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Upper Wabash River Watershed Management Plan

~Phase 2~

A project of the Upper Wabash River Basin Commission

FFY 2012 Section 205(j) Grant Project: A305-3-5
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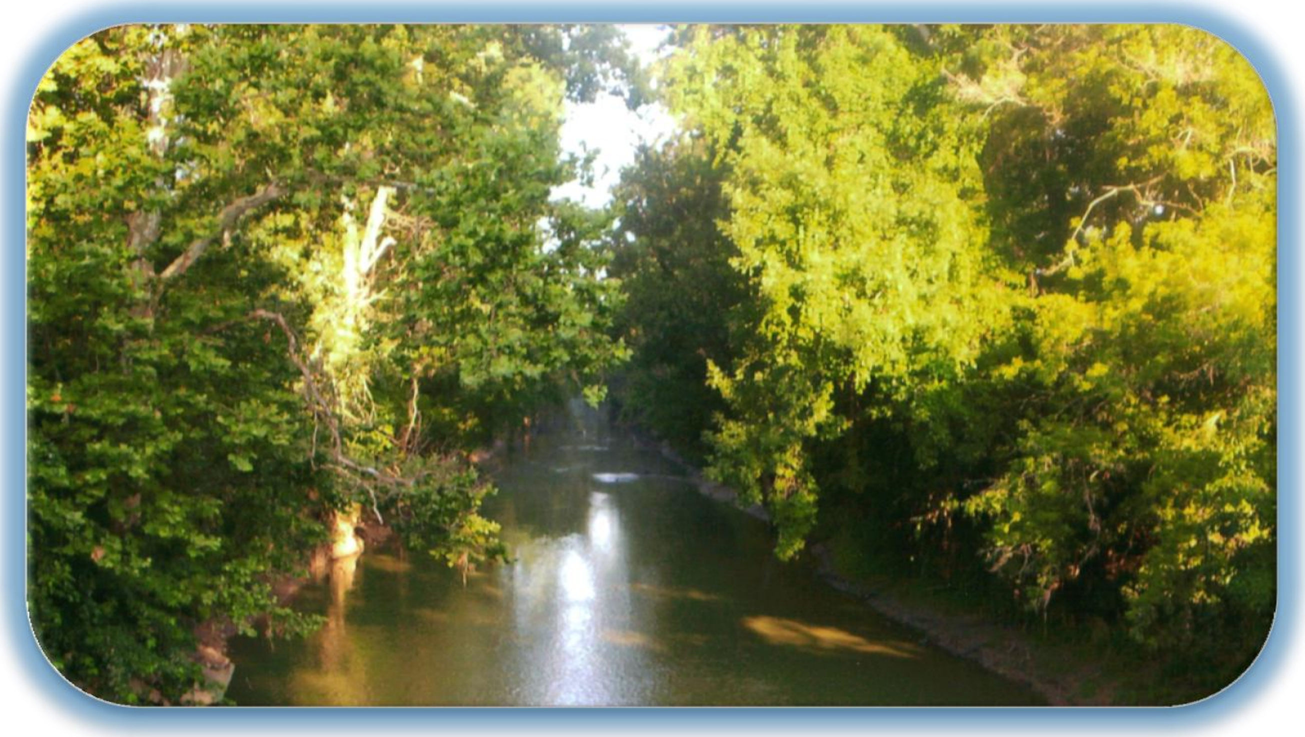

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This plan is a result of a two-year planning effort to identify causes of water quality impairments, identify potential sources of pollutants, and develop strategies to improve water quality in the "Phase 2" portion of the Upper Wabash River basin watershed. Public agencies, private organizations, and stakeholder citizens were involved as part of this planning process. This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement number C600E72012 to the Indiana Department of Environmental Management. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, or Indiana Department of Environmental Management, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Watershed Management Plan meets IDEM's 2009 Checklist.
IDEM approval received September 29, 2015

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Received US EPA approval August 17, 2016.

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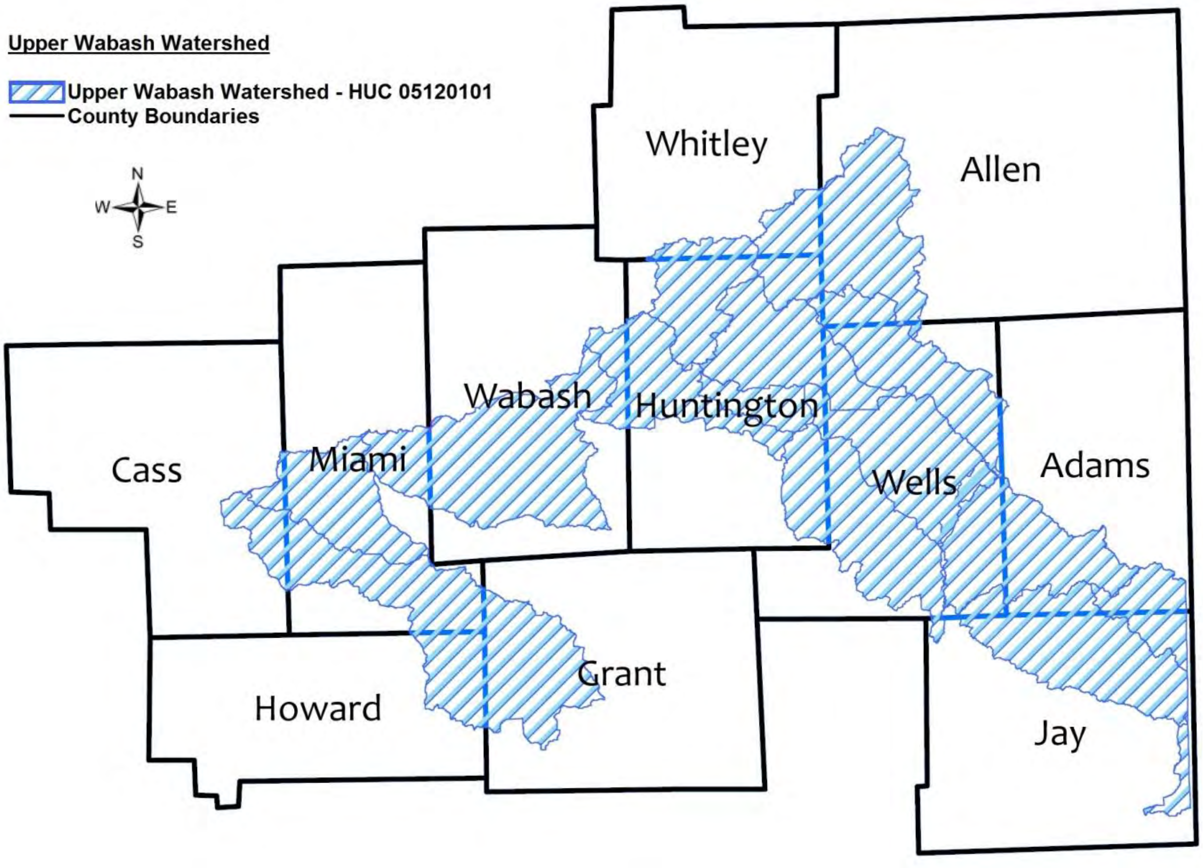
1.0 Community Watershed Initiative

The interest to prepare a Watershed Management Plan (WMP) for the Upper Wabash River basin stems from the known water quality problems in the watershed and the fact that these are common water quality problems facing many other rural watersheds throughout the State.

The Upper Wabash River basin watershed is an 8-digit hydrologic unit code (HUC 05120101) watershed located in northeastern Indiana and western Ohio. The Indiana portion of this watershed encompasses approximately 1,400 square miles in eleven different counties and approximately 750 miles of perennial streams (USEPA 2002a).

Figure 1: Upper Wabash River Basin Watershed, HUC 05120101

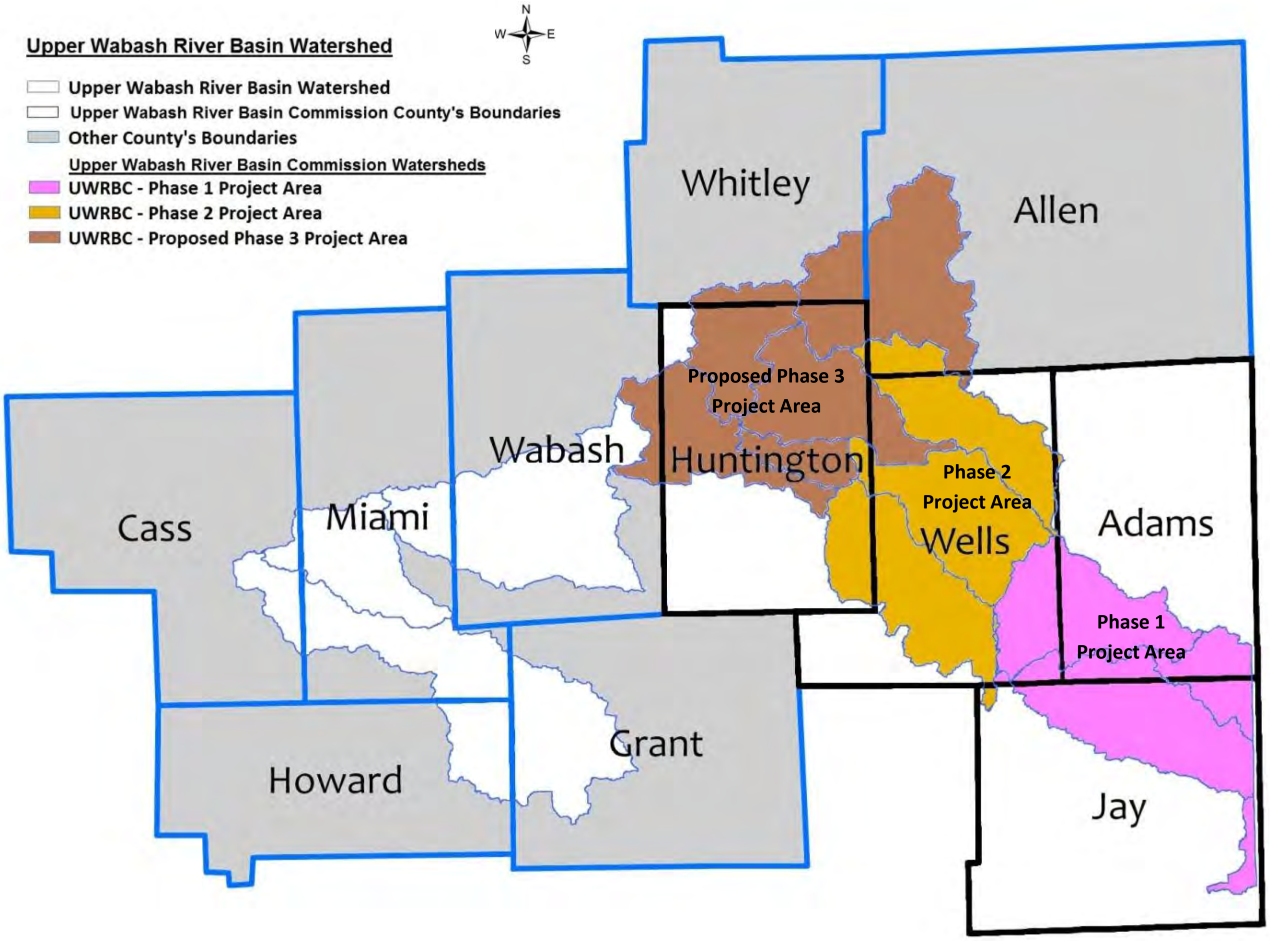


In 2001, Indiana's legislature established the Upper Wabash River Basin Commission (UWRBC) under IC 14-30-4 as a separate municipal entity. The UWRBC was formed at the request of local government officials in Adams, Jay, Wells and Huntington Counties, Indiana to provide an organized structure for mutual cooperation in an effort to address water quantity and quality concerns within the Upper Wabash River basin in the four participating counties (Adams, Jay, Wells and Huntington). The mission of the UWRBC is to provide regional leadership and promotion of flood prevention and control, soil and water conservation, and related resource management through a coordinated and comprehensive planning and implementing approach in which projects of the Commission will not adversely affect landowners within the watershed.

The UWRBC completed a watershed management plan for "Phase 1" of the Upper Wabash River watershed in 2007, then conducted a three-year implementation project of best management practices (BMP's) in the Phase 1 area from 2009-2013. This WMP is for "Phase 2" of the watershed area, and is a continuation of previous efforts to improve water quality in the Upper Wabash River watershed. Upon completion and approval of this plan, the UWRBC will administer a program to install best management practices (BMP's) in the "Phase 2" project area.

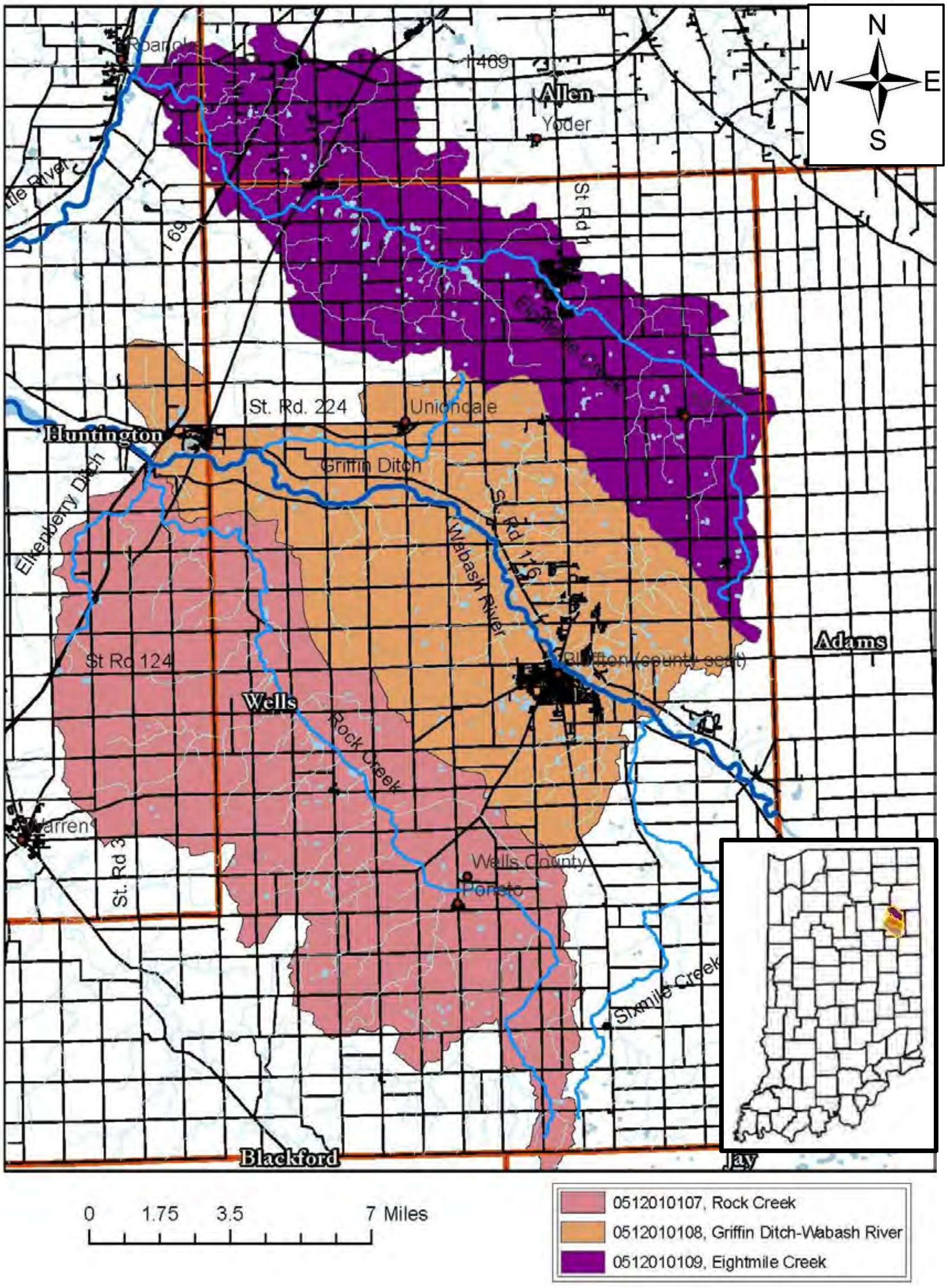
Future projects are anticipated for the "Proposed Phase 3" project area. The UWRBC jurisdiction ends at the Phase 3 project area, but other local watershed groups are interested in working in the downstream subwatersheds in the Upper Wabash River basin area. These coordinated efforts will fulfill local stakeholder desires and long-term vision to complete comprehensive management plans and BMP implementation for the area as a whole and result in watershed protection and restoration throughout the Upper Wabash River basin watersheds.

Figure 2: Upper Wabash River Basin Commission Project Watersheds



“Phase 2” of the UWRBC Project encompasses approximately 176,124 acres and includes the main stem of the Wabash River–Griffin Ditch (HUC: 0512010108), Rock Creek (HUC: 0512010107), and Eight Mile Creek (HUC: 0512010109) subwatersheds (Figure 3), located in Wells, Huntington and Allen counties.

Figure 3: UWRBC Phase 2 Project Area



This WMP is intended to benefit the communities in the watershed by helping to improve the environment through comprehensive water resource planning. This planning effort helps to ensure that current water quality issues are identified and provides a framework for addressing the natural resource concerns in the watershed. It is imperative that the planning process formulates a workable WMP that is sensitive to the values and desires of all members of the community and is developed with the input and support of a diverse cross-section of the community. Input from the farmer, homeowner, government administrator, elected official and others in the community helps to ensure that there is a balanced and equitable distribution of responsibility as well as benefits of clean water in the watershed.

Watershed planning is especially important to help prevent future water resource problems, preserve watershed functions, and ensure future environmental health. Everyone in a watershed is involved in watershed management, even if they are not aware of their contribution or impact. This WMP can provide a better understanding of community values and watershed processes and can provide guidance toward the betterment of watershed management for those who reside in the watershed and community as well as those in adjacent lands.

The watershed faces typical water quality problems, as documented in the Wabash River Total Maximum Daily Load Development Final Report (Wabash TMDL); Rock Creek Conservancy District – Water Monitoring Project; and the Flat Creek, Griffin Ditch, Fleming Ditch, and Somers Creek Watershed Diagnostic Study.

The Wabash River TMDL notes that the primary cause of impairment in the Wabash River is Escherichia coli bacteria (*E. coli*) and nutrients. Excessive nutrients are the likely cause for impaired biotic communities. Excess sediment, habitat degradation, and increased temperatures may also be causes for impaired biotic communities within the Wabash River. Eight Mile Creek and Rock Creek have also been listed as impaired on the Indiana Department of Environmental Management (IDEM) 303(d) list for *E. coli* and impaired biotic communities. Most recent biological monitoring conducted by the Rock Creek Conservancy District shows that the biotic communities are rated poor to fair upstream (Pollution Tolerance Index (PTI) = 4-10) and increases in score (18-25) as the creek approaches the Wabash River main stem at the J.E. Roush Fish and Wildlife area. A PTI score of 23 or greater is considered excellent and scores of 10 or less are considered poor. The Lake and River Enhancement (LARE) study of Flat Creek, Griffin Ditch, Fleming Ditch and Somers Creek concluded that the physical and chemical characteristics of these watersheds were degraded and that the watersheds were net contributors of sediment, nutrients and bacteria to the Wabash River. Additionally, a report in 2000 by the Indiana Department of Natural Resources (Wabash River Fish Study) shows that game fish species are severely limited in the reaches of the Upper Wabash Watershed above the J. E. Roush Lake. The species in greatest abundance, including common carp, are indicators of poor water quality.

Agriculture, the primary land use in the watershed, includes mainly grain and livestock operations. Traditional row crop production pushes tillage to the edge of many stream and ditch banks where sediments, nutrients, and other pollutants can migrate from the agricultural lands to surface waters via runoff, sub-surface tile systems and erosion. County Surveyors increasingly work to reduce re-entry of soil from ditch and stream dredging, but many waterways lack grassed buffers and are void of riparian areas.

The watershed area also encompasses the city of Bluffton (population 9,897), towns of Markle (population 1,095), Uniondale (population 310), Zanesville (population 600), Ossian (population 3,289), and Poneto (population 166); as well as smaller unincorporated communities of Liberty Center, Tocsin, Kingsland and Rockford. In urban communities, the runoff from heavily chemically treated lawns and from asphalt streets and parking lots pollutes the storm water that drains untreated into the waterways. Soils in the smaller communities and rural areas are also limiting or severely limiting for proper septic system function, and these residential areas contribute organic and nutrient pollution.

1.1 Community Leadership

The UWRBC voting members are the three County Commissioners, the County Surveyor, and the chairman of the Soil and Water Conservation Districts (SWCDs) of Adams, Jay, Wells, and Huntington Counties; or their appointed representatives. The UWRBC annually elects officers to serve as the executive committee from among the voting members, which includes a chairperson, vice chairperson, secretary and treasurer, Surveyor representative, and SWCD representative. An administrative secretary is contracted to perform the administrative, secretarial and financial duties.

Current elected officers and executive committee include:

- Ryan Noblitt, Chairperson, representing Adams Co.
- Doug Sundling, Vice Chairperson, representing Wells Co.
- Ed Paxson (2013-present); Ken Brunswick (2002-2013), Secretary, representing Jay Co.
- Jarrod Hahn, Treasurer, representing Wells Co.
- Paul Norr, Surveyor, representing Adams Co.
- Kyle Lund, SWCD, representing Huntington Co.

Table 1-1: UWRBC Voting Members

County	Member	Affiliation
Adams	Doug Bauman	Adams County Commissioner
	Kim Fruechte	Adams County Commissioner
	Ed Coil (thru 2014) Rex Moore (2015)	Adams County Commissioner
	Ryan Noblitt *(Appt. for E. Coil/R. Moore)*	Adams County SWCD
	Paul Norr	Adams County Surveyor
	Vacant *(Randy Roe, SWCD Chairman)*	Adams County SWCD
Huntington	Tom Wall	Huntington County Commissioner
	Leon Hulburt (thru 2014) Rob Miller (2015)	Huntington County Commissioner
	Larry Buzzard	Huntington County Commissioner
	Jay Poe	Huntington County Surveyor
	Kyle Lund, SWCD Chairman	Huntington County SWCD
Jay	*Milo Miller (thru 2014) Douglas Inman (2015)*	Jay County Commissioner
	Bettie Jacobs *(Appt. for M. Miller/D. Inman)*	Jay County SWCD
	Faron Parr	Jay County Commissioner

Jay	Jim Zimmerman	Jay County Commissioner
	Brad Daniels	Jay County Surveyor
	Ed Paxson (2013-present), SWCD Supervisor Ken Brunswick (2002-2013 *SWCD Appt.*)	Jay County SWCD
Wells	*Scott Mossburg (thru 2014)* Tamara Dunmoyer (2015)	Wells County Commissioner
	Doug Sundling *(Appointment for S. Mossburg thru 2014; SWCD Appointment 2015)*	Wells County Landowner
	Kevin Woodward	Wells County Commissioner
	Blake Gerber	Wells County Commissioner
	Jarrod Hahn	Wells County Surveyor
	Wayne Reinhard (*SWCD Appointment thru 2014)*	Wells County SWCD

This project will culminate in a Watershed Management Plan, which represents the earnest efforts of the community to understand, analyze and be an integral part of the solution to improve impaired water quality in the watershed area. The project's focus is to increase stakeholder awareness of water quality issues with the general goal of increasing landowner participation in non-point source pollution reduction efforts over the coming years.

1.2 Steering Committee & Stakeholder Involvement

The UWRBC holds public bi-monthly meetings to plan, discuss, and direct the activities of the Commission. The UWRBC Steering Committee, comprised of UWRBC members and other interested stakeholders, was formed in 2009 to provide oversight to the Phase 1 BMP implementation project. This Steering Committee has continued to meet bi-monthly opposite the UWRBC meetings to provide assistance and oversight to the Watershed Coordinator for this project and to provide input and make recommendations to the UWRBC voting members.

Planning and decision making is a joint venture of the citizens, partners and the UWRBC. Media releases were published and a public WMP kick-off meeting was held to announce the project and solicit input. Stakeholders were invited to join the Steering Committee and encouraged to become involved in the planning process. A total of 23 people participated in the event, and 4 additional citizens contacted the Watershed Coordinator to inquire about the project and provide input to the list of concerns. Stakeholders were invited to provide input throughout the planning process through education and outreach efforts (Appendix B); including newsletters, website announcements, workshops and field days, water quality monitoring activities, and dissemination of information through partner agencies. Stakeholder social indicator data was collected at workshops and field days through the use of surveys and are included in Appendix C.

Partnerships among water resource professionals are also essential to the successful development of the WMP. Therefore personnel from the SWCDs, The Nature Conservancy, Cooperative Extension Service, Indiana State Dept. of Agriculture-Div. of Soil Conservation, Indiana Dept. of Natural Resources-Div. of Fish and Wildlife, and US Dept. of Agriculture-Natural Resources Conservation Service have been included in or invited to participate in the Steering Committee.

Table 1-2: Steering Committee Members

Member	Affiliation
Ryan Noblitt	Adams Co. SWCD/UWRBC member
Doug Sundling	Wells Co. Landowner /UWRBC member
Jarrod Hahn	Wells Co. Surveyor/UWRBC member
Neil Ainslie	Wells Co. Resident
Barbara Elliott	Wells Co. Landowner
Beverly Balish	Wells Co. 8th Grade Biology Teacher
Eric Wenger	Wells Co. Landowner/Agricultural Producer
Makaye Conrad	Wells Co. Landowner/previous member of the Wells Co. Regional Sewer District/Hoosier Riverwatch volunteer
Kelley Barkell	Adams-Wells Co. NRCS District Conservationist/Wells Co. Landowner
Dave Lefforge	ISDA, Div. of Soil Conservation/Wells Co. Landowner
Nick Alles	ISDA, Div. of Soil Conservation/Huntington Co. Resident
Lynne Huffman	Wells Co. SWCD/Wells Co. Landowner
Doug Nusbaum	IDNR, Div. of Fish and Wildlife
Kent Wamsley	The Nature Conservancy

1.3 Stakeholder Concerns

As part of the watershed planning process, an inventory and assessment of the watershed and existing water quality studies relevant to the watershed must be conducted. Examination of the previous data may show that there is sufficient information to determine the condition of water quality, or it may indicate that additional studies need to be completed. In either case, assessing this information will help guide the identification of water quality problems and possible pollution sources in the watershed and direct specifically targeted conservation actions to address each concern.

Citizens living, working, and playing in the watershed can prove to be valuable in the planning process by providing both current and historical insight into the water quality issues in the watershed area. Initial concerns, gathered during the public meetings, as identified by the UWRBC members, Steering Committee and stakeholders are listed in Table 1-3.

Table 1-3: Stakeholder Concerns

Some of the concerns fit in multiple categories, but are listed only once.

Gathered during initial public meetings

Drainage	Log-jams and debris in river and streams
	Encourage 2-stage ditches
	Flooding along the river and streams
Sediment & Nutrients	In-stream and stream bank erosion causing sedimentation
	Agriculture fertilizer (nitrogen and phosphorus) runoff into streams
	Manure management; stockpiling and application practices
	Tillage to the edge of stream banks, no filter strips or riparian area
	Conservation tillage has low adoption rates
	Lack of buffers and filter strips on streams
	Residential runoff from chemically treated lawns (fertilizers and pesticides)
	Construction site (and road construction) erosion causing sedimentation
***E. coli* & Pathogens**	High *E. coli* levels
	Failing septic systems, severely limiting soils, lack of maintenance
	Wastewater treatment in unincorporated communities
	Run-off from asphalt streets and parking lots
Other Concerns	Wetlands drained and forests cleared
	Lack of green space and trails
	Dumping, trash in river and streams

2.0 Watershed Inventory

2.1 Geology and Topography

During the Pleistocene (ice age), Indiana experienced at least three major periods of glaciation, each lasting tens of thousands of years. Each episode of ice advance and retreat affected the landscape. The most recent event, the Wisconsin Glacier, retreated about 13,600 years ago.

The Upper Wabash River watershed is in the Bluffton Till Plain and was one of the last areas of Indiana to be covered by the glacial ice. When the glacier receded, it deposited eroded substrate of various types of sediment, referred to as “drift” over dolomite and limestone bedrock. These deposits left a series of ground moraines which give the landscape a mostly level to moderately sloping appearance, with only a few areas of steep slopes. Of the glacial drift, glacial till is a homogenous, unsorted mixture of particles ranging in size from clay to boulders deposited directly by the ice. Outwash sediments were transported and deposited by the action of the glacial meltwater, and consists of sorted and stratified sand and gravel on flood plains and stream terraces. Lacustrine material, such as clay, silt and very fine sand was deposited in still or shallow ponded glacial meltwater over the majority of the watershed area and was exposed when the glacial waters drained.

This watershed study includes three subwatersheds of the Wabash River Basin. Elevation ranges from 920 feet above sea level in the Rock Creek subwatershed, and 860 feet in the Griffin Ditch-Wabash River subwatershed to about 765 feet above sea level downstream on the Wabash River at the J. E. Roush DNR Fish and Wildlife area in Huntington County. The Eight Mile subwatershed ranges from 860 feet above sea level, to approximately 740 feet downstream where it enters the Little River in Huntington County. The Rock Creek subwatershed slopes northwest through Wells County and slopes mostly north in Huntington County. The Griffin Ditch-Wabash River subwatershed slopes northwest/west through Wells County into Huntington County. The Eight Mile subwatershed slopes northwest through Wells County and a small portion of Allen County before entering Huntington County.

2.2 Hydrology (Drainage Patterns)

The Upper Wabash River Phase 2 project watershed drains over 275 square miles in the Rock Creek, Griffin Ditch-Wabash River, and Eight Mile subwatersheds. The project watersheds cover over 58% of Wells County, 10% of Huntington County, almost 3% of Allen County, and less than 0.3 square miles in both Jay and Adams Counties. There are over 330 miles of streams and ditches within the watershed.

The Rock Creek subwatershed contains 117.10 miles of streams and ditches and 127.91 miles of county tile. The Rock Creek main channel flows for approximately 25 miles in a north/northwest direction from southern Wells County where it empties into the Wabash River in the J. E. Roush DNR Fish and Wildlife area near Markle, in Huntington County. In the mid 60’s to early 70’s, the main channel was reconstructed to reduce flooding and provide adequate drainage for agriculture production which is the main use of the stream, as evidenced by the amount of county tile in the watershed. Recreation was also a consideration during the reconstruction, so habitat areas and fish pools were included in the design, which encourages local residents to use the creek for hunting and fishing.

The Griffin Ditch-Wabash River subwatershed contains 109.90 miles of streams and ditches and 85.94 miles of county tile, and is drained by the Wabash River main stem. The Wabash River flows over 17 miles in a northwest/west direction, from just east of Bluffton, to the J.E. Roush DNR Fish and Wildlife area near Markle, in Huntington County. The Wabash River is listed by the Natural Resources Commission as an Outstanding River. Local stakeholders use the river for drainage, aesthetics, or recreational purposes such as walking trails, fishing, hunting, and canoeing.

The Eight Mile subwatershed contains 103.51 miles of streams and ditches and 82.14 miles of county tile, and the main channel flows for over 27 miles in a northwest direction through Wells and Allen Counties, where it empties into the Little River near Roanoke, in Huntington County. The Eight Mile Creek is used primarily as drainage for agriculture production, and has been channelized and maintained (dredging, clearing vegetation, etc.) as an open drainage ditch. This subwatershed contains five two-stage ditches installed by the Wells Co. Surveyor.

The overall primary use of the streams and ditches in the watershed is for drainage. County legal drains are routinely maintained for this purpose. The open streams and drains are regularly sprayed to reduce and control the growth of woody vegetation; clearing, dredging and/or reconstruction are also used as methods to reduce and remove obstructions. These modifications can result in the destruction of aquatic habitats, loss of riparian areas, and increased potential for erosion and sedimentation. The installation, repair, and replacement of subsurface tile are also used extensively throughout the watershed project area to improve drainage. In fact, there is almost as much county regulated tile as there are open streams and legal drains. Subsurface tile speeds up the amount of water that reaches the streams and ditches in a shorter amount of time. This can lead to increased flow within the stream and increased potential for erosion occurring within the stream channel. Tile inlets can also provide a direct conduit for nutrients, sediments and pathogens to travel to the open stream or river, and result in a decrease in water quality; all concerns identified by local stakeholders.

Wetlands, ponds, and lakes in the watershed area are small and numerous but cover just 1,411 acres, or 0.8% of the watershed area. Wetlands tend to be in wooded areas and landowners generally consider them as a negative. It is an area that cannot be cleared for crop production. Often, these wooded areas are offered as residential building sites. Private ponds and lakes are distributed throughout the watershed area and used for recreation on residential properties.

Table 2-1: Waters of the Upper Wabash River Phase 2 Watershed

Streams and Legal Drains	330.51 miles
County Tile	295.99 miles
Wetlands	695 acres (1,134 wetlands)
Lakes, and Ponds	716 acres (377 waters bodies)

Figure 4: Hydrology of Rock Creek, HUC 0512010107

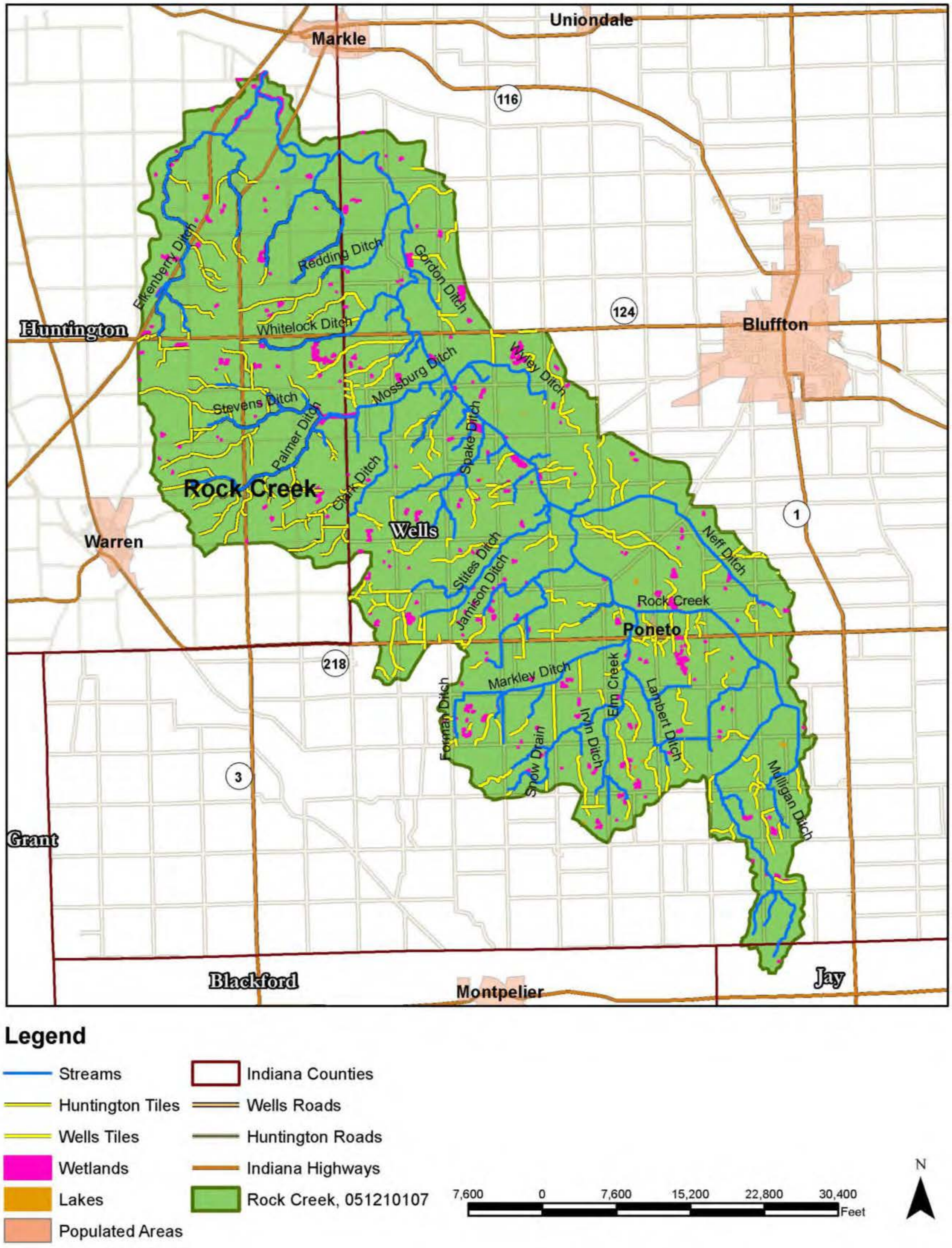


Figure 5: Hydrology of Griffin Ditch-Wabash River, HUC 0512010108

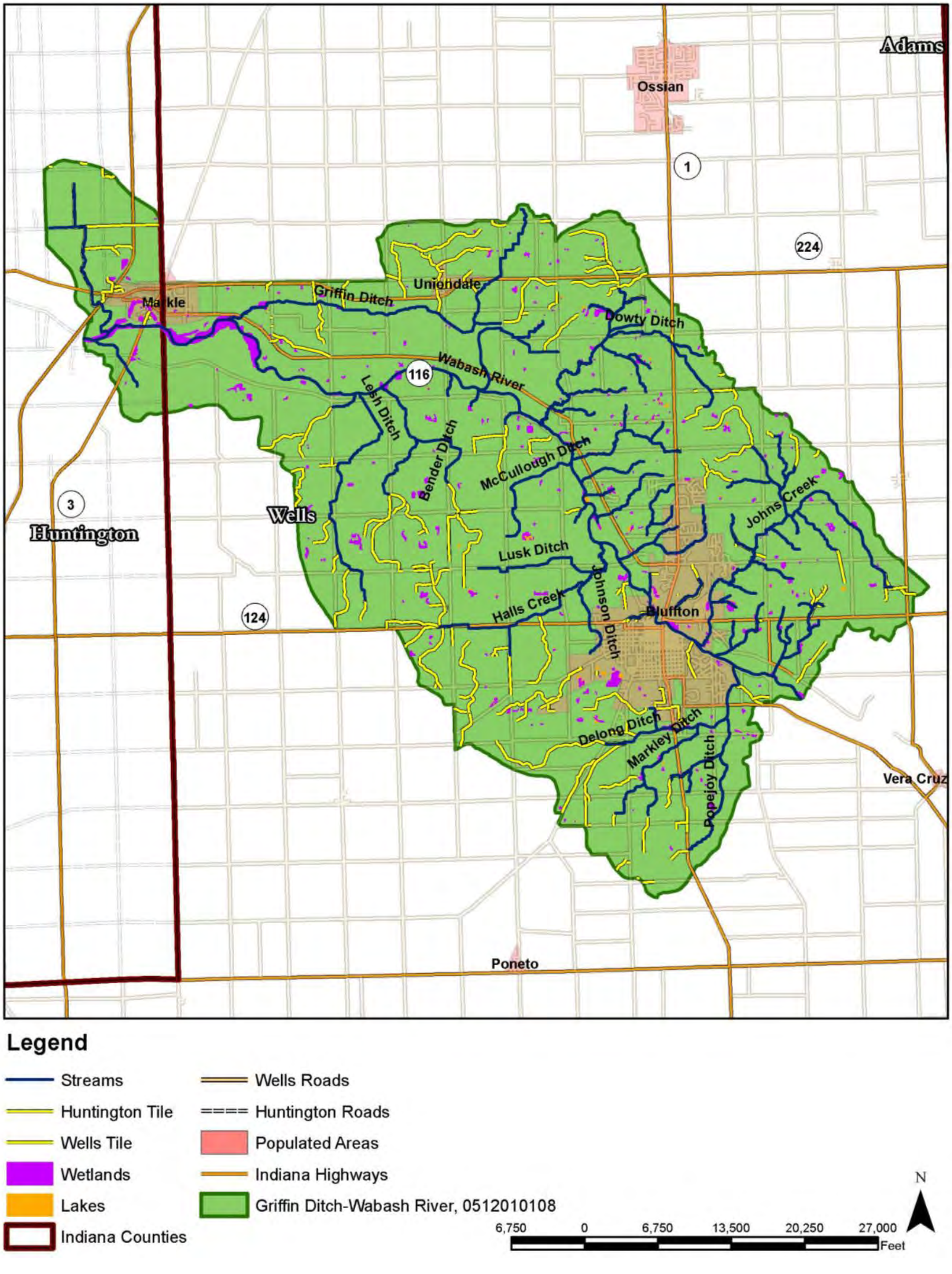
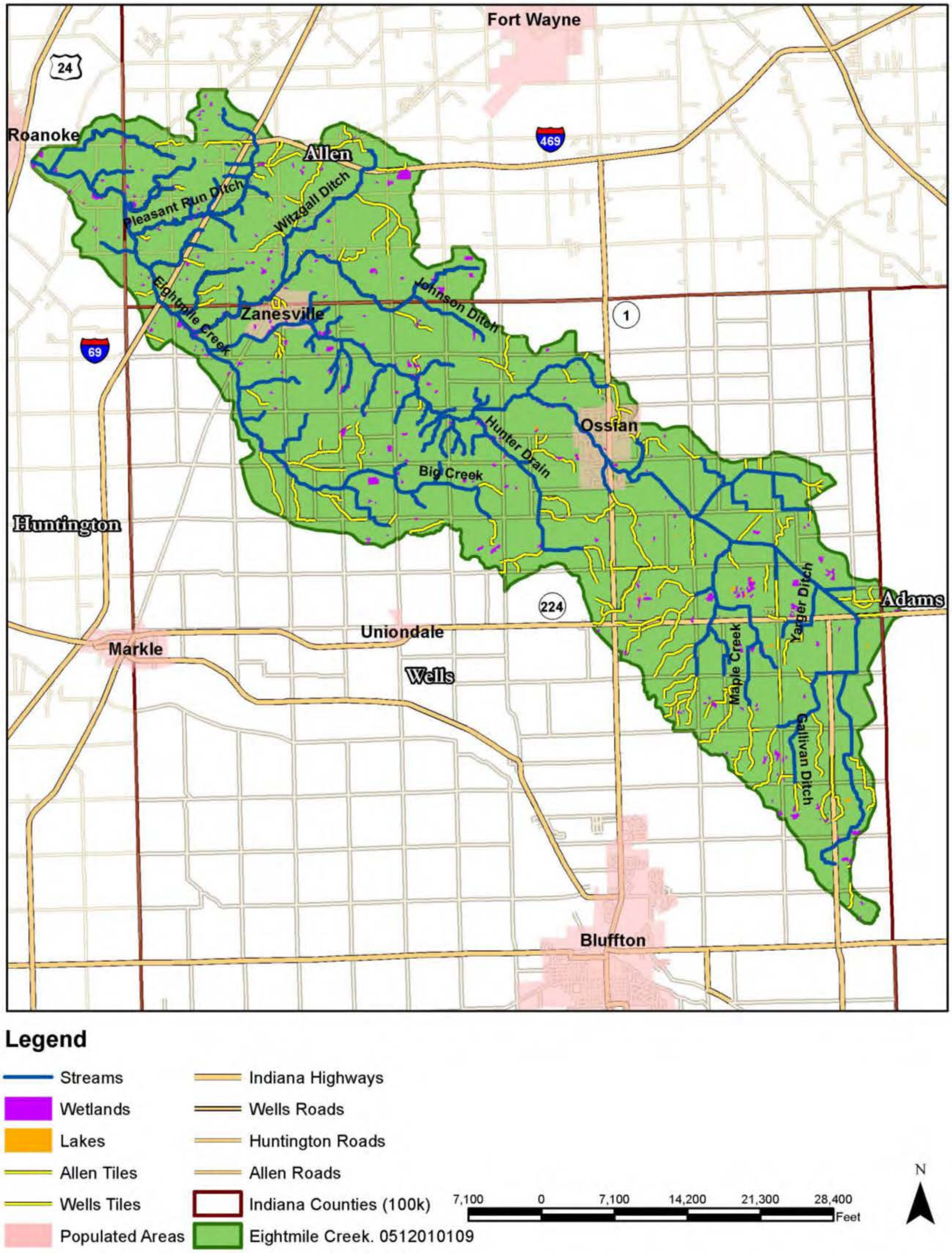


Figure 6: Hydrology of Eight Mile Creek, HUC 0512010109



Impaired Waters - IDEM 303(d) List

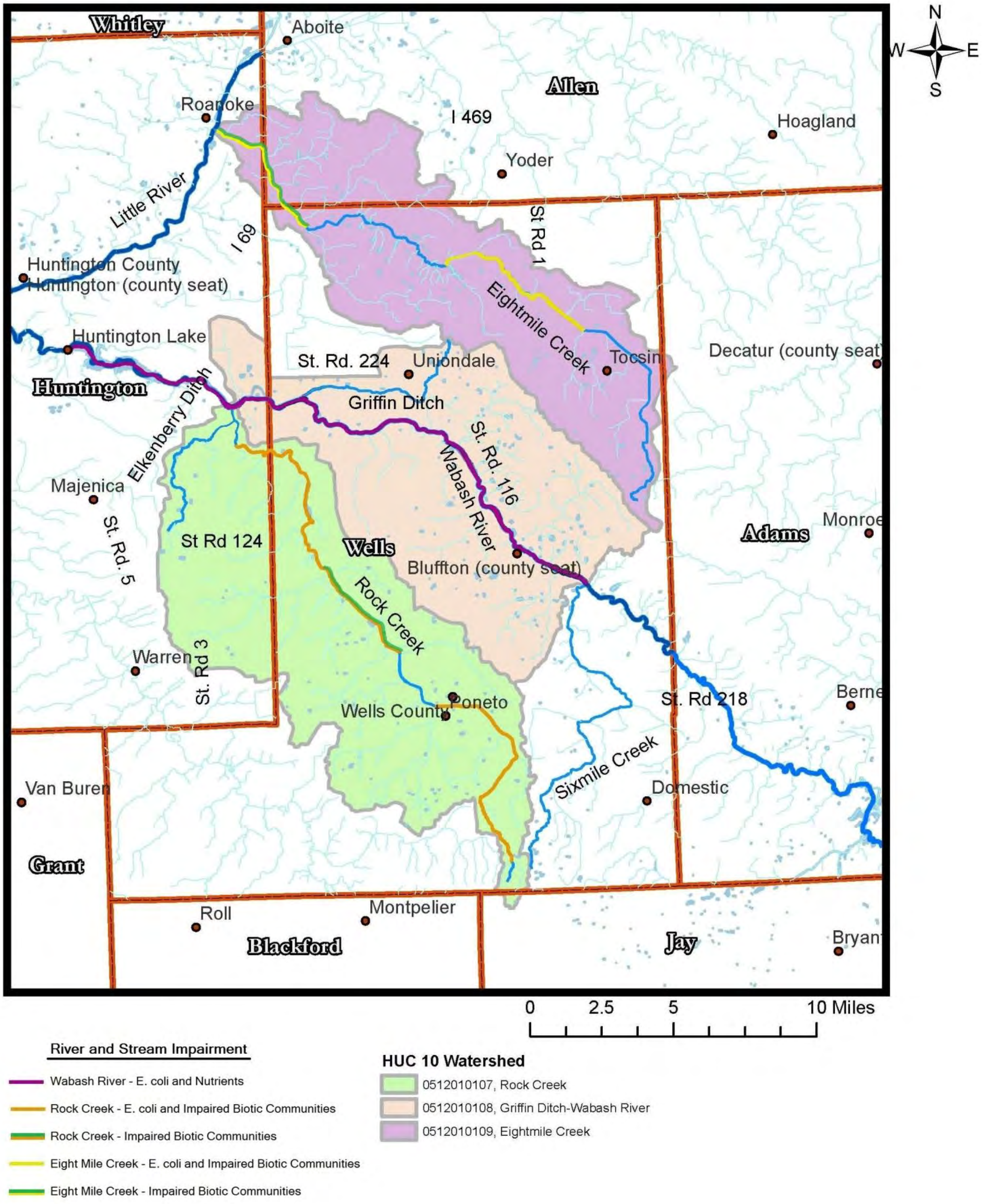
The Indiana Department of Environmental Management (IDEM) Office of Water Quality prepares Indiana's 303(d) List of Impaired Waters every two years as part of the state's Integrated Water Monitoring Assessment Report which is submitted to the US EPA. The 303(d) list identifies where water quality problems exist and the nature of those impairments. Water bodies are included on the list if they do not meet the state's water quality standards.

