
1999 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	5120201020060	WR-309	WUU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	12/29/1999 9:30	D128552	322	125	26.7	<0.005	6500	453	0.1	5.4	7.8	1.17	195	1.3	870	0.9	5.2 (B)	908	<4
1999 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	5120201010020	WR-348	WUU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	1/21/1999 13:13	D126641	118	21	21.4	<0.005	2	168	<0.1	4.9	7.9	0.27	21	241 (J)	1.2	5.8	307	50	
1999 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	5120201010020	WR-348	WUU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	2/3/1999 9:45	D126716	212	25	7.8	<0.005	450	284	<0.1	5.7	7.8	0.07	34	<1	325	0.4	2.5	373	10
1999 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	5120201010020	WR-348	WUU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	3/18/1999 13:00	D126881	182	21	11.4	<0.005	2	266	<0.1	5.4	7.9	0.07	30	307 (B)	0.5	3.1	349	23	
1999 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains																															







2001 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	8/21/2001 11:40	D132464	230	84	12	< 0.005 (QJ)	32	286	< 0.1	2.9	8.1	0.37	120	< 1	565	0.8	3.4	585	15						
2001 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	9/11/2001 11:40	D132657	174	40	29.3	< 0.005	1100	212	< 0.1	3.4	8	0.41	49	< 1	362	1.3	5.6	436	86						
2001 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	10/4/2001 11:50	D132850	291	75	10.4	< 0.005	60	375	< 0.1	4	8.4	0.35	95	< 1	590	0.5	3.1	620	15						
2001 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	11/1/2001 12:10	D133043	263	40	13.4	< 0.005	88	330	< 0.1	3.4	8.2	0.18	46	< 1	425	0.6	4.7	452	5						
2001 Fixed Station	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	12/11/2001 9:30	D133234	287	50	< 5	< 0.005	110	367	< 0.1	3.4	8.5	0.2	58	< 1	479	0.2	2.973	491	< 4						
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	1/23/2001 10:50	D131052	296	48	12.2	< 0.005	73	0.3	0.70	2.6	8.1	0.06	115	< 1	552	0.5	2.8	569	5						
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	2/23/2001 10:50	D131247	287	47	13.2 (QJ)	< 0.005 (QJ HJ)	490	0.3	372	0.2	2.9	8	0.06	115	< 1	535	0.6	2.5	563	5					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	4/26/2001 10:45	D131639	273	47	12.7	< 0.005 (QJ)	23	0.4	345	< 0.1	1.6	8.3	0.09	120	< 1	542	0.4	3.1	570	< 4					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	5/25/2001 10:35	D131845	190	23	35.2	< 0.005	100	0.3	261	0.2	7	8.1	0.4	36	< 1	342	1.8	4.7	511	173					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	6/20/2001 10:30	D132046	271	44	12.9	< 0.005	170	0.3	354	< 0.1	2.9	8.2	0.16	57	< 1	486	0.6	2.6	517	18					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	7/19/2001 10:50	D132239	188	31	25.2	< 0.005	< 1	0.3	231	< 0.1	2.2	8	0.29	89	< 1	413	1.3	5.1	484	64					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	8/29/2001 11:05	D132457	259	45	12.3	< 0.005	120	0.3	302	< 0.1	2.3	8.3	0.25	105	< 1	522	0.7	4.1	546	20					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	9/21/2001 10:45	D132550	212	28	23.7	< 0.005	2400	0.3	241	< 0.1	2.6	8.2	0.25	64	2.1 (QJ)	379	1	7	440	46					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	11/21/2001 11:10	D133036	303	44	10.1	< 0.005	100	0.3	388	< 0.1	1.6	8.6	0.09	105	< 1	53	0.3	3.1	545	< 4					
2001 Fixed Station	W Fk White River	Anderson City Park Near Old Water Works Dam Site	Eastern Com Belt Plains	512020103003	WR-293	WUU030-0003	Madison	40	6	24	-85	40	22	4440440.376	613116.5555	12/21/2001 11:10	D133227	232	27	13.4	< 0.005	< 1	0.2175	306	< 0.1	2.6	8.2	0.16	47	< 1	386	0.8	< 1	412	< 4					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	1/23/2001 8:50	D131050	289	31	13.3	< 0.005	91	0.3	348	< 0.1	2.7	8.1	0.05	48	< 1	411	0.4	2.4	429	< 4					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	2/23/2001 8:55	D131245	265	27	12.4 (QJ)	< 0.005 (QJ HJ)	73	0.4	327	< 0.1	3	8	0.05	45	< 1	393	0.5	2.4	416	4					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	3/28/2001 9:15	D131438	263	31	11.6	< 0.005	65	0.3	327	< 0.1	2	8	< 0.03	44	< 1	383	0.3	2.9	415	< 4					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	4/26/2001 8:55	D131637	257	30	11.5	< 0.005 (QJ)	37	0.3	317	< 0.1	1.5	8.2	0.03	44	1.1	374	0.4	3	435	5					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	5/25/2001 8:50	D131843	170	21	24.9	< 0.005	100	0.2	248	0.2	8.6	8.1	0.34	24	< 1	328	1.7	5.4	464	121					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	6/20/2001 9:00	D132044	149	28	11	0.005 < 0.005	210	0.3	313	< 0.1	2.2	8.1	0.06	38	< 1	410	0.6	2.5	435	17					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	7/19/2001 8:50	D132237	194	25	21.3	< 0.005	1200	0.3	226	< 0.1	1.5	8	0.16	35	< 1	329	0.9	4	397	49					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	8/29/2001 8:50	D132455	269	31	13.8	< 0.005	410	0.3	306	< 0.1	1.6	8.2	0.15	42	< 1	427	0.6	3.9	448	18					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	9/21/2001 8:55	D132648	200	21	21.7	< 0.005	1300	0.3	239	< 0.1	3.7	8.2	0.19	31	1.7 (QJ)	322	0.9	6	358	33					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	10/26/2001 8:55	D132841	141	12	32.3	< 0.005	2400	0.2	186	< 0.1	1.7	8	0.32	18	2.7	253	1.2	8.4	310	68					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	11/21/2001 9:15	D133034	291	30	10.1	< 0.005	75	0.3	353	< 0.1	0.9	8.5	< 0.03	44	< 1	399	0.3	3.4	415	< 4					
2001 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	512020101020	WR-319	WUU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	12/21/2001 8:55	D133225	216	19	14.6	< 0.005	410	0.199	271	< 0.1	2.4	8.3	0.13	27	1	321	0.8	< 1	339	21					
2001 Fixed Station	SR 13 Bridge at Perkinsville		Eastern Com Belt Plains	5120201040100	WR-279	WUU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	1/16/2001 9:25	D131065	264	80	16.9	< 0.005	< 1	0.005	< 0.005	0.005	0.005	0.005	0.005	351 (B)	0.3	2.6	8.1	0.2	93	< 1	558	2 (QJ)	3.6	592	27
2001 Fixed Station	SR 13 Bridge at Perkinsville		Eastern Com Belt Plains	5120201040100	WR-279	WUU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	2/20/2001 13:15	D131260	265	46	11.8	< 0.005	348	0.2	4	8	0.12	64	< 1	463	0.6	3	475	5							
2001 Fixed Station	SR 13 Bridge at Perkinsville		Eastern Com Belt Plains	5120201040100	WR-279	WUU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	3/7/2001 13:15	D131453	279	57	< 5	< 0.005 (HJ)	< 1	354	< 0.1	3	8.2	0.1	95	< 1	523	0.4	2.4	539	< 4						
2001 Fixed Station	SR 13 Bridge at Perkinsville		Eastern Com Belt Plains	5120201040100	WR-279	WUU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	4/4/2001 12:40	D131652	269	64	12.3	< 0.005	354	< 0.1	1.7	8.4	0.16	91	1.6	515	0.4	3.2	540	4							
2001 Fixed Station	SR 13 Bridge at Perkinsville		Eastern Com Belt Plains	5120201040100	WR-279	WUU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.34																									

2002 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	9/15/2002 13:00	AA12685	259	138	8.7	<0.005	84	321	<0.1	3.2	8	0.14	50	<1	588	0.5	3.4	618	11		
2002 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	9/15/2002 12:15	AA13444	249	111	10	<0.005	78	319	<0.1	3.3	7.9	0.1	42	<1	530	0.4	3.4	661	16		
2002 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	10/1/2002 13:00	AA13883	232	94	14.4	<0.005	190	292	<0.1	2.3	8	0.1	46	<1	474	0.4	4.3	516	11		
2002 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	11/25/2002 10:40	AA14344	286	75	11.3	<0.005	490	352	<0.1	2	8	0.08	44	<1	482	0.2	3	498	<4		
2002 Fixed Station	Eagle Cr	86th St Bridge, S of Zionsville	Eastern Com Belt Plains	5120201120080	EC-21	WUU120-0007	Marion	39	54	36.95542128	-86	17	8.42908049	4418041.825	561054.6119	12/26/2002 11:50	AA14567	256	61	8.2	<0.005	140	341	<0.1	2.9	8.1	0.05	44	<1	443	0.3	3	457	<4		
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	1/8/2002 12:30	D13571	238	56	13.98	<0.005	66	0.1759	316	<0.1	2.1535	7.7	0.0493	37.5453	<1	415	0.3392	3.766	431	7	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	2/5/2002 13:00	D13768	203	43	11.27	<0.005	72	0.1232	262	<0.1	2.3165	8.4	0.0777	35.5585	1.7	358	0.6254	4.08	388	21	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	3/5/2002 12:50	AA09729	185	38	9.69	<0.005	4	0.1718	252	<0.1	2.9766	8.9	0.05	31.4234	3.0	330	0.8345	4.929	364	24	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	4/2/2002 12:15	AA10076	227	49	8.098	<0.005	22	0.1472	282	<0.1	1.471	8.4	0.04	37.4377	1.9	390	0.5471	2.992	402	10	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	5/29/2002 12:00	AA10402	141	22	6.3	<0.005	400	0.1	197	<0.1	2	8.6	0.09	17	5.1	217	1.4	4.8	370	99	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	6/13/2002 13:00	AA11248	129	20	42.8	<0.005	13000	0.1	168	<0.1	1.4	8.2	0.17	19	<1	511	0.7	1.4	4.8	370	99
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	7/23/2002 12:50	AA12087	191	35	15	<0.005	820	0.2	235	<0.1	1.1	8.1	0.4	32	<1	328	0.4	4.6	349	12	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/15/2002 13:30	AA12686	201	34	9.9	<0.005	250	0.2	229	<0.1	1	8.1	0.04	26	<1	316	0.4	3.8	335	15	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	9/2/2002 12:50	AA13444	192	36	9.2	<0.005	54	0.2	227	<0.1	0.9	8.1	0.04	24	<1	306	0.4	3.4	332	14	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	11/25/2002 10:10	AA14345	146	37	13.5	<0.005	36	0.1 (DJ)	180	<0.1	0.7	8.2	0.05	27	<1	243	0.8	4.4	266	14	
2002 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	12/26/2002 12:30	AA14568	181	80	12.3	<0.005	370	<0.1	238	<0.1	0.8	7.9	0.04	31	1.3	373	0.5	4.1	390	6	
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	1/8/2002 10:40	D13357	263	109	46.47	<0.005	2000	0.2000	400	<0.1	3.3449	7.6	0.1887	48.632	<1	555	0.4148	3.71	569	6	
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	2/5/2002 13:20	D13769	243	66	80.99	<0.005	920	314	<0.1	2.5335	8.3	0.1665	43.7562	2.5	446	0.6228	3.438	480	19		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	3/5/2002 13:30	AA09729	189	44	90.38	<0.005	40	250	<0.1	2.8333	8.8	0.0486	33.9233	3.33	333	0.7322	4.956	377	24		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	4/2/2002 12:50	AA10077	247	69	99.75	<0.005	84	316	<0.1	1.6185	8.4	0.0662	48.1711	1.4	460	0.4491	2.94	470	6		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	5/29/2002 9:45	AA10403	154	27	14.7	<0.005	1200	183	<0.1	1.8	8.2	0.7	22	<1	268	0.7	4.4	289	13		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	6/13/2002 13:30	AA11249	109	22	53.6	<0.005	24000	150	0.3	1	8	0.35	18	<1	7.6	193	2	4.7	468	227	
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	7/23/2002 13:30	AA12089	226	77	11.9	<0.005	580	300	<0.1	2.1	8.2	0.12	60	<1	483	0.4	4	503	5		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	8/15/2002 14:00	AA12687	230	90	10.6	<0.005	110	307	<0.1	2.6	8.3	0.12	51	<1	507	0.4	4	523	4		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	9/2/2002 13:25	AA13445	228	96	8.8	<0.005	15	300	<0.1	1.9	8	0.08	59	<1	440	0.4	3.4	525	7		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	10/1/2002 13:30	AA13884	209	84	12.9	<0.005	42	0.1	2.5	<0.1	8.2	0.1	5.4	<1	440	0.3	3.6	472	<4		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	11/25/2002 10:10	AA14347	157	43	17.7	<0.005	47	190	<0.1	0.8	8.2	0.06	30	<1	264	0.7	4	288	15		
2002 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	12/26/2002 13:00	AA14569	197	108	13.4	<0.005	610	0.2	268	<0.1	1.4	7.9	0.06	42	<1	450	0.5	4	463	<4	
2002 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	1/8/2002 9:50	D133567	222	35	39.39	<0.005	21	0.1673	302	<0.1	2.1969	7.8	0.0565	31.7677	3.75	375	0.2598	3.51	381	5	
2002 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	2/5/2002 10:20	D13764	201	31	70.7	<0.005	330	1.0827	260	<0.1	2.2417	8.4	0.0925	33.0278	1.5	344	0.6399	3.189	374	30	
2002 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7																								



2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	5/1/2003 10:25	AA15882	186	50	13.1	< 0.005	370	< 0.1	268	< 0.1	1.1	8.1	0.04	38			352	0.5 (D,J)	4.1	383	15	
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	6/10/2003 9:50	AA16482	208	42	14	< 0.005	140	0.2	285	< 0.1	1.4	8.1	0.05	33	1.2	353	0.6	2.7	402	14		
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	7/17/2003 9:50	AA17491	142	19	23.2	< 0.005	61	0.1	188	< 0.1	1.2	8.4	0.09	19			236	1.1	5	265	23	
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	8/13/2003 9:50	AA18027	172	29	15.4	< 0.005	220	0.2	224	< 0.1	0.2	8.2	0.05	28	2	301	0.6	4.1	315	16 (D,J)		
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	10/1/2003 10:00	AA18789	177	25	12.3	< 0.005	110	0.2	224	< 0.1	0.6	8.1	0.06	29			280	0.6	3.2	306	16	
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	10/29/2003 10:10	AA19575	193	32	12.8	< 0.005	110	0.2	267	< 0.1	0.5	8.2	0.04	33	1.4	316	0.6	3.5	334	8 (D,J)		
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	11/24/2003 8:00	AA20167	184	32	13.3	< 0.005	1600	0.2	262	< 0.1	0.6	8.1	0.07	32			301	0.6	3.9	335	23	
2003 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	5120201110060	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	12/30/2003 10:20	AA20333	208	41	13.9	< 0.005	120	0.2	308	< 0.1	1.9	8.1	0.06	34	1.1	363	0.7	3.3	383	15		