Approximately 52.6 miles of streams in the project area (16%) have been assessed by IDEM. Of those, over 43 miles are on the IDEM 303(d) List Revised (12/28/12) for water quality impairments from nutrients, *E. coli*, and impaired biotic communities (Figure 7). This means that these water bodies do not meet one or more of its designated uses and that the water quality standards or other applicable criteria are not attained.

Table 2-2: Impaired Waters in the Upper Wabash River Phase 2 Watershed
2012 IDEM 303(d) List Revised (12/28/12)

ASSESSMENT UNIT ID (IDEM)	ASSESSMENT UNIT NAME	CAUSE OF IMPAIRMENT
INB0171_01	Rock Creek	E. coli & Impaired Biotic Communities
INB0173_01	Rock Creek	Impaired Biotic Communities
INB0174_01	Rock Creek	E. coli & Impaired Biotic Communities
INB0181_01	Wabash River	E. coli & Nutrients
INB0182_01	Wabash River	E. coli & Nutrients
INB0183_03	Wabash River	E. coli & Nutrients
INB0184_01	Wabash River	E. coli & Nutrients
INB0192_01	Eight Mile Creek	E. coli & Impaired Biotic Communities
INB0194_01	Eight Mile Creek	Impaired Biotic Communities

Figure 7: Upper Wabash River-Phase 2 Watershed Impaired Streams



2.3 *Soils*

Soils can be grouped and described by looking at the various physical and chemical characteristics. One such characterization is called STATSGO, or State Soil Geographic Database maintained by the United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS).

The soils in the Upper Wabash River Phase 2 project area fall into seven different soil associations. The Blount-Pewamo-Glynwood (IN005) association accounts for 70.78% of the watershed. The Blount-Glynwood-Morley (IN004) association covers 17.25%, the Sawmill-Lawson-Genesee (IN029) association amounts to 6.06% primarily adjoining the major streams, and the Milford-Martinton-Del Rey (IN0523) association is only 4.04% of the watershed. The Sebewa-Gilford-Homer (IN025), Milsdale-New Glarius-Randolph (IN047), and Rensselaer-Darroch-Whitaker (IN003) associations make up the balance of less than 2% of the total watershed area. In general, the soils in the watershed are dominantly glacial till, lacustrine deposits, outwash deposits, alluvium, and organic deposits.

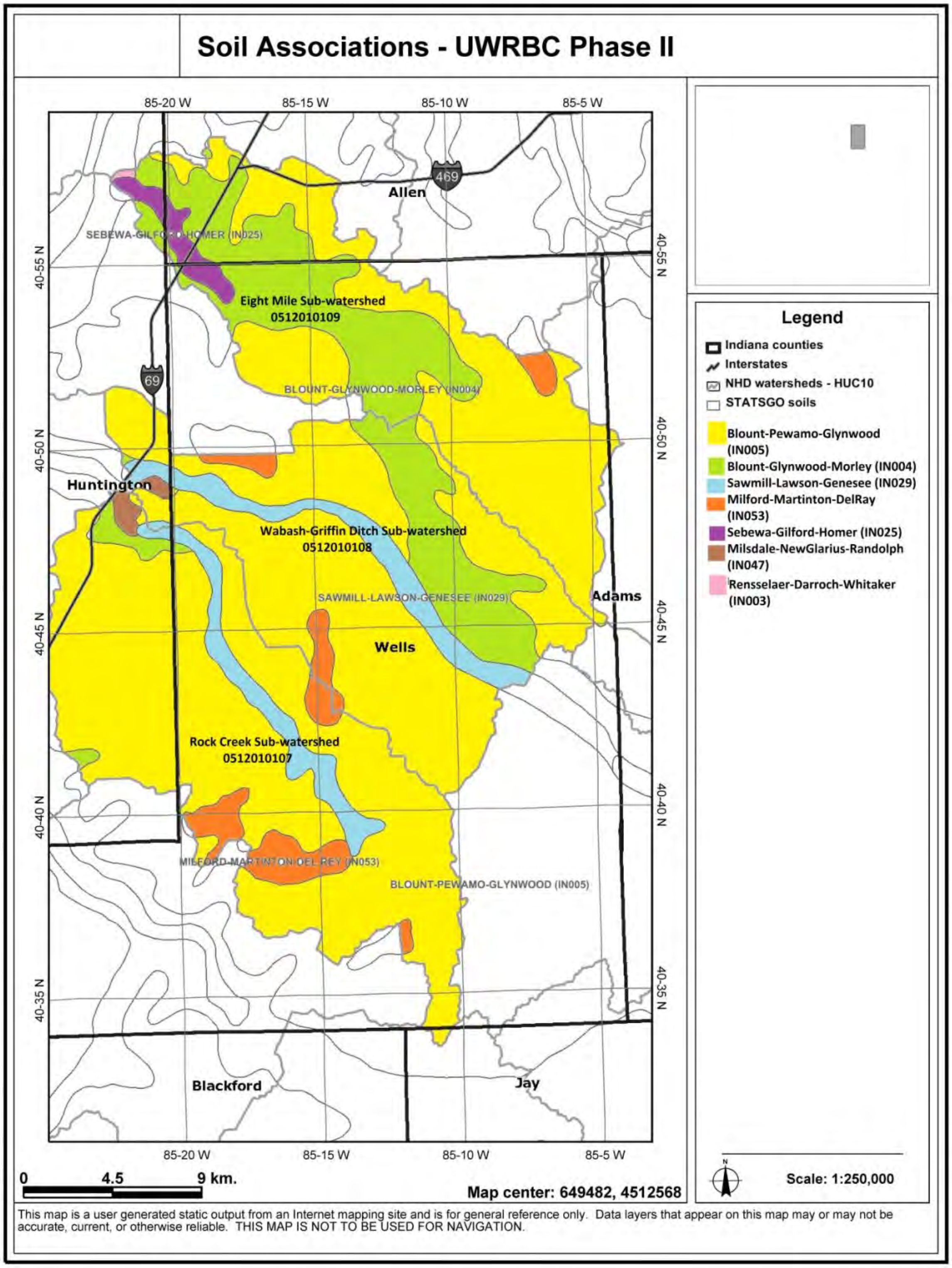
Glacial drift was deposited with minimal water action as the glacial ice melted. The glacial drift is very firm, calcareous silty clay loam and clay loam. Blount, Pewamo, Glynwood, and Morley all formed in glacial till which makes up over 87% of the watershed area. Most areas are used for cultivated crops such as corn, soybeans, small grains, and hay. The Blount and Pewamo soils typically are nearly level to gently sloping with a range of 0 to 4 percent. They are deep to very deep, somewhat poorly drained to very poorly drained, medium textured and moderately fine textured, slowly permeable soils with a well developed subsoil on the lake plains and moraines. Blount soils are on flatter or more convex positions, and Pewamo soils are in depressions or drainage ways. Glynwood and Morley soils formed in thin loess and the underlying clay loam or silty clay loam till. Glynwood and Morley are found on ground and end moraines. They are very deep, moderately well drained and well drained, and have low permeability, with slopes of generally 1 to 18 percent. Potential for surface runoff is low to very high depending on the slope and vegetative cover.

Milford and Del Rey soils formed in lacustrine sediments on the glacial lake plains and are on nearly level low broad summits or in depressions. Lacustrine material was deposited by still or shallow ponded glacial meltwater. Because coarser fragments were deposited as outwash by the moving meltwater, only the finer particles, such as clay, silt and very fine sand remained to settle out. Some areas have a thin mantle of outwash overlying the lacustrine sediments. Lacustrine deposits are typically fine textured, but they have a thin layer of sand. These soils are very deep and somewhat poorly drained to very poorly drained with a seasonal high water table. The Milford soils have a slope of less than 2 percent, and Del Rey soils have a greater slope ranging from 0 to 4 percent.

The Sawmill-Lawson-Genesee association consists of very deep, well drained soils that formed in loamy alluvium on the flood plains. Alluvial material was deposited by floodwaters from streams that were formed by the melting glaciers. These soils are subject to periodic flooding and stream bank erosion. Soils commonly associated with this group include the moderately well drained Eel soils, somewhat poorly drained Shoals soils, and very poorly drained Sloan and

Rensselaer soils that are found in the watershed. They are nearly level, moderately fine and medium textured soils formed in alluvium and outwash material on flood plains and stream terraces.

Figure 8: Soil Associations in the UWRBC Phase 2 Watershed



Highly Erodible Soils

Soil erosion and sedimentation is a concern within the project watershed area. Soil that moves from the landscape to adjacent streams and rivers results in degraded water quality, limited recreational use, and impaired aquatic habitat and health. Soil also carries attached nutrients, pesticides and herbicides to the streams and rivers which can increase plant and algae growth, kill aquatic life, and decrease the water quality.

The USDA Natural Resources Conservation Service (NRCS) uses soil texture and slope to classify soils into groups that are considered highly erodible (HEL), potentially highly erodible (PHEL), and non-erodible. The classification is based on several factors including the average annual rate of erosion by the particular soil, the maximum annual rate of erosion that can occur for the soil type without causing a decline in long-term productivity, steepness and length of the underlying slope.

Highly erodible land (HEL) describes those areas of cropland, hayland or pasture that are potentially exposed to soil erosion by wind or water, and can erode at excessive rates. NRCS has compiled a list of soils which they commonly see in these situations. Lands that are HEL can contribute a significant amount of sediment, nutrients, and chemicals to local waterways, especially if they are row crops and lack appropriate ground cover or other conservation measures. Only 2% (3,742 acres) of the Upper Wabash River Phase 2 watershed area is classified as HEL, but 30% (52,901 acres) of the watershed is classified as PHEL.

With almost one-third of the watershed area (32%) being HEL and PHEL, conservation practices such as conservation tillage and cover crops are recommended. Tillage transects; windshield surveys that collect data on current and past crop use and tillage practices; provide valuable information on trends in cropland use. Based on the 2013 tillage transect, conducted by the USDA NRCS, ISDA, and local SWCD staff; corn and beans were planted by conventional tillage methods on over 66,400 acres (53%) in the project area. Of the total planted acres in the project area 87% of the corn and 22% of the bean crop was planted using conventional tillage. Trends indicate that producers are not adopting conservation tillage for corn production, and in fact have been returning to conventional tillage. No-till (including strip or ridge till), mulch till, and reduced tillage has been widely adopted for bean production at approximately 78%. That trend seems to be holding steady or slowly increasing. Tillage to the edge of stream banks and low adoption rates on conservation tillage has been identified as concerns for contributing sediment and nutrients to the streams.

Highly erodible (HEL) and potentially highly erodible lands (PHEL) are mapped in the following Figures 9 – 11.

Figure 9: Highly Erodible Soils of Rock Creek, HUC 0512010107

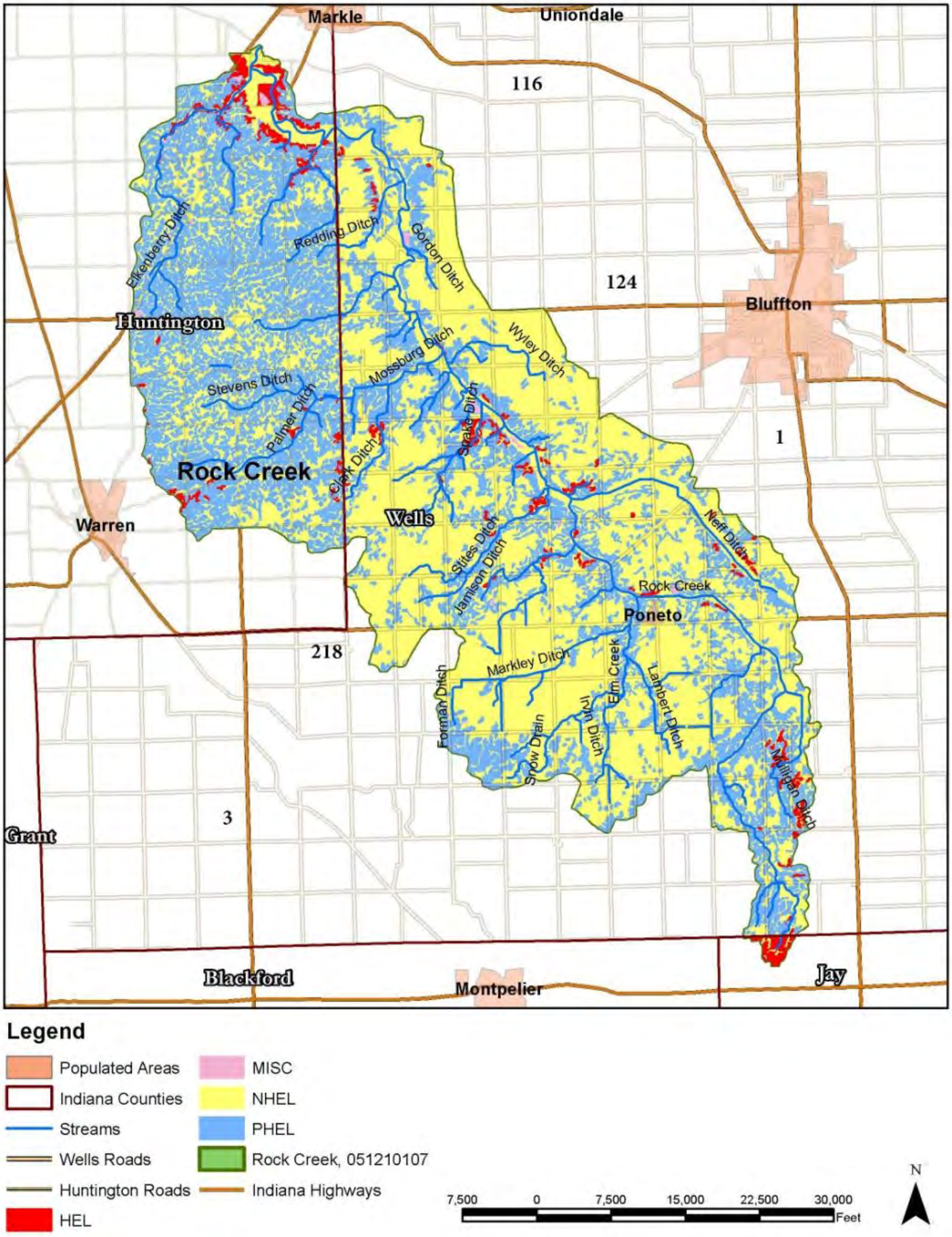


Figure 10: Highly Erodible Soils of Griffin Ditch-Wabash River, HUC 0512010108

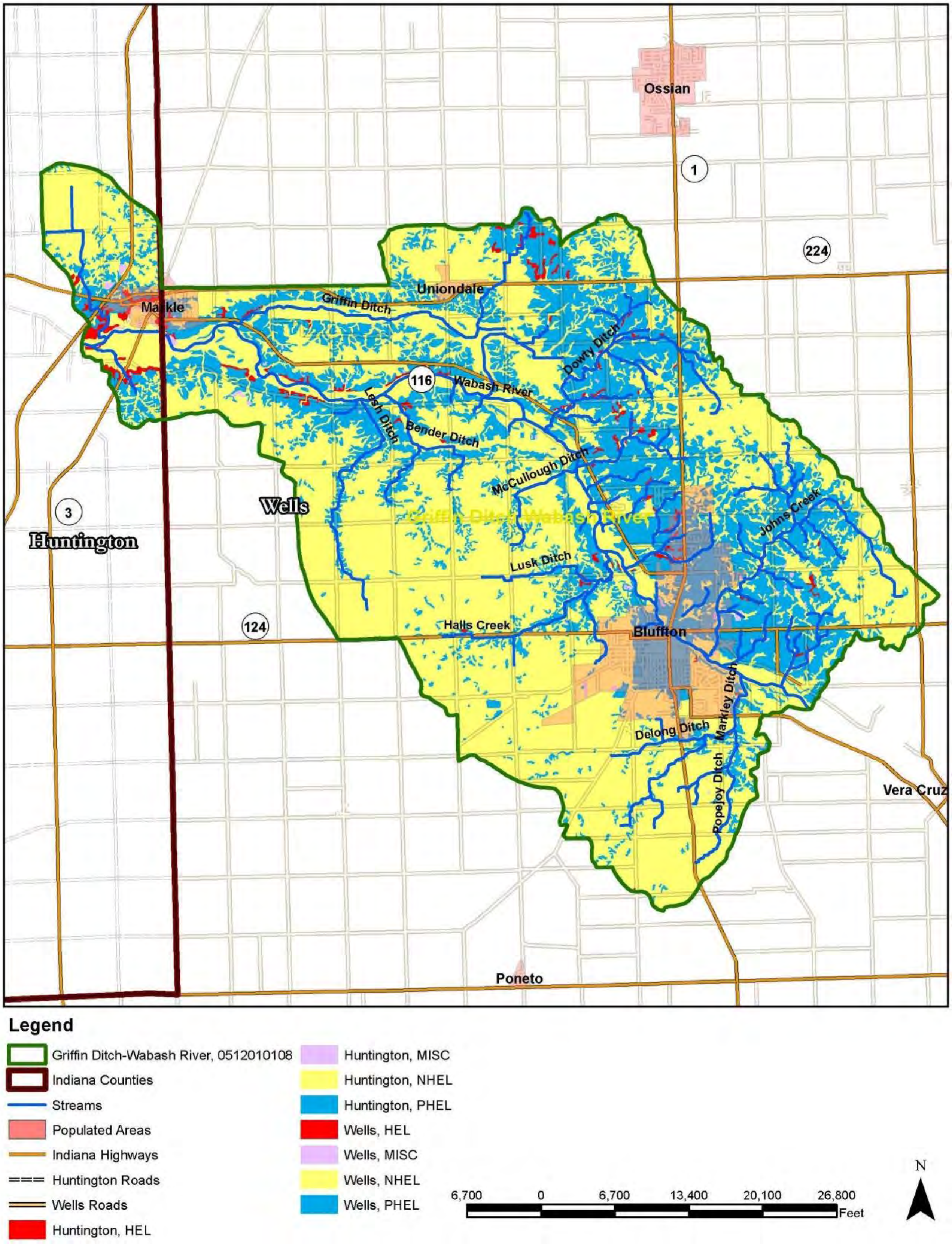
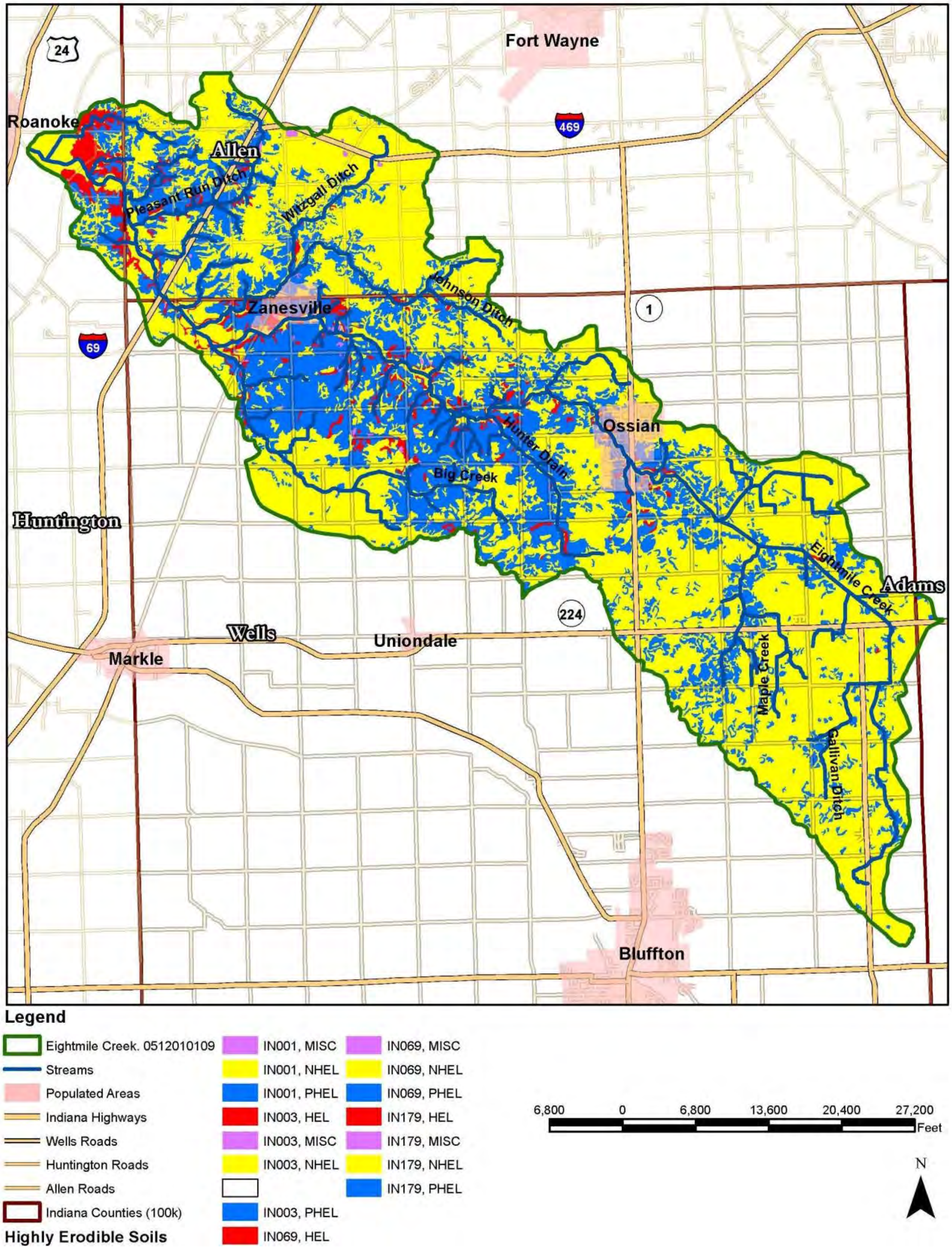


Figure 11: Highly Erodible Soils of Eight Mile, HUC 0512010109



Hydric Soils

Hydric soils are defined by the USDA Natural Resources Conservation Service as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic (low oxygen) conditions in the upper part of the soil layers. These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic (water tolerant) vegetation. The presence of hydric soils can indicate areas where a wetland once was or currently is located.

Wetlands are a distinct ecosystem. They are considered to be the most biologically diverse of all ecosystems, serving as home to a wide range of plants and animals. Among the many benefits of wetlands is water purification and flood control. A wetland acts like a natural wastewater treatment plant, removing various pollutants and helping to cycle excess nutrients through the environment. Wetlands close to headwaters of streams are physical barriers that can slow down surface runoff to help prevent sudden, damaging floods downstream and trap sediments.

Over 41% of the watershed (72,564 acres) is classified as hydric soils; however most of these areas have been drained by subsurface tile for crop production. These areas still retain their hydric properties and would be suitable for restoration of wetland habitats which could improve water quality in the project watersheds and address the stakeholder concerns of flooding, and sediment and nutrients in surface water runoff that reaches the streams and river.

Table 2-3: Hydric Soils in the Upper Wabash River Phase 2 Project Area

County	Map Unit Symbol	Soil Name
Allen	Pe	Pewamo silty clay loam
	Wh	Washtenaw silt loam
Huntington	Ms	Millsdale silty clay loam
	Pe	Patton silty clay loam, sandy substratum
	Pg	Pewamo silty clay loam
	Rk	Rensselaer loam
	Ms	Millsdale silty clay loam
	Pe	Patton silty clay loam, sandy substratum
	Pg	Pewamo silty clay loam
Wells	Co	Coesse silt loam
	Mh	Milford silty clay loam
	Mk	Milford silty clay loam, stratified sandy substratum
	Mn	Millgrove clay loam
	Mo	Millsdale silty clay loam
	Pg	Pella silty clay loam, till substratum
	Pk	Pella mucky silty clay loam, sandy substratum
	Pm	Pewamo silty clay loam
	Rr	Rensselaer loam
	Se	Saranac silty clay loam, frequently flooded
	Sv	Sloan silty clay loam, frequently flooded
	Wa	Wallkill silt loam, coprogenous earth substratum, drained
	Wd	Wallkill silt loam, undrained

Figure 12: Hydric Soils of Rock Creek, HUC 0512010107

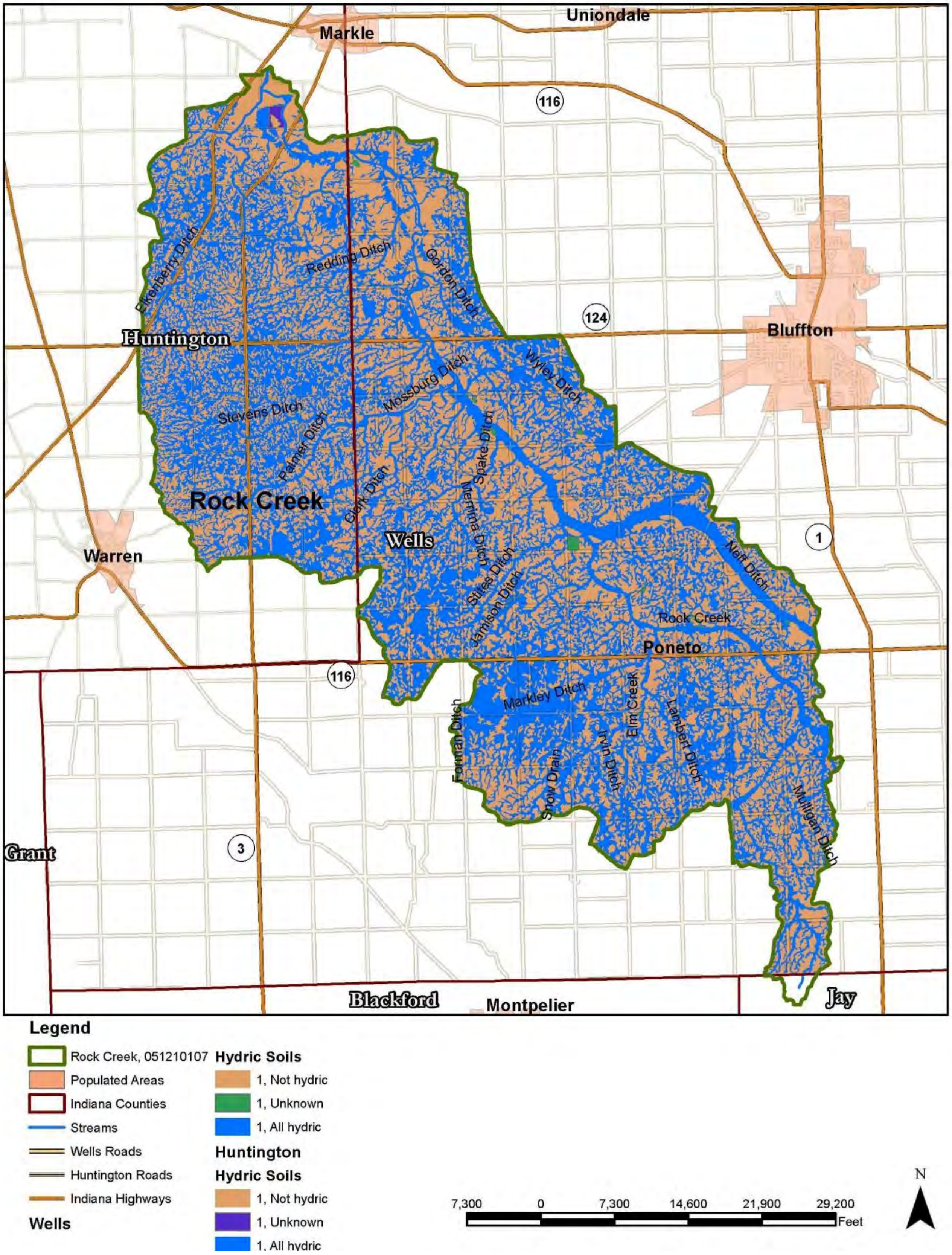


Figure 13: Hydric Soils of Griffin Ditch-Wabash River, HUC 0512010108

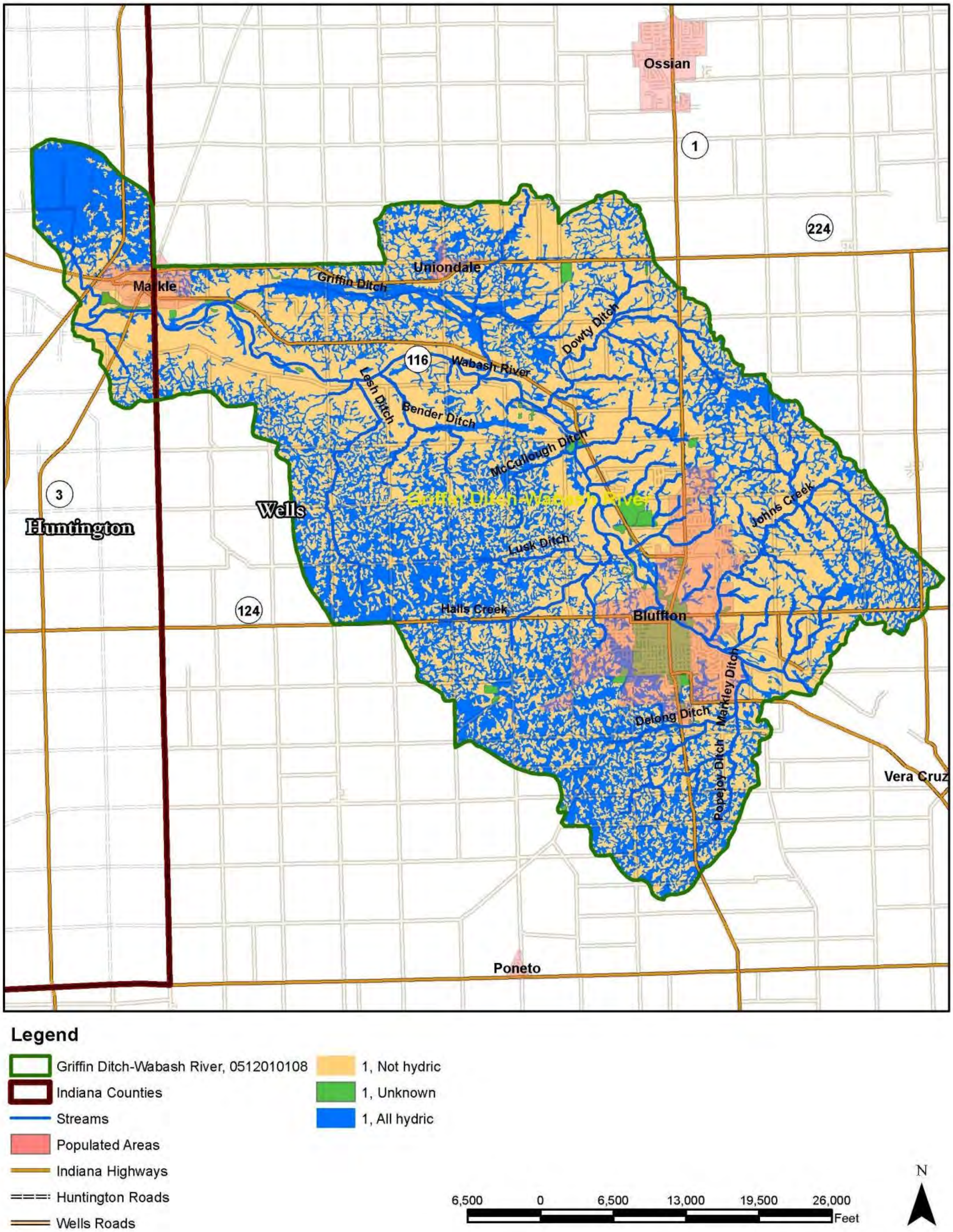
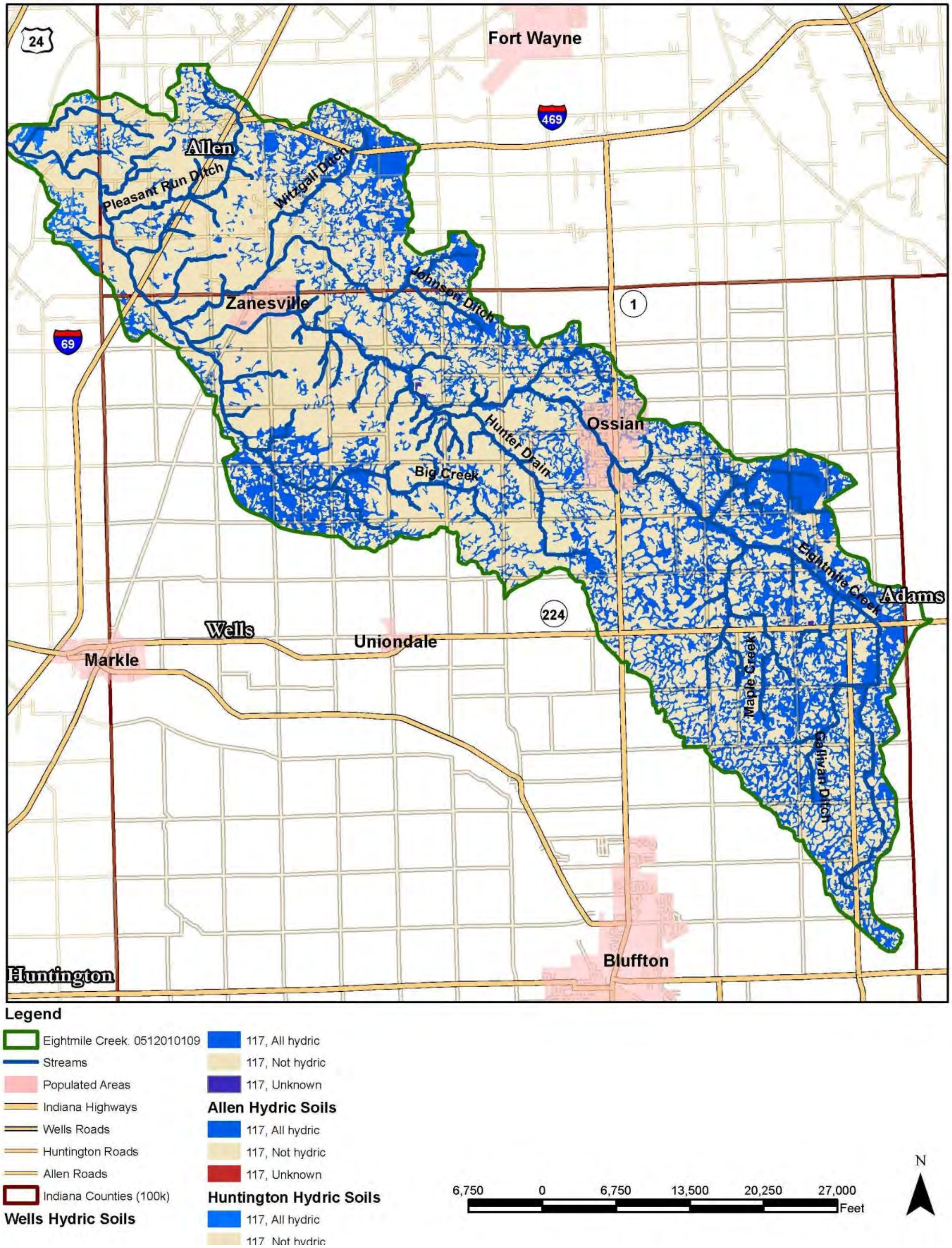


Figure 14: Hydric Soils of Eight Mile Creek, HUC 0512010109



Septic Suitability

Septic systems need well-drained soils to properly treat household wastewater. Nearly all (approximately 99%) of the soils in the Upper Wabash River Phase 2 watershed have severe limitations for supporting on-site wastewater treatment systems (i.e. septic systems) due to being very poorly to somewhat poorly drained and having slow permeability rates or high water tables. Based on visual assessments, GIS maps and estimated populations, there are over 4,000 rural on-site wastewater treatment systems in the project area.

On-site septic systems in the majority of rural homes built prior to 1978 consist of septic tanks connected to a discharge pipe (drainage tile) resulting in the discharge of raw sewage into local waterways. Since that time, many improvements have been implemented to on-site septic systems to reduce the environmental impacts of septic discharges. Currently, health departments require absorption fields with perimeter drains to allow for infiltration and soil cleansing processes. However, these systems require maintenance to ensure proper operation, and many landowners are unaware of the maintenance needs.

In 2001, it came to the attention of local officials and the public that the McKinney/Paxson Ditch located within the project watershed area had sewage disposal problems with septic systems. Water samples taken from the ditches and analyzed at various times during 1999 and 2000 showed significant elevated counts of *E. coli* bacteria, an indication of improperly treated sewage. A letter of noncompliance was issued by IDEM in 2001. Following a 2009 Recommended Order issued by IDEM, the Wells County Regional Sewer District was formed. More recent collections of water samples and analysis conducted in 2008 and 2011 showed no change in the elevated contamination levels. Local officials and county residents have since been involved in activities to identify actions to be taken to achieve a solution to the pollution problems in the McKinney/Paxson Ditch area. They are looking for solutions that can be used by the Wells County Regional Sewer District across the county. It is believed that in order to overcome these issues, septic systems may require special design, with significant increases in construction costs, and possibly increased maintenance.

Local residents recognize that this is not an isolated issue; potential impacts from wastewater exist in all of the rural unincorporated communities and rural residential clusters in the project watershed that operate without treatment systems and may be discharging raw sewage into local streams and ditches.

Figure 15: Septic System Suitability of Rock Creek, HUC 0512010107

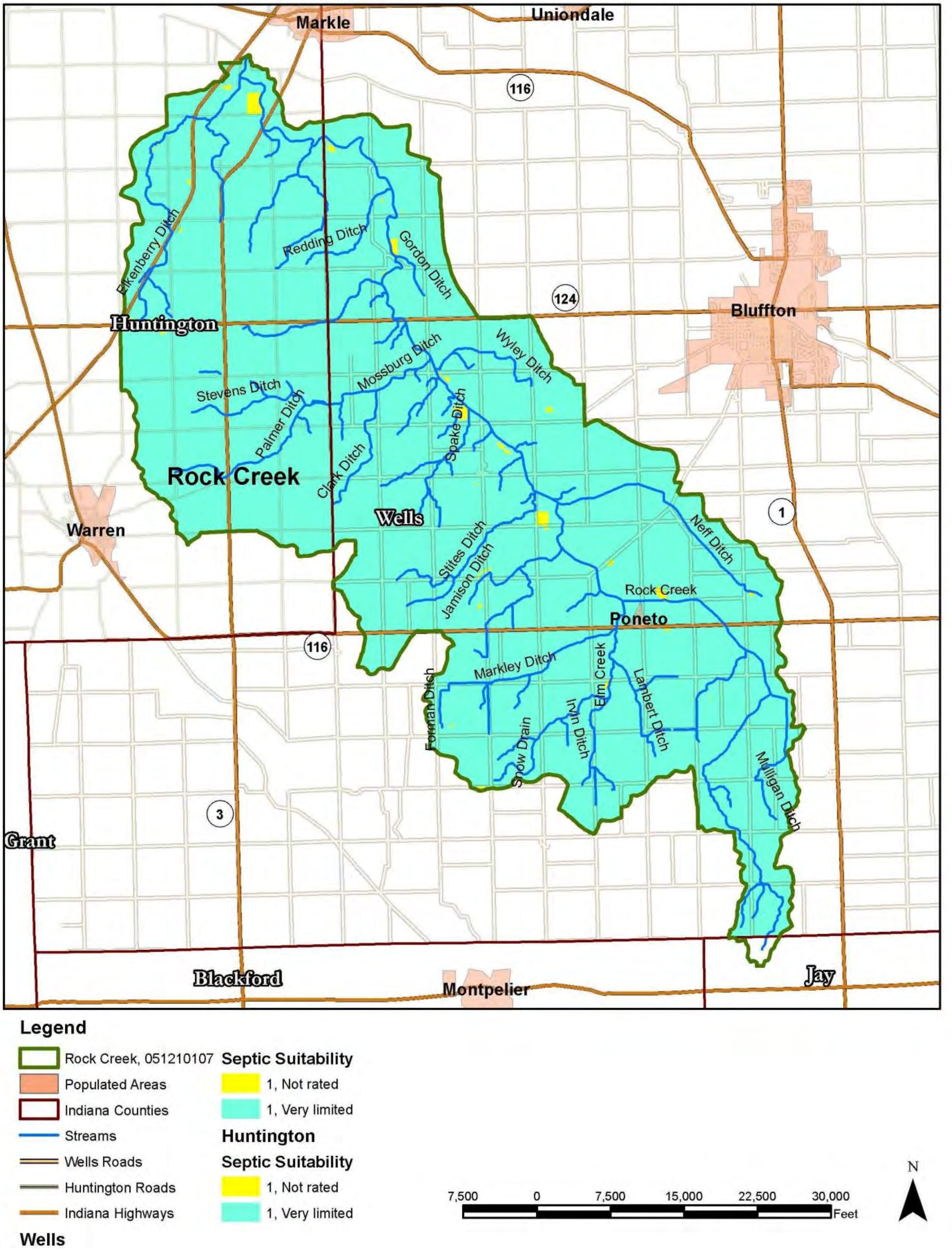


Figure 16: Septic System Suitability of Griffin Ditch-Wabash River, HUC 0512010108

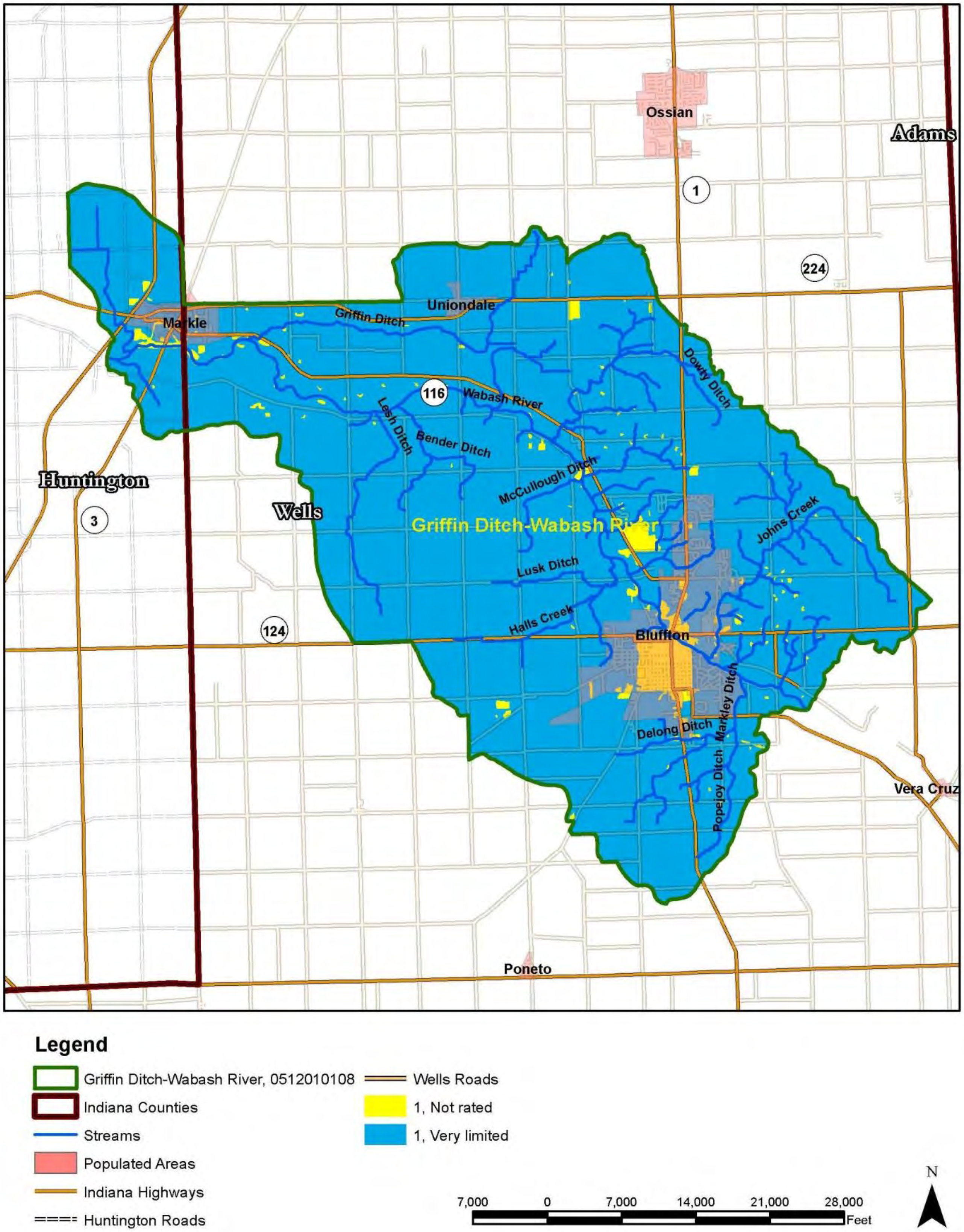
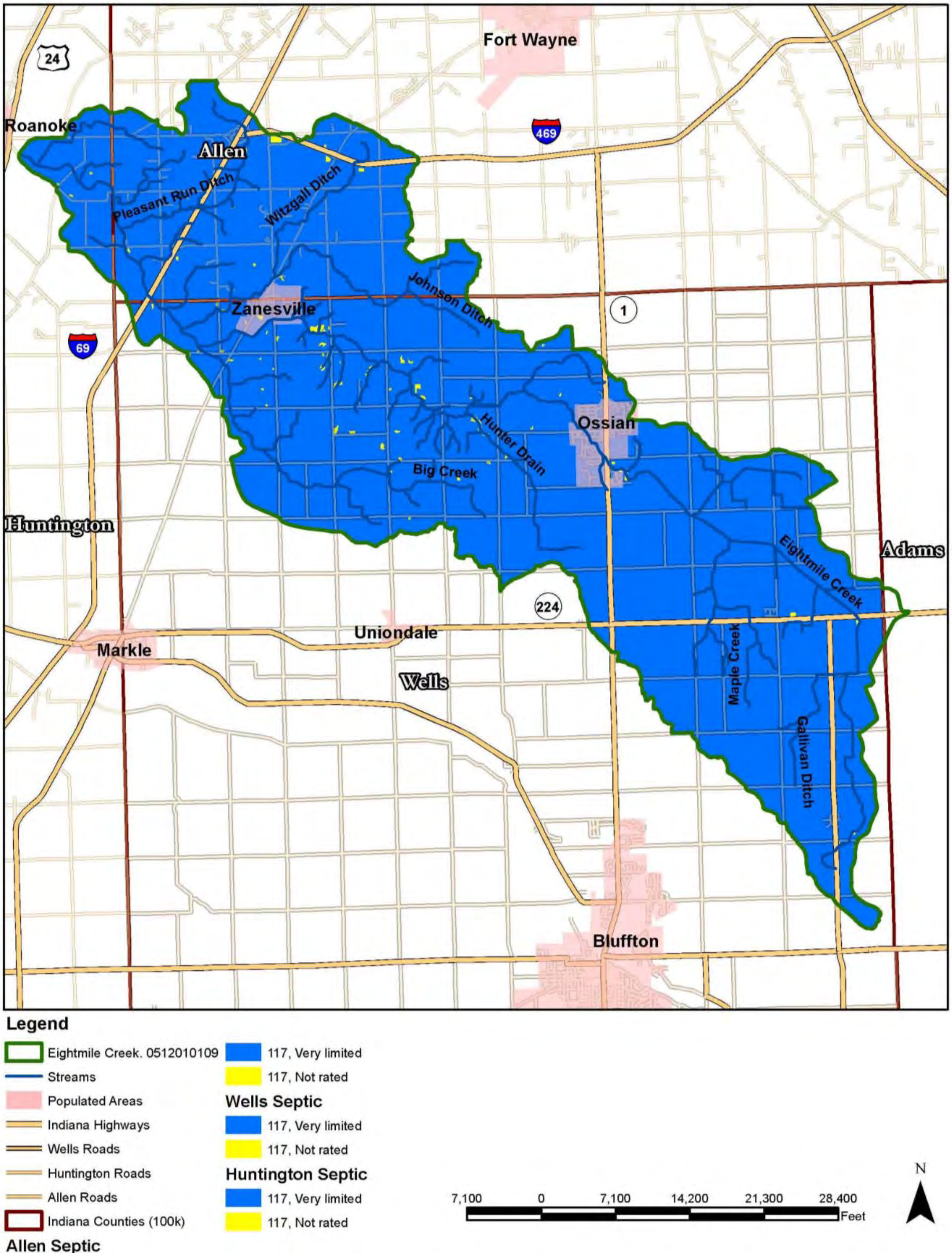


Figure 17: Septic System Suitability of Eight Mile Creek, HUC 0512010108



2.4 Land Use

Prior to settlement in the mid-1800s, much of the Upper Wabash River Basin watershed was covered in wetlands and woods. Land survey notes from the 1830's described the land generally as flat, heavily timbered, and some areas as wetlands. Other areas were recorded as tillable. The upland areas in the watershed were densely covered in sugar maple, oak, hickory, basswood, beech, yellow birch, American elm, ironwood, and red maple. Species such as silver maple, American elm, willow, basswood, sycamore, and ash were more abundant in the river corridors and low-lying marsh areas. The land was cleared by the early settlers as farming became the mainstay of the area.

It is apparent from the land use tables below (Table 2-4 and Table 2-5) that agricultural land uses continue to dominate the landscape with 150,104 acres (85.2%) of the watershed used for farming; and therefore sources associated with agricultural uses (erosion from fields, tile drainage, animal operations, fertilizer applications, failing or illicitly connected on-site septic systems) are likely significant contributors of pollutants to the watershed.

Only 8.36% of the watershed (14,739 acres) has been converted for residential, commercial or industrial land uses and the impervious surface area covers only about 3% of the watershed. Pollution sources associated with urban, suburban, and industrial land use include storm water runoff (lawn fertilizer and pesticides, pet waste, construction site activities, roads and parking lots), centralized and on-site wastewater treatment, combined sewer overflows and sanitary sewer overflows and industrial point-source outlets.

Over the years, the forests, woodlands and wetlands continued to be cleared for additional farming activities, and subsurface drainage was added as a necessity for improved crop production. Today, only 5.62% of the watershed (9,906 acres) is used for forests and woodlands and 659 acres (0.37%) of wetlands remain. Forest and woodland areas can contribute to pollution when wildlife (i.e., deer, raccoons, etc.) is concentrated in these areas and spend time in or around bodies of water.

Table 2-4: Land Use by Subwatershed and Project Area.

Land Use	**Rock Creek HUC: 0512010107**		**Griffin Ditch-Wabash River HUC: 0512010108**		**Eight Mile Creek HUC: 0512010109**		**Upper Wabash River Phase 2 Project Area**	
	Acres	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Open Water	**140**	0.21	**380**	0.66	**196**	0.38	**716**	0.41
Developed, Open Space	**3,351**	5.04	**4,151**	7.17	**2,775**	5.37	**10,277**	5.84
Low Intensity Developed	**240**	0.36	**1,847**	3.20	**1,022**	1.98	**3,109**	1.77
Med Intensity Developed	**26**	0.03	**561**	0.97	**262**	0.51	**849**	0.48
High Intensity Developed	**2**	0.01	**394**	0.68	**108**	0.21	**504**	0.28
Deciduous Forest	**2,846**	4.27	**3,564**	6.17	**3,135**	6.07	**9,545**	5.42
Evergreen Forest	**2**	0.01	**36**	0.07	**9**	0.02	**47**	0.03
Shrub/Scrub	**95**	0.14	**127**	0.21	**92**	0.18	**314**	0.18
Grassland/Herbaceous	**346**	0.52	**838**	1.46	**909**	1.76	**2,093**	1.19
Pasture/Hay	**177**	0.27	**525**	0.92	**1,071**	2.07	**1,773**	1.01
Cultivated Crops	**59,354**	88.95	**44,908**	77.79	**41,976**	81.22	**146,238**	83.03
Woody Wetlands	**74**	0.11	**208**	0.36	**81**	0.15	**363**	0.20
Emergent Herbaceous Wetlands	**60**	0.09	**190**	0.32	**46**	0.08	**296**	0.16
TOTALS	**66,713**		**57,729**		**51,680**		**176,124**	

Source: USDA-NRCS State Office, Indianapolis, IN

Table 2-5: Land Use by Groups

Land Use Groups	**Rock Creek HUC: 0512010107**		**Griffin Ditch-Wabash River HUC: 0512010108**		**Eight Mile Creek HUC: 0512010109**		**Upper Wabash River Phase 2 Project Area**	
	Acres	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Open Water	**140**	0.21	**380**	0.66	**196**	0.38	**716**	0.41
All Developed Areas	**3,619**	5.42	**6,953**	12.04	**4,167**	8.06	**14,739**	8.36
All Forest/Woodland Types	**2,943**	4.41	**3,727**	6.45	**3,236**	6.26	**9,906**	5.62
Agriculture Uses (Crops, Pasture/Hay, Grasslands)	**59,877**	89.75	**46,271**	80.15	**43,956**	85.05	**150,104**	85.22
All Wetland Types	**134**	0.20	**398**	0.68	**127**	0.24	**659**	0.37
TOTALS	**66,713**		**57,729**		**51,680**		**176,124**	

Figure 18: Land Use of Rock Creek, HUC0512010107

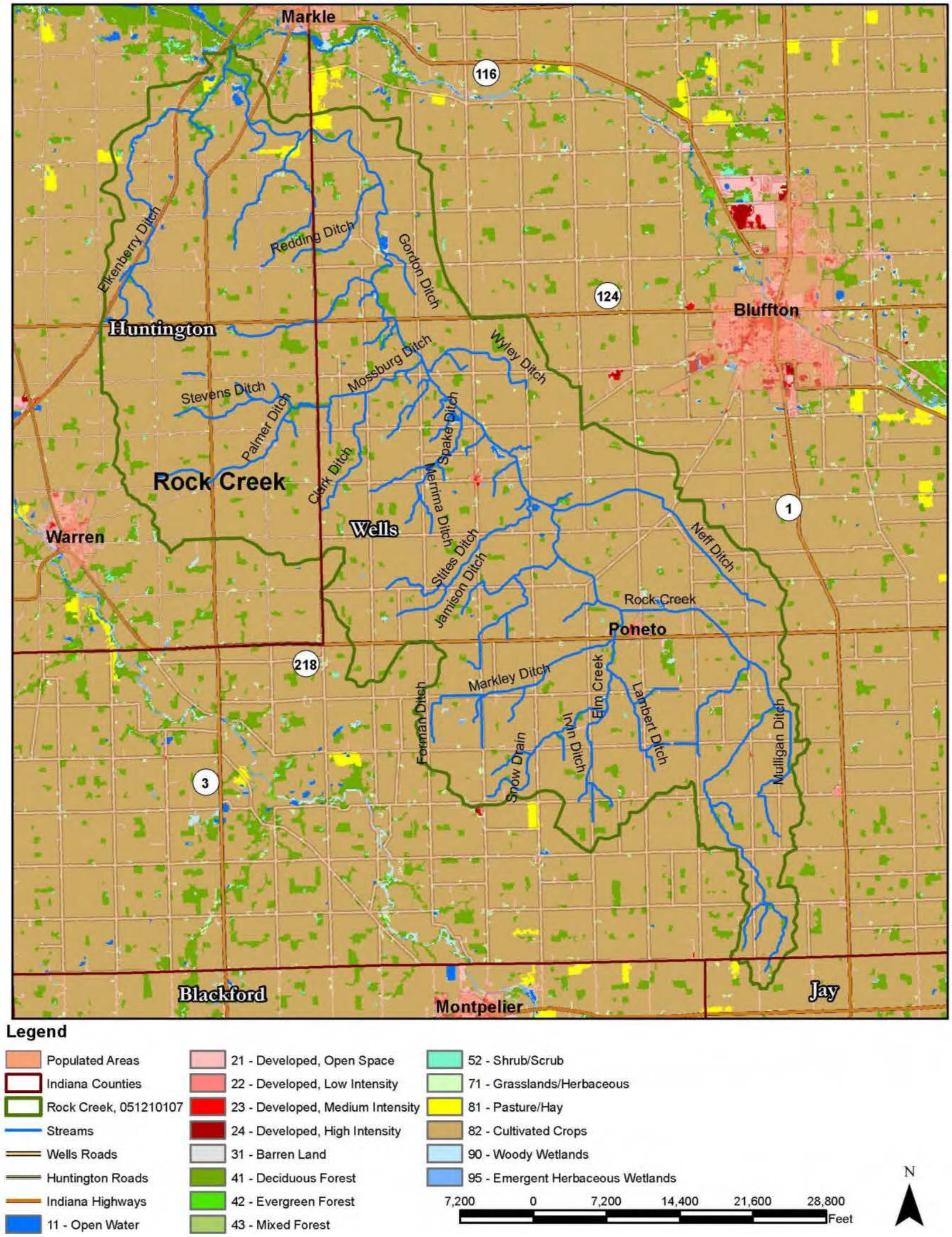


Figure 19: Land Use of Griffin Ditch-Wabash River, HUC0512010108

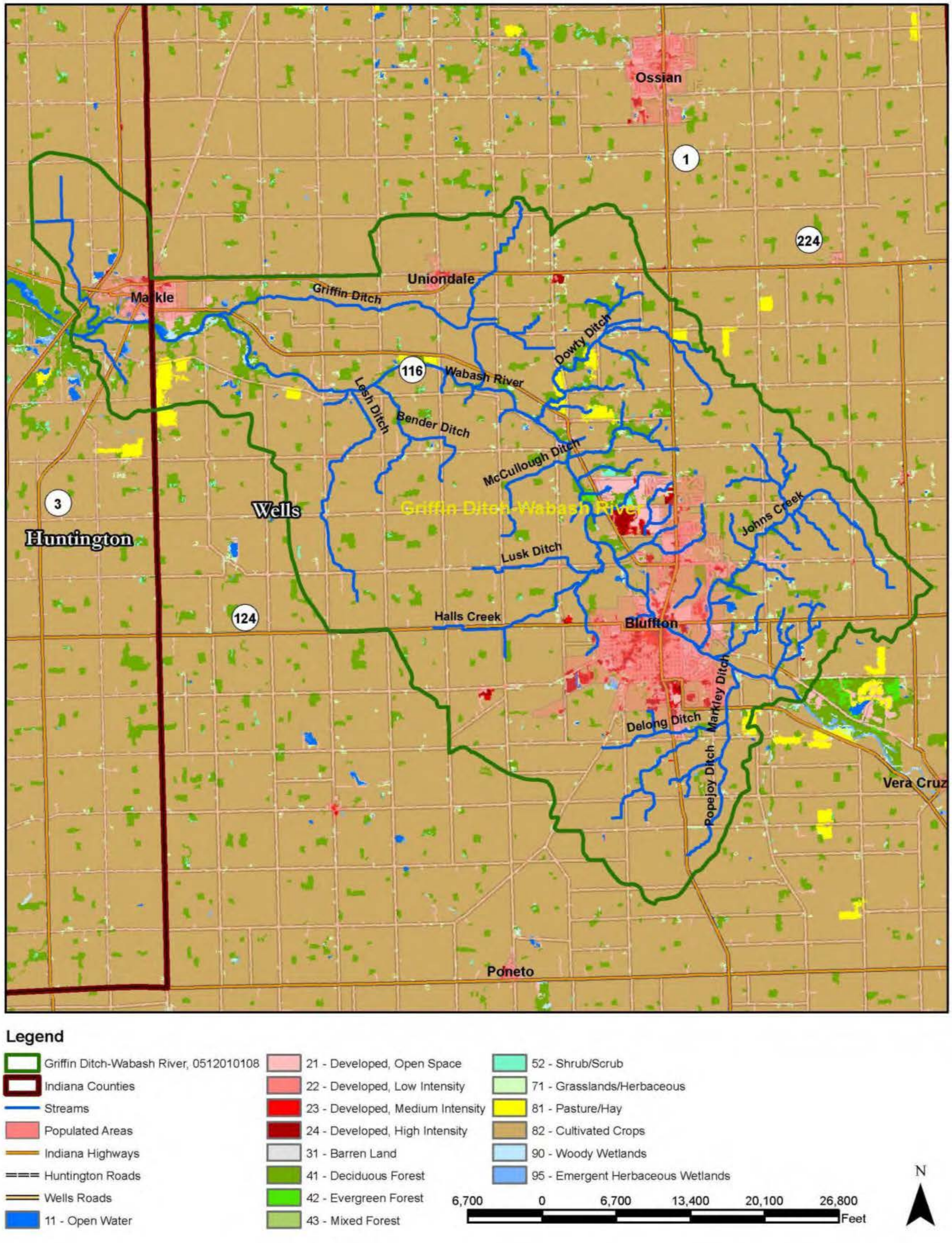
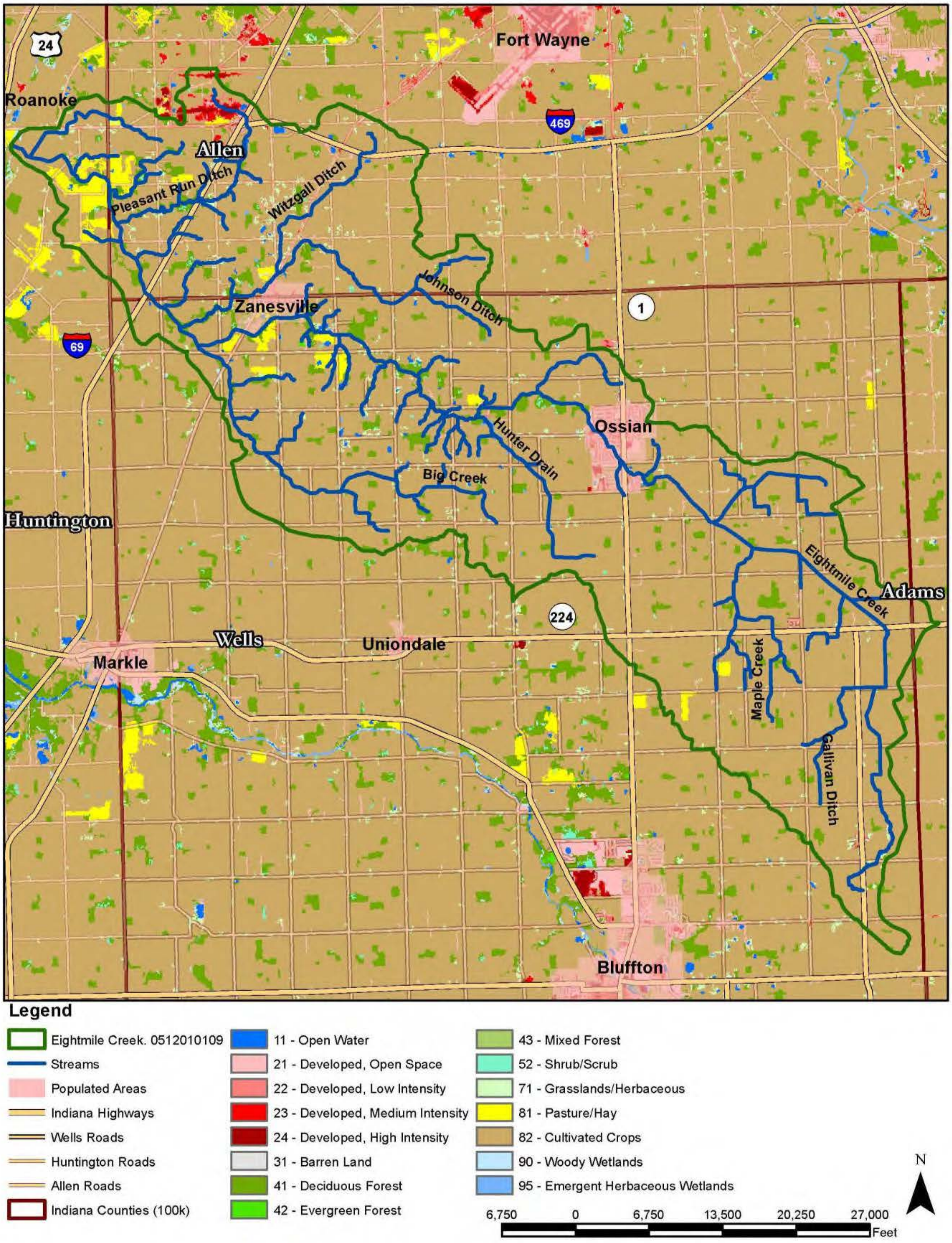


Figure 20: Land Use of Eight Mile Creek, HUC0512010109



Agricultural Uses

Farming continues to be the main enterprise in the watershed area. Corn, soybeans, and small grains are the major cultivated crops in the watershed, totaling 146,238 acres (83%). Grass, hay and pasture land account for an additional 3,866 acres (2.2%) of the agricultural activity.

Prime farmland, as defined by the USDA is the land that is best suited to food, feed, and forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland or other land, but it is not urban or built-up land or water areas. It is either used for food or fiber crops or is available for those purposes. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and results in the least damage to the environment. Approximately 95% of the watershed meets the requirements for "prime farmland if drained" (Figures 27, 28, and 29).

Livestock operations are also included in agricultural uses, with swine operations being the most common, but dairy cattle and poultry and some beef are also raised within the watershed area. A total of 32 sites are considered confined feeding operations (CFO's). Additionally, there are approximately 1,050 "hobby" farms in the project watershed area that include horses, cattle, hogs, sheep, goats, chickens and other small farm animals. Ensuring proper manure management has been listed as a concern by local stakeholders due to the probability that stockpiling and application practices are contributing nutrients to the local streams. (See Figures 24, 25, and 26 for map locations.)

With over 85% of the watershed used for farming and the desire for more productive farmland, the excavation and straightening of streams and installation of subsurface tile has been extensive in the project area. This has altered the water quantity, habitat structure and energy transfer within the streams, and speeds up the amount of surface water that reaches the ditches and streams in a shorter period of time. The increased flow within the stream increases the potential for in-stream erosion. Un-buffered tile inlets also provide a direct conduit for nutrients, sediments and pathogens to travel to the open streams and river resulting in a decrease in water quality. Additionally, as prime farmland is lost to other uses, it puts pressure on marginal lands for crop production that would be better suited for grasslands, woodlands or wetlands areas.

Figure 21: Prime Farmland of Rock Creek, HUC 0512010107

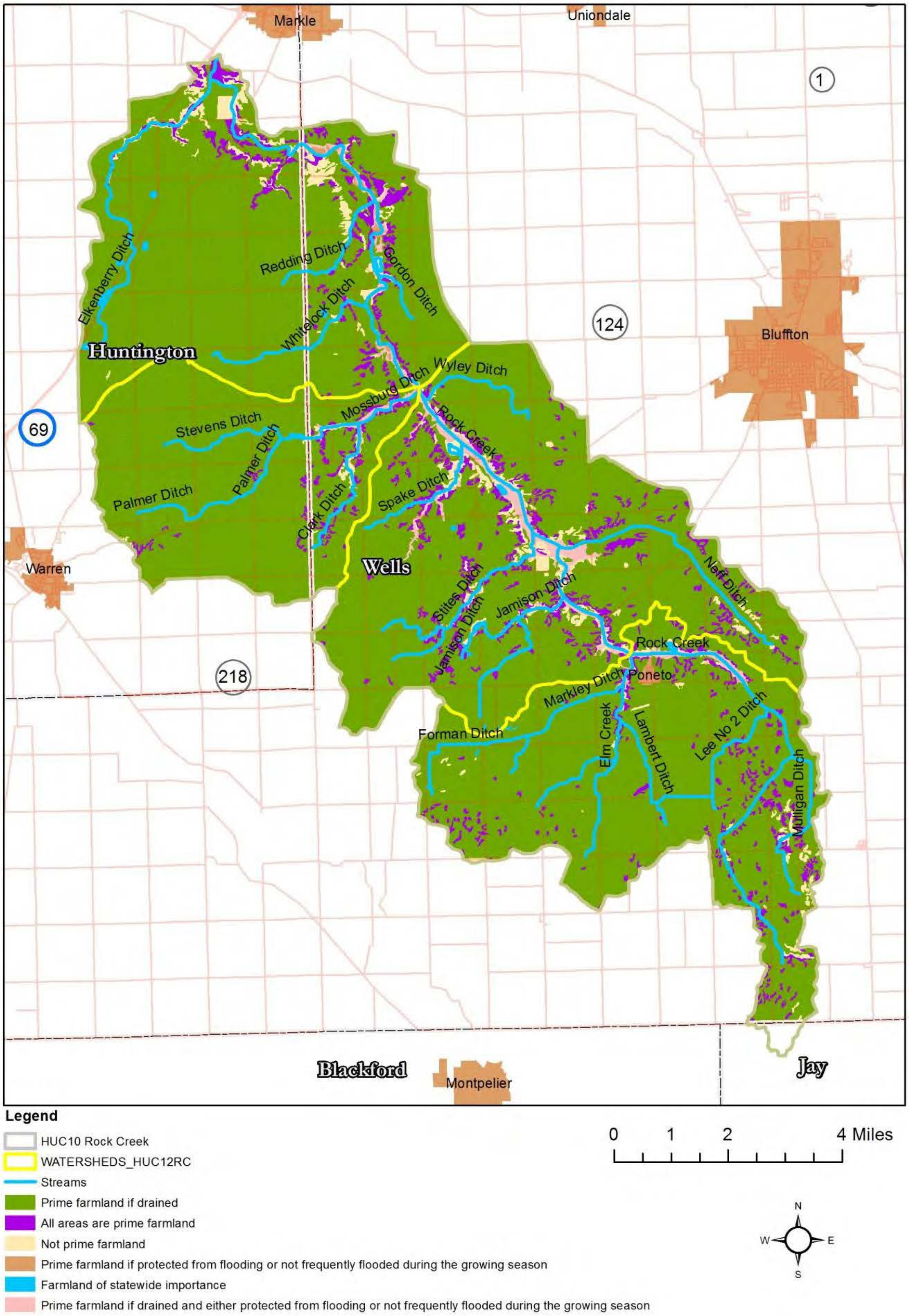


Figure 22: Prime Farmland of Griffin Ditch-Wabash River, HUC 0512010108

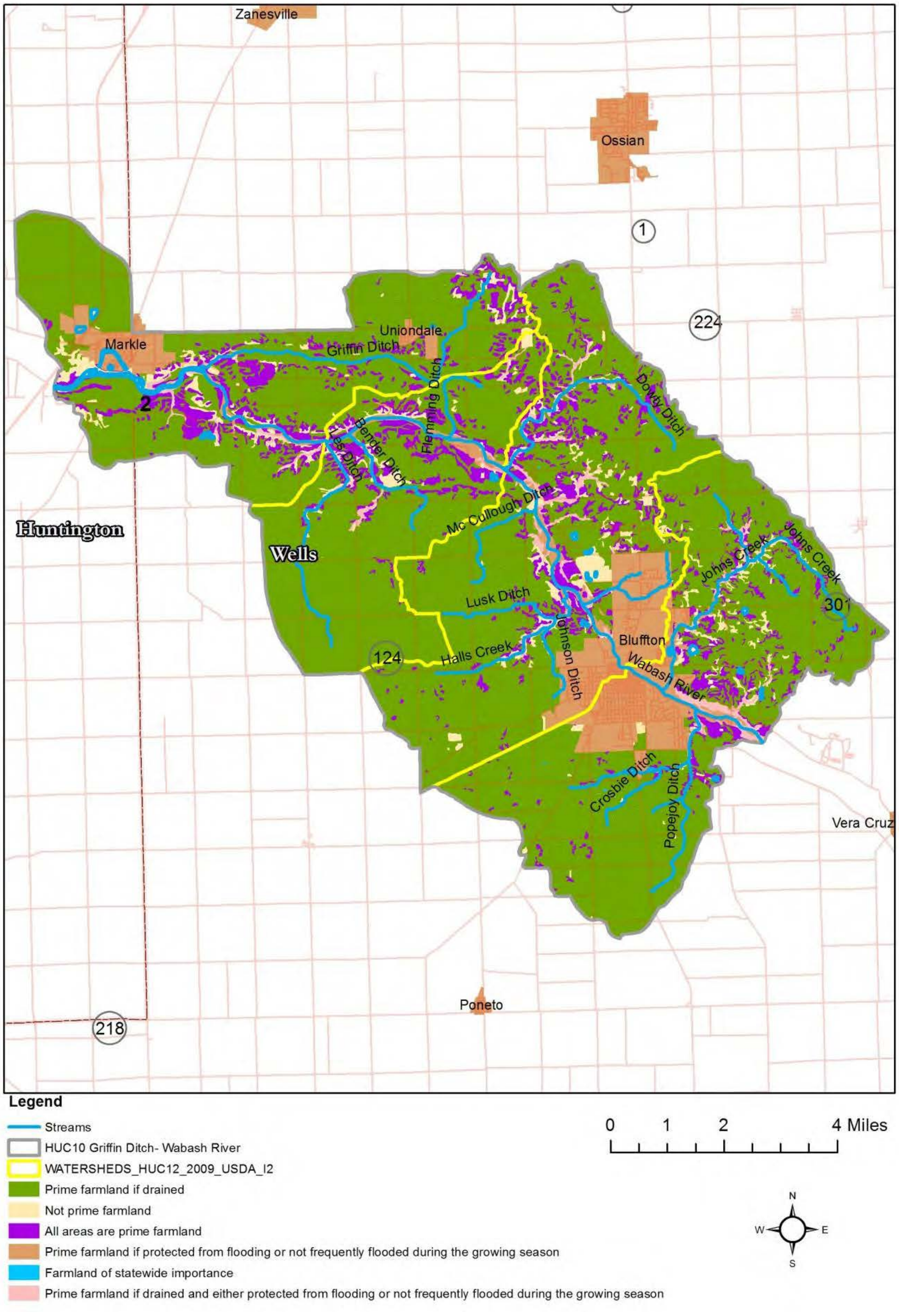


Figure 23: Prime Farmland of Eight Mile Creek, HUC 0512010109

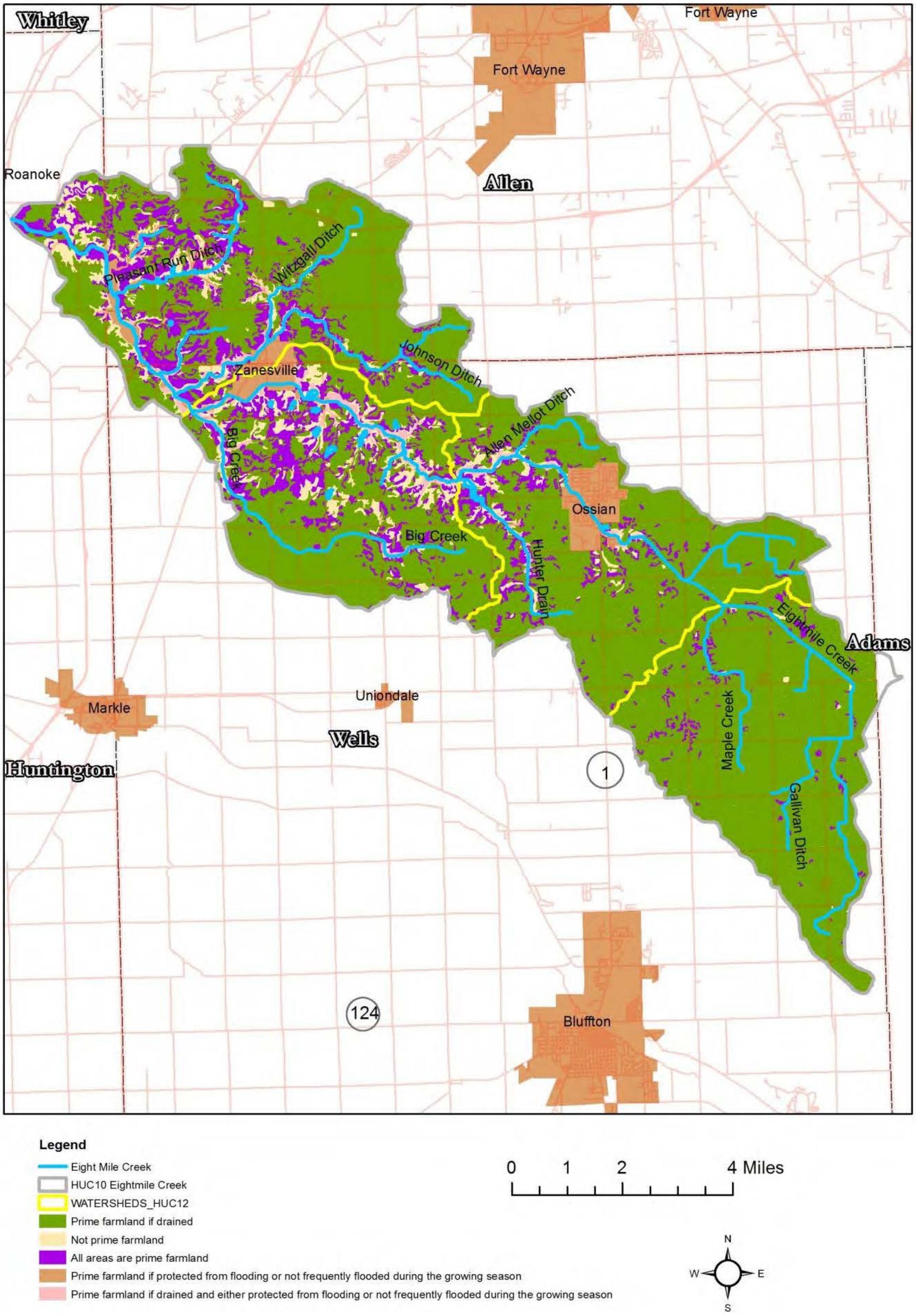


Figure 24: Confined Feeding Operations & Hobby Farms of Rock Creek, HUC 0512010107

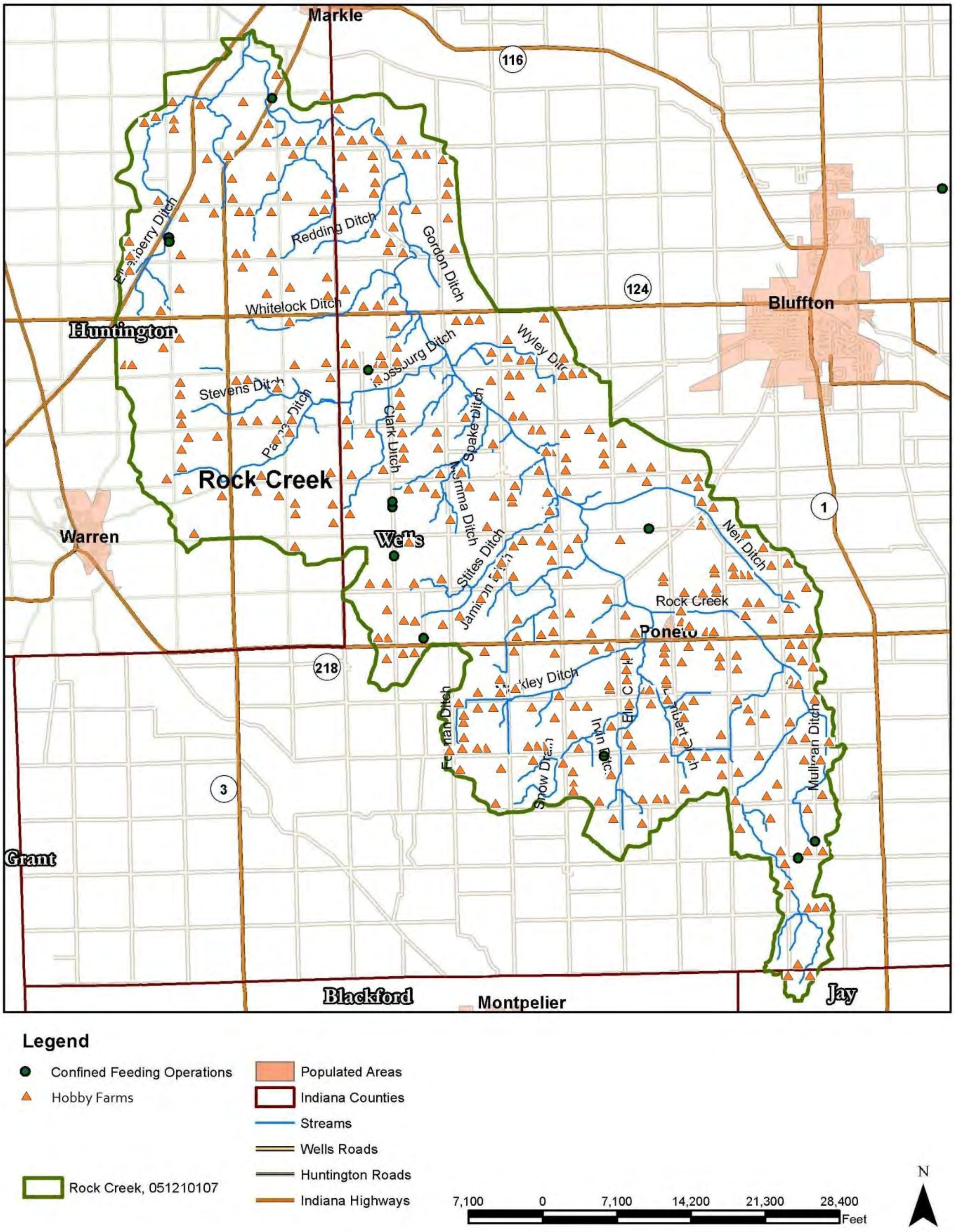


Figure 25: Confined Feeding Operations & Hobby Farms of Griffin Ditch-Wabash River, HUC 0512010108

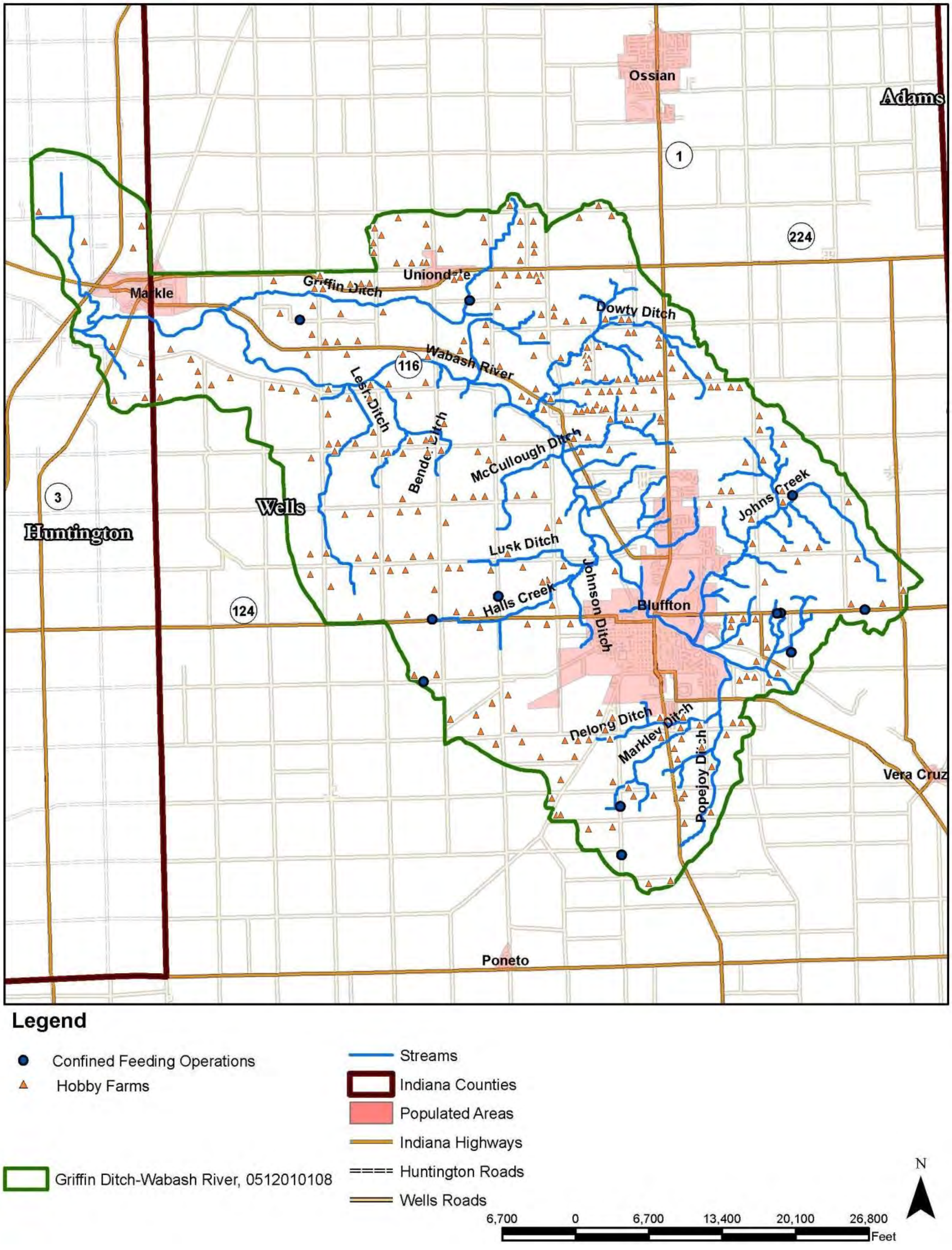


Figure 26: Confined Feeding Operations & Hobby Farms of Eight Mile Creek, HUC 0512010109

Urban Land Uses

The developed areas in the project area total only 14,739 acres, or 8.36% of the project watershed. The majority of the developed lands is within the City of Bluffton and towns of Ossian, Markle, Zanesville, Uniondale, and Poneto and includes single and multi-family housing, parks, golf courses, businesses, and industry. An area of high intensity development in the rural landscape is located in Allen County adjoining the I-69/I-469 interchange. This area contains large industrial sites, such as General Motors and Vera Bradley, as well as smaller industries that serve them. Construction in this area is generally on large parcels of ground in anticipation of future development.