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	2/21/2003 11:30	AA15050	261	73	8.6		26		380	< 0.1	2.2	8.1	< 0.03	60			488	0.2	1.6	495	< 4	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	3/27/2003 12:10	AA15291	226	45	10.6		1000		341	< 0.1	4.1	8.1	0.06	39			395	0.2 (D,J)	2.9	453	23	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	4/23/2003 11:30	AA15587	278	48	7.4		74		370	< 0.1	2.1	8.2	0.04	53			453	0.2	2.2	489	5	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	5/29/2003 11:25	AA15950	275	46	10.7				371	< 0.1	2.4	8.1	0.07	52			444	0.4	2.3	482	36	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	6/25/2003 11:10	AA16550	275	47	10.9		170 (D,J)		386	< 0.1	2.7	8.2	0.07	51			455	0.4	2.2	509	29	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	7/29/2003 14:00	AA17572	263	43	13.7				374	< 0.1	2.3	8.2	0.06	48			440	0.3	3.2	482	13	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	8/27/2003 11:05	AA18086	263	59	8.3				356	< 0.1	2	8.2	0.07	55			466	0.3 (D,J)	2.3	505	13	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	9/24/2003 9:50	AA18847	270	37	10				349	< 0.1	2	8.2	0.05	46			414	0.4	2.7	437	8	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	10/30/2003 11:30	AA19634	264	42	6.5 (D,J)				382	< 0.1	2	8.2	< 0.03	46			446	0.3	2.6	463	4	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	11/25/2003 9:10	AA20226	202	30	14.7				297	< 0.1	2.9	8	0.12	32			333	0.8	4.4	372	29	
2003 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WUU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	12/23/2003 10:15	AA20432	212	43	20				314	< 0.1	2.1	8	0.18	36			354	1	3.1	471	96	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	1/30/2003 13:20	AA14808	238	66	8.6	< 0.005	21		315	< 0.1	2.3	8	0.04	53			441	0.4	2.9	450	6	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	2/25/2003 14:10	AA14990	203	77	13				304	< 0.1	2.8	8.1	0.06	49	1.3		427	0.6	4.1	445	6	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	3/26/2003 10:50	AA15231	177	49	15.2	< 0.005 (H,J)	1100		247	< 0.1	2.9	8.1	0.09	37			336	0.8	3.1	382	26	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	4/16/2003 14:15	AA15527	206	56	13.7				303	< 0.1	2.2	8.1	0.05	45			2.4	387	0.5	3.2	419	13
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	5/1/2003 13:40	AA15890	200	56	19.2				274	0.2	1.1	8	0.06	42			390	0.7 (D,J)	3.8	425	13	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	6/10/2003 10:30	AA16480	223	55	17.7				291	< 0.1	1.5	8	0.07	41	2.6		398	0.7	2.8	452	12	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	7/17/2003 14:00	AA17487	147	22	22				198	< 0.1	1.1	8.6	0.12	22			247	1.2	5.2	286	31	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	8/13/2003 13:00	AA18025	186	38	17.7				248	< 0.1	0.4	8.1	0.09	38			2.9	335	0.7	3.8	366	18 (D,J)
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	10/1/2003 14:05	AA18787	183	30	17.7				240	< 0.1	0.7	8.1	0.1	33			308	0.7	3	332	18	
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	10/29/2003 14:10	AA19573	204	39	12				282	< 0.1	0.7	8.1	0.05	39			1.4	349	0.6	3.5	369	8 (D,J)
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	11/24/2003 11:20	AA20165	191	37	17.1				269	< 0.1	0.3	0.7	8	0.13	33			323	1	4	349	18
2003 Fixed Station	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WUU110-0001	Marion	39	46	54.22322376	-86	10	36.43610085	4403855.742	570492.8149	12/30/2003 14:10	AA20331	210	42	13.1				311	< 0.1	2	8.1	0.06	36			1.2	366	0.6	3.2	397	16
2003 Fixed Station	Fall Cr	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	1/30/2003 10:40																					



2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	6/25/2003 9:05	AA16548	276	75	14.5	< 0.005	820 (IDJ)	388	< 0.1	4.2	7.9	0.27	230	1	764	0.5 (DU)	2.8	794	9	
2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	7/29/2003 12:50	AA17570	286	43	15.2	< 0.005		367	< 0.1	2.3	8.2	0.15	48		448	0.4	4.3	485	13	
2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	8/27/2003 9:15	AA18083	255	93	12	< 0.005		190	371	< 0.1	3.2	7.9	0.48	250	1.2	843	0.8 (DU)	4.7	873	8
2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	9/24/2003 11:20	AA18845	232	34	18.4	< 0.005		1600	308	< 0.1	2.6	8	0.17	86		427	0.9	5.9	453	10
2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	10/30/2003 9:30	AA19632	253	34	11.8 (DU)	< 0.005		130	370	< 0.1	1.9	8.2	0.09	63	< 1	448	0.4	3.5	465	4
2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	11/25/2003 12:20	AA20224	194	27	21.1	< 0.005		2000	272	< 0.1	2.1	8	0.22	50		350	1.1	5.8	398	29
2003 Fixed Station	W Fk White River	Tiger Dr, CR Bridge N of Yorktown HS	Eastern Com Belt Plains	512020102006	WR-309	WVUJ02-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	12/23/2003 11:40	AA20430	183	52	26.9	< 0.005		26000	268	0.2	1.5	7.8	0.28	61	7.2	375	1.4	3.4	464	75
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	3/26/2003 14:50	AA15287	176	28	14.4	< 0.005			287	< 0.1	7.4	8.2	0.11	33		329	0.7 (DU)	3.5	382	24
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	4/22/2003 14:45	AA15583	237	30	11.5	< 0.005			329	< 0.1	2.6	8.5	0.04	44	1.3	363	0.6	3.3	395	6
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	5/28/2003 14:00	AA15946	252	30	8.2	< 0.005			350	< 0.1	4.8	8.4	0.04	42		391	0.6	2.7	443	12
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	6/24/2003 14:45	AA16546	273	32	11.3	< 0.005			368	< 0.1	5.8	8.3	0.06	39	0.7 (UJ)	426	0.6	3.6	454	13
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	7/29/2003 11:30	AA17568	281	28	15.2	< 0.005			360	< 0.1	2.7	8.2	0.08	37		398	0.4	3.9	434	10
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	8/26/2003 15:00	AA18081	268	34	10.9	< 0.005			346	< 0.1	0.2	8.4	0.08	44		398	0.6 (DU)	3.8	428	7
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	9/23/2003 15:00	AA18843	268	51	7.6	< 0.005			297	< 0.1	4.1	8.2	0.12	26	< 1	328	0.9	5.4	362	26
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	10/29/2003 15:00	AA19630	246	25	8.4 (DU)	< 0.005			359	< 0.1	3.3	8.4	0.04	31		381	0.4	3	394	< 4
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	11/24/2003 15:20	AA20222	223	25	12	< 0.005			316	< 0.1	3.2	8	0.08	29		345	0.7	4.1	376	14
2003 Fixed Station	W Fk White River	US 27 Bridge, E of Winchester	Eastern Com Belt Plains	512020101020	WR-348	WVUJ01-0006	Randolph	40	10	56	-84	58	8	444960.451	672919.438	12/22/2003 12:00	AA20428	274	27	< 5	< 0.005			364	< 0.1	3.2	8.1	< 0.03	36	< 1	383	0.3	1.8	405	< 4
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	1/29/2003 17:00	AA14642	281	94	< 5	< 0.005			355	< 0.1	2.9	8	0.26	49		525	0.3	2.3	560	5
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	2/17/2003 15:15	AA15018	211	112	13.5	< 0.005			331	< 0.1	2.4	8.1	0.2	47		479	0.6	4.2	534	16
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	3/25/2003 12:15	AA15259	218	64	7.4	< 0.005			330	< 0.1	2.8	8.3	0.11	42		426	0.4	2.4	443	18
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	4/30/2003 12:10	AA15554	228	69	9.8	< 0.005			324	< 0.1	1.5	8.3	0.09	41		461	0.5	3.2 (UJ)	457	9
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	5/20/2003 16:00	AA15917	241	51	10.9	< 0.005			351	< 0.1	2.9	8.1	0.15	35		422	0.4	3.1	475	38
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	6/23/2003 13:20	AA16517	254	65	9.7	< 0.005			338	< 0.1	2.2	8.4	0.17	44		453	0.4	2.6	490	9
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	7/23/2003 8:00	AA17520	296	36	25.4	< 0.005			286	< 0.1	2.1	8.1	0.19	26		360	0.6	4.2	429	83
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	8/14/2003 13:30	AA18052	228	53	10.3	< 0.005	400		300	< 0.1	1.5	8.3	0.15	39		394	0.6	3.1	434	26
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	9/15/2003 13:00	AA18814	268	51	7.6	< 0.005			328	< 0.1	1.5	8.2	0.11	75		447	0.6	4.4	475	4
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	10/2/2003 16:30	AA19600	247	44	9	< 0.005			326	< 0.1	2.3	8.2	0.15	36		404	0.6	2.8	436	18
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	11/6/2003 11:15	AA20193	240	53	10.5	< 0.005			324	< 0.1	1.8	8.2	0.14	36		416	0.6	3.2	431	4
2003 Fixed Station	White Lick Cr	CR 600 N, Near Centerton	Eastern Com Belt Plains	512020150180	WLC-2	WVU150-0007	Morgan	39	30	49	-86	22	49	4373958.395	553272.9115	12/4/2003 16:00	AA20388	243	49	8.7	< 0.005			351	< 0.1	2.6	8.1	0.14	38		426	0.5	2.5	446	10
2004 Fixed Station	Cicero Cr	E 266th St, Arcadia	Eastern Com Belt Plains	512020108070	CIC-17	WVU080-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	1/6/2004 13:00	AA20492	116	17	29.8	< 0.005			202	< 0.1	5.5	7.5	0.39	19		238	1.5	5.8	407 (UJ)	62
2004 Fixed Station	Cicero Cr	E 266th St, Arcadia	Eastern Com Belt Plains	512020108070	CIC-17	WVU080-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	2/3/2004 9:45	AA21971	268	44	6.9	< 0.005			361	< 0.1	5.4	7.8	0.03 (DU)	46		436	0.4	2.7	448	7
2004 Fixed Station	Cicero Cr	E 266th St, Arcadia	Eastern Com Belt Plains	512020108070	CIC-17	WVU080-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	3/2/2004 10:15	AA21151	181	33	13.9	< 0.005			345	< 0.1	8.2	7.8	0.14	27		335	1	3	426	84
2004 Fixed Station	Cicero Cr	E 266th St, Arcadia	Eastern Com Belt Plains	512020108070	CIC-17	WVU080-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521																				

2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	5/12/2004 10:50	AA22529	244	76	14.4	< 0.005	22	0.3	333	< 0.1	2.2	8.1	0.26	68			505	0.8	3.8	530	13	
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	6/10/2004 9:45	AA22529	244	58	10.3	< 0.005		0.2	313	< 0.1	3.3	8	0.24	49	< 1	462	0.8	3.1	533	22		
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	7/1/2004 10:05	AA22341	244	62	9	< 0.005		61	0.3	314	< 0.1	2.9	8.1	0.19	57	< 1	478	0.7	2.9	521	19 (DU)	
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	8/5/2004 9:50	AA23662	212	79	14.3	< 0.005		61	0.3	291	< 0.1	2.2	7.9	0.28	57	< 1	457	0.8	3.4	483	13	
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	9/7/2004 10:10	AA24169	213	85	7.8	< 0.005		980		294	< 0.1	2.7	8	0.38	66		485	0.7	3.3	519	6	
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	10/14/2004 10:10	AA24396	222	104	13.6	< 0.005		490	0.3	312	< 0.1	3	8	0.4	98	1	550	0.8	3.6	576	< 4	
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	11/8/2004 10:10	AA24743	220	66	22.5	< 0.005		51	0.2	336	< 0.1	3.3	7.8	0.33	85		480	0.8	4.5	500	< 4	
2004 Fixed Station	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Corn Belt Plains	512020190080	IWC-9	WUU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	12/29/2004 10:10	AA25008	286	82	5.1	< 0.005		290	0.3	368	< 0.1	4	8	0.29	88	1	561	0.7	2.3	591	< 4	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	1/20/2004 11:20	AA20548	236	59	7.7	< 0.005		370		362	< 0.1	2.9	8	0.13	61		457	0.5	3.2	481	5	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	2/5/2004 9:30	AA20663	271	92	8.6	< 0.005		690		364	< 0.1	2.9	8	0.16	61	< 1	521	0.4	2.6	533	< 4	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	3/1/2004 11:00	AA21218	232	50	11	< 0.005		33		344	< 0.1	3.4	8.3	0.11	44		407	0.5 (DU)	2.6	429	5 (DU)	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	4/7/2004 10:15	AA21986	246	51	9	< 0.005		44		292	< 0.1	2.8	8.2	0.1	44	1	(DU)	412	0.5	2.8	437	6
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	5/1/2004 10:10	AA22530	249	70	12.4	< 0.005		380		353	< 0.1	2.1	8.1	0.24	58		496	0.7	3.5	527	11	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	6/10/2004 10:20	AA23020	250	36	10.3	< 0.005		118		367	< 0.1	3.2	8.1	0.24	58	< 1	455	0.6	2.8	532	25	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	7/1/2004 10:40	AA23242	248	60	9	< 0.005		380		348	< 0.1	2.8	8.2	0.18	56		463	0.7	2.8	515	15 (DU)	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	8/5/2004 10:30	AA23663	206	72	13.9	< 0.005		240		308	< 0.1	2.1	8	0.31	47	1	428	0.8	3.6	465	18	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	9/7/2004 10:50	AA24171	211	90	14.8	< 0.005		150		307	< 0.1	2.7	8	0.48	71		487	0.8	3.3	526	15	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	10/14/2004 10:50	AA24397	190	80	14	< 0.005		690		289	< 0.1	2.2	8	0.38	104	1.4	486	0.9	3.9	516	10	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	11/8/2004 10:50	AA24744	227	70	17.9	< 0.005		130		320	< 0.1	3.5	7.9	0.34	87		501	0.7	4.2	521	5	
2004 Fixed Station	W Fk White River	86th St, Nora	Eastern Corn Belt Plains	512020190050	WR-248	WUU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	12/29/2004 10:45	AA25009	284	76	7.6	< 0.005		370		380	< 0.1	3.8	8.1	0.26	89	< 1	541	0.6	2.2	570	6	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	1/23/2004 10:15	AA20638	248	41	7.8	< 0.005		120	0.3	389	< 0.1	2.3	8.1	0.08	73		486	0.3	2.1	501	6	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	2/19/2004 9:45	AA20759	272	47	11.7	< 0.005		>2400	0.2	350	< 0.1	1.6	8.2	0.16	98	< 1	485	0.4	3.4	504	< 4	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	3/2/2004 9:45	AA21314	256	46	8.6	< 0.005		120	0.2	359	< 0.1	1.4	8.4	0.06	73		457	0.3	2.5	473	5 (DU)	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	4/29/2004 9:55	AA21992	276	46	12.2	< 0.005 (HU)		76	0.3	348	< 0.1	1.3	8.3	0.1	109	1	487	0.5	3	515	4	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	5/27/2004 9:45	AA22626	275	46	8.2	< 0.005		100	0.2	353	< 0.1	1.9	8.1	0.21	94		502	0.6	2.8	536	9	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	6/24/2004 9:35	AA23060	285	36	9.8	< 0.005		200	0.2	322	< 0.1	2.6	8.2	0.1	71	< 1	457	0.6	3	497	14	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	7/28/2004 9:35	AA23419	279	58	11.1	< 0.005		160	0.3	366	< 0.1	2.1	8.2	0.18	54		482	0.6	2.8	539	14 (DU)	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	8/20/2004 9:30	AA23760	298	71	8.2	< 0.005		99	0.3 (DU)	371	< 0.1	2.3	8.1	0.3	219	4	< 1	705	0.4	2.7	744	4
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	9/22/2004 9:55	AA24254	288	77	8.1	< 0.005		36	0.3	377	< 0.1	2.6	8.2	0.4	212		726	0.6	2.6	764	5	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	10/21/2004 9:55	AA24596	248	60	13.1	< 0.005		130	0.2	350	< 0.1	2	8	0.29	168	< 1	634	0.5	3.1	664	5	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293	WUU030-0003	Madison	40	6	24	-85	40		440440.376	613116.5555	11/19/2004 10:10	AA24910	294	67	12.6	< 0.005		550	0.3	365	< 0.1	2.8	8.1	0.33	206		672	0.6	2.8	700	8	