Even though the amount of impervious surface in the watershed appears low, most of the development is along the Wabash River and the major streams (Rock Creek and Eight Mile). According to the Center for Watershed Protection's, '*Watershed Protection Techniques',* there is a direct relationship between the amount of impervious surface in a watershed and the quality and quantity of water found within that drainage area. Development surrounding the streams has the potential to produce significant impacts on the water quality of those streams. Stakeholders identified residential runoff from chemically treated lawns, construction site erosion causing sedimentation, runoff from streets and parking lots, and lack of green space as concerns relating to urban development.

National Pollution Discharge Elimination System (NPDES) Facilities

Other potential impacts to water quality exist in these urban communities due to the operation of facilities which treat wastewater and are permitted to discharge the treated effluent to local waterways. These facilities are regulated by the National Pollution Discharge Elimination System (NPDES) permits, and range from municipal sewer treatment plants (STP) to industrial waste dischargers.

The City of Bluffton, town of Ossian, and town of Markle operate traditional municipal waste water treatment plants (WWTP). The town of Zanesville is connected to a municipal sewer treatment system that is operated outside the watershed. The city of Bluffton municipal STP reported 11 sewer overflow/bypass discharges from 2011–2013. Of those incidents, three were discharges to the Wabash River while the remaining events were discharges to public and private lands. The town of Markle WWTP reported a bypass discharge of 0.5 million gallons/day from their equalization basins directly to the Wabash River in 2013 and two overflows in 2014. The town of Ossian WWTP reported four sewer discharges in 2013 to the Eight Mile Creek.

The town of Uniondale and town of Poneto have wetland sewer treatment systems. Uniondale's wetland system discharges to the Griffin Ditch, a tributary of the Wabash River; and Poneto's wetland system discharges to the Rock Creek. Both of these wetland waste water treatment systems had compliance issues in 2014. The town of Uniondale exceeded the discharge permit limit for *E. coli* on one occasion due to possible equipment malfunctions, and has regularly been above the discharge levels for Phosphorus. An inspection at the Poneto wetland treatment system in the spring of 2014 revealed an overflow at that site. Due to the reported sewer overflow/bypass discharges, stakeholders remain concerned that these facilities add sewage, nutrients and bacteria into the streams.

Other NPDES sites in the watershed include two closed landfills, two active stone quarries, a number of industrial waste sites, open dumps and remediation sites. The landfills are located along the Rock Creek and Eight Mile creek. These sites are closed landfills and they are continuously monitored, however concern still exists with area residents that due to their locations they may be contributing contaminants to the streams. The stone quarries are located in the Rock Creek and Wabash-Griffin Ditch watersheds. One is adjacent to and discharges directly into the Rock Creek and the second one discharges into a tributary of the Wabash River. Even though these sites have NPDES permits, stakeholders are concerned that contaminants from the operations pose a risk to water quality of the nearby streams and landscape changes increase runoff and stream flow resulting in increased erosion. Table 2-6 details the NPDES facilities, industrial waste sites, clean-up sites, open dumps and landfills that are mapped on Figures 27 - 29.

Table 2-6: NPDES Facilities

Map ID	Permit Number	Facility Name & Flow (if applicable)	Activity Description	Discharges To
RC 01	0000064	Rockford Wells	Clean up Site	Rock Creek
RC 02	ING490112	Rock Creek Materials LLC	Stone Quarry	Rock Creek
RC 03	200209054	IN DOT Plumtree	Clean up Site	Rock Creek via Mossburg Ditch
RC 04	90-02	South Wells County Landfill	Closed Landfill	Rock Creek
RC 05	IN0059048	Poneto Municipal STP 0.024 Mil Gal/Day	Sewage Treatment	Rock Creek
WG 01	199711027	Hott	Clean up Site	Wabash River
WG 02	IND005456173	Wayne Metal Products Co. Inc.	Industrial Waste	Markle Waste Water Treatment Plant - Wabash River
WG 03	199803220	All Seasons Industries Inc.	Clean up Site	Wabash River
WG 04	IN0023736	Markle WWTP 0.45 Mil Gal/Day	Municipal WWTP	Wabash River
WG 05	IN0051098	Uniondale WWTP 0.0223 Mil Gal/Day	Municipal WWTP	Wabash River via Griffin Ditch
WG 06	ING490017	IMI Bluffton Plant	Stone Quarry	Wabash River
WG 07	IN0022411	Bluffton Municipal STP 6.0 Mil Gal/Day	Municipal Sewage Treatment	Wabash River
WG 08	4080510	Red Cross	Brownfield Site	Wabash River
WG 09	IND984875740	Crown Unlimited Inc.	Industrial Waste	Wabash River
WG 10	IND984897520	Crown Unlimited	Industrial Waste	Wabash River
WG 11	IND005080965	Sterling Casting Corp	Industrial Waste	Wabash River
WG 12	INP000277	Alexin LLC 0.076 Mil Gal/Day	NPDES facility	Bluffton Municipal STP - Wabash River
WG 13	IND985085745	Main Cleaners	Industrial Waste	Wabash River
WG 14	201119674	The Main Cleaners	Clean up Site	Wabash River

Map ID	Permit Number	Facility Name & Flow (if applicable)	Activity Description	Discharges To
WG 15	IND985091545	OK Modern Cleaners	Industrial Waste	Wabash River
WG 16	IN0036668 - Terminated	Sterling Casting Corp	Gray & Ductile Iron Foundries	Wabash River
WG 17	IND984897694	Hires Auto Parts	Industrial Waste	Wabash River
WG 17	IND984919316	Ten Kwik Minutes Inc. Bluffton	Industrial Waste	Wabash River
WG 17	IND984876193	Hiday Motors Inc.	Industrial Waste	Wabash River
WG 18	IND984875872	Reimschisel Ford Inc.	Industrial Waste	Wabash River
WG 19	IND984887786	CVS Pharmacy	Industrial Waste	Wabash River
WG 20	IND982608796	Biberstine Tire Inc.	Industrial Waste	Wabash River
WG 21	4070307	Bluffton Motor Works LLC	Brownfield Site	Wabash River
WG 22	IND061574869	Franklin Electric Co. Inc.	Industrial Waste	Bluffton Municipal STP – Wabash River
WG 23	IN0033294 - Terminated	Bluffton Sewage Treatment Plant	Municipal Sewage Treatment	Wabash River
WG 24	IN0004596	Bluffton Public Water Supply 0.07 Mil Gal/Day	Water Supply Treatment	Wabash River
WG 25		Bluffton Public Water Supply	Water Supply Treatment	Wabash River
WG 26	200705003	Marengwer Trailer Park	Clean up Site	Wabash River
EM 01	IND982211013	Fort Wayne Fleet Equipment Co.	Industrial Waste	Eight Mile
EM 02	IND115304594	General Motors Co. Fort Wayne Assembly	Industrial Waste	Eight Mile
EM 03	IND065545949	D&D Body Shop	Industrial Waste	Eight Mile
EM 04	20000530A	Bailey Open Dump	Open Dump	Eight Mile
EM 05	IND984886697	Energy Control, Inc.	Industrial Waste	Eight Mile
EM 06	IN0004294 - Terminated	Ossian Canning Co.	Canning Facility	Eight Mile
EM 07	IN0020745	Town of Ossian WWTP 0.9 Mil Gal/Day	Municipal WWTP	Eight Mile
EM 08	IN0001334275	JRP Machine Products	Industrial Waste	Eight Mile
EM 09	INP000278 - Terminated	Dawn Food Products 0.004 Mil Gal/Day	Food Preparations	Ossian POTW - Eight Mile
EM 10	IND115304768	Johnson Controls, Inc.	Industrial Waste	Eight Mile
EM 11	000008797880	Stripease	Industrial Waste	Eight Mile
EM 12	90-01	North Wells Landfill	Closed Landfill	Eight Mile

Figure 27: NPDES Facilities of Rock Creek, HUC 0512010107

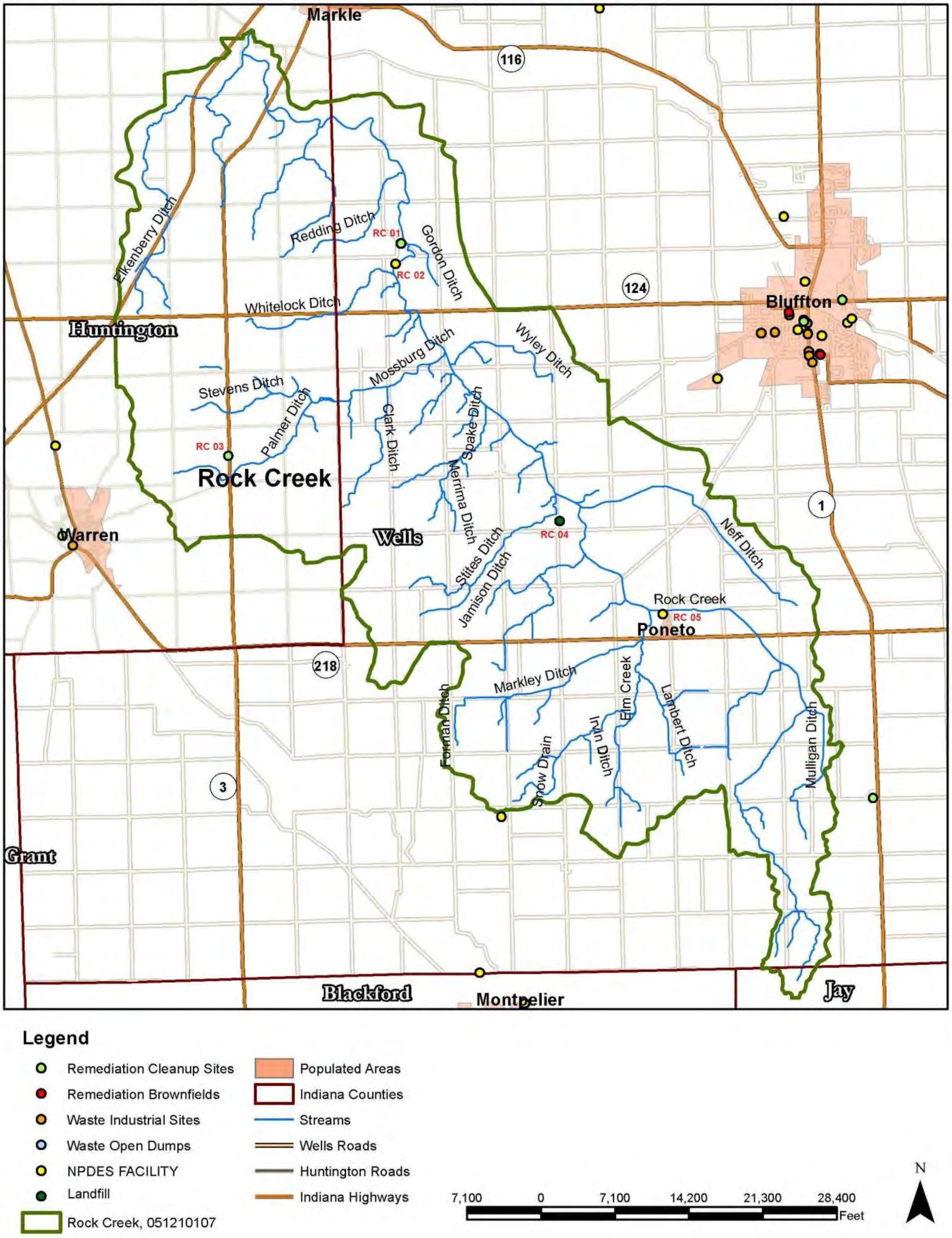


Figure 28: NPDES Facilities of Griffin Ditch-Wabash River, HUC 0512010108

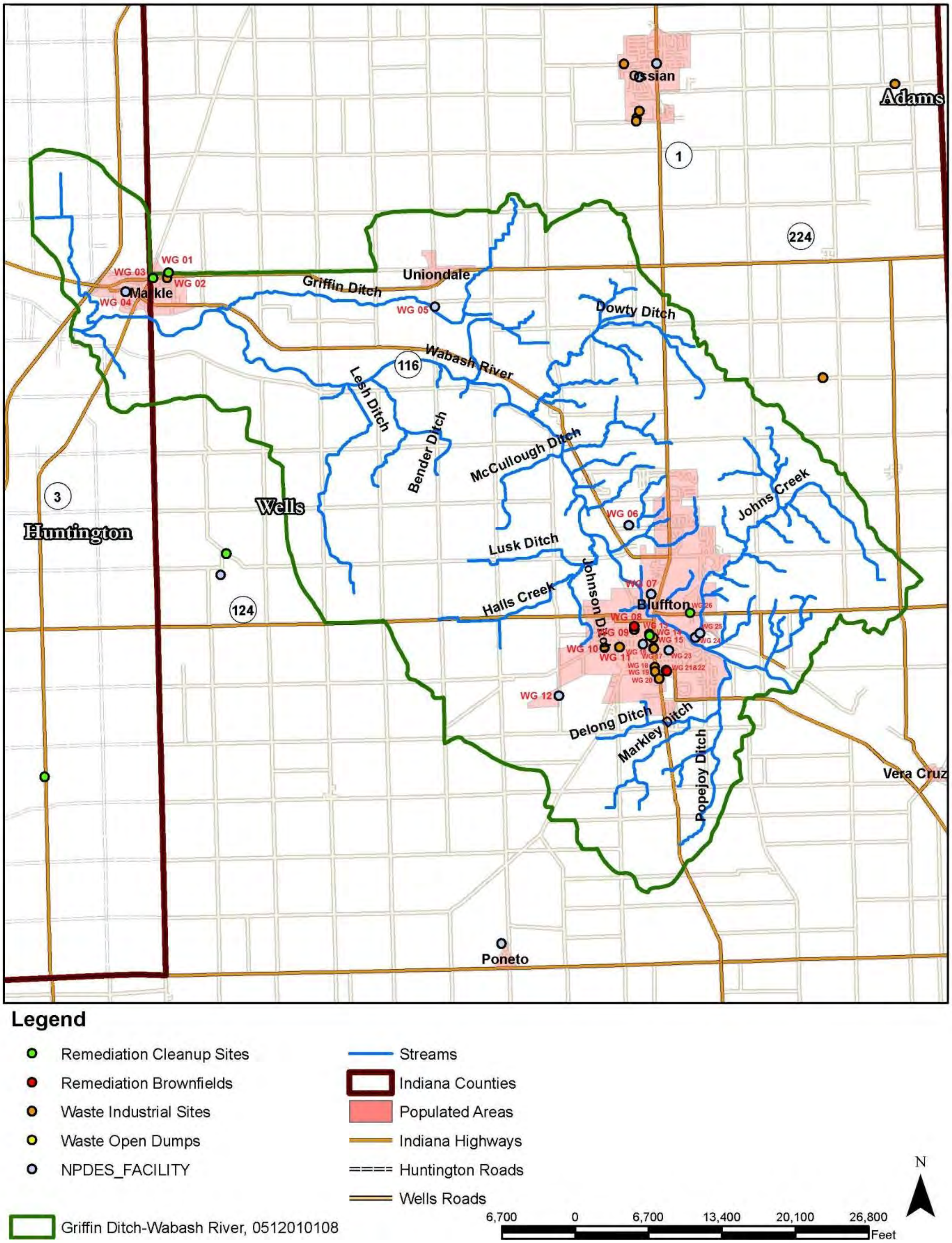
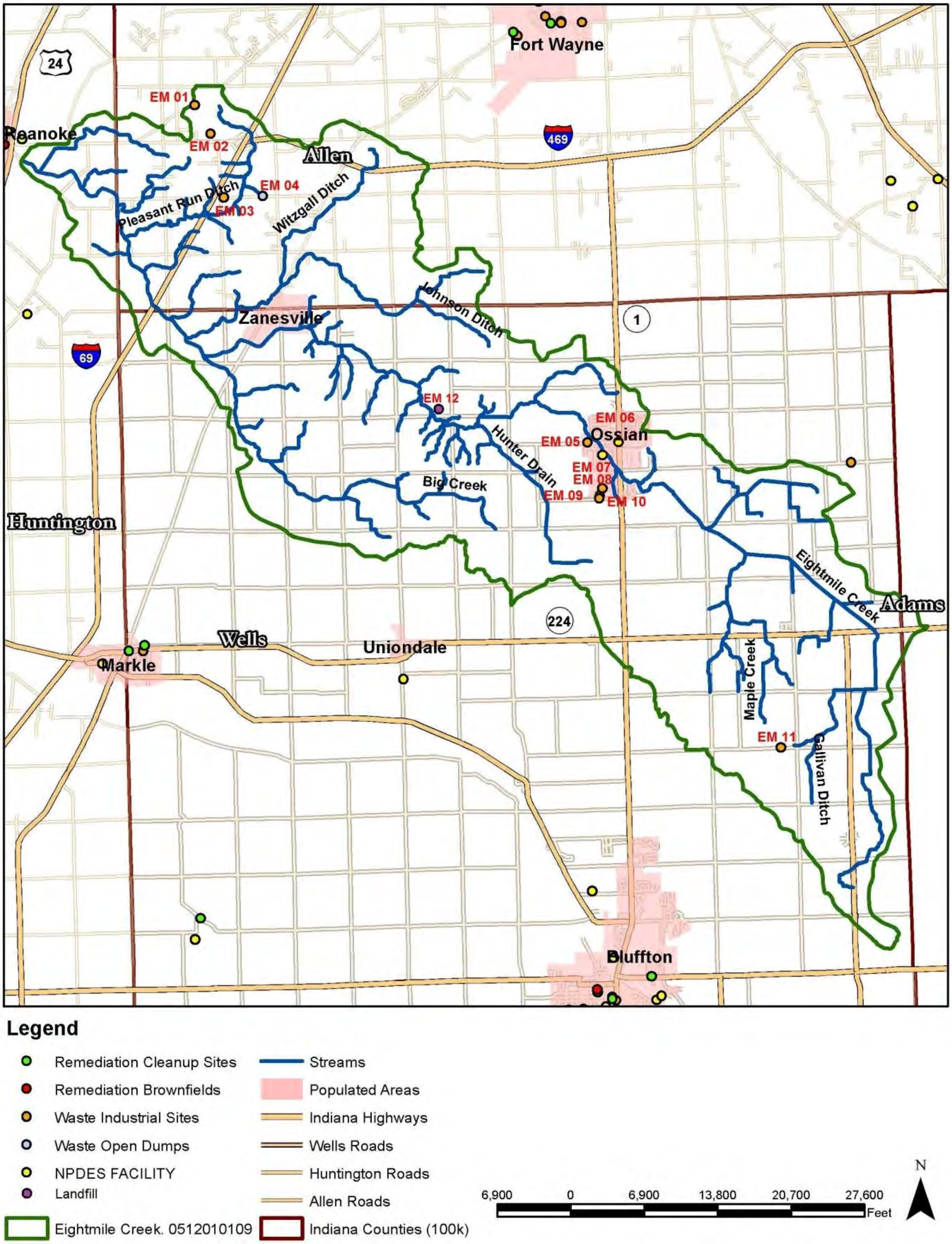


Figure 29: NPDES Facilities of Eight Mile Creek, HUC 0512010109



Other Land Uses

Forests, woodlands and wetlands in the project area account for around 6% of the watershed (10,565 acres). The forest land base is highly fragmented due to agriculture and development; and the majority of wetlands are located in the woodland areas that have not been cleared for crop production or in the floodplains adjacent to the streams and river. Healthy woodlands and wetlands perform valuable water quality-related functions by filtering water and trapping sediments and pollutants from surface runoff and retain sediment during flooding events. These systems offer green space, improve water quality, and buffer the streams or river from adjacent land uses. The lack of forested riparian areas and stream buffers increases the potential for sediment and nutrients to reach the river and streams. Additionally, wildlife habitat is decreased, which can result in a decline in the diversity of the wildlife throughout the watershed.

There are a few recreational and/or protected areas in the watershed; Acres Along the Wabash and the Hammer Nature Preserve (Anna Brand Hammer) owned by Acres Land Trust, the City of Bluffton Wetland area, and the J.E. Roush Nature Preserve managed by the Indiana Department of Natural Resources.

Stakeholder Concerns by Land Use

The list of stakeholder concerns gathered during initial meetings has been evaluated and compared to the major land uses in the watershed where they most commonly occur. This comparison will aid in identifying goals to improve water quality in the watershed.

Table 2-7: Stakeholder Concerns by Land Use

Stakeholder Concern	Agriculture & Livestock	Rural	Urban
Log jams and debris in the river and streams.	X	X	X
Encourage 2-stage ditches.	X	X	X
Flooding along the river and streams.	X	X	X
In-stream and stream bank erosion causing sedimentation.	X	X	X
Agriculture fertilizer (nitrogen and phosphorus) runoff into streams.	X		
Manure management; stockpiling and application practices.	X		
Tillage to the edge of stream banks, no filter strips or riparian area.	X		
Conservation tillage has low adoption rates.	X		
Lack of buffers and filter strips on streams.	X	X	X
Residential runoff from chemically treated lawns (fertilizers and pesticides).		X	X
Construction Site (and road construction) erosion causing sedimentation.		X	X
High *E. coli* levels.	X	X	X
Failing septic systems, severely limiting soils, lack of maintenance.		X	X
Wastewater treatment in unincorporated communities.		X	
Runoff from asphalt streets and parking lots.			X
Wetland drained and forests cleared.	X	X	X
Lack of green space and trails.			X
Dumping, trash in river and streams.		X	X

2.5 Rare, Threatened and Endangered Plants and Animals

The loss of habitat from human activities; such as streamside deforestation, removal of fence rows, loss of grass lands, conversion of forested land for agriculture development, pesticide use, stream flow alterations, and siltation all contribute to a species being listed as rare, threatened and endangered. Stakeholders have identified the removal of forest and wetlands, and the lack of riparian areas, buffers and filter strips as concerns in the project area; all of which can contribute to a species listing.

According to the Indiana Department of Natural Resources Division of Nature Preserves there are a number of endangered, threatened and rare plants and animals that have been identified in Wells, Allen and Huntington Counties and could be within the watershed area, however a detailed field study was not conducted to verify their actual presence.

A number of mussels have been observed in the Wabash River, Rock Creek and Eight Mile Creek waterways, but a field study by experts will need to be conducted to identify the species. Great Blue Herons are abundant in project area and roost near the local streams. Bald Eagles which are listed as threatened and of special concern have been seen migrating from the J.E. Roush Fish and Wildlife Area upstream along the Wabash River corridor to Bluffton.

Table 2-8: Endangered, Threatened and Rare Species List for Allen, Huntington, and Wells Counties

County	Species Name	Common Name	Fed	State	GRank	SRank
	Mollusk: Bivalvia (Mussels)					
Allen	Epioblasma obliquata perobliqua	White Cat's Paw Pearlymussel	LE	SE	G1T1	SX
Allen, Huntington, Wells	Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	G2T2	SX
Huntington, Wells	Epioblasma triquetra	Snuffbox	LE	SE	G3	S1
Allen, Huntington	Lampsilis fasciola	Wavyrayed Lampmussel		SSC	G5	S3
Allen, Huntington	Ligumia recta	Black Sandshell			G5	S2
Allen, Huntington	Obovaria subrotunda	Round Hickorynut		SSC	G4	S1
Allen, Huntington, Wells	Pleurobema clava	Clubshell	LE	SE	G2	S1
Allen, Huntington, Wells	Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Allen, Huntington, Wells	Quadrula cylindrica cylindrica	Rabbitsfoot	C	SE	G3G4T3	S1
Allen, Huntington, Wells	Toxolasma lividus	Purple Lilliput		SSC	G3	S2
Allen, Huntington	Villosa fabalis	Rayed Bean	LE	SSC	G2	S1
	Insect: Odonata (Dragonflies & Damselflies)					
Wells	Macromia wabashensis	Wabash River Cruiser		SE	G1G3Q	S1
Allen	Tachopteryx thoreyi	Gray Petaltail		SR	G4	S2S3
	Fish					
Allen, Huntington	Moxostoma valenciennesi	Greater Redhorse		SE	G4	S2
Allen	Percina evides	Gilt Darter		SE	G4	S1
	Amphibian					
Allen	Ambystoma laterale	Blue-spotted Salamander		SSC	G5	S2
Allen	Hemidactylium scutatum	Four-toed Salamander		SSC	G5	S2
Allen, Wells	Rana pipiens	Northern Leopard Frog		SSC	G5	S2
	Reptile					
Allen	Clemmys guttata	Spotted Turtle		SE	G5	S2
Allen, Wells	Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Allen	Emydoidea blandingii	Blanding's Turtle		SE	G4	S2
Wells	Nerodia erythrogaster neglecta	Copperbelly Water Snake	PS:LT	SE	G5T3	S2
Allen, Wells	Sistrurus catenatus catenatus	Eastern Massasauga	C	SE	G3G4 T3T4Q	S2

County	Species Name	Common Name	Fed	State	GRank	SRank
	Bird					
Allen, Huntington, Wells	Ardea herodias	Great Blue Heron			G5	S4B
Allen	Asio flammeus	Short-eared Owl		SE	G5	S2
Allen, Wells	Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Allen, Huntington	Buteo lineatus	Red-shouldered Hawk		SSC	G5	S3
Allen	Buteo platypterus	Broad-winged Hawk	No Status	SSC	G5	S3B
Allen	Certhia americana	Brown Creeper			G5	S2B
Allen	Circus cyaneus	Northern Harrier		SE	G5	S2
Huntington	Cistothorus palustris	Marsh Wren		SE	G5	S3B
Allen	Dendroica cerulea	Cerulean Warbler		SE	G4	S3B
Allen	Falco peregrinus	Peregrine Falcon	No Status	SE	G4	S2B
Allen, Huntington	Haliaeetus leucocephalus	Bald Eagle	LT, PDL	SSC	G5	S2
Allen, Huntington	Ixobrychus exilis	Least Bittern		SE	G5	S3B
Allen	Lanius ludovicianus	Loggerhead Shrike	No Status	SE	G4	S3B
Allen	Nyctanassa violacea	Yellow-crowned Night-heron		SE	G5	S2B
Allen, Huntington	Nycticorax nycticorax	Black-crowned Night-heron		SE	G5	S1B
Huntington	Phalacrocorax auritus	Double-crested Cormorant		SX	G5	SHB
Allen	Phalaropus tricolor	Wilson's Phalarope		SSC	G5	SHB
Huntington	Rallus limicola	Virginia Rail		SE	G5	S3B
Allen, Huntington	Sturnella neglecta	Western Meadowlark		SSC	G5	S2B
Allen	Tyto alba	Barn Owl		SE	G5	S2
Allen, Huntington	Wilsonia citrina	Hooded Warbler		SSC	G5	S3B
	Mammal					
Huntington	Mustela nivalis	Least Weasel		SSC	G5	S2?
Huntington, Wells	Myotis sodalis	Indiana Bat or Social Myotis	LE	SE	G2	S1
Allen, Huntington	Taxidea taxus	American Badger		SSC	G5	S2
	Vascular Plant					
Allen, Wells	Andromeda glaucophylla	Bog Rosemary		SR	G5	S2
Wells	Arethusa bulbosa	Swamp pink		SX	G4	SX
Allen, Wells	Armoracia aquatica	Lake Cress		SE	G4?	S1
Wells	Carex arctata	Black Sedge		SE	G5?	S1
Wells	Carex echinata	Little Prickly Sedge		SE	G5	S1
Wells	Carex limosa	Mud Sedge		SE	G5	S1
Allen	Chelone obliqua var. speciosa	Rose Turtlehead		WL	G4T3	S3
Allen	Circaea alpina	Small Enchanter's Nightshade		SX	G5	SX
Allen, Huntington	Coeloglossum viride var. virescens	Long-bract Green Orchis		ST	G5T5	S2
Wells	Crataegus kelloggii	Kellogg Hawthorn		SE	G3?	S1
Allen	Crataegus succulenta	Fleshy Hawthorn		SR	G5	S2
Wells	Eriophorum gracile	Slender Cotton-grass		ST	G5	S2
Allen, Wells	Euphorbia obtusata	Bluntleaf Spurge		SE	G5	S1
Huntington, Wells	Fragaria vesca var. americana	Woodland Strawberry		SE	G5T5	S1
Huntington	Juglans cinerea	Butternut		WL	G4	S3
Allen	Phlox ovata	Mountain Phlox		SE	G4	S1
	Vascular Plant (Cont.)					
Huntington	Pinus strobus	Eastern White Pine		SR	G5	S2
Wells	Plantago cordata	Heart-leaved Plantain		SE	G4	S1
Wells	Platanthera orbiculata	Large Roundleaf Orchid		SX	G5	SX
Allen	Platanthera psycodes	Small Purple-fringe Orchis		SR	G5	S2
Allen, Wells	Poa alsodes	Grove Meadow Grass		SR	G4G5	S2
Allen	Scutellaria parvula var. parvula	Small Skullcap		SX	G4T4	SX
Allen	Spiranthes lucida	Shining Ladies'-tresses		SR	G5	S2
Allen	Spiranthes magnicamporum	Great Plains Ladies'-tresses		SE	G4	S1
Huntington	Viburnum molle	Softleaf Arrow-wood		SR	G5	S2
Wells	Viburnum opulus var. americanum	Highbush-cranberry		SE	G5T5	S1
Wells	Xyris difformis	Carolina Yellow-eyed Grass		ST	G5	S2

County	Species Name	Common Name	Fed	State	GRank	SRank
	High Quality Natural Community					
Huntington, Wells	Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Allen	Forest - floodplain mesic	Mesic Floodplain Forest		SG	G3?	S1
Allen, Wells	Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	G3?	S3
Allen	Forest – upland dry	Dry Upland Forest		SG	G4	S4
Allen	Forest – upland dry – mesic	Dry-mesic Upland Forest		SG	G4	S4
Huntington, Wells	Forest-upland mesic	Mesic Upland Forest		SG	G3?	S3
Allen	Lake – pond	Pond		SG	GNR	SNR
Allen	Prairie – dry-mesic	Dry-mesic Prairie		SG	G3	S2
Allen	Wetland – marsh	Marsh		SG	GU	S4
Allen	Wetland – swamp forest	Forested Swamp		SG	G2?	S2
Allen	Wetland – swamp shrub	Shrub Swamp		SG	GU	S2
	Other					
Allen	Geomorphic - Nonglacial Erosional Feature - Water Fall and Cascade	Water Fall and Cascade			GNR	SNR

Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list

GRANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank

SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; S4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

2.6 Local Planning Efforts

This WMP is a holistic approach to watershed management and brings together various planning efforts to provide a guiding document for the protection and management of our natural resources, and identifies opportunities for developing partnerships through the various strategies incorporated into this plan throughout the entire UWRBC Phase 2 watershed area.

Comprehensive Plans

The Upper Wabash River Phase 2 watershed covers portions of Wells, Huntington, and Allen counties, and less than 200 acres each in Jay and Adams counties. Each county has held planning efforts to guide future development and growth. The plans were developed separately from one another, using different methods to determine objectives, goals and aspirations and were specifically focused towards local zoning and planning efforts in the individual counties.

In relation to the UWRBC Phase 2 watershed, the comprehensive plans were reviewed to take into consideration how local communities are intending to manage land use and water resources. This information can serve as indicators of future threats to water quality. Several goals included in the comprehensive plans support the concerns expressed by local stakeholders in the development of this WMP. These goals include: access to public sanitary sewers or alternative methods of sewage treatment in rural residential development; promotion of conservation, open spaces, development buffers and riparian areas along streams and rivers; conserve and restore forestland, wetlands and natural areas; and promoting the use of 2-stage ditches and storm water detention/retention areas.

Wells County: Wells County developed their first Comprehensive Plan in 1970. It was updated in 1993, and in again in 2013. The current Comprehensive Plan is for a period of 10 years, and became effective January 1, 2014.

The plan identifies the need to protect productive farm ground, limit rural residential uses to areas that can be served by public sanitary sewers, limit objectionable land uses, and promote storm water detention, conservation, trails and open spaces. The plan also includes strategies to promote community clean-up programs and water testing of the river and streams.

Table 2-9: Natural Resource Strategies from the Wells County Comprehensive Plan

STATEMENT OF OBJECTIVES FOR THE FUTURE DEVELOPMENT OF THE JURISDICTION:
Rural Residential Development: Rural residential development is the use of property outside of the incorporated limits of the County's City and Towns for the purpose of low density housing. The following areas within the County are affected by this topic: All property zoned S-1, A-R or A-1 within Wells County *Action points need to be considered to help the County reach its goals and aspirations regarding this topic:* • *Review rural residential zoning districts to verify whether they promote denser development near public sanitary systems* • *Verify that the ordinance does not cause any unnecessary removal of productive farm ground* • *Review how the A-1 residential densities and sell-off requirements impact rural development to reduce its residential densities* • *Review the applicability of developing rural residential uses only where public sanitary sewer can be accessed, or review alternative methods of sewage treatment that would alleviate the need*
Confined Animal Feeding Operations (CAFO): CAFOs are as defined by 327 I.A.C. 5-4-3, a lot or facility, other than an aquatic animal production facility, that exceeds a certain number, as established by state law, of individual animals and where (1) those animals have been, are, or will be stabled or confined and fed or maintained for a total of at least forty-five (45) days in any twelve (12) month period and (2) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over at least fifty percent (50%) of the lot or facility. For the purposes of this plan, this definition will also include both onsite and satellite manure storage facilities. The following areas within the County are affected by this topic: Areas located in the vicinity of existing CAFO operations and areas in and around the A-1 zoning district *Action points need to be considered to help the County reach its goals and aspirations regarding this topic:* • *Remember when reviewing the CAFO section of the zoning ordinance, do not stray away too far from the current rules* • *Continually review new technologies to promote using proven odor reduction techniques within the plan* • *Continually stay up-to-date on the Indiana Department of Environmental Management, Indiana State Chemists, and the United States Environmental Protection Agency's rules regarding ground water protection, surface water protection, and manure application* • *Review the need for minimal acreage requirements regarding CAFOs while keeping action point 1 in mind* • *Continually stay up-to-date on the Indiana Code rules regarding water rights*
Housing Subdivisions: A housing subdivision is any residential development that would require a Major Subdivision approval as required by the County ordinances. The following areas within the County are affected by this topic: All property zoned A-R, S-1, R-1, R-2, R-3, M-1 and M-2 within Wells County *Action points need to be considered to help the County reach its goals and aspirations regarding this topic:* • *Review the ordinances to verify that housing subdivisions are being promoted directly around the incorporated City and Towns where sanitary sewer service is readily accessible*

Wells County's Discouraged Land Uses: Some land uses should be discouraged in Wells County based on their negative attributes. The following areas within the County are affected by this topic: all areas within Wells County

Action points need to be considered to help the County reach its goals and aspirations regarding this topic:

- *Review the requirements for landfills to verify adequacy*
- *Review the requirements for commercial scale wind development to verify adequacy*
- *Review the requirements for all electric production facilities to verify adequacy*
- *Determine what types of land uses may have objectionable attributes and verify whether or not the ordinance should prohibit such uses, or whether the ordinance requirements governing such uses are adequate, or should be amended*
- *Review the County's setbacks to verify that they successfully alleviate the objectionable attributes of these uses*
- *Review possible non-setback related solutions that have been proven successful in alleviating the objectionable attributes*
- *Review what types of approval processes are adequate for these uses (i.e. development plans, special exceptions, overlay zones)*

Oil and Gas Exploration and Extraction: This is the exploration and extraction of hydrocarbon deposits beneath the earth's surface, such as oil and natural gas. The following areas within the County are affected by this topic: The southern portion of Wells County

Action points need to be considered to help the County reach its goals and aspirations regarding this topic:

- *Continually stay up-to-date on the Indiana Department of Natural Resources requirements for oil and gas exploration and extraction*
- *Review the County's ordinances to verify whether or not requirements should exist regarding this use and in which zoning districts it should be permitted*

Floodplain: Floodplain means the channel proper and the areas adjoining any wetland, lake, or watercourse which have been or hereafter may be covered by the regulatory flood. The floodplain includes both the floodway and the fringe districts. The following areas within the County are affected by this topic: Any area designated by the National Floodplain Insurance Rate Map as having a one percent or greater chance of flooding in a given year

Action points need to be considered to help the County reach its goals and aspirations regarding this topic:

- *Protect the County's residences from the effects of flood damages*
- *Find a balance between private land rights and necessary flood plain regulations*
- *Utilize flood prone areas for recreational uses that are not negatively impacted by flooding*
- *Start with the state and federal government's regulations to participate in the national flood insurance program*
- *Upgrade floodplain maps to make determinations easier at a local level and encourage more accurate mapping when feasible*
- *Strongly discourage development in the mapped floodplain*
- *Promote conservation and open spaces' uses such as parks and trails in flood prone areas*
- *Review regulations and zoning maps to verify that these policies are being promoted*

County Appeal: County appeal is the ability for it to attract and arouse interest of those moving to and residing within it. The following areas within the County are affected by this topic: All areas within Wells County

Action points need to be considered to help the County reach its goals and aspirations regarding this topic:

- *Promote the creation of community clean-up groups*
- *Create water testing protocols for the County's rivers and streams*
- *The County should stay aware of the different pollution rules as set forth by the State of Indiana and the federal government*
- *Create programs to help clean up and utilize the Wabash River*
- *Protect existing and promote future conservation areas*

A STATEMENT OF POLICY FOR THE LAND USE DEVELOPMENT OF THE JURISDICTION:

Overview of Zoning Principles

The following zoning principles should be taken into account when the County is making land use decisions

- *Areas that need to be preserved should be zoned Conservation (C-1), therefore not providing developers with a false sense of development opportunity*
- *Urban residential should only be used in areas that have immediate access to a public sanitary sewer system*
- *Rural residential should only be used in areas that have a reasonable potential for obtaining access to a public sanitary system*

A STATEMENT OF POLICY FOR THE DEVELOPMENT OF PUBLIC WAYS, PUBLIC PLACES, PUBLIC LANDS, PUBLIC STRUCTURES AND PUBLIC UTILITIES:

Community Transportation

- *Continue the Bluffton Trail System to connect pedestrian destinations*
- *Review the feasibility of continuing the Wabash River Trail System to Markle and Vera Cruz*

Community Sanitary Sewer Service

- *Improve the County's sewer capacities in areas with a high potential for growth*
- *Reduce the infiltration and inflow of storm water into the County's sanitary sewers to improve line and plant capacities*
- *Promote private sanitary sewer system upgrades that reduce the amount of pollution entering the County's waterways*
- *Promote the use of the Wells County Regional Sewer District to help determine the best route to treat the rural sewage issues within the County*
- *Promote the separation of the County's sanitary sewer and storm water*

Community Storm Water Service

- *Promote the improvement of the County's storm drainage facilities*
- *Promote the use of two-stage open ditches in the County*
- *Promote the separation of the County sanitary sewer and storm water systems*
- *Promote storm water detention/retention and ditch widening at new development sites*
- *Promote regional detention basins*
- *Review new technology options for storm water detention*

Community Recreation

- *Preserve and maintain the County's parks and recreational areas*
- *Promote community service activities to help preserve and maintain the County's parks and recreational areas, including youth leadership*

Huntington County: In April 2000, Huntington County began its process of updating its Comprehensive Plan. The plan was completed in 2001 and contains long range goals, objectives and strategies that will guide future decision-making efforts.

This plan emphasizes objectives to protect the quality and quantity of water in Huntington County's streams, rivers and reservoirs. Specific strategies include the conservation of natural areas, protecting forestlands, wetlands, prairies and farm ground, creating open space and connecting communities through trail development, and directing development to those areas that have the infrastructure to support it.

Table 2-10: Natural Resource Strategies from the Huntington County Comprehensive Plan

<table>
<tr><td colspan="2">Goal Statement - Environment: Promote an ecologically sound community through the protection and enhancement of environmental resources, balancing the value of human, plant, and animal life forms and their need to coexist together, while continuing to recognize, protect and enhance to the fullest extent possible, those natural systems and the intricacies of their interrelationships, which support our way of life in Huntington County.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Protect the quality and quantity of water in Huntington County's streams, rivers, and reservoirs.
• Conserve natural areas such as forestland, wetlands and prairies.
• Protect and enhance the character of the natural environment present in Huntington County.
• Protect and enhance the streams and riverbanks throughout the county.
• Minimize conflicts between growth and the natural environment.
• Protect and preserve natural drainage areas and the 100-year floodplain.
• Reserve open space for future development of parks and recreation amenities and to provide habitats for plants and animals.</td><td>• Establish development buffers around waterways that run throughout Huntington County.
• Establish a Huntington County Land Trust program to protect forestlands, wetlands, prairies and valuable farm ground.
• Use cluster development techniques for new developments to create pockets of open space.
• Limit development and uses within the 100-year flood zone.
• Limit development and uses within the 500-year flood zone.
• Expand DNR's involvement throughout the county.
• Create education experience (K-12) with respect to environmental issues.
• Encourage conscientious landowners.</td></tr>
<tr><td colspan="2">Goal Statement – Parks and Recreation: Develop, maintain and promote recreational opportunities and/or facilities to meet the current and future needs of Huntington County; preserve green spaces between towns by development of a forest preserve system that is countywide.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Protect parklands and recreational areas from undesirable, conflicting and potentially hazardous land uses and developments.
• Ensure a mix of sizes and locations of public parks and open spaces to provide opportunities for passive and active recreation.
• Interconnect the parks, recreation land, public natural areas and public facilities with a network of trails suitable for pedestrians and bicyclists.</td><td>• Develop trails from Huntington to the towns in the County (Andrews, Roanoke, Warren, Mt. Etna and Markle).
• Develop trails connecting smaller towns to one another.
• Develop trails connecting to other communities and counties.
• Expand reservoir programs.</td></tr>
<tr><td colspan="2">Goal Statement – Alternative Transportation: To provide a safe, appropriate and when possible, an aesthetic transportation network for alternative modes of transportation throughout Huntington County.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Encourage alternative transportation linkages to schools, parks, and other public resources.</td><td>• Trail systems to connect communities and amenities.
• Make improvements to water access for boating purposes.</td></tr>
</table>

<table>
<tr><td colspan="2">Goal Statement – Community Facilities: Provide responsive, high quality, effective and efficient public facilities and services for the current and future citizens of Huntington County.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Recognize change and add, change or consolidate services when appropriate.
• Recognize what types of facilities work locally and which work regionally and act upon these appropriately.</td><td>• Ensure adequate water and sewage system quality and availability for all existing and future developments within Huntington County.
• Ensure adequate solid waste disposal, management, and availability for all existing and future developments within Huntington County.</td></tr>
<tr><td colspan="2">Goal Statement – Growth Management: Manage and direct growth and development in Huntington County by encouraging compact urban form within the corporate limits of each municipality; discouraging sprawl; and preserving the integrity of prime agricultural land while maintaining the highest “quality of life” for current and future residents.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Preserve and enhance the farming industry throughout Huntington County by discouraging urban sprawl and spot zoning.
• Develop green spaces/buffers between development zones.</td><td>• Establishing a Transfer of Development Rights (TDR) program for the county to help preserve farmland and open space while combating sprawl.
• Create a Huntington County Land Trust program.
• Make necessary revisions to the storm water control ordinances.
• Set up an overlay district for confined feeding areas.
• Increasing minimum lot size of agriculturally zoned lands.
• Take a more proactive stance towards urbanization and preservation of lands throughout Huntington County.</td></tr>
<tr><td colspan="2">Goal Statement – Land Use: Encourage orderly and responsible development of land in order to promote the health, safety and welfare of residents within Huntington County, while promoting opportunities for community growth and development that results in enhanced quality of life that leads to diverse housing, economic vitality and enhanced recreation and that nurtures environmental integrity.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Allow residential, commercial, industrial, farming, parks, and open space to occur in areas planned for such uses and restrict the same uses from occurring where they are not planned.
• Protect prime agricultural land from unrelated development.
• Require that uses of land are sensitive to adjacent environmental features.
• Strongly discourage incompatible and conflicting land uses from being adjacent or in close proximity to one another.</td><td>• Follow existing Land Use Patterns to accommodate additional residential development without compromising the county’s agricultural land base.
• Smart Growth – direct growth to those areas that already have the infrastructure to support it.
• Limit development on areas not suitable for future development.</td></tr>
</table>

Allen County: Allen County's current Comprehensive Plan was adopted in 2007. The new plan brought about an integrated approach to planning and development to create a community that makes more efficient and coordinated use of resources.

This plan is largely focused on continued residential growth, but takes into consideration natural features of significant value and environmentally sensitive land. Objectives and strategies include protection of agricultural lands, woodlands, wetlands, wildlife habitats and conservation areas; as well as supporting and collaborating on the development of watershed management plans to address surface water contamination. This plan includes protection for endangered species, which is not specifically addressed in the other county comprehensive plans.

Table 2-11: Natural Resource Strategies from the Allen County Comprehensive Plan

<table>
<tr><td colspan="2">Goal - Land Use: Carefully planned, sustainable growth and efficient use of land resources through coordinated and quality development, revitalization and redevelopment which leads to improved community well-being.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Encourage carefully planned growth by utilizing the conceptual development map as part of the community's land use decision-making process.
• Use land resources more efficiently by encouraging new development within the Conceptual Development Map growth areas which are adjacent to existing development.
• Use land resources efficiently by encouraging new development, revitalization and redevelopment in areas already served by infrastructure.
• Discourage unplanned growth in areas not currently served by public municipal or private corporate sanitary sewer facilities.
• Encourage sustainable growth by conserving natural features and environmentally sensitive land with significant value.
• Maintain the quality of agricultural operations by minimizing urban, suburban and rural conflicts.</td><td>• Significant utility, service area, and infrastructure expansions should be encouraged inside the Conceptual Development Map growth areas.
• Endorse improvements to and extensions of infrastructure in areas adjacent to existing development.
• Support new development, revitalization and redevelopment in areas currently served by adequate existing public municipal or private corporate sanitary sewer and water facilities.
• Develop and adopt Plan Commission policies to address development in unincorporated communities not currently served by public municipal or private corporate sanitary sewer facilities.
• Define "significant value" in terms of natural features and environmentally sensitive land.
• Encourage development proposals that are sensitive to preserve or reserve areas.
• Identify and implement additional floodplain- and watershed-management tools, and update existing floodplain- and watershed-management tools as needed.
• Inform and educate the public and appropriate community stakeholders about sustainable development alternatives that conserve natural features and preserve environmentally sensitive land.
• Collaborate with nongovernmental entities and organizations to acquire and/or protect significant natural and environmentally sensitive land.
• Encourage discussion on the value of exclusive agricultural-zoning districts.
• Identify the full range of tools available to promote the continued viability of prime agricultural land and existing agricultural operations.
• Encourage the continuation of agricultural uses by protecting agricultural areas from incompatible land uses.</td></tr>
<tr><td colspan="2">Goal – Housing and Neighborhoods: Neighborhoods that are stable and diverse, providing a wide range of housing options, linking residents to a variety of land uses which meet the needs of the community.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Provide connectivity.</td><td>• Promote and plan for greenways, bikeways, and trails within new and existing developments.</td></tr>
</table>

<table>
<tr><td colspan="2">Goal – Transportation: An integrated transportation system that ensures accessibility, safe and efficient movement and connectivity through all parts of the county and region; and accommodates a range of transportation choices such as public transit and paratransit, high-speed rail, pedestrian, bicycle, vehicular and horse-drawn.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Improve vehicular transportation throughout the region while accounting for air quality standards and noise mitigation.</td><td>• Ensure that environmental oversight complies with state and federal standards in transportation improvement projects.</td></tr>
<tr><td colspan="2">Goal – Environmental Stewardship: A healthy, sustainable, and enjoyable environment with clean air and water, greenways and open spaces for residents, habitats for wildlife, protection from flooding, utilization of rivers, protection of other environmental assets (farmland, woodlands and wetlands), and promotion of a strong ethic among residents and businesses to control pollution and support environmental stewardship efforts.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Ensure the conservation of significant land resources, including but not limited to agricultural lands, woodlands and wetlands.
• Protect wildlife habitats and limit invasive species.
• Preserve and improve the quality of groundwater and surface water resources.
• Protect the natural and built environment through comprehensive floodplain management initiatives.
• Encourage Brownfield redevelopment.</td><td>• Coordinate and combine existing maps and inventories of agricultural, woodland and wetland areas. Identify areas of contiguous prime soil, significant agricultural heritage and prime lands for targeted conservation efforts.
• Continue stewardship efforts and identify areas for possible expansion of contiguous forested and natural areas (such as the Little Wabash River Corridor and other environmentally significant areas).
• Investigate the value of adopting local wetland protection ordinances and regulations.
• Pursue wetlands restoration initiatives.
• Consider zoning and subdivision standards to protect natural features and environmentally sensitive land.
• Collaborate with federal and state agencies and not-for-profit organizations in the protection of endangered species.
• Work with local organizations to protect natural habitat areas, particularly along linear riparian corridors and around critical aquatic communities.
• Support and collaborate in the establishment of watershed management plans that recommends actions to address major sources of surface water contamination.
• Using the No Adverse Impact principle as a guide, develop a program to map floodplains, track impacts of floods and enhance green infrastructure in floodplains.
• Consider tools, such as overlay districts along river basins and streams to encourage the expansion of riparian buffers and enhance public access to waterfronts.
• Develop an inventory of Brownfields.
• Set priorities for Brownfield redevelopment in the region.
• Secure resources to assist with assessment, remediation and redevelopment of brownfields.</td></tr>
</table>

<table>
<tr><td colspan="2">Goal – Community Identity and Appearance: An attractive, vibrant community with a positive image and physical appearance in its rural areas, small towns, neighborhoods and downtowns that celebrates its heritage, diversity and waterways through ongoing quality development, historic preservation and neighborhood revitalization.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Renew, protect and enhance the rivers and other significant waterways that define the region.
• Preserve rural agricultural landscapes.</td><td>• Collaborate with an array of community partners to improve water quality and enhance rivers, streams, corridors and watershed areas.
• Encourage the preservation of prime agricultural areas that are distinguished by high crop yields and large contiguous blocks of land.
• Encourage the preservation of agricultural uses and structures by protecting agricultural areas from incompatible land uses.
• Develop and adopt updated regulations that place limits on metes and bounds tract property sales and development.
• Maintain and enhance heritage corridors.</td></tr>
<tr><td colspan="2">Goal – Community Facilities: Quality facilities that promote recreation and cultural enjoyment, ensure public health and safety, provide educational opportunities, and encourage tourism and investment; collectively building a thriving, accessible and welcoming community for all ages and backgrounds.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Sustain and improve high-quality parks and recreational opportunities throughout the county.</td><td>• Encourage parkland and open space conservation.
• Encourage usable open space for new development.</td></tr>
<tr><td colspan="2">Goal – Utilities: Safe and abundant drinking water and regionalization of interests for improving regional water quality – such as reduction of failed septic systems and improved performance from sanitary sewers and stormwater facilities – that is expandable to meet demands and support community plans for growth.</td></tr>
<tr><th>Objectives</th><th>Strategies</th></tr>
<tr><td>• Ensure cooperative decision making and uniform standards for protecting water quality throughout the region.
• Improve and expand sanitary sewer systems within the Conceptual Development Map areas.
• Work with the Department of Health and other agencies to protect and enhance drinking water systems.
• Enhance stormwater management and drainage systems.</td><td>• Consider a collaborative water quality partnership among local governments, stakeholders and utility providers.
• Encourage improvement to existing sewer systems to resolve sewer overflows.
• Provide direction for the exploration of alternative sewage-processing methods.
• Discourage development on conventional septic systems.
• Discourage on-site wastewater package treatment facilities.
• Expand and enhance initiatives to protect the St. Joseph, Wabash and Maumee River watersheds.
• Work with local groups to educate the public about practices to protect groundwater and river water in order to maintain drinking-water quality.
• Consider a partnership to coordinate stormwater management on a countywide basis.
• Ensure uniform standards for stormwater management and drainage systems.</td></tr>
</table>

MS4 Areas and Rule 5

The UWRBC Phase 2 watershed area in Wells and Huntington Counties does not fall under the Municipal Separate Storm Sewer System (MS4) regulation; however, Allen County, in its entirety, is regulated as a MS4 area. The land in this project that is located in Allen County is not considered to be a priority for planning and/or enforcement for the MS4 due to the land use being mostly agricultural or industrial. The industrial sites, such as the General Motors plant, Vera Bradley plant, and Truck Bed Liner plant as well as other commercial and residential construction are regulated under the Allen County Erosion Control Ordinance. The Allen

County Erosion Control Ordinance requires any new construction site to implement BMPs to meet an 80% total suspended sediment removal rate post construction.

The Wells and Huntington County Soil and Water Conservation Districts (SWCDs) have plan review authority for 327 IAC 15-5, commonly referred to as Rule 5 (storm water run-off associated with construction activity), which is a regulation designed to reduce pollutants, principally sediment, that are a result of soil erosion and other activities associated with construction and/or land disturbing activities on projects of 1 acre or more. The SWCDs actively review the storm water pollution prevention plans, make site visits, and suggest best management practices to reduce the threat that runoff could pose to local water quality throughout the counties. The Allen County Erosion Control Ordinance is used to regulate property in Allen County, similar to Rule 5.

Regional Sewer District Plans

The Wells County Regional Sewer District, which includes all unincorporated areas of Wells County, was formed in 2009 following a Recommended Order that was issued by IDEM due to sewage disposal issues that were discovered in the McKinney/Paxson Ditch. The McKinney/Paxson Ditch is a subwatershed of the Wabash–Griffin Ditch watershed in this project area. A sewer district plan was submitted to IDEM in 2011, and was found to be deficient. The plan was revised and resubmitted in March 2012. This plan anticipated that a project to achieve collection, treatment and disposal of sewage to solve the pollution problem in the McKinney/Paxson ditches would be approved by June 2012. Following development of the cost estimates, rate study, and meeting with possible funding agencies, it was determined that the project was not feasible. The Wells County Regional Sewer District continues to work with IDEM to find cost-effective solutions to this problem, and has focused its efforts on investigating possible experimental on-site treatment systems versus trying to construct a treatment facility for the affected area. The Wells County Regional Sewer District will be tasked to address other unincorporated areas in the future.

Watershed Management Plans

Watershed Diagnostic Study: Flat Creek, Griffin Ditch, Fleming Ditch and Somers Creek

(www.in.gov/dnr/fishwild/files/fw-FlatCrk__GriffenDitch_FlemingDitch_WtrshdDiag-WellsCo-April2002.pdf.)

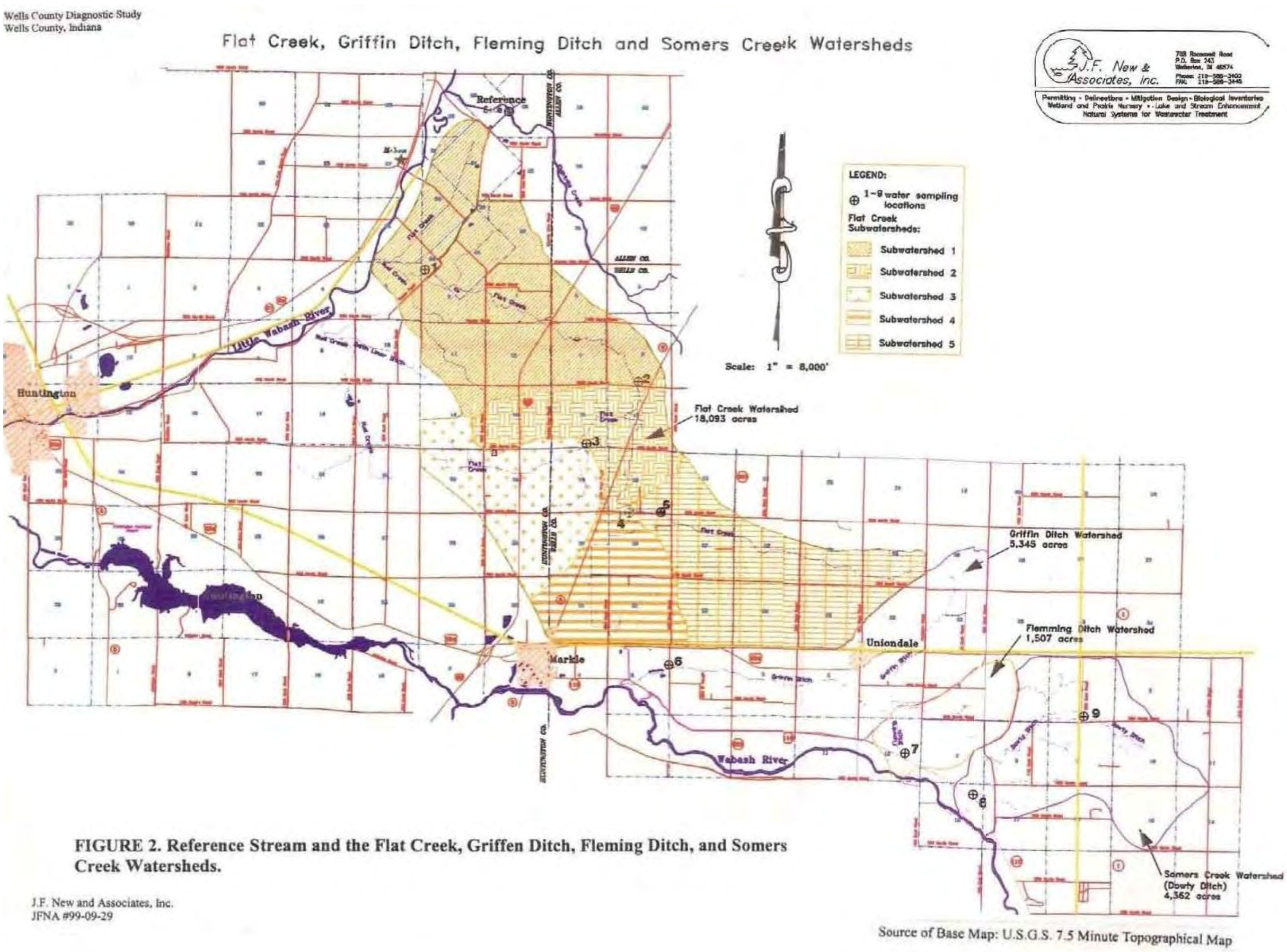
In 2000, a Watershed Diagnostic Study was conducted by J.F. New and Associates on the Flat Creek, Griffin Ditch, Fleming Ditch and Somers Creek subwatersheds (Figure 30) in Wells and Huntington Counties. The study was sponsored by the Wells County Soil & Water Conservation District and funded through the IDNR Lake and River Enhancement (LARE) program.

Areas of concern listed in the study include farming near the edge of streams and stream bank erosion due to artificial channelization and lack of filter strips or riparian areas. Additionally the study noted that concentrations of rural development with on-site septic systems have definite implications for nutrient and bacterial loading to the waterways.

The study recommended implementing several best management practices such as conservation tillage, drainage management plans to protect natural resources, innovative riparian management systems, wetland restoration and shallow water pond construction, fencing, grassed swales, storm water treatment, and creating additional water storage capacity where possible. The study also states that the ditches would benefit from in-stream structures such as rock chutes, drop structures and grade control structures to slow streambed and stream bank erosion. Areas where highly erodible land borders the ditches were listed as priority sites for these practices.

Following the LARE study, the Wells Co. SWCD actively promoted the use of USDA technical and financial assistance programs and Clean Water Indiana grant funds to implement best management practices in the watershed study area in an effort to reduce nonpoint source pollution. As a result of their outreach activities since 2001, conservation tillage, wetland restoration, cover crops, filter strips and grass waterways, and a restored wetland have been installed in the watershed area; however, additional practices are still needed.

Figure 30: LARE Watershed Diagnostic Study Map
Flat Creek, Griffin Ditch, Fleming Ditch, and Somers Creek



Wabash River (Upper) WMP 5-74

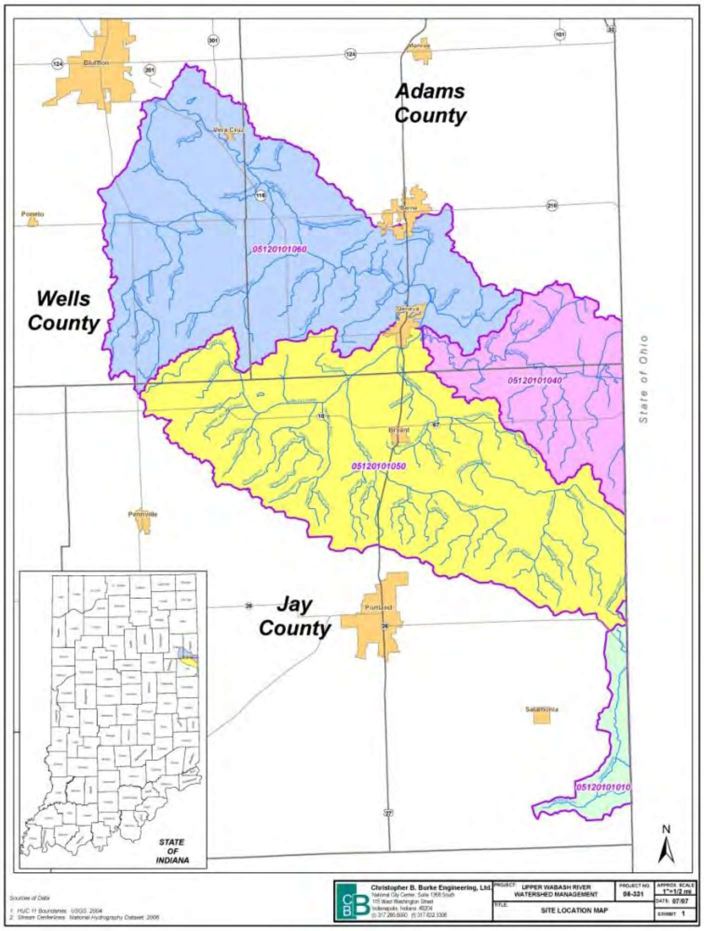
http://www.in.gov/idem/nps/3187.htm

The Upper Wabash River Basin Commission received an IDEM 205(j) grant in 2005 and hired Christopher Burke Engineering, Ltd. to develop the watershed management plan for the Upper Wabash River Phase 1 project area that begins at the Ohio/Indiana state line and ends just east of the current project area. The planning process was completed in 2007.

The plan identifies several potential pollutant sources that are contributing sediment, nutrients, pathogens and bacteria to the watershed. The pollutant sources listed include: stream bank erosion and in-stream obstructions, areas prone to flooding, unbuffered stream reaches, conventional tilled farms, highly erodible lands, subsurface drainage systems, livestock in streams, failing septic systems, and storm water runoff from impervious areas.

Goals for improving water quality in the project area were identified by the stakeholders, and subsequently, an IDEM Section 319 grant funded the implementation of best management practices and education efforts from 2009-2013 by the Upper Wabash River Basin Commission. The Upper Wabash River Basin Commission continues to partner with the Soil and Water Conservation Districts in the Phase 1 project area to monitor water quality and promote best management practices in the watersheds.

Figure 31: UWRBC Phase I Project Area



Other Reports

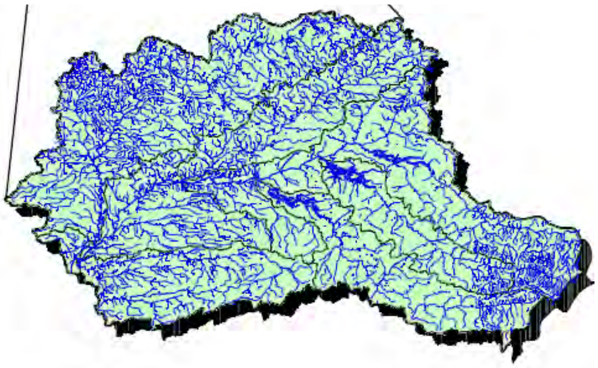
Since 1999, the Rock Creek Conservancy District has been performing low level water quality testing for nutrients, *E. coli*, chemical and biological parameters, and habitat assessments. The program has changed several times throughout the years, as funding allowed, but has mainly been conducted using Indiana Hoosier Riverwatch methods. The main focus of this monitoring has been for the education of the landowners within the District and to have a benchmark for identifying changes in the water quality of the Rock Creek.

Other watershed studies have been developed for state agencies for the entire Upper Wabash River Basin, but none of them are specific to the Upper Wabash River Phase 2 project area. The various reports provide an overall strategy for addressing pollutants in the basin as a whole, but do not dictate management activities for individual stream segments or tributary watersheds. Several of the studies recommend targeting and prioritizing activities at the 12-digit HUC watershed level.

The Rapid Watershed Assessment Upper Wabash Watershed (2009) report sites excessive amounts of sediments, nutrients, and bacteria as resource concerns in the entire Upper Wabash 8-digit HUC 05120101 watershed that begins in northeast Ohio and continues west into 10 northeastern Indiana counties, which includes the UWRBC Phase 2 project area. The Wabash River TMDL (2006) details sources of pollution for the entire 475 miles of river in Indiana to the confluence with the Ohio River. The TMDL states that nonpoint source pollution in the watershed results from agricultural practices, land application of manure, and urban and rural run-off; as well as point source pollution from straight pipe discharges of home sewage treatment systems and combined sewer overflow outlets. The Watershed Restoration Action Strategy for the Upper Wabash Watershed (2002) identifies and discusses the same concerns as the other reports, again on the 8-digit HUC watershed scale, which is much too large to make local decisions. However, many of the concerns listed in these reports have also been identified by the UWRBC members, steering committee members, and stakeholders in the Phase 2 project area.

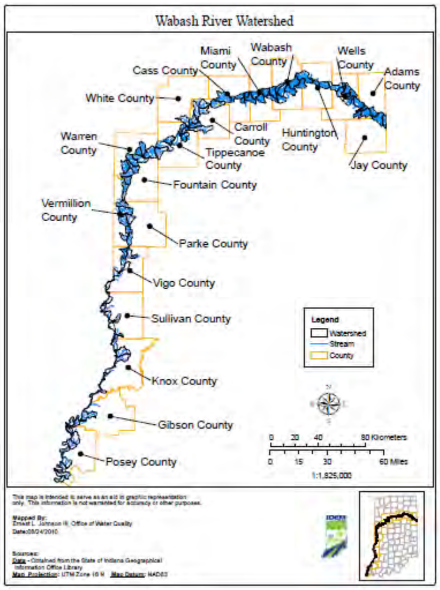
Figure 32: Other Reports Project Areas

Upper Wabash River Basin Fourteen Digit Hydrologic Unit Mileages (1999) ***and***
1998 Upper Wabash River Basin Sampling Sites and Stream Standard Violations (2000)



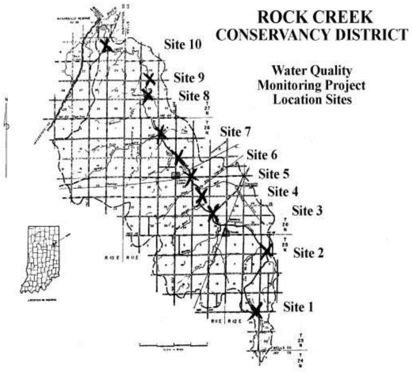
An Assessment of Pesticides in the Upper Wabash River Basin (2001)

Watershed Restoration Action Strategy for the Upper Wabash Watershed (2002)



Wabash River TMDL (2006)

Rapid Watershed Assessment Upper Wabash Watershed (2009)



Rock Creek Conservancy District Water Quality Monitoring Project (1999-present)

2.7 Watershed Summary

Agriculture is the primary land use in the Upper Wabash River Phase 2 watershed area. The nearly flat landscape and highly productive soils account for row crops being the largest agricultural commodity. Both surface and subsurface drainage is used to increase the potential for crop production, but also speeds up the delivery of storm water to the receiving streams and provides a direct conduit for sediment, fertilizer, and chemical runoff. Conventional tillage is used throughout the watershed which can also contribute to sediment and nutrients entering the streams, however there is interest in transitioning to reduced tillage methods and using conservation practices such as cover crops to minimize the loss of soil and nutrients from the agricultural lands. Regular maintenance of open ditches and conversion of riparian areas and woodlands to row crops result in losses of areas that would normally provide benefits for water quality improvement, flood protection, and wildlife habitat.

Confined feeding operations (CFO’s) are prevalent in the watershed, as well as smaller livestock operations and “hobby” farms. Almost all of the CFO’s are located adjacent to or within one mile of a stream. Manure storage and land application can contribute nutrients and pathogens to local waterways. In the past, local CFOs have had storage lagoons that have overtopped and drained into field tile resulting in fish kills in local waterways. Land application of manure prior to wet weather events has also been a cause of impairment. On at least two occasions, manure was spilled onto roads and into side ditches during transport which then drained to and directly impacted local streams and water quality.

The watershed contains rural residential development and a number of small rural communities. Soils throughout the project area are unsuitable for individual on-site septic systems, and the unincorporated communities do not provide wastewater treatment. Many of the older septic systems are considered “direct connect” and even newer updated systems such as those in the McKinney/Paxson drainage area fail due to soil limitations and lack of maintenance resulting in wastewater discharges that impact water quality.

Urbanized areas within the watershed present different threats to water quality due to urban residential, suburban residential, commercial and industrial uses. Storm water runoff from these concentrated areas of rooftops, lawns, streets and roads, and parking lots all contribute to surface waters reaching the river and streams untreated and at a faster rate than under less developed conditions. Construction sites for urban housing and industrial parks tend to be larger and also have a greater chance of contributing sediment. Generally speaking, residents in urbanized areas often fail to recognize the combined impact of their actions and how it will affect the environmental resources as a whole.

3.0 Environmental and Water Quality Data

3.1 Historical Water Quality Information

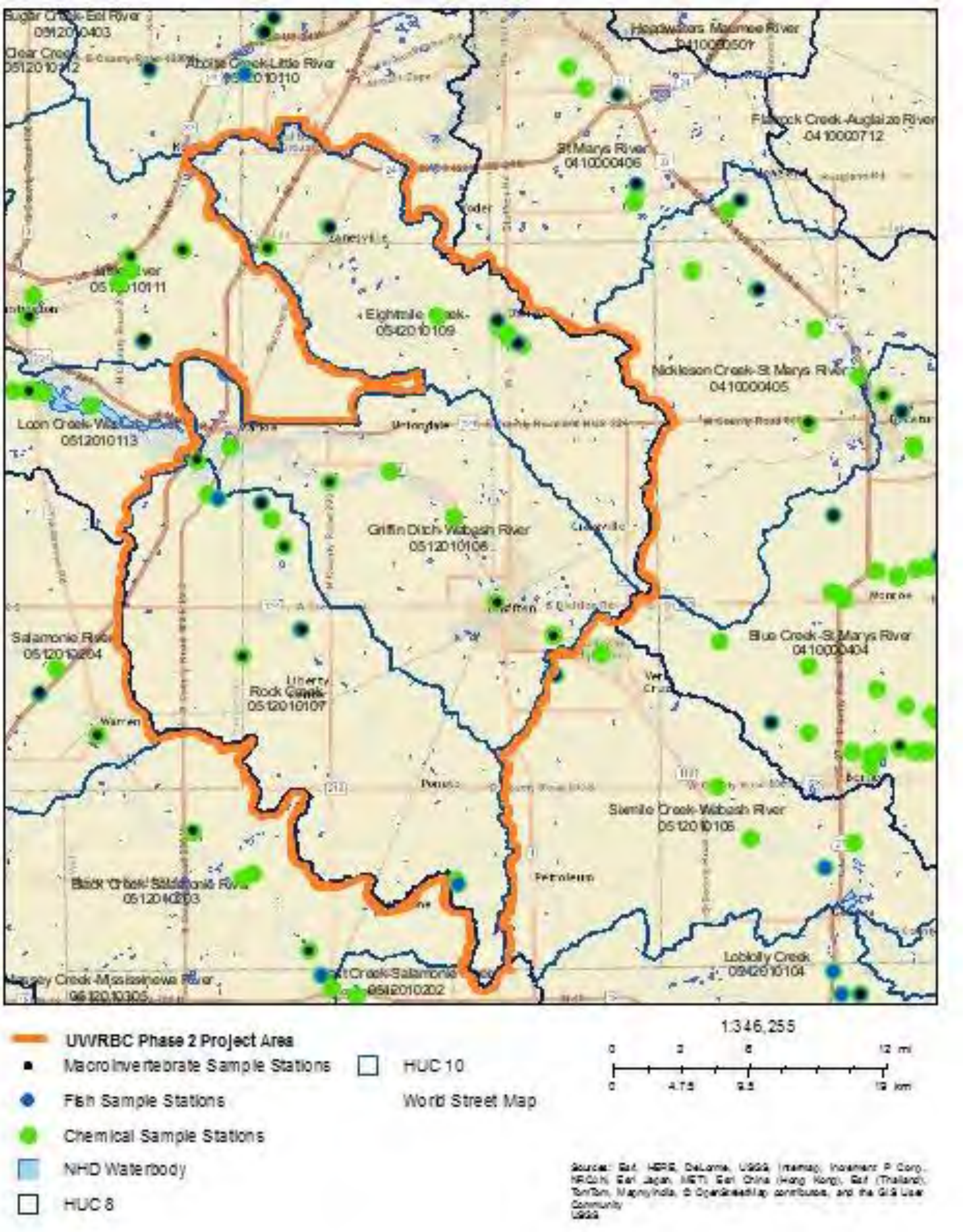
A variety of reports have been developed that contain historical water quality data for the Upper Wabash River Basin watershed area. Water quality monitoring data is also available from various sources; including IDEM, US EPA, and the US Geological Survey, as well as local studies and volunteer monitoring groups.

IDEM monitors the rivers, streams and lakes in Indiana to comply with federal regulations to develop reports to summarize the status of Indiana's waters. According to *Indiana's 2014 Integrated Water Monitoring and Assessment Report,* 71% of the waters sampled in the Upper Wabash River basin do not meet the criteria to support aquatic life use, and 87% does not meet the criteria for recreational use. Based on the data that IDEM has collected in the Upper Wabash River Phase 2 project area, the Wabash River main stem and segments of the Rock Creek, Elkenberry Ditch, and Eight Mile totaling over 43 miles of river or streams are included on Indiana's 303(d) List of Impaired Waters. The impairments to the river and streams include *E. coli*, impaired biotic communities, nutrients, and PCBs and Mercury in fish tissue.

The Wabash River Watershed Total Maximum Daily Load (TMDL) report that was completed for IDEM in 2006 also lists the Wabash River main stem as impaired for *E. coli* and nutrients. A TMDL is the total amount of a pollutant that can be assimilated by the receiving water while still achieving water quality standards. The report stated that due to the size of the watershed, more detailed implementation plans would need to be developed and tailored to individual tributary watersheds. Additional monitoring was also recommended to further refine the estimate of nutrient loads. Based on a comprehensive review of the available water quality data at that time, it was determined that TMDLs would be developed for *E. coli*, nitrate and phosphorus for the Upper Wabash River watershed, which includes the project area. The TMDLs that were established were: a reduction in *E. coli* from nonpoint sources by up to 95% of the existing loads; and a reduction in total phosphorus from nonpoint sources of 12-23% of the existing loads. Existing nitrate levels required no reductions to meet water quality standards. It was noted that by reducing the pollutants in the streams and river the biological communities should improve and no longer be impaired.

The Indiana Water Quality Atlas is an online, interactive mapping application that can be used for watershed management and water quality analysis. Sampling locations and water quality results from IDEM's Assessment Information Management System (AIMS) includes periodic macroinvertebrate, chemical and fish data from 1991 through 2008 as part of their probabilistic monitoring program (Figure 33). This information will be discussed in the subwatershed section that follows. IDEM will return to the watershed in 2015 to collect additional data.

Figure 33: IDEM Water Quality Monitoring Locations



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
USGS

The US EPA website includes a variety of watershed assessment summaries, monitoring data, and compliance reports from state, federal and local agencies, universities, dischargers, and volunteers. The majority of this data is also available through IDEM. EPA's "Surf Your Watershed" webpage provides links to citizen-based groups, impaired waters, and the STORET data warehouse for water quality monitoring data. The "My WATERS Mapper" is an interactive map that displays snapshots of EPA Office of Water program data. It includes information on water quality assessments, and NPDES permits, and other water-related map layers.

According to NPDES facility reports obtained through the US EPA Enforcement and Compliance History Online (ECHO) website, several industrial facilities with NPDES permits are listed as contributing pollutants. The Bluffton, Ossian, Uniondale and Markle wastewater treatment plants have all had recent sanitary sewer and combined sewer overflow incidents that directly impact the watershed streams by contributing significant amounts of sediment, nutrients and pathogens into the local waterways.

The US Geological Survey (USGS) operates an extensive network of stream gauging stations throughout the United States. In Indiana, these stations provide a variety of information for over 200 sites. The USGS National Water Information System (NWIS) provides for the long-term storage of this water data. The USGS NWIS lists three stream gauges on the Wabash River within the UWRBC Phase 2 project area. USGS site #03322958 near Bluffton, at CR450E has recently been discontinued. This site previously recorded gage height and discharge measurements which were compared to the UWRBC monitoring measurements and used to estimate stream flow in the project area when high waters prevented the collection of flow data. USGS site #03323000 at the Main Street Bridge in Bluffton was in service from 1930-1971, and put back in service in April 2015. This site currently only measures gage height and precipitation. There is an abundance of historical monitoring data for this station which provides insight into the condition of the river over past decades. The other stream gauge station, USGS site #404919085204901 is located at the Markle Pumping Station. This information is not available online but can be obtained through the USGS state office.

In 2002, a Lake and River Enhancement (LARE) Diagnostic Study was completed on the Flat Creek, Griffin Ditch, Flemming Ditch, and Somers Creek (also known as Dowty Ditch) subwatersheds. The Griffin Ditch, Flemming Ditch and Somers Creek are included in this watershed management plan project area. In general, the LARE study noted that the physical and chemical characteristics of these streams indicate a high degree of degradation. Multiple parameters violated Indiana state standards for both human and aquatic biota health. High loading rates of dissolved nutrients relative to flows, and sediment loading rates during runoff events were both listed as concerns. The habitat evaluations fell below the level conducive to the existence of warm water faunas, and the macroinvertebrate communities were of low diversity and composed predominantly of highly tolerant taxa or species.

Figure 34: LARE Diagnostic Study – Water Quality Monitoring Locations in Griffin and Flemming Ditches, and Somers Creek Watersheds – Sites 6-9

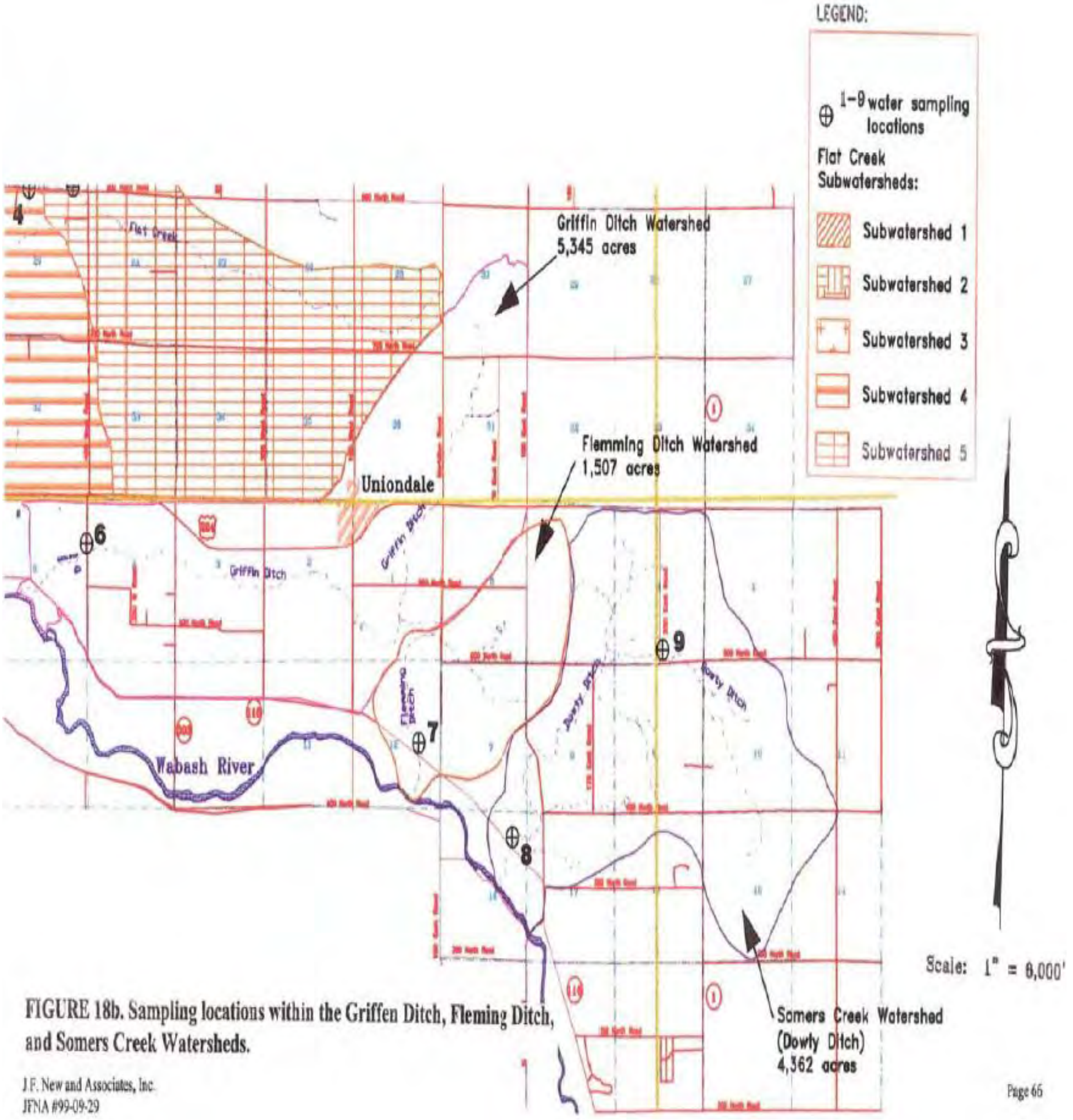
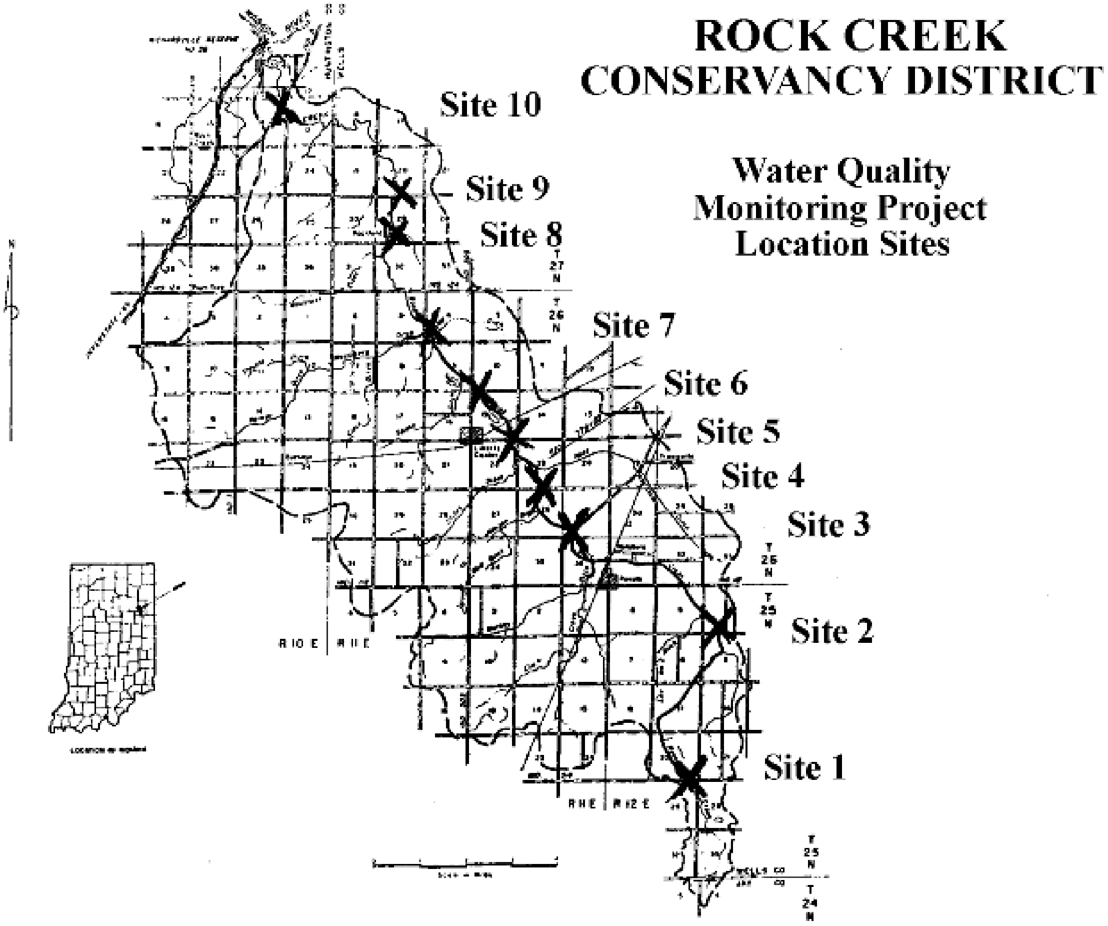


FIGURE 18b. Sampling locations within the Griffen Ditch, Fleming Ditch, and Somers Creek Watersheds.

J.F. New and Associates, Inc.
JFNA #99-09-29

The Rock Creek Conservancy District (RCCD) began collecting water quality information on the Rock Creek channel in 1999. The RCCD sampled for herbicides, phosphorus, nitrogen, *E. coli* and total coliforms. The results did not indicate a large influx of agricultural herbicides into the creek; however, *E. coli*, total coliforms and phosphorus did exceed the maximum contaminant level, as determined by the state, on several sampling events over the years. In general, nitrogen generally exceeded the maximum contaminant level during the spring and early summer planting season. In 2002, Hoosier Riverwatch biological and habitat monitoring was added to the program to further evaluate the health of the stream. Due to limited funding, the chemical monitoring was discontinued in 2005, but the biological, habitat and stream flow data continued to be collected through 2012. Overall, macroinvertebrate pollution tolerance indexes (PTI) indicate that the Rock Creek has a poor – fair rating at the upper end of the creek, and as the stream flows towards the Wabash River it improves to fair – good, with a few sites gaining an excellent rating on occasion. Habitat evaluations using the Citizens Qualitative Habitat Evaluation Index (CQHEI) generally show the same trend, with low scores at the upper end of the creek, improving as the stream flows towards the Wabash River, but not reaching the benchmark score of 60, which you would expect from a stream that is considered by the stakeholders to be primarily for agricultural drainage.