2004 Fixed Station	Anderson City Park Near Old Water Works Dam Site		Eastern Corn Belt Plains	512020130030	WR-293																																

2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	2/2/2005 10:30	AA25669	262	45	5.2	352	<0.1	5.9	7.9	0.04	40	423	0.5	2.6	455	<4				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	3/10/2005 11:30	AA25976	225	41	7.8	309	<0.1	6	8.2	0.03	36	370	0.4	2.3	396	<4				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	4/20/2005 10:25	AA26176	227	41	12.6	310	<0.1	3.8	8	<-0.03	39	369	0.6	3.2	398	8				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	5/17/2005 9:15	AA26791	234	36	13.1	345	<0.1	7.5	8	0.04 (DU)	33	374	0.5 (DU)	2.3 (DU)	412	13				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	6/27/2005 9:05	AA27540	204	38	17.8	312	<0.1	4.4	8	0.06	32	361	0.8	3.8	414	10				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	7/14/2005 10:15	AA28239	208	84	13.9	297	<0.1	2.4 (DU)	8.1	0.08	41	448	0.8	4.6	482	9				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	8/26/2005 8:00	AA28585	247	95	16	315	<0.1	1.6	8	0.1	40	507	0.6	4.4	542	6				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	9/27/2005 11:00	AA28975	182	41	22	255	<0.1	5.6	7.8	0.19	29	377	1	6.5	401	22				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	10/12/2005 11:20	AA39171	235	77	14.3	350	<0.1	2.3	8.1	0.06	41	471	0.6	3.8	517	4				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	11/15/2005 10:30	AA39432	138	30	39.6	238	<0.1	8	7.4	0.46	21	331	2.1	7	478	132				
2005 Fixed Station	Ciencr Cr	E 266th St, Arcadia	Eastern Corn Belt Plains	512020108070	CIC-17	WVUJ08-0002	Hamilton	40	10	28	-86	0	2	4447597.963	585095.521	12/7/2005 11:15	AA39786	277	70	10	367	<0.1	4.8	8	0.04	41	497	0.7	3.6	528	<4				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	1/20/2005 11:40	AA25315	221	44	7.7	272	<0.1	2.8	7.9	0.06	39	364	0.5	2.7	386	7				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	2/28/2005 11:45	AA25799	225	51	7.1	272	<0.1	2.9	8	0.07	44	388	0.5	2.5	412	<4				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	4/3/2005 11:45	AA28049	225	61	11.4	160	<0.1	1.6	8	<-0.03	45	436	0.6	3.7	462	5				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	5/17/2005 11:50	AA26474	235	60	10.6	310	<0.1	2.2	8.3	0.09	49	313	0.8	3.3	463	6				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	5/26/2005 11:00	AA28857	233	52	10.6	99	<0.1	5.1	8.1	0.06	42	421	0.4	2.5	462	10				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	6/22/2005 9:40	AA27736	231	65	9.5	328	<0.1	4.7	8	0.06	42	<1	455	0.6	3	473	8			
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	7/7/2005 10:40	AA28339	233	94	12.8	240	<0.1	3.6	8	0.12	50	508	0.7	3.4	557	12				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	8/31/2005 11:40	AA28666	157	82	19.3	16000	<0.1	1.4	8	0.06	45	1.6	388	0.9	4.8	436	17			
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	9/8/2005 11:40	AA29043	215	158	13.1	150	<0.1	4.6	7.9	0.12	53	614	0.8	3.5	637	9				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	10/13/2005 11:10	AA39251	247	97	9	100	<0.1	2.5	8.1	0.18	47	<1	508	0.5	3.3	543	<4 (DU)			
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	11/3/2005 10:15	AA39504	265	92	12.6	58	<0.1	1.8	7.8	0.08	52	515	0.4	3.6	548	<4				
2005 Fixed Station	Eagle Cr	86th St Bridge, S of Zionville	Eastern Corn Belt Plains	5120201120080	EC-21	WVUJ120-0007	Marion	39	54	36.95542128	-86	17	8.429098049	4418041.825	561054.6119	12/29/2005 11:00	AA39649	128	30	10.1	1300	<0.1	5	7.8	0.31	22	3.3	281	1.6	6.4 (O)	408	98			
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	1/20/2005 12:20	AA25314	118	26	17.5	150	<0.1	1.45	<0.1	1.5	7.9	0.17	19	216	0.9	3.6	263	43		
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	2/28/2005 12:20	AA25800	173	40	12.5	17	<0.1	2.16	<0.1	2.6	8	0.09	24	<1 (QJ)	285	0.6	3.2	309	6	
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	3/23/2005 12:25	AA28050	183	62	15.5	2400	<0.1	2.45	<-0.1	1.8	8	<-0.03	35	333	0.6	3.7	355	5		
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	4/13/2005 12:50	AA26475	198	56	11.4	440	<0.1	2.58	<-0.1	1.6	8.1	0.03	39	1.6	354	0.4	3.2	400	7	
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	5/26/2005 11:50	AA26856	206	58	14.2	30	<0.1	0.1	1.7	8	0.04	41	3.8	386	0.8	2.8	421	7		
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	6/22/2005 10:05	AA27737	186	53	11.2	15	<0.1	0.2	263	<-0.1	1.9	7.9	0.03	35	1.5	364	0.6	3.2	387	7
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	7/7/2005 11:20	AA28340	190	54	15.2	15	<0.1	0.1	266	<-0.1	1.3	8.1	0.04	37	3.6	367	0.7	3.1	404	10
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	8/31/2005 12:45	AA28667	118	32	18	4900	<0.1	0.2	162	0.1	0.6	7.9	0.06	22	2.2	228	0.9	4.1	259	18
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	9/8/2005 12:20	AA29044	186	54	12.7	19	<0.1	0.1	241	<-0.1	0.8	8.1	0.06	28	3.58	0.6	3.1	374	11	
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	10/13/2005 12:00	AA39252	175	54	13.1	55	<0.1	2.22	<-0.1	0.4	8.2	0.04	31	1.6	327	0.5	3.6	357	7 (DU)	
2005 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Corn Belt Plains	5120201120110	EC-7	WVUJ120-0002	Marion	39	46	41.70253891	-86	15	2.401127																						



2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	1/26/2005 11:05	AA25786	250	25	8.1	< 0.005	650	0.2	289	< 0.1	1.9	7.9	0.07	34		345	0.4	2.4	367	5	
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	2/18/2005 11:05	AA25910	189	21	12.5	< 0.005	36 (D,J)	0.1	255	< 0.1	3.2	7.8	0.06	26	< 1 (QJ)	294	0.6	3	326	23	
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	3/30/2005 10:35	AA26142	229	29	9.4	< 0.005		200	0.2	299	< 0.1	2.5	8.2	< 0.03	33		335	0.4	2.9	370	4
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	4/19/2005 10:45	AA26589	249	31	13.3	< 0.005		150	0.2	326	< 0.1	0.6	8.2	0.03	39	1.6	348	0.5	3	380	< 4
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	5/26/2005 10:30	AA27701	250	25	9.8	< 0.005		96	0.2	320	< 0.1	2.5	8.1	0.06	37		361	0.5	2.6	390	6
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	6/29/2005 10:35	AA28113	81	13	41	< 0.005		2400	0.2	306	0.1	3.8	7.9	0.46	24	5.3	227	2.1	5.1	524	296
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	7/27/2005 11:15	AA28542	221	27	15	< 0.005		30	0.3	284	< 0.1	0.5	8	0.18	38		335	0.8	3.4	378	19
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	8/24/2005 12:00	AA28885	242	30	11.5	< 0.005		74	0.3	314	< 0.1	0.5	8	0.15	38	< 1	364	0.5	2.8	392	11
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	9/21/2005 10:45	AA28896	241	22	14	< 0.005		370	0.2	298	< 0.1	1.3	8	0.14	37		362	0.5	4	401	21
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	10/19/2005 11:10	AA29397	298	32	8.6	< 0.005		120	0.3	369	< 0.1	0.5	8.1	0.04	43	< 1	437	0.3 (QJ)	2.9	429	< 4
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	11/22/2005 10:45	AA39752	242	22	14.7	< 0.005		290	0.1	316	< 0.1	1.7	8	0.09	32		378	0.4	3.6	397	4
2005 Fixed Station	W Fk White River	Memorial Dr, E Edge of Muncie	Eastern Com Belt Plains	5120201010120	WR-319	WWU010-0001	Delaware	40	10	42	-85	20	32	4448868.338	641141.9477	12/22/2005 10:35	AA39855	236 (QJ)	22	13.5	< 0.005		60	0.2	284	< 0.1	0.7	8.1	0.03	33	1.7	323	0.6	3.9	348	8
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	1/12/2005 8:30	AA25440	112	20	25.9	< 0.005		144	< 0.1	1.8	7.6	0.25	34		202	0.6	2.6	296	102		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	2/2/2005 10:00	AA25668	304	60	5.6	< 0.005		261	< 0.1	2.8	8	0.32	65	< 1	489	0.3	2.5	508	< 4		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	3/10/2005 12:00	AA25974	260	50	9	< 0.005		325	< 0.1	2.5	8.3	0.08	57		444	0.4	2.7	463	< 4		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	4/20/2005 9:50	AA26174	272	60	14.7	< 0.005		338	< 0.1	1.1	8.2	0.12	82		2	476	0.6	3.7	502	< 4	
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	5/17/2005 8:45	AA26789	232	40	15.5	< 0.005		323	< 0.1	4.5	7.9	0.17 (D,J)	50		393	0.9 (D,J)	3.9 (D,J)	433	13		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	6/27/2005 8:40	AA27538	254	63	15.4	< 0.005		375	< 0.1	2.2	8.1	0.25	130	< 1	567	0.6	3	611	11		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	7/14/2005 10:30	AA28237	245	66	12.7	< 0.005		360	< 0.1	2.5 (D,J)	8.1	0.36	97		510	0.7	3.2	551	20		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	8/26/2005 8:30	AA28583	272	85	12.3	< 0.005	100	368	< 0.1	2.7	8.1	0.34	120	< 1	599	0.5	2.7	643	20		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	9/27/2005 11:20	AA28973	121	16	66.5	< 0.005		185	0.2	2	7.7	0.48	26		254	1.8	11.1	379	124		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	10/12/2005 11:00	AA39169	277	62	11.4	< 0.005		408	< 0.1	2.1	8.1	0.32	97	< 1	551	0.5	2.8	579	6		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	11/16/2005 10:00	AA39430	201	39	27.5	< 0.005		280	< 0.1	2.4	7.8	0.4	33		357	1.7	5.3	418	57		
2005 Fixed Station	W Fk White River	SR 13 Bridge at Perkinsville	Eastern Com Belt Plains	5120201040100	WR-279	WWU040-0004	Madison	40	8	32	-85	51	46	4444162.52	596872.3425	12/7/2005 10:55	AA39784	241	46	11.6	< 0.005		310	< 0.1	2.4	8.1	0.15	66		432	0.5	3.4	461	5		
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	1/17/2005 8:30	AA25366	242	99	19.2	< 0.005		340	0.2	3.2	7.7	0.34	84		2.9	533	1	3.1	571	17	
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	2/18/2005 10:00	AA25853	168	51	25.9	< 0.005		281	< 0.1	3.2	7.7	0.22	38		327	1.4	3.8	429	91		
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	3/17/2005 8:40	AA26123	256	102	14.3	< 0.005		346	< 0.1	4	7.9	0.14 (D,J)	106		595	1	3.5	624	9		
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	4/20/2005 7:30	AA26527	243	120	22.2	< 0.005		327	< 0.1	2.9	7.8	0.52	117		4.5	609	1.6	4.8 (QJ)	644	17	
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	5/6/2005 8:00	AA26907	239	76	16.3	< 0.005		334	< 0.1	3.8	7.9	0.3	84		511	0.9	4	542	20		
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	6/16/2005 7:50	AA27788	158	53	18.1	< 0.005		268	< 0.1	4.9	7.8	0.28	63		2.1	376	1.3	4.3	434	38	
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	7/20/2005 9:00	AA28393	181	82	22.7	< 0.005		264	< 0.1	2.5	7.9	0.45	65		455	1	4.2	518	40		
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	8/18/2005 8:10	AA28719	229	121	22.2	< 0.005		332	< 0.1	4.3	7.8	0.66	132		1	657	1.5	5.1	693	18	
2005 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Com Belt Plains	5120201																																

2006 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	5120201120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	11/8/2006 12:45	AA45036	174	29	14.1	32	0.2	211	<0.1	1.4	7.9	0.12	23			266	0.9	5.5	284	6	
2006 Fixed Station	Eagle Cr	At Indianapolis, Lynhurst and 10th St Bridge	Eastern Com Belt Plains	512020120110	EC-7	WUU120-0002	Marion	39	46	41.70253891	-86	15	2.401127358	4403414.175	564169.5985	12/21/2006 11:50	AA45153	167	24	18.4	330	0.2	209	<0.1	1.2	7.9	0.09	21		1.1	265	0.6	4.2	272	6	
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	14/2006 12:00	AA39961	164	54	13.4	79	234	0.1	2.3	7.9	0.08	34			319	0.7	4.4	343	10		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	2/15/2006 13:00	AA42612	203	58	14.4	16	276	<0.1	3.5	8.2	0.07	40		1.5	373	0.6	3.6	402	6		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	3/9/2006 12:50	AA40420	152	69	20.2	2400	214	<0.1	2.1	8.1	0.07	38			340	0.8	4.2	379	21		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	4/12/2006 12:00	AA40931	196	54	14.7	58	254	<0.1	2.4	8.1	0.04	41		1.6	359	0.6	3.8	386	9		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	5/30/2006 12:40	AA41598	218	65	15.7	81	302	<0.1	1.9	7.8	0.04	50			436	0.7	4	447	5		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	6/15/2006 13:00	AA42553	236	86	12.2	120	314	0.6	3.8	7.8	0.09	55		1.7	374	1.3	3.9	415	<4		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	7/5/2006 12:00	AA43074	227	76	16.1	270	306	<0.1	1.6	7.9	0.07	46			442	0.5	4.1	473	4		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	8/3/2006 12:00	AA43763	226	92	12.8	110	311	0.5	3.4	7.8	0.1	44		1.8	475	1.3	4.3	523	6		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	9/28/2006 13:10	AA44442	157	40	19.8	240	207	<0.1	1	(D,J)	8	0.08	23			274	0.8	4.7	303	11	
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	10/12/2006 13:40	AA44552	183	48	14.4	200	238	<0.1	1.4	8.1	0.07	31		1	337	0.7	4.2	346	7		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	11/8/2006 13:30	AA45037	177	34	18.4	130	220	<0.1	1.3	7.9	0.11	25			279	0.9	6.4	300	7		
2006 Fixed Station	Eagle Cr	At Indianapolis, Raymond St, E of SR 67	Eastern Com Belt Plains	512020120140	EC-1	WUU120-0001	Marion	39	44	7.005885459	-86	11	47.67184265	4398685.059	568844.5813	12/21/2006 12:30	AA45154	176	37	16.5	2400	208	<0.1	1.4	7.9	0.1	24		2.1	280	0.6	4.3	303	19		
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	1/4/2006 8:40	AA43955	191	44	15.7			0.1	2.8	8.0	0.08	36			341	0.6	3.6	373	18		
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	2/15/2006 9:30	AA40157	230	44	11.1			0.1	319	<0.1	2.6	8.2	0.04	37		1	368	0.4	2.7	396	9
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	3/9/2006 8:10	AA40414	188	50	13.6			0.1	256	<0.1	1.8	8	0.04	38			338	0.5	3	371	14
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	4/12/2006 9:00	AA40925	206	37	10.6			0.1	269	<0.1	1.5	8.1	0.04	37		1.5	331	0.5	3.2	357	9
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	5/30/2006 9:00	AA41593	199	33	18.1			0.1	251	<0.1	2	8	<0.03	34			343	0.7	4	372	11
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	6/15/2006 8:50	AA42547	198	32	13.5			0.1	260	<0.1	1.5	8.1	0.04	33		1.6	356	1	3.6	380	13
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	7/5/2006 8:15	AA43069	195	36	16.9			0.1	1	8	0.08	36			331	0.6	3.4	377	21		