Figure 35: Rock Creek Conservancy District Water Quality Monitoring Locations



3.2 Habitat and Biological Information

The biological and habitat studies conducted by the various groups indicate that the ditches and streams in the project area are degraded. The primary sources of impairments have been identified as sediment, nutrients, and bacteria. Since agriculture is the dominant land use within the watershed, activities associated with agricultural activities (i.e. sheet/rill erosion from fields, tile drainage, fertilizer applications, confined feeding operations, and on-site wastewater systems) are likely significant sources causing impairment to the water bodies. Municipal and industrial discharges and urban storm water runoff (including construction activities, lawn fertilizer, and pet waste) are also believed to be contributing sources.

The lack of wetlands, riparian areas, buffers and filter strips, and drainage maintenance activities increase the rate in which surface water runoff reaches the streams and river and also point to stream bank and in-stream erosion and degradation of quality habitat and biological communities. The addition of phosphorus and nitrogen to the local streams and Wabash River often causes excessive algal growth and further compromises the stream conditions for the biological communities and aquatic life. Filter strips have been promoted locally by the Soil and Water Conservation Districts and County Surveyors, and were observed during the windshield survey. The areas with filter strips generally appeared to have stable stream banks, but in-stream siltation and erosion was still noted.

Between 2002 and 2009, the City of Bluffton reforested approximately 150 acres of the Wabash River floodplain with Oak-Hickory and Maple-Beech forest habitats and a mixture of native grasses and wildflowers. Additional natural habitat riparian areas in the project area include two properties owned and managed by Acres Land Trust, Inc. The Anna Brand Hammer Nature Preserve in the Eight Mile subwatershed contains approximately 20 acres of mixed hardwood forest in the midst of fields with a small intermittent stream that provides homes for salamanders and wildlife. The 86 acre Acres Along the Wabash Nature Preserve in the Wabash River-Griffin Ditch subwatershed includes natural forests and native grass plantings. The J. E. Roush Fish and Wildlife area in the Wabash River-Griffin Ditch subwatershed on the Wabash River also provides over 2,700 acres of diverse forest, wetland, and native habitat area. These areas promote diverse aquatic communities and host a variety of wildlife, as well as benefit water quality by providing buffer zones to filter pollutants.

3.3 Watershed Surveys

In addition to the historical water quality data, other data inventories were collected using both desktop and windshield survey methods to help identify potential sources of pollutants in the Upper Wabash River Phase 2 project area.

The desktop survey included collecting information through Geographic Information Systems (GIS) from a variety of on-line sources, including IndianaMap, USDA's Web Soil Survey, and the Allen, Huntington and Wells County GIS websites, to name a few. This led to specific sources of information such as IDEMs Office of Land Quality, where various land uses are regulated by National Pollution Discharge Elimination System (NPDES) permits for activities such as agricultural and solid waste, auto salvage, concentrated feeding operations, hazardous waste, industrial waste, and underground storage tanks.

This was followed by researching available reports such as Rapid Watershed Assessments (RWA) and tillage transect information from the USDA-Natural Resource Conservation Service (NRCS) and Indiana State Department of Agriculture-Division of Soil Conservation (ISDA-DSC) respectively, to gather existing natural resource data, such as soils, land use, wetlands and tillage trends to identify possible areas where conservation practices may already exist. The county GIS websites were also used to estimate areas that would benefit from the implementation of conservation practices.

Windshield surveys were conducted to confirm the conditions on the land by driving throughout the watershed and visually assessing the local land use and documenting the findings using photographs, and field sheets. This information was then compiled and used to support or alleviate the stakeholder concerns gathered during the initial public meetings. This information is discussed more specifically within each subwatershed.

Table 3-1: Summary of Windshield Survey Observations.

Windshield Observations	
Drainage	• Log-jams and debris in the Wabash River (1 site), Rock Creek (2 sites) and Eight Mile Creek (2 sites). • Five 2-stage ditches are located in the Moser Ditch-Eight Mile Creek subwatershed, two are located in the Johns Creek-Wabash River subwatershed, and one is located in the Dowty Ditch-Wabash River subwatershed.
Sediment & Nutrients	• The presence of silt bars, sloughing creek banks and areas of active erosion (including sheet, rill, gully and bank erosion) observed in all watersheds. (Wabash River/Griffin Ditch – 14 sites; Rock Creek – 25 sites; Eight Mile – 9 sites). • Lack of buffer/filter strips (Wabash River-Griffin Ditch – 35 miles; Rock Creek – 48 miles; Eight Mile Creek – 38 miles), tillage to the edge of streams, and conventional tillage (66,405 acres) in all watersheds. • 32 CFOs and smaller hobby farms (1,062) in all watersheds. • Animals have direct access to waterways in Elkenberry-Rock Creek subwatershed (1 site) and Dowty Ditch-Wabash River subwatershed (1 site). • Manure transport lines observed near Rock Creek in the Stites Ditch subwatershed (2 sites).
E. coli & Pathogens	• Rural homes in the watersheds with septic systems (estimated 4,000) • Wastewater treatment facility discharges from Bluffton, Markle and Uniondale to the Wabash River (6 occurrences), from Poneto to the Rock Creek (1 occurrence), and from Ossian to the Eight Mile Creek (4 occurrences). • Concentrated impervious areas in populated areas (approx. 3 %).
Other Concerns	• Two sites were observed where woodlands were being cleared. • Few green spaces in the rural areas in all watersheds. • On three separate occasions trash and household furniture was dumped in or along the Wabash River.

Photos of Watershed Areas

Photo 1: 2-stage Ditch on Eight Mile Creek CR 1000 N – CR 100 E (WQM site 2).

Photo 2: Wooded riparian area being cleared on Rock Creek CR 600 W, north of CR 300 N.

Photo 3: Bank sloughing on Wabash River in IDNR Fish & Wildlife area (WQM site 12).

Photo 4: Bank sloughing on Rock Creek in IDNR Fish & Wildlife area (WQM site 10).

3.4 Project Water Quality Monitoring, Targets and Data

The primary goal of conducting water quality monitoring for this project was to collect current baseline data which identifies the chemical, biological and physical conditions of the Rock Creek, Eight Mile Creek, and Wabash River and compare it to the historical data to evaluate changes in the water quality. This allowed for evaluation of aggregate water quality, while also identifying contributions of non-point source pollution from individual catchments within the watershed. It was used to determine non-point source pollution problems and possible causes or sources. This data also serves as a benchmark for comparison to future water quality data. A secondary goal was to educate the public about non-point source pollution issues and assist stakeholders in identifying critical areas within the watershed that were prioritized for future best management practice implementation.

The study was designed to be a year-long, monthly sampling program at 15 sites (Table 3-2 and Figure 35). The sites were distributed between the Rock Creek, Wabash River and Eight Mile Creek subwatersheds. It was anticipated that there would be times that some sites would not be accessible due to high water or other hazards; therefore a standard of completeness was set to sample a minimum of 12 of the 15 sites during each of the 12 monthly sampling events.

The water quality assessment included water chemistry, flow, biological (macroinvertebrate counts) and habitat evaluations. Chemistry and flow were monitored monthly, and biology and habitat sampling was conducted during a single event between July and October. Volunteer monitoring using Hoosier Riverwatch methods was also conducted at three designated sample sites (#2, #7, and #13) at least once each year during the project duration.

Chemistry measurements for dissolved oxygen (DO), temperature, pH, and turbidity were taken in the field with a Hach® Hydrolab Quanta multi-parameter sonde. Grab samples were collected and taken to Meadow-Wood Laboratory Services for total phosphorus and nitrate-nitrite testing; and *E. coli* samples were plated in the field and taken to the laboratory for incubation and analysis. A Hach® OTT MF Pro electromagnetic flow meter was used for flow measurements. Hoosier Riverwatch monitoring parameters included temperature, DO, pH, Nitrate-Nitrite, orthophosphate, and turbidity. Biological sampling (macroinvertebrate counts) used the macroinvertebrate Pollution Tolerance Index (PTI) ratings, and the Citizens Qualitative Habitat Evaluation Index (CQHEI) was used for the habitat evaluations, both Hoosier Riverwatch volunteer monitoring methods.

Pictures of the monitoring sites are included in Appendix F.

Table 3-2: UWRBC Phase 2 Water Quality Monitoring Locations

SITE NUMBER	LATITUDE/ UTM EAST	LONGITUDE/ UTM NORTH	WATER SEGMENT	ROADWAY	SITE COMMENTS
1	40.951829944 638944.42	-85.349130621 4534721.92	Eight Mile	Mayne Rd, NE of Station Rd, Roanoke, Huntington Co.	Steep banks, downed trees, housing, dairy within 1 mile
2 *HR site	40.887734117 651306.69	-85.203991178 4527847.18	Eight Mile	CR 100 E & CR 1000 N, near Ossian, Wells Co.	2-stage ditch, grass lands, dumping concrete on banks
3	40.859139506 656809.80	-85.13947349 4524786.31	Eight Mile	CR 800 N, west of CR 450 E, near Ossian, Wells Co.	Rip rap on bottom, buffer w/ row crops, silted
4	40.815413464 661821.27	-85.081277937 4520037.91	Eight Mile	CR 500 N, east of SR 301, Wells Co.	Man-made changes, silting, grass banks
5	40.728426157 657336.02	-85.136889182 4510279.90	Wabash River	CR 450 E, at White Bridge east of Bluffton, Wells Co.	Dairy farm within 1 mile; septic issues in McKinney/ Paxson Ditch
6	40.757136019 653225.95	-85.184775917 4513382.34	Wabash River	CR 100 N, at Gerber Bridge, SR 116 and Oak St. Ext., Wells Co.	Steep banks, downed trees, row crop
7 *HR site	40.788304126 651559.79	-85.203673923 4516809.57	Wabash River	Rose Rd, north of CR 300 N, Wells Co.	Bedrock sheets, tires, trash, debris in river
8	40.820563138 641843.30	-85.318016745 4520199.37	Wabash River	CR 500 W, at IDNR F&W area, south of SR 116, Wells Co.	Wide and deep, impoundment area for flood waters
9	40.816460699 638216.79	-85.361119341 4519675.06	Wabash River	North of CR 100 S at IDNR F&W area, Huntington Co.	Large boulders, rock, rapid area, very natural site
10	40.814927481 638009.98	-85.363609102 4519500.93	Rock Creek	East CR 100 S dead end at IDNR F&W area, Huntington Co.	Bedrock, large snail bed downstream from site
11	40.807323921 637905.35	-85.366133898 4518750.96	Elkenberry Ditch	Division Rd, dead end at IDNR F&W area, Huntington Co.	Bedrock, normally very shallow and narrow, natural habitat area
12	40.818272028 637987.24	-85.363796521 4519871.93	Wabash River	Division Rd, under I-69, at IDNR F&W area, Huntington Co.	Large boulders, back water, stream bank erosion, downed trees
13 *HR site	40.7709157 642715.43	-85.308936127 4514702.61	Rock Creek	CR 200 N, east of CR 500 W, Wells Co.	Large rock, stable banks, buffer w/row crops
14	40.714427708 645333.94	-85.279366951 4508480.30	Rock Creek	CR 300 W, north of CR 200 S, Wells Co.	Steep banks, siltation, buffer w/row crop
15	40.683498485 647875.22	-85.250091478 4505095.67	Rock Creek	CR 400 S, east of CR 200 W, Wells Co.	Steep banks, silt bar, buffer w/row crop, foam in water
*HR site: denotes the Hoosier Riverwatch volunteer monitoring locations.					

Historical data is available for the following sites:
Site 5 – USGS #03322958 Stream Gauge and AIMS stations #7983 (WUW070-0012) and #5821 (WUW070-0004); Site 7 – AIMS station #4445 (WUW070-0003); Site 10 – AIMS station #5851 (WUW080-0005); Site 13 – AIMS station #5835 (WUW080-0004) and Rock Creek Conservancy District site #9; Site 15 – Rock Creek Conservancy District site #4.

Figure 36: Upper Wabash River Phase 2 Project Water Quality Monitoring Locations

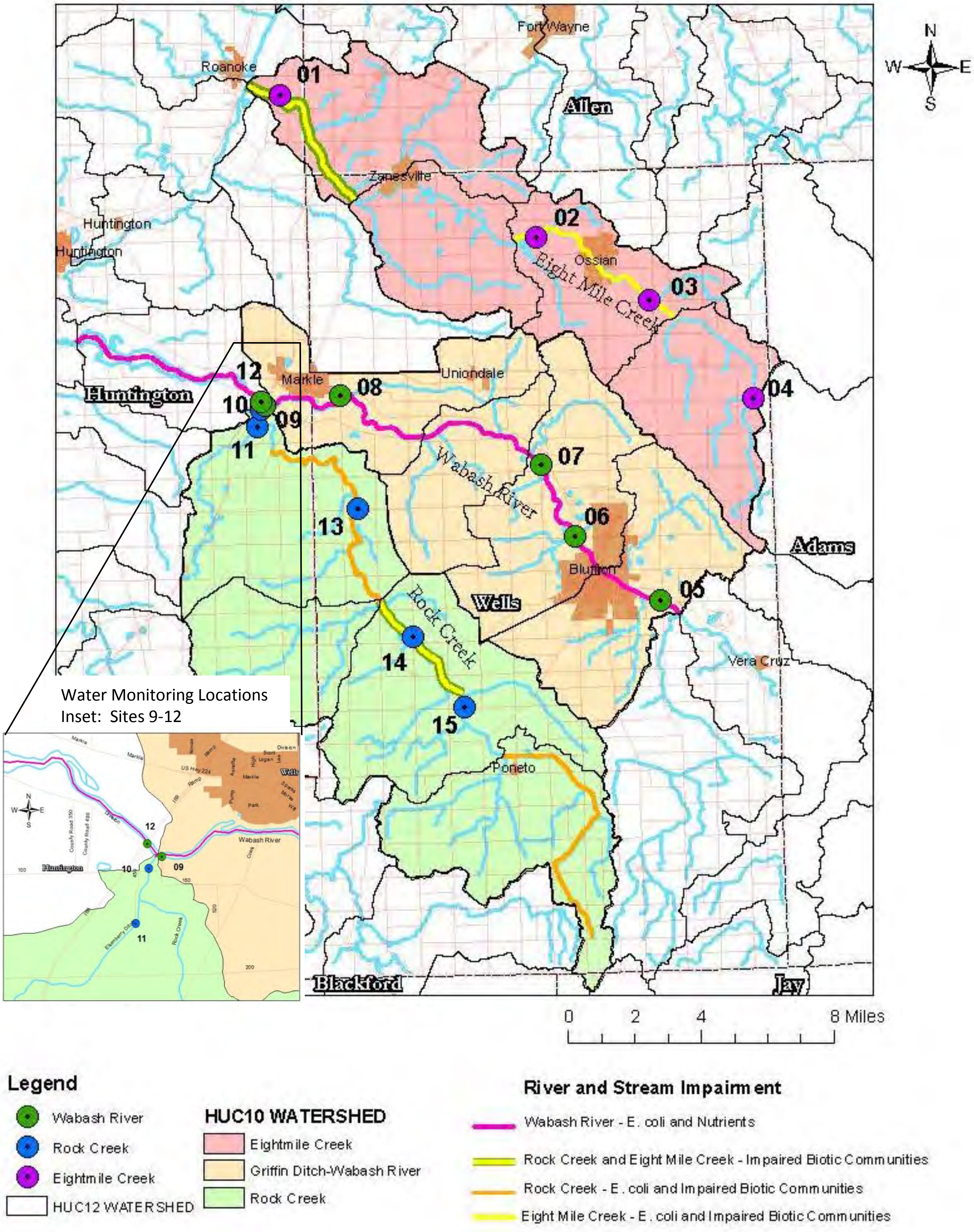
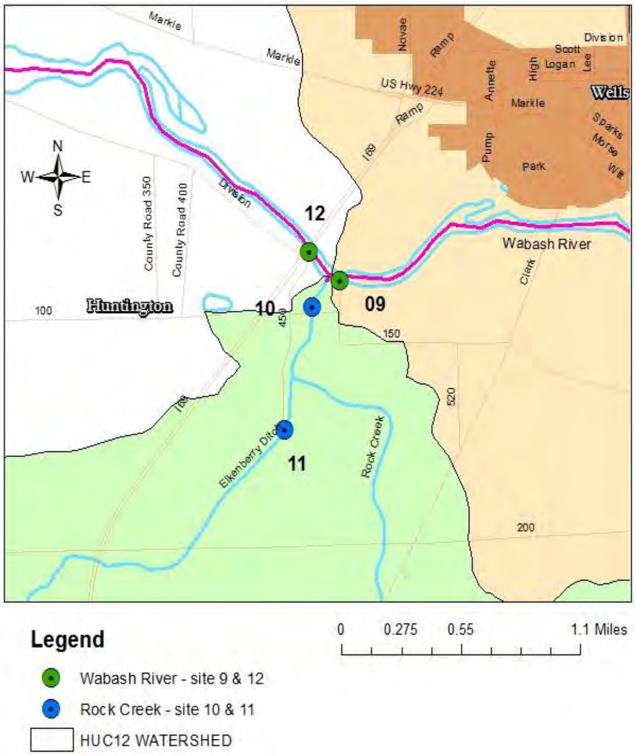


Figure 37: Upper Wabash River Phase 2 Project - WQM Locations Map Inset Sites 9-12



Sites 1-4: Eight Mile Creek Monitoring

Site 1: Eight Mile Creek at Mayne Road, Huntington County, Pleasant Run Ditch subwatershed HUC 051201010904. This monitoring site also includes the Big Creek subwatershed HUC 051202020903 drainage area. When monitoring began in 2013, site 1 had a forested riparian area on both sides of the ditch with small to medium rock bottom with minimal smothering. In the fall of 2014, the Huntington County Surveyor performed ditch clearing and maintenance which removed all vegetation on one side of the ditch. The previous rocky bottom was then mostly sandy and silted.

Site 2: Eight Mile Creek at CR 100 E and CR 1000 N, Wells County, Moser Lake subwatershed HUC 051201010902. This site has a two-stage ditch on one side and a narrow riparian area on the other, stable vegetated banks and minimal smothering. The Town of Ossian waste water treatment plant NPDES discharge pipe is located approximately 1 mile up-stream.

Site 3: Eight Mile Creek at CR 800 N west of CR 450 E, Wells County, Moser Lake subwatershed HUC 051201010902. Located adjacent to row crop fields, the ditch bottom is very fine, smothered and silted. It has a combination of stable and eroding banks, and no stream shading. Filter strips are present at this site.

Site 4: Eight Mile Creek at CR 500 N east of SR 301, Wells County, Maple Creek subwatershed HUC 051201010901. Similar to site 3; site 4 is located adjacent to row cops with narrow filter strips. It is channelized with a combination of steep stable and eroding banks, smothered, and silted with no stream shading. Riffle/run areas are not present at this site.

Sites 5-9, and 12: Wabash River Monitoring

Site 5: Wabash River at the White Bridge on CR 450 E east of Bluffton, Wells County, Johns Creek subwatershed HUC 051201010801. This is the upstream monitoring site on the Wabash River in the project area, and represents the pollutants coming into the project area from the upstream Wabash River Basin watershed. The river substrate is mostly large rock and boulders that are smothered and silted. There are many man-made changes. The riparian area consists of a wide forest/wetland area on one side and a road, grass, greenway trail and park on the other. The site includes a combination of stable and eroding banks, a variety of fish cover, and areas of riffles and runs.

Site 6: Wabash River at the Gerber Bridge on CR 100 N west of SR 116, Wells County, Dowty Ditch subwatershed HUC 051201010802. Downstream from the City of Bluffton and the Bluffton municipal wastewater treatment plant, site 6 has a mostly medium rock bottom that is smothered and silted. The clay banks are steep, eroded, and slippery making it difficult to access the site. Row crops are located beyond a wide riparian area. There are no riffles or runs.

Site 7: Wabash River at Rose Road north of CR 300 N, Wells County, Dowty Ditch subwatershed HUC 051201010802. This site is primarily bedrock with boulders and smaller coarse rock that is smothered and silted. There are a few man-made changes, a wide riparian area on one side; trees, a gravel road and row crops on the other. It has a combination of stable and eroding banks, large riffle and run areas, a variety of fish cover, and is partly shaded. There are numerous downed trees and logs in this area and it is a popular fishing location.

Site 8: Wabash River at CR 500 W south of SR 116 at the Indiana Department of Natural Resources J.E. Roush Lake Fish and Wildlife area east of Markle, Wells County, Griffin Ditch subwatershed HUC 051201010804, and includes the Bender Ditch subwatershed HUC 051201010803 drainage area. This site is an impoundment area for flood waters of Roush Lake. It is too deep and wide to perform stream flow monitoring, so the flow was estimated. Biological assessments could not be completed at this site. This site is also prone to flooding and therefore chemical monitoring was conducted only when the site was accessible. There is a levee and sluice gate just downstream from this site that holds flood waters back from the Town of Markle.

Site 9: Wabash River located in the J.E. Roush Lake Fish and Wildlife area north of CR 100 S at the dead end access road, Huntington County, Griffin Ditch subwatershed HUC 051201010804. This Wabash River site is mostly natural with forested riparian areas, various fish cover, and pools, riffles and runs. Boulders and large rocks make up the substrate of the river and the banks are stable and well vegetated.

Site 12: Wabash River on Division Road in the J.E. Roush Lake Fish and Wildlife area; just east of the I-69 Interstate bridges, Huntington County, Loon Creek subwatershed HUC 051201011301 but is used as an indicator for the Wabash River and Rock Creek subwatersheds. Boulders and large rocks are smothered and silted, but there is an abundance of fish habitat and riffle and runs at this site. The banks are a combination of stable and eroding and there is a shallow backwater area with nearly no flow during dry periods. There are man-made changes at this site including the access road and the I-69 Interstate bridges that cross the Wabash River.

During spring snow melts and wet weather events, flooding in the area prevents access to the site and the flow is too great to safely conduct monitoring.

Sites 10, 11, 13-15: Rock Creek Monitoring

Site 10: Rock Creek at CR 100 S in the J.E. Roush Lake Fish and Wildlife area, Huntington County, Elkenberry Ditch subwatershed HUC 051201010704. The creek bottom is mostly smothered and silted bedrock, boulders, and small to medium coarse rock. There are few man-made changes with a wide forested riparian area, various types of fish cover and riffles and runs. Bedrock outcrops are observed in several areas along the stream bank. A snail bed is located downstream, near the mouth of the Rock Creek where it enters the Wabash River. At times of heavy snow melt and rain events this site is not accessible due to flooding

Site 11: Elkenberry Ditch at the dead end of Division Road in the J.E. Roush Lake Fish and Wildlife area, Huntington County, Elkenberry Ditch subwatershed HUC 051201010704. This tributary stream to the Rock Creek is small in comparison to the other sites in the area. It has a bedrock substrate that is smothered and silted with some fish cover areas. It is heavily forested and the pools, riffles and runs are shallow and slow during most of the year. An access road to other areas of the DNR property crosses through the stream over the bedrock at the monitoring site. At times of heavy snow melt and rain events this site is not accessible due to flooding.

Site 13: Rock Creek at CR 200 N, Wells County, Elkenberry Ditch subwatershed HUC 051201010704 and includes the Mossburg Ditch subwatershed HUC 051201010702 drainage area. This site is comparable to most of the lower section (north of SR 124) of the Rock Creek. It has grass buffers along row crops on both banks, mostly large rock on the substrate with some silting, a few areas of fish cover, fish pools, runs and riffles, and little or no stream shading. The banks are generally stable and well vegetated with a few areas of erosion and bank sloughing. The small rural community of Rockford and an active stone quarry is located 1 mile upstream from this monitoring site.

Site 14: Rock Creek at CR 300 W, north of CR 200 S, Wells County, Stites Ditch subwatershed HUC 051201010703. This site on the Rock Creek has a tree line on one bank and grass buffer along row crops on the other. There is a large surface water inlet pipe near the monitoring location. The banks are relatively steep and in-stream erosion at or below the flow line is an issue. Initially, it was thought that this would be a good site to monitor as it is downstream from the rural community of Liberty Center, but due to the amount of sediment in the stream, it is difficult to move within the stream to collect the data, therefore the majority of testing has been chemical data using suspended equipment and grab samples.

Site 15: Rock Creek at CR 400 S, Wells County, Stites Ditch subwatershed HUC 051201010703. This site has a medium rock substrate that is smothered and silted. The riparian area consists of a narrow line of trees along row crops on one side and grass buffer along row crops on the other. There are a few areas of fish cover, undercut banks and is partly shaded. Pool areas and slow riffle and run areas are present. A large dairy CFO is located within 1.5 miles of the monitoring site, and adjoining fields are used for manure applications.

Table 3-3: Subwatershed Acres by Water Monitoring Sites

12-digit HUC Subwatershed Name	12-digit HUC	12-digit HUC Acres	Monitoring Site Subwatershed Acres	Monitoring Site % of Subwatershed	Monitoring Site Number
Eight Mile Creek Monitoring Sites: Total Drainage Area = 51,692 acres					
Pleasant Run	051201010904	15,437	14,345	93%	1
Big Creek	051201010903	11,414	11,414	100%	
Moser Lake	051201010902	12,421	3,419	28%	
			6,259	50%	2
			2,743	22%	3
Maple Creek	051201010901	12,420	8,064	65%	
			4,356	35%	4
Wabash River Monitoring Sites: Total Drainage Area in Phase 2 Project Area = 57,743 acres					
Johns Creek	051201010801	16,413	1,212	7%	5
			15,201	93%	6
Dowty Ditch	051201010802	17,250	1,349	8%	
			11,016	64%	7
			4,885	28%	8
Bender Ditch	051201010803	10,257	10,257	100%	
Griffin Ditch	051201010804	13,823	8,591	62%	
			5,232	38%	9
			53	0.38%	12
Elkenberry Ditch	051201010704	18,666	37	0.06%	
Rock Creek Monitoring Sites: Total Drainage Area = 66,731					
Elkenberry Ditch	051201010704	18,666	7,194	39%	10
			6,173	33%	11
			5,299	28%	13
Mossburg Ditch	051201010702	10,839	10,839	100%	
Stites Ditch	051201010703	20,459	6,582	32%	
			10,268	50%	14
			3,609	18%	15
Rock Creek Headwaters	051201010701	16,767	16,767	100%	

Chemistry

Aquatic chemistry is complex and is influenced by many interrelated factors. Dissolved oxygen in water is essential to the health of streams and rivers. Much of the dissolved oxygen in water comes from the oxygen in the air. Dissolved oxygen can indicate how well the water can support aquatic plant and animal life, or indicate the level of pollution in the water. Generally a higher oxygen level indicates better water quality. Rapid decomposition of organic materials, including dead algae, shoreline vegetation, manure or wastewater decreases dissolved oxygen.

Water temperature has a direct influence on other water quality factors such as dissolved oxygen, growth of bacteria or algae and even on the survival of some aquatic species. Colder water can hold more dissolved oxygen, where as warmer water with lower oxygen levels weaken fish and aquatic insects making them more susceptible to illness and disease. The rate of plant and algal growth increases with warmer temperatures, leading to increased plant death and decomposition. Temperature also effect metabolic rates of the aquatic animals. Loss of shading by trees, runoff from roads and parking lots, and discharges from municipal wastewater and industrial sources can all affect the temperature of local waterways.

The pH level, the measure of whether the water is acidic or basic, is important because aquatic organisms are sensitive to pH, especially during reproduction. Additionally, changes in pH can make some pollutants more toxic to fish and aquatic insects. Many natural processes affect pH, such as plant photo-synthesis which can raise the pH, however due to the limestone geology in the area; most surface waters in Indiana have a relatively basic pH.

Turbidity is the relative clarity of the water. Turbid water is cloudy and is caused by suspended matter including clay, silt, organic and inorganic material, and algae. Turbidity can cause higher water temperatures, thus lowering the dissolved oxygen levels, and the suspended particles can clog gills of fish and invertebrates and smother their habitat. Soil erosion and runoff from agricultural fields, lawns, parking lots, construction sites, or the stream bank itself leads to turbid waters.

Nitrogen is found in all living things, and occurs in water as nitrate, nitrite and ammonia. Nitrates are essential for plant growth, and are the main ingredient in fertilizers. Due to its high solubility and weak retention by soil; nitrates are very mobile in soil and has a high potential to migrate. It does not volatilize in water; therefore, nitrate/nitrite is likely to remain until it is consumed by plants or other organisms. Sewage is the #1 source of nitrates in Indiana's surface waters, but it also comes from animal feed lots, manure from farm fields, or the over application of fertilizers on agricultural lands, golf courses and lawns.

Phosphorus is also essential to plant and animal life, and is naturally present in the environment. The presence of phosphorus in itself is not the problem, but the addition of excessive amounts can lead to excessive plant and algal growth. Unlike nitrogen and other nutrients, once phosphorus is in an aquatic system, it remains there unless physically removed. Phosphorus occurs naturally in soil, and sediments from soil erosion and runoff are a significant source of phosphorus. Additional sources can come from manure, over-fertilized fields, storm drains, parking lot and road runoff, construction sites, wastewater and septic tank effluent, or even waterfowl.

Fecal coliform bacteria are naturally present in the digestive tract of warm-blooded animals and are found in the feces of humans, pets, livestock, wildlife and waterfowl. It is rare or absent in unpolluted waters. *E. coli* is the specific species of fecal coliform bacteria used to evaluate the presence of fecal contamination and the potential presence of other pathogens that could cause human illnesses. Sources of *E.coli* and fecal coliform in water is typically due to sewer overflows, poorly or non-functioning septic systems, pet waste, wildlife, livestock or manure runoff from fields.

Habitat and Flow

A natural steam and rivers meander as they flow to release the energy of the water in the most even or uniform manner, often referred to "as the path of least resistance". These meandering streams and rivers provide a variety of habitat for plants and animals. Pools, riffles, undercut banks and snags all provide different types of habitat. The more types of habitat present, the greater the potential for a greater diversity of plants and animals. Areas adjacent to stream channels, referred to as "riparian areas" provide bank support and stabilization, erosion and flood control, water quality protection, wildlife habitat and scenic beauty. The habitat is evaluated by recording and scoring the type and condition of the stream bottom, the cover or hiding places for fish and aquatic organisms, the stream shape and human alterations, the riparian area, the depth and velocity, and the pools, riffles or runs present in the stream.

Habitat ratings can range from a score of 0-100. Streams that have moderate to extensive man-made modifications would generally be classified as modified warm water habitats, and have lower scores ranging from 0-49. These modified habitats could include channelized, treeless ditches with silt and muck substrates, eroding banks, with little depth and poor flow rate. Streams that score from 50-60 can generally support biological communities, but depending on which habitat features are lacking may fall short of attaining the warm water habitat classification. Streams that have enough positive habitat features available to attain the warm water habitat classification score from 61-69 on the habitat evaluation; and generally include good depth and flow, a varied substrate, riffles and pools, and trees and shrubs. Exceptional warm water habitat would be those streams that score above 70, and would include variable depth, good flow, riffles and pools, good substrates, stable banks, forest canopy and a quality riparian area.

Stream flow is important because it influences the physical, chemical and biological characteristics of the streams and river. High flow or discharge rates (the volume of water flowing in the stream per second) may indicate recent rain or snowmelt events leading to sediments and nutrients being carried to the stream or river. Low flow or discharge rates may indicate drought conditions which can cause pollutants to be in higher concentrations in the stream or river and indicate that the pollutant entered the stream or river without the aid of runoff.

Biology - Macroinvertebrates

Benthic macroinvertebrates are aquatic invertebrates that live in the bottom parts of our waters. They make good indicators of the health of our streams and rivers because they live in the water for all or most of their life. They often live more than one year, have limited mobility and stay in areas suitable for their survival. They are easy to collect and identify and differ in their tolerance to the amounts and types of pollution. Pollution-sensitive organisms are more susceptible to the effects of physical or chemical changes in the water, therefore the presence of pollution-sensitive organisms act as indicators of the absence of pollutants. Impairments to the biotic communities can be caused by lack of habitat, water pollution or a combination of both.

Water Quality Target Levels

Table 3-4 lists the water quality parameters and target levels used to assess the water quality throughout the Upper Wabash River Phase 2 project. Water quality targets for each parameter were selected based on applicable Indiana Administrative Code, the Wabash River Watershed TMDL, and other standards accepted by IDEM.

Table 3-4: Water Quality Parameters and Target Levels in the Upper Wabash River Phase 2 Project Watershed.

Parameter	Target Level	Source
Dissolved Oxygen (DO)	Min.: >4.0 mg/L Max.: <12.0 mg/L and 100% saturation	Indiana Administrative Code (327 IAC 2-1-6)
pH	Min.: 6 units Max.: 9 units	Indiana Administrative Code (327 IAC 2-1-6)
Temperature	Dependent on time of year and whether stream is designated as a cold water fishery. Expected range: 0°C (32° F) in winter months to 32.2° C (90° F) in summer months	Indiana Administrative Code (327 IAC 2-1-6)
Turbidity	Max.: 25.0 NTU	Minnesota TMDL criteria for protection of fish/ macroinvertebrate health
E. coli	Max.: 235 cfu/100 mL in a single sample	Indiana Administrative Code (327 IAC 2-1.5-8)
Total Phosphorus	Max.: 0.3 mg/L	Wabash River Watershed TMDL/ IDEM draft TMDL Target
Nitrate (NO3)	Max.: 10 mg/L	Indiana Administrative Code (327 IAC 2-1-6)
Nitrite (NO2)	Max.: 1 mg/L	Indiana Administrative Code (327 IAC 2-1-6)
Total Nitrogen	Max. 10 mg/L	Indiana Administrative Code (327 IAC 2-1-6)
Temperature Change	Max.: <2.8° C (5° F)	Indiana Administrative Code (327 IAC 2-1-6)
Ortho-Phosphate	Max: 0.05 mg/L	Hoosier Riverwatch – Indiana average
Macroinvertebrate Index of Biotic Integrity	Min.: >10 Pollution Tolerance Index rating	Hoosier Riverwatch
Citizen's Qualitative Habitat Evaluation Index	Min.: >60 CQHEI score	Hoosier Riverwatch – developed by Ohio EPA

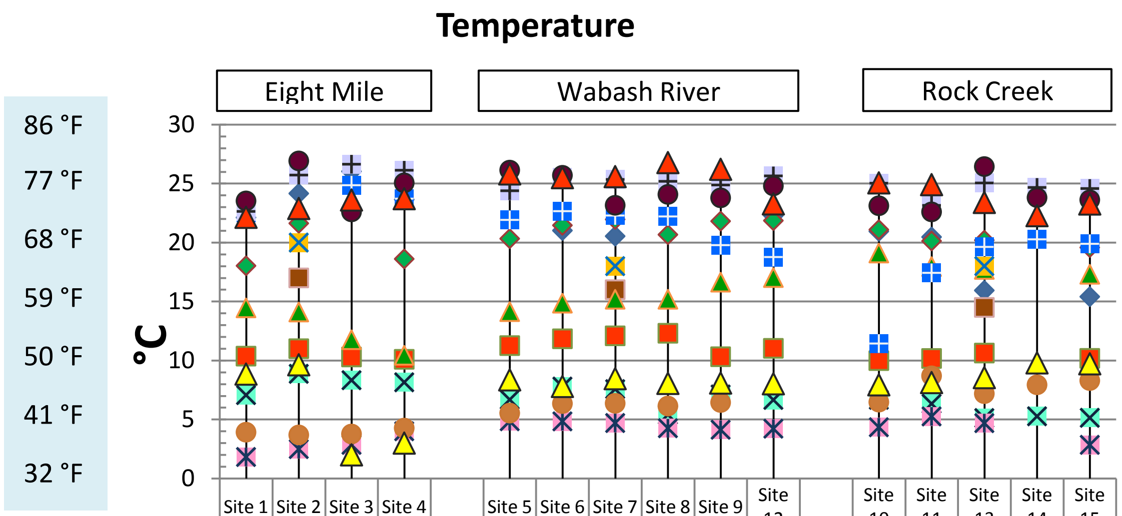
Upper Wabash Watershed Phase 2 Water Quality Data (2013-2014)

Monthly water quality monitoring began in September 2013 and continued through the end of November 2013. Monitoring was delayed due to heavy rains and flood-level waters followed by several significant snow events, sub-zero temperatures, and thick ice sheets that had formed on the streams and river. Regular monthly monitoring resumed as weather allowed beginning in March 2014. The monitoring schedule was amended to allow for a 14-21 day interval between sampling events in order make up the missed months of monitoring and still meet the requirement of 12 monitoring events from September 2013 – November 2014. Hoosier Riverwatch volunteer monitoring was also conducted at three sites (#2, #7, and #13) in October 2013 and September 2014. One site in each of the three subwatersheds was selected to encourage stakeholder participation across the watershed area. Figures 38 through 50 display the results of the data collected throughout the project and the data is also included in Appendix G.

Temperature

Figure 38 illustrates the water temperature at each site at the time of each sampling event. Overall, temperatures measured nearly the same in all three subwatersheds with seasonal changes creating a wide range of temperatures throughout the yearly monitoring period. Temperatures in Eight Mile Creek range from 1.82°C to 26.92°C. The Wabash River temperatures range from 4.22°C to 26.78°C, and the Rock Creek temperatures range from 2.85°C to 26.44°C. Temperatures recorded at the individual sites during a sampling event only varied by 2.32°C – 8.67°C, except for two occasions. For the 9/12/13-9/15/13 event, the temperature at Rock Creek sites 13 and 15 were as much as 10.62°C lower than the highest temperature recorded for the event at site 5 on the Wabash River. During the 6/13/14-6/15/14 event, the temperature at Rock Creek site 10 was 14.32°C lower than the highest temperature recorded for the event at 25.76°C at site 2 on the Eight Mile Creek. Some of the variances can be attributed to the fact that the testing occurred throughout each day over a 2-3 day period. Sites that were sampled in the early part of the day would naturally have a lower temperature than sites that were mid-day and later in the day.

Figure 38: Temperature Monitoring Data Chart

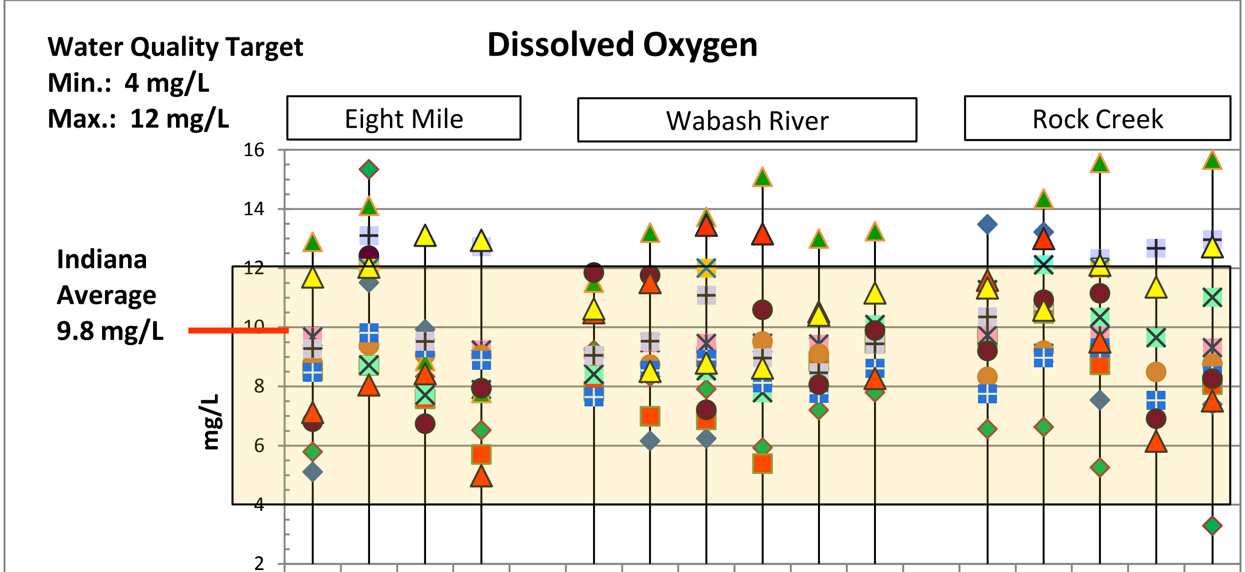


	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	22.12	24.16	26.03	23.64	25.12	21.02	20.54			22.28	20.95	20.47	15.94		15.41
◆ 10/3/13 - 10/6/13	18.03	21.63	22.93	18.61	20.33	21.46	21.96	20.67	21.81	21.86	21.09	20.13	20.2		19.58
■ HRW Volunteer - 10/12/13		17					16						14.5		
■ 11/1/13 - 11/3/13	10.37	11	10.3	10.1	11.26	11.84	12.09	12.31	10.32	11.03	9.99	10.17	10.63		10.18
✕ 11/21/13 - 11/23/13	7.07	8.87	8.33	8.15	6.68	7.79	7.57	5.4	7.12	6.66	6.67	6.33	5.12	5.27	5.14
✱ 3/15/2014	1.82	2.49	2.85	4	4.85	4.84	4.7	4.26	4.13	4.22	4.34	5.26	4.69		2.85
● 4/5/2014	3.92	3.69	3.77	4.27	5.54	6.35	6.37	6.14	6.44		6.47	8.7	7.19	7.94	8.3
▲ 4/25/14 - 4/26/14	14.46	14.11	11.76	10.44	14.14	14.86	15.19	15.19	16.64	17.03	19.11	17.96	17.72		17.31
⊞ 6/13/14 - 6/15/14	22.54	25.76	24.86	23.72	21.92	22.66	22.29	22.21	19.78	18.77	11.44	17.43	19.63	20.27	19.89
+ 7/11/14 - 7/13/14	22.64	25.72	26.64	26.13	24.39	25.53	25.35	25.19	24.88	25.65	25.03	23.15	25.05	24.67	24.58
● 8/4/14 - 8/5/14	23.53	26.92	22.6	25.06	26.14	25.7	23.16	24.08	23.79	24.8	23.12	22.6	26.44	23.81	23.62
▲ 8/28/14 - 8/31/14	22.14	22.89	23.61	23.72	25.82	25.5	25.59	26.78	26.21	23.28	25.06	24.91	23.4	22.28	23.27
✕ HRW Volunteer - 9/23/14		20					18						18		
△ 11/1/14 - 11/16/14	8.85	9.64	2	3	8.36	7.8	8.46	8.06	8.09	8.03	7.94	8.13	8.55	9.8	9.72

Dissolved Oxygen

Dissolved oxygen concentrations varied with seasonal changes. The 4/25/14-4/26/14 sampling was conducted approximately three weeks after a large rain event and significant spring warming and resulted in 10 of the 14 sites (71%) being greater than the water quality target of 12.0 mg/L. Based on the water temperatures, the increase in the levels may be due to an increase in plant growth and photosynthesis. On one occasion (10/3/13-10/6/13 sample), the level of dissolved oxygen at site 15 on Rock Creek fell below the water quality standard of 4.0 mg/L. Overall, Rock Creek had 12 samples out of 57 (21%) that measured greater than the target during four sampling events; and Eight Mile Creek had 9 samples out of 50 (18%) during five events that were greater than the target. The Wabash River had 7 samples out of 71 (9.8%) over the target only during two sampling events. It should be noted that concentrations greater than 12.0 mg/L can occur naturally due to really cold water temperatures.