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	8/3/2006 8:50	AA43758	186	38	20.5			0.1	252	<0.1	0.2	7.9	0.08	26		1.7	329	0.6	3.8	348	21
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	9/28/2006 8:45	AA44337	173	36	16.2	2000	0.1	221	<0.1	0.3	(D,J)	7.9	0.12	24			284	0.8	3.7	334	26
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	10/12/2006 10:00	AA44545	196	44	21.8			0.1	249	<0.1	0.1	8	0.11	30		2.8	352	0.8	3.9	369	16
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	11/8/2006 9:45	AA45032	199	38	12.5			0.1	257	<0.1	0.6	7.9	0.05	32			315	0.7	4.1	338	7
2006 Fixed Station	Fall Cr	Indianapolis, Keystone Ave near 38th St, and IWC Intake	Eastern Com Belt Plains	512020110060F	FC-7	WUU110-0002	Marion	39	50	3.627676918	-86	7	18.8080395	4409739.792	575136.4603	12/21/2006 9:00	AA45149	184	28	13.2			0.1	257	<0.1	1.5	7.9	0.09	24		<1	306	0.3	3.6	318	8
2006 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	512020100120	FC-26	WUU100-0001	Hamilton	39	57	-85	52	1		4423315.605	596782.6426	1/20/2006 8:55	AA40059	218	41	13.2			0.1	319	<0.1	3.9	8.1	0.09	35			369	0.6	2.8	415	30
2006 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	512020100120	FC-26	WUU100-0001	Hamilton	39	57	-85	52	1		4423315.605	596782.6426	2/15/2006 8:45	AA40257	276	45	7.8	(D,J)		0.1	337	<0.1	2.9	8.1	0.03	52			433	0.3	2	456	11
2006 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	512020100120	FC-26	WUU100-0001	Hamilton	39	57	-85	52	1		4423315.605	596782.6426	3/30/2006 8:45	AA40628	257	40	7.8			0.1	377	<0.1	2	8.1	<0.03	44			407	0.3	2.2	440	9
2006 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	512020100120	FC-26	WUU100-0001	Hamilton	39	57	-85	52	1		4423315.605	596782.6426	4/20/2006 8:35	AA41126	238	32	14.4			0.1	291	<0.1	2.9	8	0.08	41			370	0.6	3.2	418	29
2006 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	512020100120	FC-26	WUU100-0001	Hamilton	39	57	-85	52	1		4423315.605	596782.6426	5/24/2006 9:05	AA42318	211	35	12.4			0.1	351	<0.1	3.2	8.1	0.04	45			422	0.5	2.3	460	25
2006 Fixed Station	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	512020100120	FC-26	WUU100-0001	Hamilton	39	57	-85	52	1		4423315.605	596782.6426	6/28/2006 9:00	AA42747	271	40	12.4			0.1	346	<0.1	2.8	8	0.1	46			485	0.6	2.4	542	

2006 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Corn Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	9/7/2006 14:40	AA44494	227	126	19.8	326	<0.1	5.5	7.9	0.9	134	682	1.1	5.4	722	13	
2006 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Corn Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	10/4/2006 10:40	AA44788	166	87.3	3	251	<0.1	2.9	7.8	0.52	80	1.6	469	0.8	5	512	24
2006 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Corn Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	11/8/2006 16:15	AA45088	248	64	16.3	318	<0.1	3.6	7.8	0.39	61	4.79	0.7	4.3	508	11	
2006 Fixed Station	W Fk White River	SR 144 Bridge, Near Waverly	Eastern Corn Belt Plains	5120201140030	WR-210	WWU140-0003	Morgan	39	34	1	-86	15	21	4379958.515	563921.6362	12/12/2006 13:10	AA45216	245	59	11.9	324	<0.1	3.4	7.8	0.35	66	<1	468	0.8	4.3	494	11
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	1/31/2006 9:15	AA40009	210	67	16.1	306	<0.1	3.4	8	0.2	52	430	0.9	3.4	489	38	
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	2/21/2006 10:25	AA40121	201	67	16.9	281	<0.1	4.5	7.9	0.31	52	1.3	411	0.8	3.7	469	50
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	3/27/2006 13:50	AA40469	229	77	12.2	332	<0.1	3.2	7.9	0.24	71	2.7	481	0.4	3.1	519	22
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	4/19/2006 15:20	AA40979	173	38	26.4	256	<0.1	3.7	7.9	0.28	38	2.6	338	1.4	4.6	471	125
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	5/25/2006 12:25	AA41648	232	55	16.9	303	<0.1	3.7	8	0.17	56	4.55	0.8	3.3	507	42	
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	6/13/2006 8:30	AA42601	198	48	20.6	271	<0.1	5.1	8	0.34	54	1.4	400	1.1	3.8	492	64
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	7/18/2006 14:05	AA43123	126	82	24.3	302	<0.1	3.4	8.4	0.39	84	509	1.6	5.1	563	29	
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	8/31/2006 9:40	AA43833	187	83	18.1	271	<0.1	2.6	7.9	0.46	62	1.8	457	1.1	4.7	513	34
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	9/7/2006 13:30	AA44491	224	101	19	317	<0.1	4.7	8.2	0.64	110	4.5	607	1.1	4.9	646	14
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	10/4/2006 12:30	AA44788	209	92	18.5	290	<0.1	4.4	8	0.64	90	1.7	528	1.1	4.8	588	40
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	11/8/2006 15:00	AA45088	245	59	14.7	320	<0.1	3.1	7.9	0.34	56	4.59	0.6	4.1	489	15	
2006 Fixed Station	W Fk White River	SR 39 Bridge, Martinsville	Interior Plateau	5120201160060	WR-192	WWU160-0004	Morgan	39	26	2	-86	26	58	4365072.097	547381.1792	12/12/2006 12:00	AA45214	242	51	11.1	326	<0.1	3	7.9	0.29	52	<1	428	0.8	4.3	464	18
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	1/20/2006 11:35	AA40056	224	37	14.4	313	<0.1	3.2	8.1	0.14	52	3.95	0.6	3.4	427	15	
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	2/15/2006 11:15	AA40255	273	48	10.2	490	<0.1	3.1	8.2	0.11	101	<1	495	0.4	3	518	10
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	3/30/2006 11:10	AA40625	254	48	10.2	370	<0.1	2.1	8.4	0.14	128	<1	527	0.5	3.1	557	5
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	4/20/2006 11:10	AA41124	239	32	15.2	170	<0.1	2.9	8	0.12	65	1.2	405	0.6	4.4	432	11
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	5/24/2006 11:20	AA42316	261	34	15.2	170	<0.1	3	8	0.08	112	4.66	0.5	3.1	495	10	
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	6/28/2006 11:25	AA42745	264	47	14	329	<0.1	3.1	8	0.27	115	<1	530	0.7	3.4	563	18
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	7/26/2006 11:05	AA43452	278	100	13.2	68	<0.1	4.3	8	0.52	272	<1	924	0.9	4.3	973	8
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	8/23/2006 11:15	AA44055	270	137	13.9	150	<0.1	5.7	7.9	0.88	358	<1	1070	0.6	4.7	1100	15
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	9/21/2006 11:30	AA44539	264	106	13.6	360	<0.1	6.1	7.9	0.76	356	<1	1080	0.7	3.9	1110	6
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	10/25/2006 11:40	AA44382	266	44	13.1	140	<0.1	2.8	8	0.21	95	4.54	0.6	4.6	560	5	
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	11/29/2006 11:30	AA45132	280	47	9.4	160	<0.1	2.4	8	0.21	118	<1	560	0.3	3.6	597	7
2006 Fixed Station	Tiger Dr, CR Bridge N of Yorktown HS		Eastern Corn Belt Plains	5120201020060	WR-309	WWU020-0005	Delaware	40	10	44	-85	29	42	4448698.314	628132.9847	12/21/2006 11:05	AA45143	259	46	11.9	388	<0.1	2.9	7.8	0.21	116	2.4	536	0.6	3.8	576	6
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	1/19/2006 12:30	AA40054	207	24	11.9	294	<0.1	4.5	8	0.1	22	3.22	0.6	3.1	362	13	
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	2/14/2006 12:45	AA40253	264	27	6.9 (DU)	326	<0.1	4.3	8.2	<0.03	35	<1	372	0.2	2.4	389	7
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	3/29/2006 12:10	AA40623	250	38	6.1	361	<0.1	3	8.3	<0.03	43	3.90	0.3	2.1	419	7	
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	4/19/2006 13:10	AA41122	237	22	12.4	301	<0.1	4	8.2	0.06	28	<1	346	0.6	3.3	384	16
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	5/23/2006 13:00	AA42314	253	23	13.2	325	<0.1	4.5	8.1	0.05	24	3.74	0.6	2.9	418	16	
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	6/27/2006 12:55	AA42743	271	24	12.4	325	<0.1	4	8.1	0.11	28	<1	418	0.6	2.9	471	20
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains	5120201010020	WR-348	WWU010-0006	Randolph	40	10	56	-84	58	8	4449960.451	672919.438	7/25/2006 12:50	AA43450	278	31	16.1	313	<0.1	4.0	8.2	0.14	32	3.90	0.7	4.8	432	10	
2006 Fixed Station	US 27 Bridge, E of Winchester		Eastern Corn Belt Plains																													

2007 Fixed Station Monitoring	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WWU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	7/18/2007 8:20	AA48940	254	63	6.9	200	352	<0.1	1.6	8	0.09	49		454	0.4	2.7	495	11	
2007 Fixed Station Monitoring	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WWU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	8/23/2007 8:25	AA49275	196	35	17	980	287	<0.1	2.4	7.9	0.14	45		359	0.8	4.9	410	37	
2007 Fixed Station Monitoring	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WWU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	9/28/2007 8:55	AA49721	230	80	10.4	390	339	<0.1	1.6	7.9	0.08	54		486	0.4	3.3	549	10	
2007 Fixed Station Monitoring	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WWU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	10/25/2007 9:05	AA50093	257	54	10.5	180	353	<0.1	1.6	7.9	0.04	49		439	0.4	3.6	472	6	
2007 Fixed Station Monitoring	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WWU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	11/20/2007 8:35	AA50290	280 (Q)	58	8.1	89	376	<0.1	2	7.9	0.04	60		477	0.3	3.1	508	6	
2007 Fixed Station Monitoring	Fall Cr	SR 238, Fortville	Eastern Com Belt Plains	5120201100120	FC-26	WWU100-0001	Hamilton	39	57	16	-85	52	1	4423315.605	596782.6426	12/20/2007 8:45	AA50766	252	52	7.7	370	383	<0.1	3.5	7.9	0.05	52		449	0.3	2.9	481	9	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	1/4/2007 13:50	AA45331	198	28	10	266	<0.1	1.89		0.08	30.2		313	<0.5	2.93				
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	2/6/2007 12:50	AA45540	222	38	9.41	247	<0.1	1.61	7.24	<0.06	33.8	<4		<0.5	2.88	328 (IDJ)	12 (IDJ)		
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	3/6/2007 13:40	AA45873	128	29 (IDJ)	16	171	0.113	1.12	6.85	0.197	18.3		199	0.648	3.86	244	36		
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	4/17/2007 14:10	AA46511	192	31	15.2	70	253	<0.1	1.3	8.1	0.09	30 (IDJ)	3.1	306	0.6	3.3	335	11	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	5/29/2007 13:15	AA47644	208	43	15.9	410	286	<0.1	0.4	7.8	0.06	38		354	0.6	3.37	402	9	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	6/14/2007 13:20	AA48027	263	70	16.3	140	379	<0.1	0.3	7.8	0.07	63	4.6	472	0.8	3.3	545	18	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	7/5/2007 13:30	AA48536	237	58	23.4	320	320	<0.1	0.5	7.7	0.11	46		407	1.2	3.7	446	16	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	8/16/2007 13:30	AA49134	250	72	15.9	108	350	0.3	0.4	7.9	0.07	62	4.2	497	1.6	4.6	505	10	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	9/6/2007 8:50	AA49588	212	62	17.8	88	323	<0.1	0.1	7.7	0.12	43		397	0.9	4.8	444	14	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	10/4/2007 13:20	AA49815	208	58	18.8	410	279	<0.1	0.2	7.7	0.12	36	3.4	368	1	4.5	397	14	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	11/8/2007 13:30	AA50100	269	78	11.2	27	386	<0.1	0.7	7.6	0.09	56		480	0.6	3.1	508	5	
2007 Fixed Station Monitoring	Fall Cr	Stadium Dr Bridge, Indianapolis	Eastern Com Belt Plains	5120201110060	FC-0.6	WWU110-0001	Marion	39	46	54.223232376	-86	10	36.43610085	4403855.742	570492.8149	12/5/2007 9:40	AA50995	162	46	17.4	2000	232	<0.1	0.4	7.6	0.05	39	1.9	321	0.5	4.9 (Q)	342	6	
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	1/4/2007 10:20	AA45334	170	254	16.9	0.15	220	<0.1	2.5	1.78	22.9		277	0.77	4.02		29		
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	2/6/2007 9:20	AA45544	288	58	<8	0.29	343	0.116	3.01	7.89	0.245	59.8	<4	1.08	2.57	494 (IDJ)	7 (IDJ)		
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	3/6/2007 10:30	AA45876	138	32 (IDJ)	15.2	0.18	189	0.109	1.74	7.41	0.31	22.7		195	0.897	4.25	256	27	
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	4/17/2007 9:50	AA46514	181	31	17.6	610	0.1	262	<0.1	2.8	7.9	0.19	30 (IDJ)	1.7	310	0.6	3.9	354	21
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	5/29/2007 11:50	AA47647	237	64	20.4	56	0.2	347	<0.1	2.8	8	0.28	64		468	0.7	3.41	512	16
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	6/14/2007 10:20	AA48030	267	84	15.1	31	0.3	379	<0.1	2.5	8.1	0.38	95	3.2	536	1	4.1	579	16
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	7/5/2007 10:10	AA48539	257	87	20.2	12	0.4	314	<0.1	2.3	8.2	0.32	79	4.2	493	1.2	4.1	536	22
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	8/16/2007 9:50	AA49141	194	97	12.6	13	0.4	275	<0.1	2.5	7.8	0.52	108		521	0.8	4.6	555	4
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	9/6/2007 10:20	AA49588	222	124	13.3	19	0.4	328	<0.1	3.2	7.9	0.52	104	<1	609	0.7	5.1	640	4
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	10/4/2007 9:45	AA49818	259	152	9.2	19	0.5	372	<0.1	3.6	8.1	0.69	126		720	0.7	4.3	750	<4
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	11/8/2007 10:10	AA50103	284	128	12	6100	0.2	346	<0.1	4.1	8	0.69	127		693	0.6	3.9	720	<4
2007 Fixed Station Monitoring	Indianapolis Waterway Canal	Guilford Ave Bridge	Eastern Com Belt Plains	512020190080	IWC-9	WWU090-0004	Marion	39	52	16.72020981	-86	8	34.59695106	4413825.621	573295.7191	12/5/2007 8:00	AA50098	207	50	14.5	6100	0.2	335	<0.1	4.6	7.8	0.28	70	1.2	448	0.6	4.6 (Q)	484	17
2007 Fixed Station Monitoring	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WWU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	1/4/2007 10:50	AA45335	174	23	25.7		227	<0.1	2.63	0.253	24.2		277	0.791	3.94		43		
2007 Fixed Station Monitoring	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WWU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	2/6/2007 10:00	AA45545	298	54	<8		341	<0.1	2.93	8.03	2.11	61.6	<4	0.925	2.53	452 (IDJ)	6 (IDJ)		
2007 Fixed Station Monitoring	W Fk White River	86th St, Nora	Eastern Com Belt Plains	512020190050	WR-248	WWU090-0002	Marion	39	54	37.31955798	-86	6	18.12464447	4418192.178	576494.3248	3/6/2007 11:00	AA45877	142	36 (IDJ)	15.7		201	<0.1	1.8										