Figure 39: Dissolved Oxygen Monitoring Data Chart

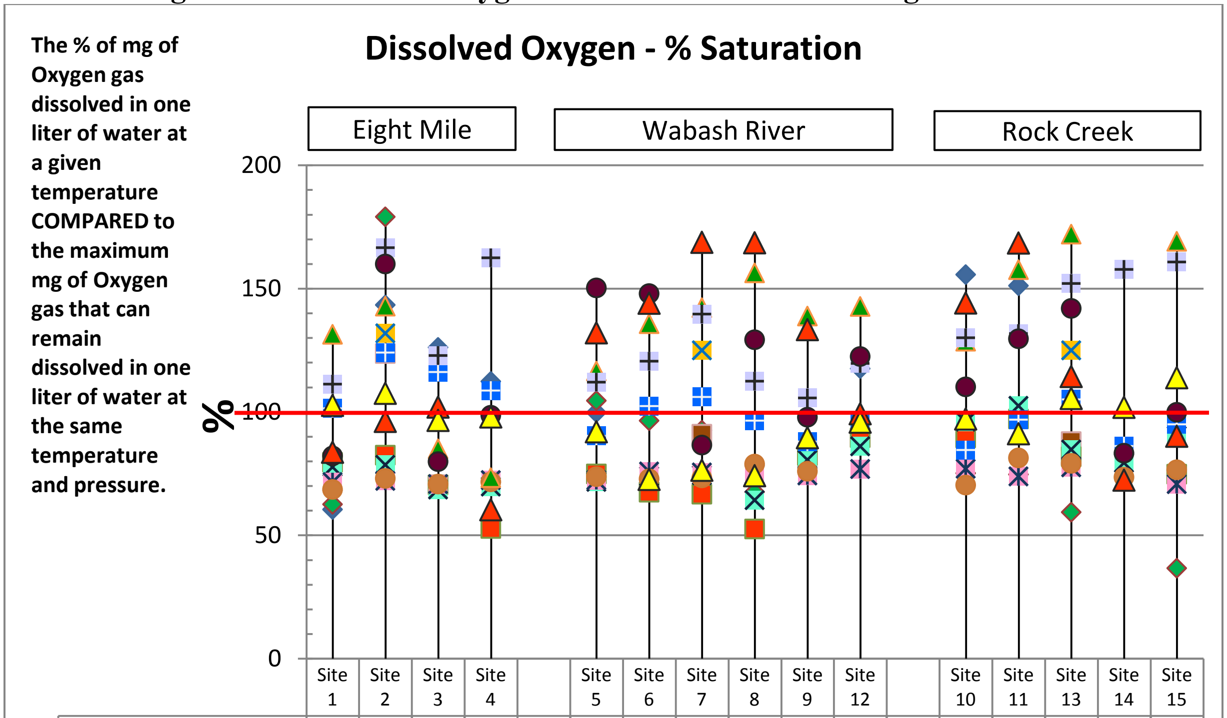


	Site 1	Site 2	Site 3	Site 4		Site 5	Site 6	Site 7	Site 8	Site 9	Site 12		Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	5.11	11.51	9.93	9.21		7.97	6.16	6.24			9.91		13.48	13.22	7.54		7.39
◆ 10/3/13 - 10/6/13	5.79	15.34	8.33	6.52		9.23	8.33	7.91	5.93	7.2	7.8		6.56	6.63	5.26		3.29
■ HRW Volunteer - 10/12/13		12						9							9		
■ 11/1/13 - 11/3/13	8.53	8.71	7.58	5.7		7.84	6.99	6.87	5.39	8.83	9.46		9.68	10.47	8.73		8.06
× 11/21/13 - 11/23/13	9.01	8.72	7.71	7.89		8.41	8.44	8.53	7.79	9.34	10.09		11.27	12.11	10.34	9.65	11.01
✱ 3/15/2014	9.67	9.56	9.31	9.23		9.02	9.48	9.45	9.46	9.43	9.75		9.73	9.12	9.72		9.31
● 4/5/2014	8.76	9.39	9.08	9.06		9.04	8.74	8.79	9.52	9.1			8.32	9.21	9.3	8.49	8.76
▲ 4/25/14 - 4/26/14	12.89	14.11	8.86	7.78		11.51	13.2	13.73	15.09	13	13.25		11.45	14.35	15.56		15.67
⊞ 6/13/14 - 6/15/14	8.47	9.81	9.3	8.89		7.64	8.54	8.91	8.12	7.77	8.61		7.75	8.97	9.3	7.53	8.36
+ 7/11/14 - 7/13/14	9.28	13.1	9.52	12.72		9.05	9.53	11.08	8.96	8.46	9.44		10.35	10.9	12.31	12.67	12.96
● 8/4/14 - 8/5/14	6.81	12.42	6.74	7.94		11.85	11.76	7.21	10.59	8.06	9.89		9.2	10.93	11.15	6.91	8.26
▲ 8/28/14 - 8/31/14	7.12	8.05	8.43	4.98		10.49	11.51	13.45	13.16	10.52	8.27		11.59	13	9.5	6.15	7.51
× HRW Volunteer - 9/23/14		12						12							12		
△ 11/1/14 - 11/16/14	11.7	12.03	13.11	12.94		10.62	8.51	8.79	8.62	10.41	11.16		11.33	10.58	12.1	11.36	12.72

Dissolved Oxygen - % Saturation

In general, 97.71% of the samples resulted in levels of 60% saturation or more. Only 4 samples fell below that level in October and November 2013; one each on Eight Mile Creek (site 4 at 52.8%) and Wabash River (site 8 at 52.6%), and two on Rock Creek (site 13 at 59.4% and site 15 at 36.7%). Besides having low percent saturation, water can become supersaturated, holding more than 100% of the oxygen it would hold under normal conditions. This occurred during monitoring events in the late spring, summer and fall. All 15 samples on the 7/11/14 – 7/13/14 sampling event exceeded 100% saturation. The Wabash River had 26 samples out of 71 (36.6%) resulting in over 100% saturation, followed by Rock Creek with 23 samples out of 57 (40.3%) and Eight Mile Creek with 20 samples out of 50 (40%).

Figure 40: Dissolved Oxygen - % Saturation Monitoring Data Chart



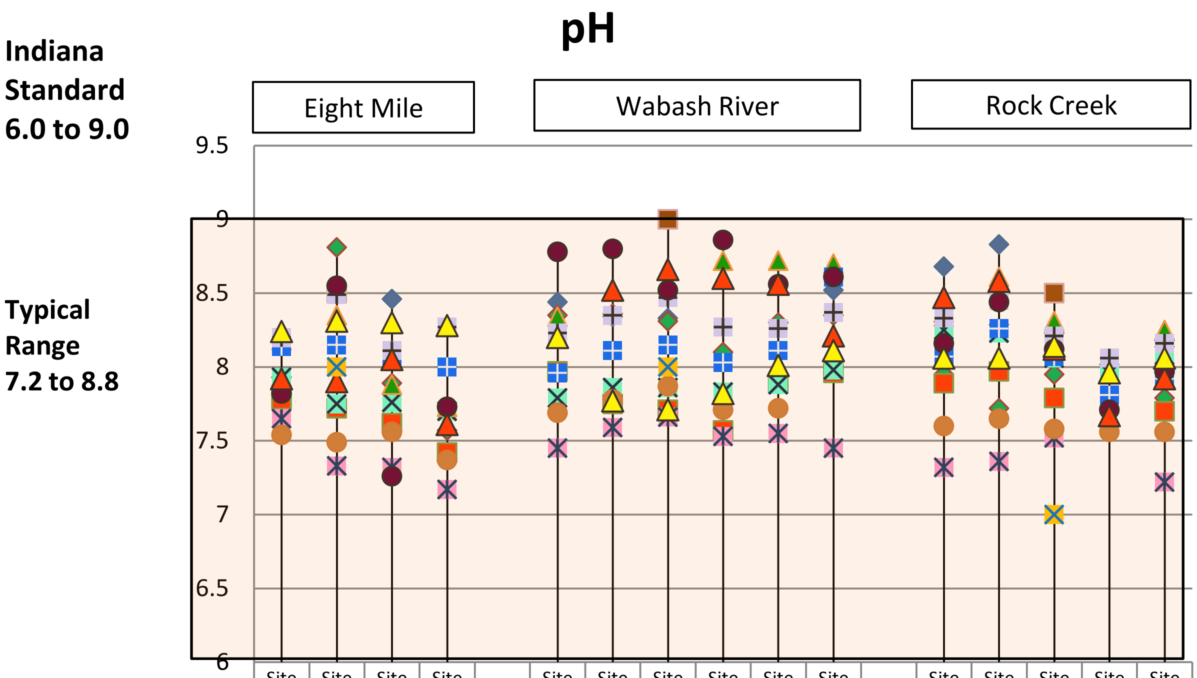
The % of mg of Oxygen gas dissolved in one liter of water at a given temperature COMPARED to the maximum mg of Oxygen gas that can remain dissolved in one liter of water at the same temperature and pressure.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	60.5	143.4	126.2	112.4	99.8	71.3	72.7			117.6	155.7	151.2	78.7		76.2
◆ 10/3/13 - 10/6/13	62.6	179.1	99.5	71.5	104.6	96.5	92.6	67.6	83.9	91	75.2	74.7	59.4		36.7
■ HRW Volunteer - 10/12/13		123.7					91						88		
■ 11/1/13 - 11/3/13	79.6	82.5	70.5	52.8	74.9	67.5	66.7	52.6	82.3	89.6	89.5	97.2	81.9		74.8
× 11/21/13 - 11/23/13	77.7	78.6	68.6	69.8	71.7	74	74.4	64.3	80.6	86.1	96.1	102.5	84.8	79.4	90.3
✱ 3/15/2014	71.6	72.1	70.8	72.4	72.4	75.9	75.5	74.7	74.3	76.9	77	73.9	77.6		70.8
● 4/5/2014	68.6	73.1	70.8	71.7	73.8	72.9	73.3	78.9	76		70.4	81.4	79.2	73.6	76.6
▲ 4/25/14 - 4/26/14	131.5	142.9	85.1	73.4	116.6	135.8	142.3	156.4	138.9	142.8	128.7	157.7	172.1		169.2
⊞ 6/13/14 - 6/15/14	101.5	124.1	116.2	108.7	90.3	102.4	106.1	96.5	88	95.6	84.6	96.9	105.1	86.2	95
+ 7/11/14 - 7/13/14	111.3	166.6	122.9	162.5	112.1	120.6	139.7	112.5	105.7	119.7	130.1	131.8	152.1	157.8	160.8
● 8/4/14 - 8/5/14	82.2	160	79.9	98.7	150.3	148	86.6	129.3	97.9	122.5	110.2	129.7	142	83.3	99.9
▲ 8/28/14 - 8/31/14	83.7	96.2	102	60.4	132.1	144.1	168.8	168.6	133.4	99.3	144.2	168.5	114.4	72.4	90.2
× HRW Volunteer - 9/23/14		131.9					125						125		
△ 11/1/14 - 11/16/14	102.7	107.6	96.6	98	92	72.7	76.4	74.2	89.6	95.9	97.2	91.2	105.5	101.9	113.9

pH

The pH at all sites was within the acceptable range throughout the monitoring period, which is expected, due to the limestone that is present in the soil and bottom of the streams and river. The Eight Mile Creek results varied between 7.17–8.81 units, the Wabash River results varied between 7.45–8.86 units, and the Rock Creek varied between 7.22–8.83 units. The Hoosier Riverwatch (HRW) test results of 7 and 9 are a result of the limitations on the monitoring method detection limits.

Figure 41: pH Monitoring Data Chart

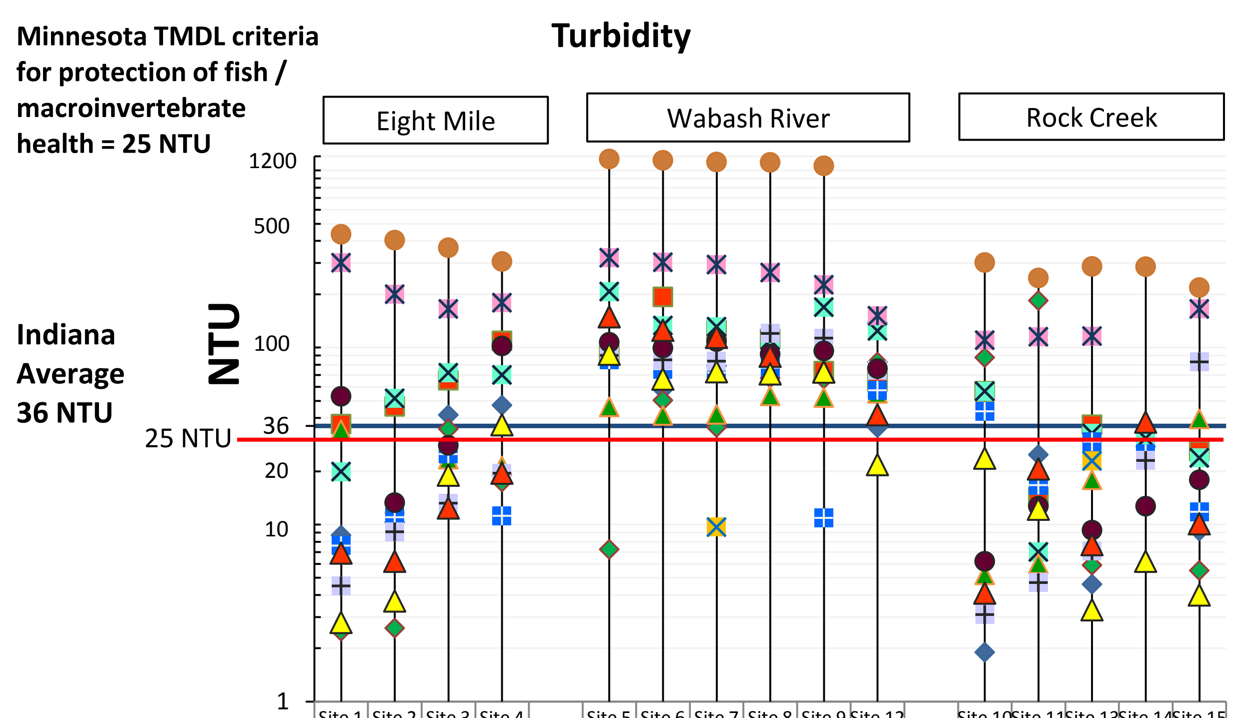


	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	7.93	8.53	8.46	8	8.44	8.34	8.33			8.52	8.68	8.83	8.23		8.18
◆ 10/3/13 - 10/6/13	7.75	8.81	7.89	7.57	8.35	8.36	8.31	8.1	8.3	8.35	7.95	7.72	7.95		7.79
■ HRW Volunteer - 10/12/13		8.5					9						8.5		
■ 11/1/13 - 11/3/13	7.78	7.72	7.62	7.42	7.97	7.75	7.71	7.57	7.89	7.96	7.89	7.97	7.79		7.7
✕ 11/21/13 - 11/23/13	7.93	7.75	7.76	7.7	7.79	7.86	7.86	7.83	7.88	7.98	8.25	8.23	8.06	7.96	8.08
✖ 3/15/2014	7.65	7.33	7.32	7.17	7.45	7.59	7.66	7.53	7.55	7.45	7.32	7.36	7.52		7.22
● 4/5/2014	7.54	7.49	7.56	7.37	7.69	7.78	7.87	7.71	7.72		7.6	7.65	7.58	7.56	7.56
▲ 4/25/14 - 4/26/14	8.18	8.35	7.88	7.73	8.34	8.51	8.58	8.72	8.72	8.7	8.34	8.61	8.31		8.25
⊞ 6/13/14 - 6/15/14	8.14	8.15	8.06	8	7.96	8.11	8.15	8.03	8.11	8.61	8.07	8.26	8.07	7.81	7.92
+ 7/11/14 - 7/13/14	8.2	8.49	8.11	8.27	8.23	8.35	8.47	8.27	8.26	8.37	8.33	8.45	8.21	8.06	8.16
● 8/4/14 - 8/5/14	7.82	8.55	7.26	7.73	8.78	8.8	8.52	8.86	8.56	8.61	8.16	8.44	8.12	7.71	7.97
▲ 8/28/14 - 8/31/14	7.92	7.9	8.05	7.61	8.2	8.52	8.66	8.6	8.56	8.21	8.47	8.58	8.12	7.67	7.92
✕ HRW Volunteer - 9/23/14		8					8						7		
△ 11/1/14 - 11/16/14	8.24	8.31	8.3	8.28	8.2	7.77	7.71	7.82	8.01	8.11	8.06	8.06	8.14	7.96	8.06

Turbidity

Turbid water can be the result of soil erosion, urban runoff, algal blooms and bottom sediment disturbance and has a direct relationship to the flow in the stream or river. During the monitoring period, the Eight Mile Creek turbidity concentrations exceeded the 25.0 NTU target in 23 of the 49 (46.9%) samples, and peaked at 436 NTUs, which is over 17 times the target level. The Wabash River exceeded the target 97.1% of the time, with only 2 samples out of 70 that was under the target level. The peak on the Wabash River occurred during spring snow and ice melt and was 1161 NTUs, or more than 46 times the target level. The Rock Creek turbidity concentrations exceeded the target 41% of the time with 23 out of 56 samples over 25.0 NTUs. The Rock Creek peak was at 302 NTUs, or over 12 times the target. On two sampling events (3/15/14 and 4/5/14) all of the sites were over the target level of 25 NTUs.

Figure 42: Turbidity Monitoring Data Chart

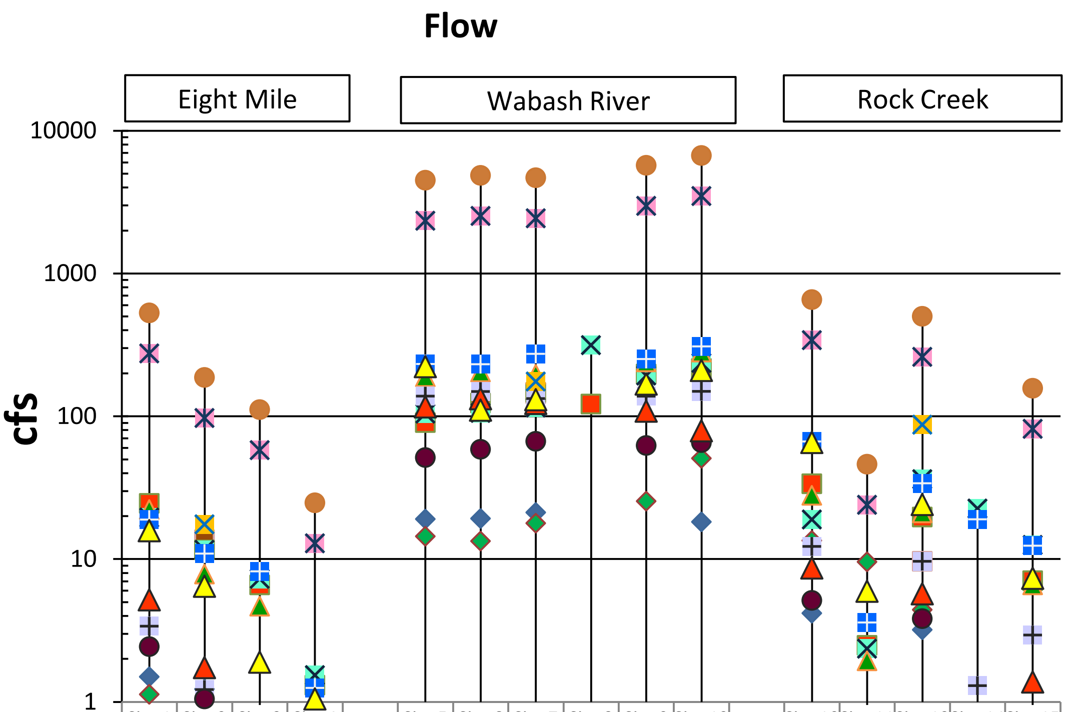


	Site 1	Site 2	Site 3	Site 4		Site 5	Site 6	Site 7	Site 8	Site 9	Site 12		Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	8.7	10.3	41.6	47.2		99.9	57.8	78.8			35.3		1.9	24.8	4.6		9.2
◆ 10/3/13 - 10/6/13	2.5	2.6	34.7	17.4		7.24	50.3	35.4	67.3	66.5	82.7		87.8	184	5.9		5.5
■ HRW Volunteer - 10/12/13																	
■ 11/1/13 - 11/3/13	36.9	46.5	65.3	109		90.38	193	125	112	73.5	64		56.6	14.3	36.6		26
✖ 11/21/13 - 11/23/13	19.9	51.6	72	70		207	133	131	110	169	124		56.6	7	32.7	30.7	23.8
✖ 3/5/2014	301	200	165	179		321	303	294	265	226	151		110	115	116		165
● 4/5/2014	436	404	366	306		1161	1141	1116	1111	1062			302	247	287	286	218
▲ 4/25/14 - 4/26/14	34.3	13.1	23.4	21.4		46.2	41.3	41.9	53.3	52.2	55.1		5.2	6	17.9		39.5
▦ 6/13/14 - 6/15/14	7.6	11	25	11.2		85.2	75.5	72.2	76.9	10.9	57.3		43.6	16.7	29.4	25.1	11.8
+ 7/11/14 - 7/13/14	4.5	9.1	13.2	19.5		90.2	85.1	83.7	120	113	74.5		3.1	4.7	7.1	23	82.9
● 8/4/14 - 8/5/14	53	13.3	28	102		107	99.3	108	91.8	95.7	76		6.2	12.7	9.3	12.7	17.9
▲ 8/28/14 - 8/31/14	6.9	6.2	12.4	19.5		149	125	114	89.2	72.9	41.7		4.1	20.6	7.7	37.9	10.1
✖ HRW Volunteer - 9/23/14		0						9.67							22.87		
△ 11/1/14 - 11/16/14	2.8	3.7	19	36.6		91.6	66.3	72.9	70.9	72.6	21.8		23.7	12.2	3.3	6.2	4

Flow

Flow varies based on seasons, rain and snow events, and dry periods; and can influence the chemical tests, as well as in-stream habitat and biology. Flow is used to calculate average concentrations of pollutants as well as estimated pollutant loads in a stream or river and the resulting reductions that are needed to reach water quality targets so that the stream or river will attain its intended use. Figure 43 below details the actual in stream flow readings or estimates based off of USGS gauges.

Figure 43: Flow Monitoring Data Chart

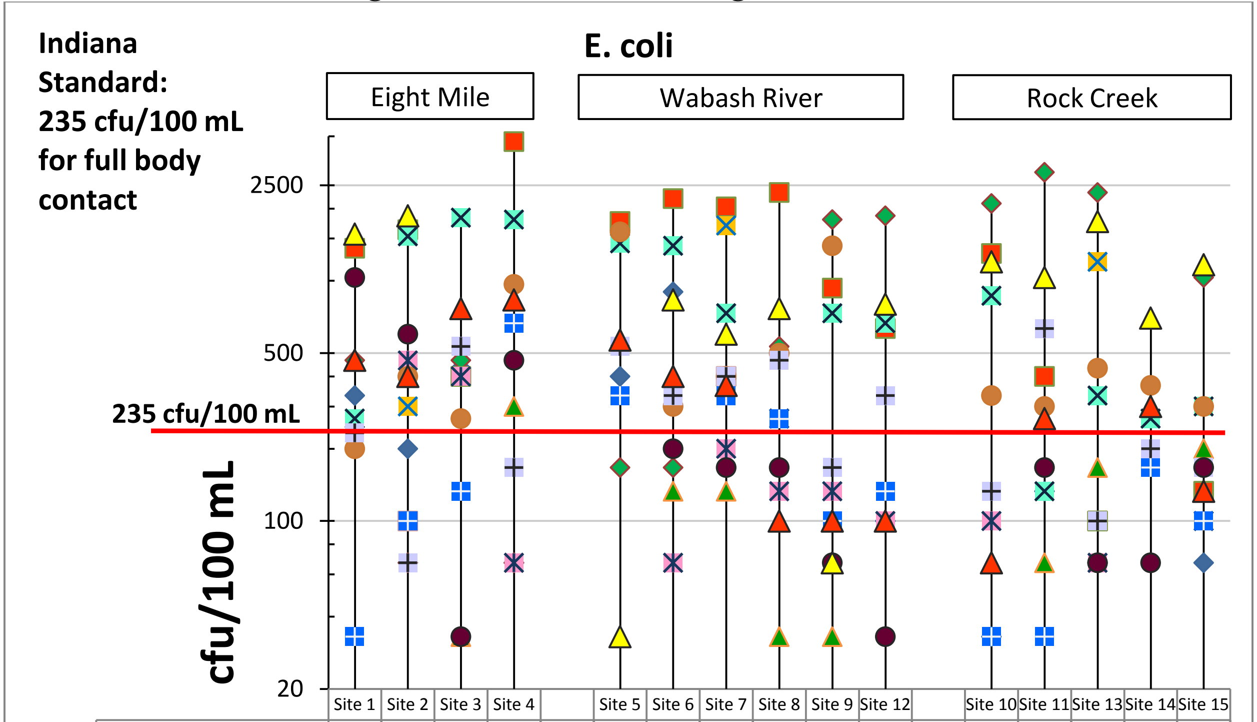


	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	1.5	1.23	0.07		19.08	19.24	21.22			18.23	4.18	0	3.2		0.93
◆ 10/3/13 - 10/6/13	1.13	0.51	0.71	0	14.44	13.37	17.84		25.45	50.79	13.49	9.57	4.42		0.75
■ HRW Volunteer - 10/12/13		13.67					143.8						9.66		
■ 11/1/13 - 11/3/13	24.55	11.59	6.6	1.31	90.38	124	147	121.9	197.8	216.4	33.7	2.49	19.71		7.06
✕ 11/21/13 - 11/23/13	19.54	11.61	7.28	1.54	104.4	105.7	115.2	314.9	192.8	236.2	18.94	2.36	36.26	22.59	12.56
✕ 3/15/14 EST - Bridge Pull	275.6	97.3	57.94	12.9	2340	2529	2435		2975	3486	341.3	24	260.7		81.7
● 4/5/2014 EST - Bridge Pull	530	187.2	111.4	24.8	4500	4864	4683		5722	6705	656.4	46.2	501.4		157.2
▲ 4/25/14 - 4/26/14	22.26	7.86	4.68	1.04	189	204.3	196.7		240.3	281.6	27.97	1.94	21.06		6.6
⊞ 6/13/14 - 6/15/14	18.91	10.93	8.21	1.253	232.3	231.5	273.7		251.7	308.6	66.64	3.6	33.96	19	12.41
+ 7/11/14 - 7/13/14	3.39	1.22	0.68	0.17	138.4	149.1	133.1		138.2	149.5	12.27	0.41	9.65	1.3	2.94
● 8/4/14 - 8/5/14	2.44	1.05	0.31	-0.14	51.44	58.75	66.85		62.48	65.48	5.14	0.19	3.83		0.88
▲ 8/28/14 - 8/31/14	5.19	1.74	0.38	-0.1	116.4	132.8	123.1		108.7	79.25	8.67	0.49	5.72		1.38
✕ HRW Volunteer - 9/23/14		17.52					175.2						87.37		
△ 11/1/14 - 11/16/14	15.82	6.46	1.9	1.05	222.9	110.5	130.7		168.2	209.6	65.6	5.96	24.15		7.35

E. coli

It is not unusual for *E. coli* concentrations in the Eight Mile Creek, Wabash River and Rock Creek to exceed the state water quality standard for total body contact of 235 cfu/100 mL. During the monitoring period, Eight Mile Creek exceeded the target 60% of the time (30 out of 50 samples). The Wabash River exceeded the target 59.15% of the time (42 out of 71 samples), and Rock Creek exceeded the target 44.8% of the time (26 out of 58 samples). On three sampling events (11/1/13-11/3/13, 11/21/13-11/23/13 and 4/5/14) all but one site was over the target level (14 sites out of 15, and 13 sites out of 14). Not only were results over the target, 30 of the 179 samples (16.75%) were over 1,000 cfu/100 mL, indicating direct *E. coli* sources and inputs such as livestock or manure runoff from land application on fields and failed or illicitly discharging septic systems. The lowest number of sites testing over the target occurred on 3/15/14, 4/25/14-4/26/14, and 8/4/14-8/5/14; with 2 sites out of 14, 1 site out of 14, and 3 sites out of 15, respectively, being over the target.

Figure 44: *E. coli* Monitoring Data Chart

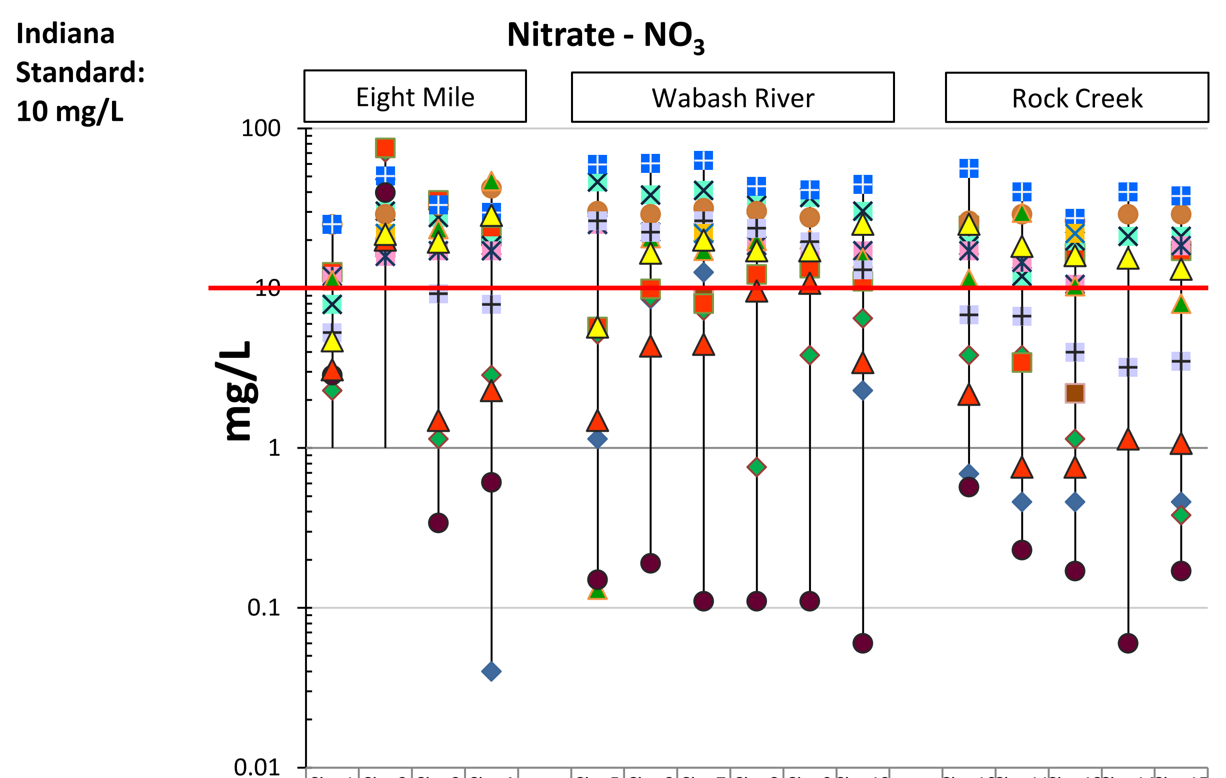


	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	333	200	433	67	400	900	367			100	33	133	67		67
◆ 10/3/13 - 10/6/13	467	67	467	67	167	167	333	533	1800	1867	2100	2833	2333		1033
■ HRW Volunteer - 10/12/13		100					400						100		
■ 11/1/13 - 11/3/13	1367	1633	400	3800	1767	2200	2033	2333	933	633	1300	400	100		133
✕ 11/21/13 - 11/23/13	267	1533	1833	1800	1433	1400	733	267	733	667	867	133	333	267	300
✕ 3/15/2014	0	466	400	67	0	67	200	133	133	100	100	0	67		100
● 4/5/2014	200	400	267	967	1600	300	400	500	1400		333	300	433	367	300
▲ 4/25/14 - 4/26/14	0	0	33	300	0	133	133	33	33	0	0	67	167		200
⊞ 6/13/14 - 6/15/14	33	100	133	666	333	333	333	266	100	133	33	33	100	167	100
+ 7/11/14 - 7/13/14	233	67	533	167	533	333	400	467	167	333	133	633	100	200	167
● 8/4/14 - 8/5/14	1033	600	33	467	0	200	167	167	67	33	0	167	67	67	167
▲ 8/28/14 - 8/31/14	467	400	767	833	567	400	367	100	100	100	67	267	0	300	133
✕ HRW Volunteer - 9/23/14		300					1700						1200		
△ 11/1/14 - 11/16/14	1566	1866	0	0	33	833	600	767	67	800	1200	1033	1766	700	1167

Nitrate (NO_3)

Nitrate levels can vary greatly throughout the year based on land use. Site 2 on the Eight Mile Creek exceeded the target for drinking water of 10 mg/L on all testing events with an annual average concentration of 34.48 mg/L. There were four testing events (in the months of August, September and October) where only one or two sites out of the 15 sampled exceeded the target. Overall, 108 samples out of 178 total (61.3%) exceeded the target, indicating an abundance of nitrate in the watershed. On three monitoring events (3/15/14, 4/5/14, and 6/13/14) the target was exceeded at all sites. Nitrate concentrations in general are higher during late fall, spring and early summer at times of agricultural activity (harvest, manure application, and planting) and at times of heavy rainfall.

Figure 45: Nitrate – NO_3 Monitoring Data Chart

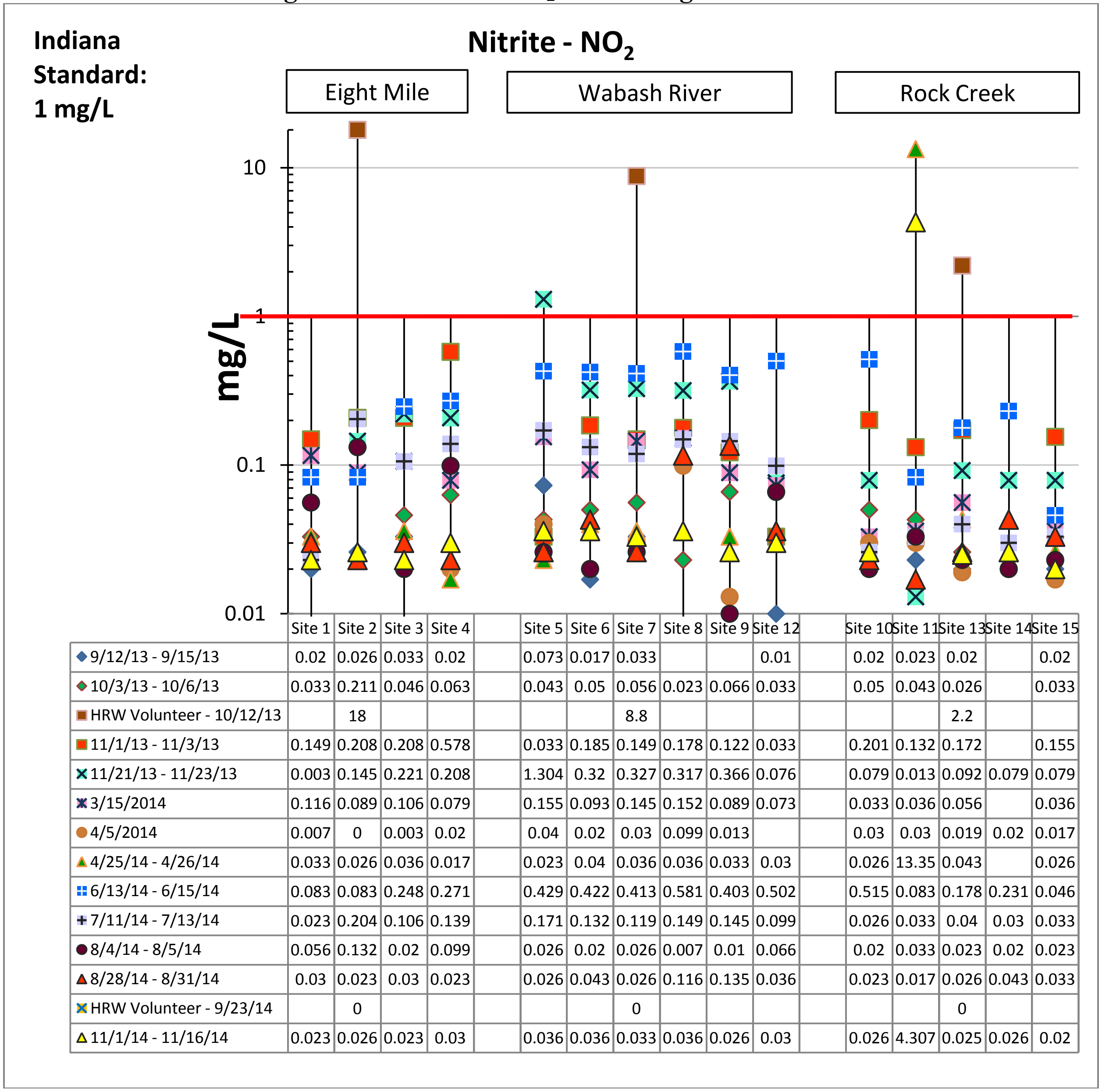


	Site 1	Site 2	Site 3	Site 4		Site 5	Site 6	Site 7	Site 8	Site 9	Site 12		Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	0	48.05	0	0.04		1.14	8.58	12.58			2.29		0.69	0.46	0.46		0.46
◆ 10/3/13 - 10/6/13	2.29	70.93	1.14	2.86		5.15	8.77	7.25	0.76	3.81	6.48		3.81	3.81	1.14		0.38
■ HRW Volunteer - 10/12/13		18						8.8							2.2		
■ 11/1/13 - 11/3/13	12.58	75.5	35.46	21.16		5.72	9.91	8.01	12.2	13.35	11.06		24.6	3.43	16.59		17.16
✖ 11/21/13 - 11/23/13	7.92	30.36	27.72	18.48		46.2	38.28	40.92	33	36.96	30.36		18.48	11.88	19.8	21.12	21.12
✖ 3/15/2014	11.88	15.84	17.16	17.16		25.08	22.44	22.44	18.48	17.16	17.16		17.16	14.52	10.56		18.48
● 4/5/2014	25.08	29.04	33	42.24		30.36	29.04	31.68	30.36	27.72			26.4	29.04	26.4	29.04	29.04
▲ 4/25/14 - 4/26/14	11.21	20.02	23.45	46.9		0.13	20.59	17.16	19.83	20.21	15.44		11.44	29.74	10.3		8.01
⊞ 6/13/14 - 6/15/14	25.17	50.34	33.18	29.74		59.49	60.47	62.92	43.47	41.18	44.62		56.06	40.04	27.46	40.04	37.75
+ 7/11/14 - 7/13/14	5.28	21.12	9.24	7.92		26.4	22.44	26.4	23.76	19.56	13.04		6.81	6.69	3.98	3.2	3.49
● 8/4/14 - 8/5/14	2.86	39.69	0.34	0.61		0.15	0.19	0.11	0.11	0.11	0.06		0.57	0.23	0.17	0.06	0.17
▲ 8/28/14 - 8/31/14	3.09	20.02	1.49	2.29		1.49	4.35	4.46	9.61	10.75	3.43		2.17	0.76	0.76	1.14	1.07
✖ HRW Volunteer - 9/23/14		22						22							22		
△ 11/1/14 - 11/16/14	4.69	21.74	19.45	28.6		5.72	16.59	20.02	17.16	17.16	25.17		25.17	18.3	16.02	15.44	13.16

Nitrite (NO_2)

Only six samples exceeded the Nitrite target of 1 mg/L, and three of those were using the Hoosier Riverwatch testing method on 10/12/13 at the one HRW site in each subwatershed. The Wabash River site 5 was over the target on one occasion, and the Rock Creek-Elkenberry Ditch site 11 is the only other anomaly, with two testing events that measured significantly higher than the other test sites.

Figure 46: Nitrite – NO_2Monitoring Data Chart

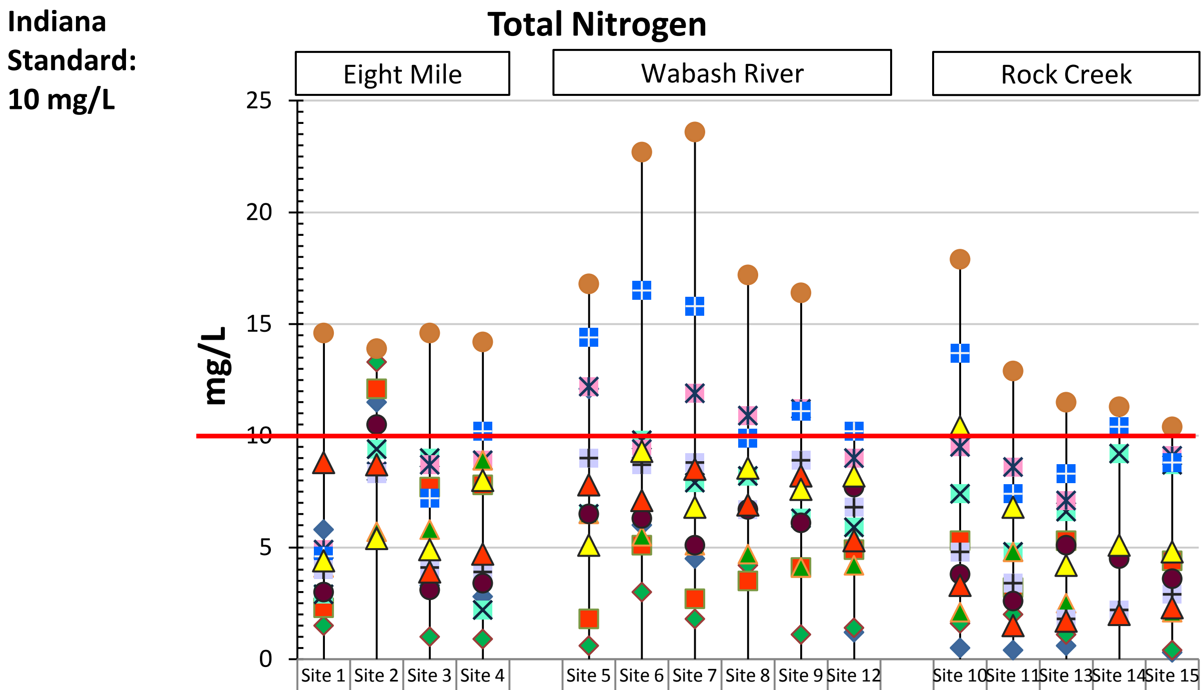


	Site 1	Site 2	Site 3	Site 4		Site 5	Site 6	Site 7	Site 8	Site 9	Site 12		Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	0.02	0.026	0.033	0.02		0.073	0.017	0.033			0.01		0.02	0.023	0.02		0.02
◆ 10/3/13 - 10/6/13	0.033	0.211	0.046	0.063		0.043	0.05	0.056	0.023	0.066	0.033		0.05	0.043	0.026		0.033
■ HRW Volunteer - 10/12/13		18						8.8							2.2		
■ 11/1/13 - 11/3/13	0.149	0.208	0.208	0.578		0.033	0.185	0.149	0.178	0.122	0.033		0.201	0.132	0.172		0.155
✕ 11/21/13 - 11/23/13	0.003	0.145	0.221	0.208		1.304	0.32	0.327	0.317	0.366	0.076		0.079	0.013	0.092	0.079	0.079
✕ 3/15/2014	0.116	0.089	0.106	0.079		0.155	0.093	0.145	0.152	0.089	0.073		0.033	0.036	0.056		0.036
● 4/5/2014	0.007	0	0.003	0.02		0.04	0.02	0.03	0.099	0.013			0.03	0.03	0.019	0.02	0.017
▲ 4/25/14 - 4/26/14	0.033	0.026	0.036	0.017		0.023	0.04	0.036	0.036	0.033	0.03		0.026	13.35	0.043		0.026
⊞ 6/13/14 - 6/15/14	0.083	0.083	0.248	0.271		0.429	0.422	0.413	0.581	0.403	0.502		0.515	0.083	0.178	0.231	0.046
+ 7/11/14 - 7/13/14	0.023	0.204	0.106	0.139		0.171	0.132	0.119	0.149	0.145	0.099		0.026	0.033	0.04	0.03	0.033
● 8/4/14 - 8/5/14	0.056	0.132	0.02	0.099		0.026	0.02	0.026	0.007	0.01	0.066		0.02	0.033	0.023	0.02	0.023
▲ 8/28/14 - 8/31/14	0.03	0.023	0.03	0.023		0.026	0.043	0.026	0.116	0.135	0.036		0.023	0.017	0.026	0.043	0.033
✕ HRW Volunteer - 9/23/14		0						0							0		
△ 11/1/14 - 11/16/14	0.023	0.026	0.023	0.03		0.036	0.036	0.033	0.036	0.026	0.03		0.026	4.307	0.025	0.026	0.02

Total Nitrogen

A total of 172 Total Nitrogen samples were collected throughout the monitoring period. Of those, 32 samples (18.6%) exceeded the water quality target of 10 mg/L. The Eight Mile Creek subwatershed had nine exceedances out of 48 samples (18.75%). The Wabash River monitoring sites exceeded the target in 15 samples out of 71 (21%), and the Rock Creek subwatershed had eight exceedances out of 55 samples (14.5%). All sampling sites exceeded the target on one occasion (4/15/14), which was during a time of snow and ice melt with high flows and saturated soil conditions. The 6/13/14-6/15/14 sampling event resulted in eight of the 15 sites exceeding the target, which was also under moist conditions, indicating that nutrients are being flushed into the streams and rivers throughout the subwatersheds. Site 2 in the Eight Mile Creek subwatershed had the most exceedances with five out of 12 samples (41.6%), followed by site 5 on the Wabash River with four out of 12 samples (33.3%) exceeding the target. Also of concern is that the results on the Wabash River were 1.5–2 times higher than the target for more than 50% of the exceedances.

Figure 47: Total Nitrogen Monitoring Data Chart

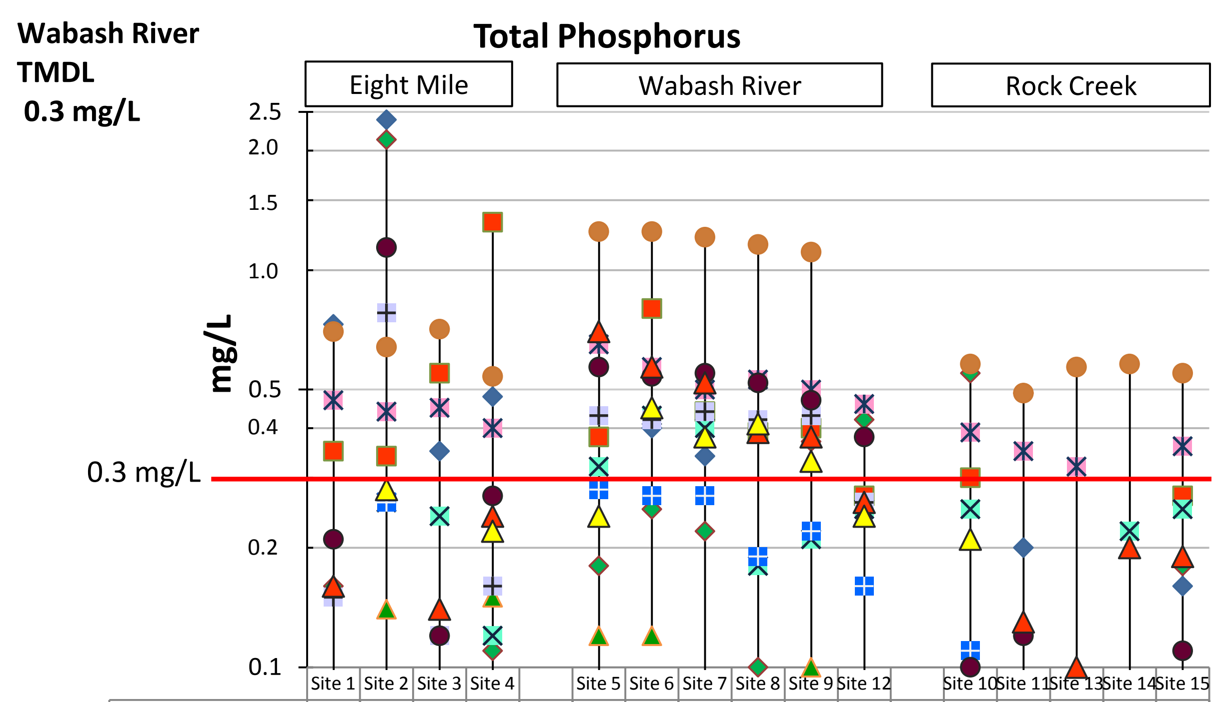


	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	5.8	11.5	3.3	2.8	12.1	6	4.5			1.2	0.5	0.4	0.6		0.3
◆ 10/3/13 - 10/6/13	1.5	13.3	1	0.9	0.6	3	1.8	4.2	1.1	1.4	1.6	2	1.1		0.4
■ 11/1/13 - 11/3/13	2.3	12.1	7.7	7.8	1.8	5.1	2.7	3.5	4.1	4.9	5.3	3.2	5.3		4.4
✖ 11/21/13 - 11/23/13	2.9	9.4	9	2.2	6.5	9.8	7.9	8.2	6.3	5.9	7.4	4.8	6.6	9.2	8.7
✖ 3/15/2014	4.9	8.4	8.7	8.9	12.2	9.4	11.9	10.9	11.2	9	9.5	8.6	7.1		9.1
● 4/5/2014	14.6	13.9	14.6	14.2	16.8	22.7	23.6	17.2	16.4		17.9	12.9	11.5	11.3	10.4
▲ 4/25/14 - 4/26/14	4.1	5.7	5.8	8.9	6.5	5.5	5.1	4.7	4.1	4.2	2.1	4.8	2.5		2.1
⊞ 6/13/14 - 6/15/14	4.6	8.3	7.2	10.2	14.4	16.5	15.8	9.9	11.1	10.2	13.7	7.4	8.3	10.4	8.8
✚ 7/11/14 - 7/13/14	4	8.3	4.1	3.9	9	8.7	8.8	6.7	8.9	6.8	4.8	3.4	1.8	2.2	2.9
● 8/4/14 - 8/5/14	3	10.5	3.1	3.4	6.5	6.3	5.1	6.7	6.1	7.7	3.8	2.6	5.1	4.5	3.6
▲ 8/28/14 - 8/31/14	8.8	8.7	3.9	4.7	7.8	7.1	8.5	6.9	8.2	5.3	3.3	1.5	1.7	2	2.3
△ 11/1/14 -11/16/14	4.4	5.4	4.9	8	5.1	9.3	6.8	8.55	7.6	8.2	10.4	6.8	4.2	5.1	4.8

Total Phosphorus

The water quality target 0.3 mg/L for Total Phosphorus was exceeded in 72 samples out of the 172 that were collected (41.8%). The Eight Mile Creek subwatershed had 19 exceedances out of 48 samples (39.5%), with site 2 accounting for just over a third of the exceedances (7 out of 19 samples). Site 2 also had the highest levels of Total Phosphorus on four monitoring events, being as much as eight times the target level. The Wabash River subwatershed had 41 exceedances out of 69 monitoring samples (59.4%), with site 7 exceeding the target in nine out of 12 samples (75%). Monitoring results on the Wabash River subwatershed were as much as four times the target level. The Rock Creek subwatershed exceeded the target in 12 out of 55 samples (21.8%). All samples exceeded the target on two occasions, 3/15/14 and 4/5/14, both during times of high flow events when soil and stream bank erosion or in-stream sedimentation would be more likely to occur. There were two instances where all samples were under the target, occurring on 4/25/14-4/26/14 and 6/13/14-6/15/14.

Figure 48: Total Phosphorus Monitoring Data Chart



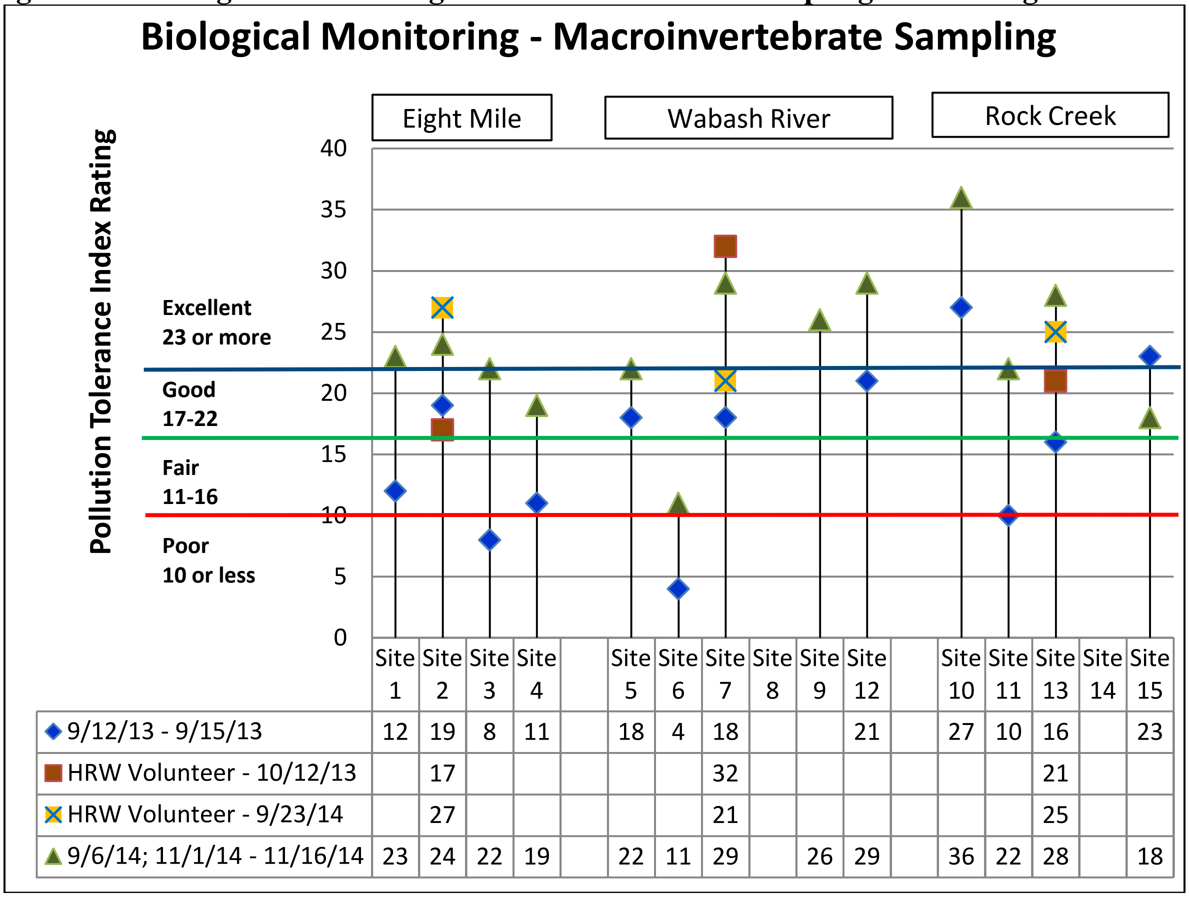
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	0.73	2.39	0.35	0.48	0.07	0.4	0.34			0.26	0.09	0.2	0.08		0.16
◆ 10/3/13 - 10/6/13	0.16	2.13	0.08	0.11	0.18	0.25	0.22	0.1	0.37	0.42	0.55	0.49	0.05		0.18
■ 11/1/13 - 11/3/13	0.35	0.34	0.55	1.32	0.38	0.8	0.44	0.39	0.4	0.27	0.3	0.04	0.05		0.27
✖ 11/21/13 - 11/23/13	0.08	0.26	0.24	0.12	0.32	0.43	0.4	0.18	0.21	0.25	0.25	0.01	0.08	0.22	0.25
✱ 3/15/2014	0.47	0.44	0.45	0.4	0.65	0.57	0.5	0.53	0.5	0.46	0.39	0.35	0.32		0.36
● 4/5/2014	0.7	0.64	0.71	0.54	1.25	1.25	1.21	1.16	1.11		0.58	0.49	0.57	0.58	0.55
▲ 4/25/14 - 4/26/14	0.03	0.14	0.05	0.15	0.12	0.12	0.08	0.07	0.1	0.03	0.02	0.04	0.03		0.03
⊞ 6/13/14 - 6/15/14	0.15	0.26	0.09	0.06	0.28	0.27	0.27	0.19	0.22	0.16	0.11	0.05	0.06	0.08	0.06
+ 7/11/14 - 7/13/14	0.15	0.78	0.12	0.16	0.43	0.42	0.44	0.42	0.43	0.26	0.05	0.06	0.05	0.08	0.07
● 8/4/14 - 8/5/14	0.21	1.14	0.12	0.27	0.57	0.54	0.55	0.52	0.47	0.38	0.1	0.12	0.09	0.07	0.11
▲ 8/28/14 - 8/31/14	0.16	0.08	0.14	0.24	0.7	0.57	0.52	0.39	0.38	0.26	0.08	0.13	0.1	0.2	0.19
△ 11/1/14 - 11/16/14	0.09	0.28	0.09	0.22	0.24	0.45	0.38	0.41	0.33	0.24	0.21	0.06	0.07	0.04	0.08

Biological Monitoring – Macroinvertebrate Sampling

Macroinvertebrate sampling occurred once per year at a minimum of 12 sites and once per year at the three Hoosier Riverwatch monitoring sites. Site 8 on the Wabash River is an impoundment area that is part of the J. E. Roush DNR Fish & Wildlife area. This site is too deep to conduct biological monitoring. The Rock Creek site 14 is heavily silted. Staff would sink into the silted substrate while trying to complete monitoring activities, so it was determined that for safety reasons biological monitoring would not be completed at this site. Biological monitoring was not conducted on site 9 on the Wabash River in 2013 due to time constraints.

The 2014 ratings were higher than the 2013 ratings at all sites except for site 15 on the Rock Creek. The three sites that were rated as poor in 2013 (Eight Mile site 3, Wabash River site 6, and Rock Creek site 11) were now rated as fair and good in 2014. Site 2 on the Eight Mile Creek is a 2-stage ditch location, and this site was rated good and excellent in 2013 and 2014, respectively. Site 10 on the Rock Creek rated excellent during both years. This site is very natural, with a snail bed just downstream from the monitoring location. Additionally, the Wabash River sites 7, 9 and 12 are mostly natural sites with diverse populations of macroinvertebrates. In general, a total of 31 collections were completed at the sites, with 23 samplings rating as good or excellent (74.1%). Each of the monitoring site ratings were also averaged for both years, and a total of 9 sites out of 13 rated as good or excellent (69%).

Figure 49: Biological Monitoring – Macroinvertebrate Sampling Monitoring Data Chart



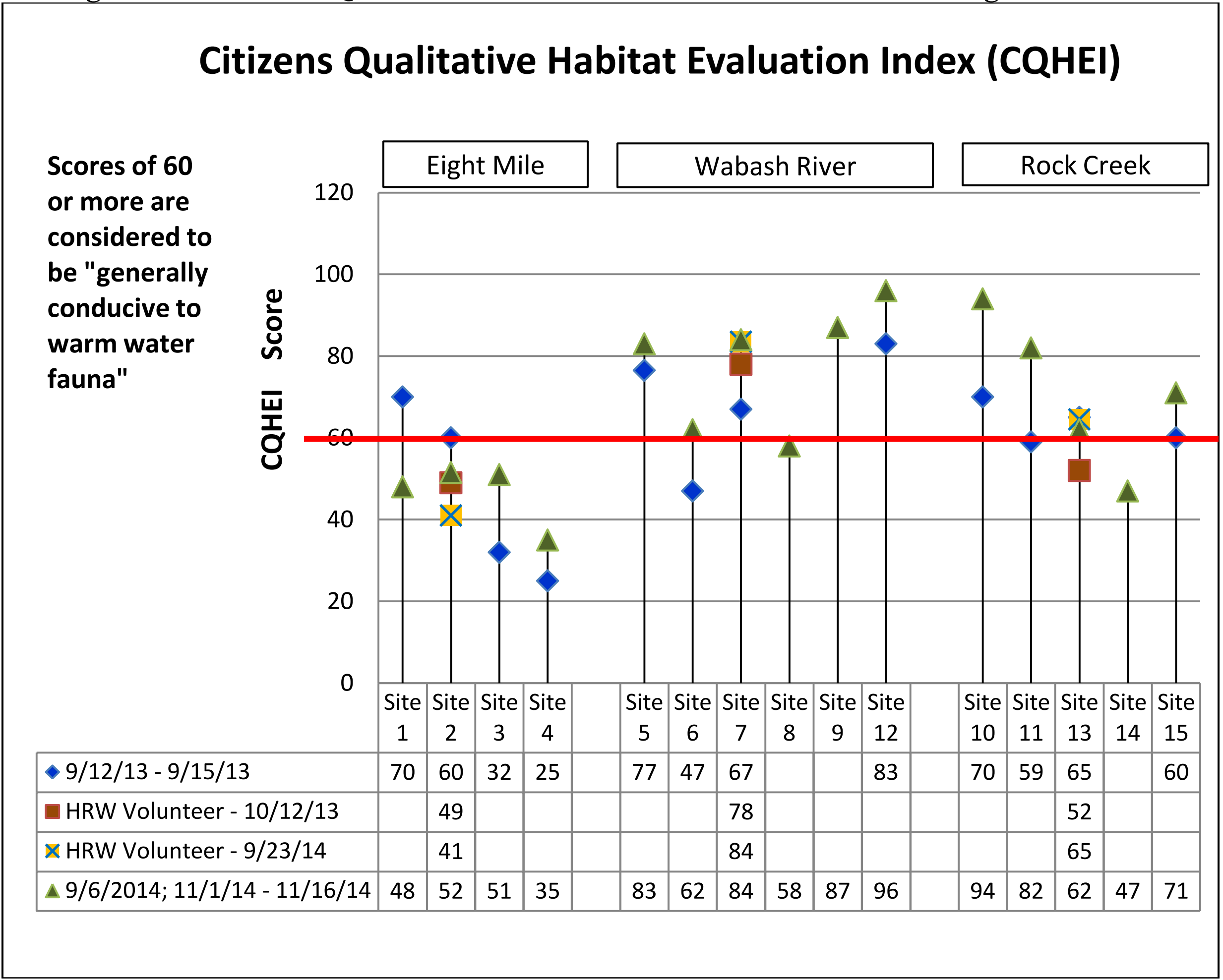
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 12	Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	12	19	8	11	18	4	18			21	27	10	16		23
■ HRW Volunteer - 10/12/13		17					32						21		
✕ HRW Volunteer - 9/23/14		27					21						25		
▲ 9/6/14; 11/1/14 - 11/16/14	23	24	22	19	22	11	29		26	29	36	22	28		18

Habitat

The habitat varies widely between the tributary streams and the Wabash River. The Citizens Qualitative Habitat Evaluation Index (CQHEI) was used to measure the quality of the habitat at the monitoring sites. A score of 60 was used as the habitat quality target. Our monitoring protocol required that monitoring be completed at a minimum of 12 sites each year. In general, the habitat CQHEI index score improved at all but two sites from 2013 to 2014.

Eight Mile Creek sites 1 and 2 meet or exceeded the target in 2013, but fell below the target in 2014. Ditch maintenance and clearing activities at site 1, and substrate smothering and an increase in bank erosion at site 2 accounts for the decrease. The Wabash River and Rock Creek sites 10 and 11 in the DNR Fish & Wildlife area have the most diverse habitat and natural areas which increases the index scores. The Wabash River site 6 is downstream from the City of Bluffton and has a smothered and silted substrate, minimal riparian area, and many man-made changes accounting for the lower score. Overall, a total of 33 evaluations were made at the 15 monitoring sites, and a total of 20 evaluations met or exceeded the target (60%). Additionally, when averaging the scores at each site over the two-year period, 53% of the sites (8 out of 15) met or exceeded the target, which in this case is a positive outcome.

Figure 50: Citizens Qualitative Habitat Evaluation Index Monitoring Data Chart



	Site 1	Site 2	Site 3	Site 4		Site 5	Site 6	Site 7	Site 8	Site 9	Site 12		Site 10	Site 11	Site 13	Site 14	Site 15
◆ 9/12/13 - 9/15/13	70	60	32	25		77	47	67			83		70	59	65		60
■ HRW Volunteer - 10/12/13		49						78							52		
✕ HRW Volunteer - 9/23/14		41						84							65		
▲ 9/6/2014; 11/1/14 - 11/16/14	48	52	51	35		83	62	84	58	87	96		94	82	62	47	71

4.0 Watershed Inventory – Part II

In order to better understand the water quality concerns in the project area, an inventory and assessment of each subwatershed is necessary. The following sections detail the assessment for each 12-digit HUC subwatershed in the Rock Creek, Griffin Ditch-Wabash River, and Eight Mile Creek watersheds followed by the broader, 10-digit HUC watershed-wide scale summary. Land use, soils characteristics, point and non-point areas of concern, and historical and current water quality sampling information is detailed for each area.

4.1 Subwatersheds of the Rock Creek Watershed

4.1.1 Headwaters-Rock Creek HUC 051201010701

The Headwaters of Rock Creek (HUC: 051201010701) subwatershed contains 16,767 acres, which is 25% of the Rock Creek watershed. There are almost 39 miles of streams in the subwatershed, and an estimated 32 miles of county tile drainage. Six miles of the Rock Creek channel are on the IDEM 303(d) List of Impaired Waters due to *E. coli* and impaired biotic communities. It is estimated that approximately five miles of streams and ditches lack buffers in this subwatershed.

Agriculture is the dominate land use, estimated at 90% of the area. There are approximately 125 acres of wetlands and 575 acres of woodlands scattered throughout the subwatershed. Over 3,969 acres (24%) are considered HEL/PHEL soils. Based on 2013 tillage transect information, an estimated 8,000 acres are conventionally tilled. Cover crops are known to be used in this subwatershed but were not identifiable during the windshield survey. Field observations included: filter strips along most of the steams, fall tillage up to the stream bank on four crop fields; field tile being installed at one location; and a manure transport hose in use at one site. There are three CFOs and approximately 120 hobby farms in the subwatershed that contain an estimated 6,000 animals.

The town of Poneto is located next to the Rock Creek main channel just upstream from the northern subwatershed boundary. The town consists of 77 homes on 68 acres, and is served by Poneto's wetland wastewater treatment facility, (a NPDES facility) which had one observed overflow in 2014 to the Rock Creek. The rural community of Wellsburg is also in this subwatershed. Based on visual estimates there are 262 rural residences with on-site septic systems that may be contributing nutrients and *E.coli* to the streams. An old landfill, referred to as the Poneto Dump is located in the subwatershed, but no information was found for this location.

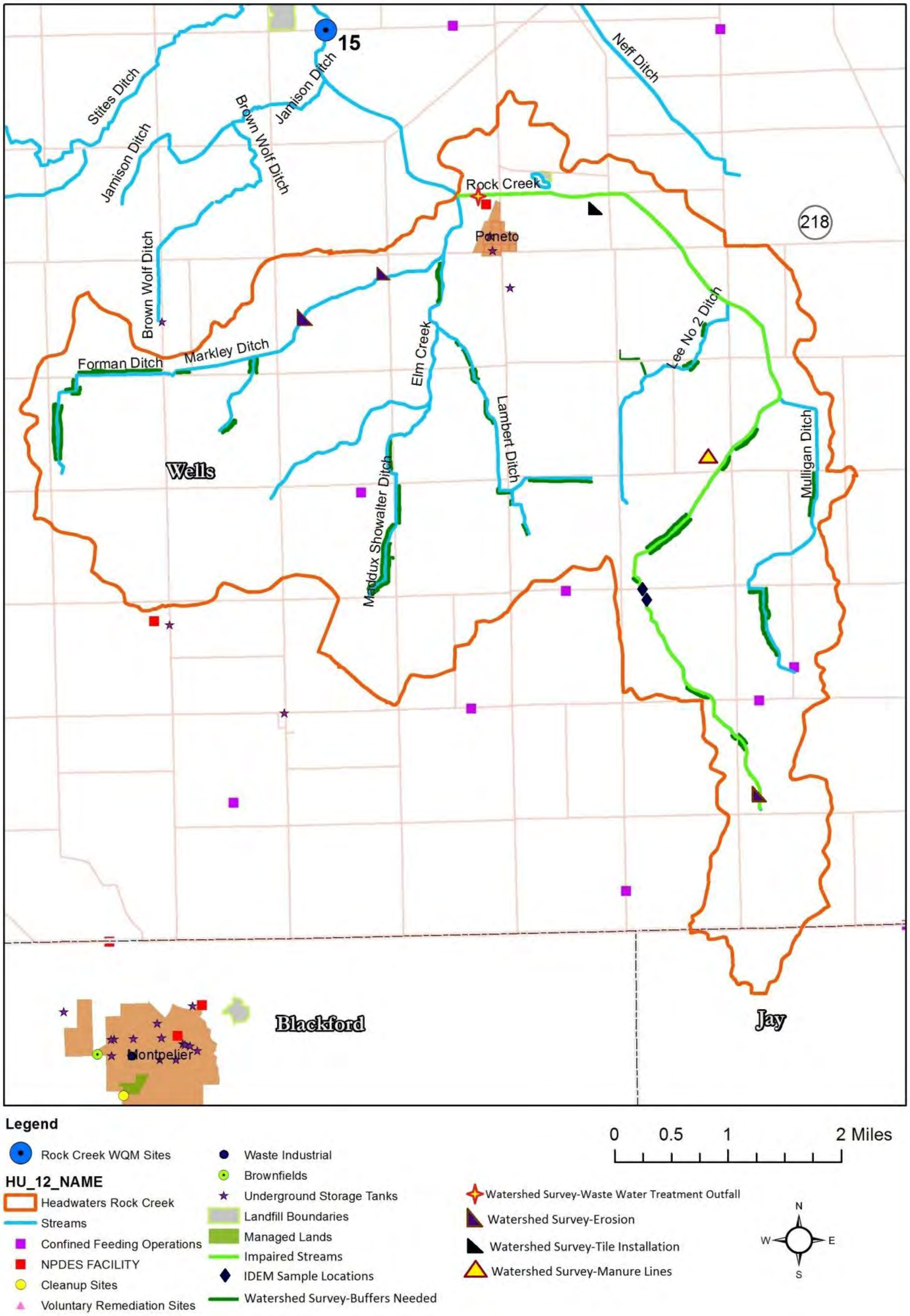
The IDEM Indiana Water Quality Atlas shows two monitoring sites in this subwatershed that were sampled in 2003. The sampling location on the Rock Creek at CR 900S was sampled for *E. coli* five times over a 30-day period. Those tests resulted in a geometric mean of 997 cfu/100mL, which is well above the *E. coli* target geometric mean of 125 cfu/100mL. The *E. coli* levels also exceeded the state standard on all five samples for the single sample target of 235 cfu/100mL. Concentrations ranged from 325 to 2,419 colonies/100mL. Turbidity also exceeded the Minnesota TMDL criteria for protection of fish and macroinvertebrate health of 25 NTUs on one occasion. The other sampling location, located approximately 800 feet south of the CR 900S, included chemical monitoring and a fish survey. Turbidity levels were exceeded during two testing events, but all of the temperature, dissolved oxygen and pH measurements were within standards or recommendations. The fish survey results included: central stoneroller, bluegill, green sunfish, fathead, blunt nose and black stripe minnows, creek chub, white sucker, red fin shiner and orange throat darter. The majority of these species are adapted for small streams with shallow, slow moving water. Siltation and habitat degradation is their main threat.

The Rock Creek Conservancy District (RCCD) has conducted volunteer habitat and biological sampling at two sites in this subwatershed since 2002. A total of 39 testing events have been recorded through 2010. Macroinvertebrate pollution tolerance index ratings at RCCD site 1, on CR 1000S, have been rated as poor in 36 out of 39 events, with scores of 10 or less on the rating scale, indicating a lack of biological communities. The RCCD site 2, located at CR 700S, was rated poor on 21 events, and received a fair rating on 16 events. This site also achieved a good rating on two events; the first time in 2004 and again in 2009. Habitat evaluations for RCCD site 1 have ranged from a score of 9 to 39, while RCCD site 2 scores range from 21 to 41. The low habitat scores can be attributed to the channelization, shallow depth and low flow in these areas.

Current project monitoring data from Site 15 was used to evaluate the Headwaters subwatershed. Chemistry data was collected twelve times, from September 2013 to November 2014. Dissolved Oxygen levels exceeded the maximum target on three occasions (25% of the samples) and the Dissolved Oxygen Saturation levels were over 100% on those same occasions; which occurred over a range of temperatures, flow conditions and turbidity measurements. Dissolved Oxygen and Saturation levels also dropped below the minimum target on one occasion when *E. coli* test results were well above the *E. coli* target. This was attributed to runoff of animal waste that had been applied to an adjoining field. Turbidity measurements exceeded the target for fish and macroinvertebrate health in four samples (33.3%). *E. coli* exceeded the target in four samples (33.3%), during high flow, moist conditions, mid-range flow, and low flow, indicating both non-point and point sources of pollution. The nitrate target was exceeded in six samples (50%) during high flow, moist conditions, and mid-range flow, and the Total Nitrogen target was exceeded in one sample during high flow, suggesting that nutrients in storm water runoff is the cause. The Nitrite target was not exceeded at any time during the monitoring events.

Habitat evaluations and biological monitoring was conducted once each year, in 2013 and 2014. The stream substrate was silted and smothered, but a variety of stream habitat was present. The riparian area consists of a combination of forested buffer and grass filter strip, with row crops and residential property beyond the riparian area. This site met or exceeded the habitat rating target of good on both occasions. The macroinvertebrate collections also scored excellent and good on the macroinvertebrate pollution tolerance index.

Figure 51: Headwaters – Rock Creek, HUC 051201010701



4.1.2 Mossburg Ditch-Rock Creek HUC 051201010702

The smallest Rock Creek subwatershed is the Mossburg Ditch, which contains 10,839 acres. There are nearly 13 miles of streams and 20 miles of county legal tile. It is estimated that four miles of streams lack 30 foot buffers, and in-stream and gully erosion was observed at six sites.

Approximately 90% of the subwatershed (9,726 acres) is used for cropland and agricultural activities. HEL/PHEL classification applies to 4,506 acres, which is 41.5% of the area. Woodlands total just over 500 acres (4.6% of the area), and there are 115 acres of wetlands. Tillage transect information indicates that the Huntington County portion of this watershed contains more no-till and reduced tillage than the Wells County area. Overall, it is estimated that approximately 4,500 acres are conventionally tilled. A CFO with over 2,000 animals and approximately 50 hobby farms with animals are located in the subwatershed. Observations during the windshield survey included: three areas where buffer/filter strips have been installed and three small pasture areas with horses and cattle. In the western portion of the subwatershed, drainage tile was being installed at two locations, and two ditches had recently had reconstruction activity.

The small community of Buckeye (three residences and a farmer co-op) is within this subwatershed, which consists of 6.8 acres. Based on visual assessments, 125 rural homes (an average of 7 per square mile) have on-site septic systems. This subwatershed also has one (non-leaking) underground storage tank location, and one NPDES clean-up site. No compliance reports were found for those sites.

IDEM sampled in this subwatershed in 1991 and again in 1998. The Mossburg Ditch was monitored at the Huntington/Wells County Line in 1991. No chemical parameters were exceeded, and the macroinvertebrate study found a significant number of organisms that are intolerant to pollution. A second location was monitored in 1998, where the Mossburg Ditch enters Rock Creek near CR 400W. The chemical results showed exceedances of the state standards for nitrogen ammonia and total phosphorus. The macroinvertebrate survey included a mix of both pollution intolerant taxa such as mayflies and caddis flies, as well as pollution tolerant taxa of midges. The IDEM fish sampling resulted in species that are not present in highly polluted or heavily silted areas. Species identified included: stonecat and yellow bullhead catfish, large mouth and rock bass, long ear and green sunfish, darters, minnows and carp.

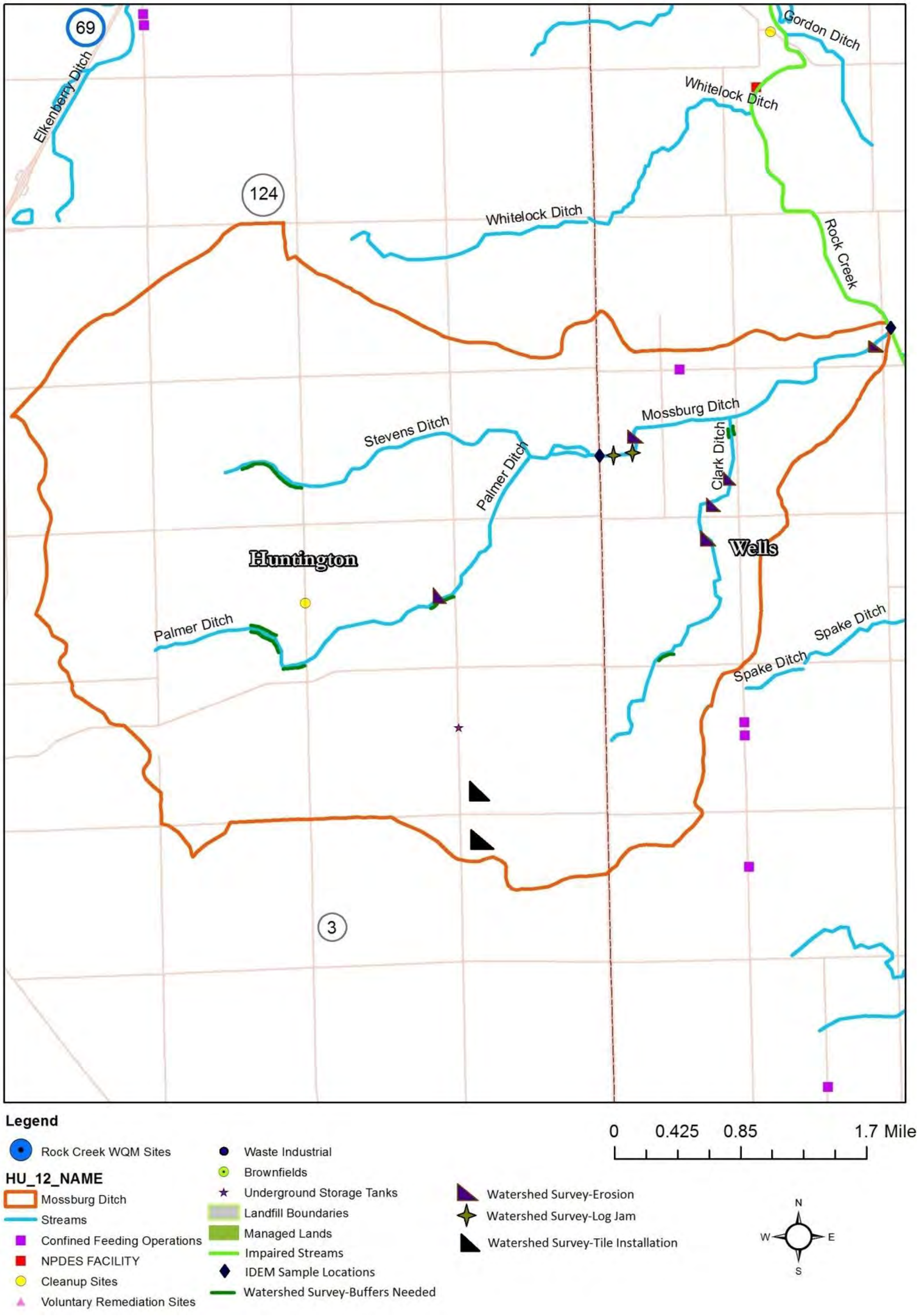
The RCCD volunteer monitoring shows that macroinvertebrate samples at RCCD site 7 on CR 400W at the Mossburg Ditch resulted in 19 poor ratings, 14 fair ratings, and 6 good ratings from 2002-2010. The habitat evaluation scores ranged from 26–54 over this same period. The majority of the time the score was from 35-45 (26 events out of 39), with 18 events having a habitat of score of 40 or greater.

There were no monitoring sites in this subwatershed; therefore, data collected at the downstream water monitoring site 13 was used for evaluating the water quality parameters of the Mossburg Ditch subwatershed. A total of 14 samples were collected from this site during 2013-2014. Dissolved Oxygen exceeded the maximum target on three testing events, and the Dissolved

Oxygen Saturation exceeded 100% on seven sampling events across various flow conditions and temperature fluctuations. Nitrate levels exceeded the target in eight samples. Using the Hoosier Riverwatch field method, the nitrite target was exceeded in one sample; however using approved lab methods the nitrite levels remained within standard recommendations. Total nitrogen and total phosphorus both exceeded the target in one sample; during the high flow spring thaw event.

Habitat evaluations and biological surveys were conducted four times over the collection period. The monitoring site substrate consists of silted large rock. There is a fair amount of in-stream habitat, but undercut banks are present and the site has no shade. The riparian area consists of grass filter strips adjoining row crops. Pools, riffles and runs are present which increases the diversity of the aquatic insects. Native mussels were discovered at this site with one being 3 ½" – 4" in size along with smaller ¾" mussels in clusters. Site 13 scored above the target value indicating good in three out of the four sampling events. The macroinvertebrate collections initially ranked fair, but improved with each sampling event to reach an excellent rating on two occasions.

Figure 52: Mossburg Ditch–Rock Creek, HUC 051201010702



4.1.3 Stites Ditch-Rock Creek HUC 051201010703

The Stites Ditch is 30.6% of the total Rock Creek watershed area and is the largest subwatershed at 20,459 acres. There are over 35 miles of streams and 40 miles of county legal tile. Four miles of the main stem of the Rock Creek channel within this subwatershed are included on the IDEM 303(d) List of Impaired Waters for impaired biotic communities. Based on visual assessments, eight miles of streams lack buffer/filter strip areas.

Cropland is the dominant land use at 91% (18,621 acres), with approximately 4,149 acres classified as HEL/PHEL (20% of cropland acres). Woodlands account for approximately 3.1% of the subwatershed area (640 acres), and wetlands total around 230 acres (0.99% of the subwatershed area). Four pasture/hay areas and one CRP field was observed in the watershed. Several conventionally tilled fields were observed, but over the project period the amount of conventional tillage varies depending on the crop rotation. Areas that were conventionally tilled for corn production, is often then planted by reduced tillage methods for soybeans. Based on the 2013 tillage transect data it is estimated that approximately 10,000 acres is conventional tillage. Grass waterways were observed in the watershed and estimated to total over 11 acres. There are five CFOs within the subwatershed housing approximately 10,700 animals, and hobby farms totaling 131 with an estimated number of 750 additional animals. Manure transport lines were observed at two locations during the windshield survey. In-stream and gully erosion was observed at seven sites, and a total of approximately 160 feet of stream bank erosion was observed at two sites. Tile installation was observed at one location.

The unincorporated town of Liberty Center has over 100 residences, two churches, a convenience store/gas station, post office, fire station and a commercial business that are on individual on-site septic systems on 135 acres. There is a high probability that untreated sewage is reaching the Rock Creek channel less than a mile away through sub-surface tile. The entire Stites Ditch subwatershed contains approximately 380 septic systems, which equates to an average of 9 rural homes per square mile, outside of Liberty Center. There are two underground storage tanks, one leaking and one non-leaking, the closed and monitored Southern Wells Landfill, and an old private landfill. No compliance issues were found for these sites.

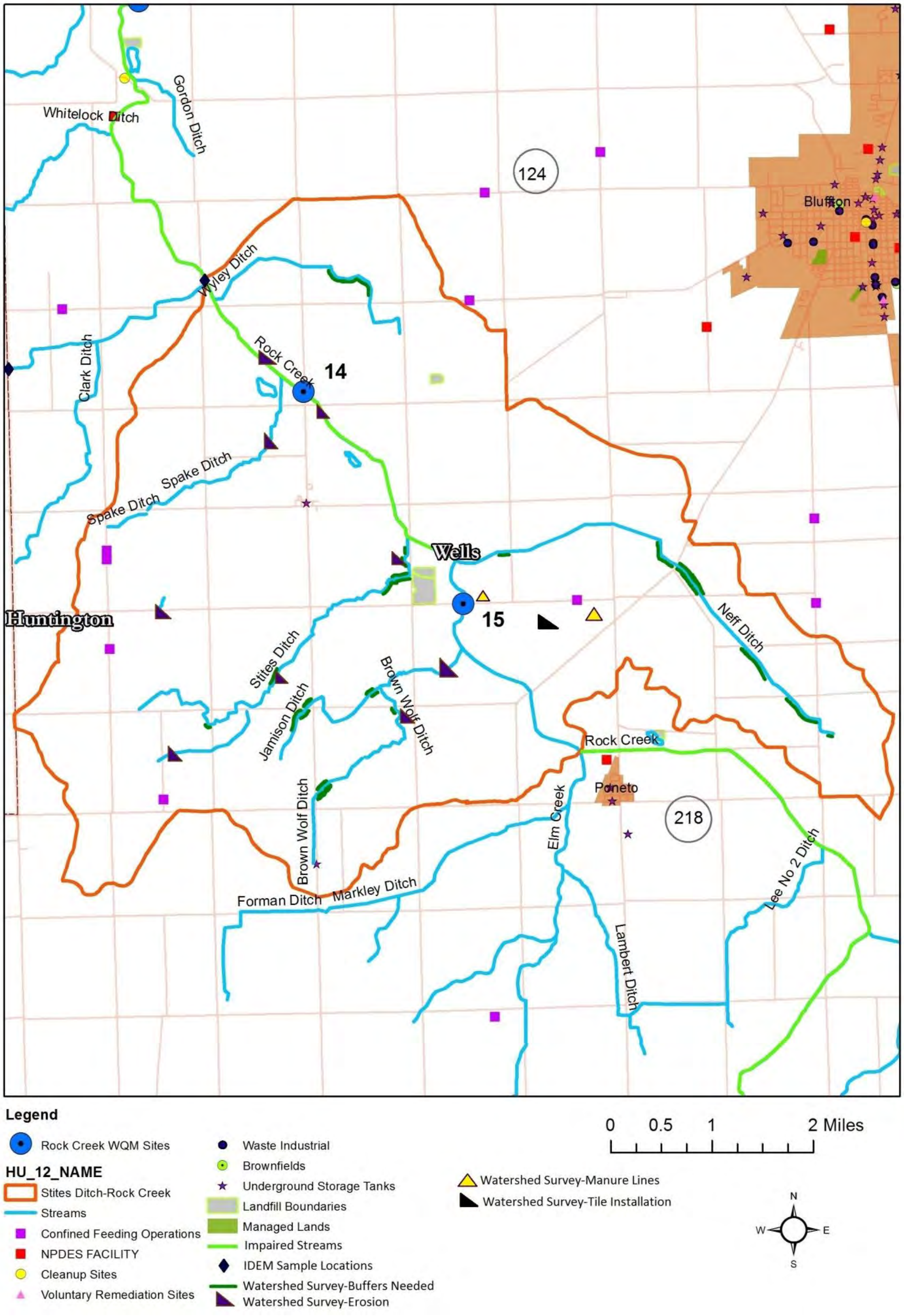
IDEM does not have any water quality monitoring stations located in this subwatershed; however the location where the Mossburg Ditch enters the Rock Creek near CR 400 W, discussed in the Mossburg Ditch subwatershed section is just downstream from the Stites Ditch subwatershed boundary. That information was discussed in the Mossburg Ditch subwatershed section.

The RCCD biological and habitat evaluations were conducted at four sites within this subwatershed from 2002-2010. RCCD site 3 is located near CR 500S on Hoosier Highway, site 4 is at CR 400S, site 5 is at CR 300S, and site 6 is at CR 200S. Out of the 39 samples, site 3 macroinvertebrate pollution tolerance indexes were 11 poor, 16 fair, 10 good and 2 that achieved excellent. The habitat assessments ranged from 21-57 with almost half of the events with a score of 40 or above. Site 4 macroinvertebrate ratings were 19 poor, 13 fair and 7 good. Habitat assessments for this site ranged from 20-51, with 20 events scoring 40 or more. Site 5 had over half of the ratings, 20 out of 39, in the poor category. The remaining events were rated fair, with the exception of one event that attained a good rating. Site 5 habitat assessments ranged from 24-54, and had 22 events that scored 40 or above. At site 6, macroinvertebrate ratings on 28 of the events were poor, and the remaining 11 events were fair. Habitat assessments for this location ranged from 26-60, with 20 events that scored 40 or above. The target level of 60 was attained on one occasion, and fell just short of the target on four occasions.

The current project water quality monitoring location site 14 collects the drainage from 68% of the Stites Ditch subwatershed, and was used in the evaluation of water quality issues for the area. Only seven samples were collected from this site during the monitoring program due to sediment in the stream that made it difficult to conduct the monitoring activities. Flow measurements were only successfully collected during three monitoring events, and were estimated for the remaining events. The Dissolved Oxygen level exceeded the target on one occasion, and the Dissolved Oxygen Saturation exceeded the 100% target on two occasions. Turbidity measurements exceeded the target for aquatic health in four samples out of seven. *E. coli* exceeded the target in four samples, under moist and dry conditions indicating the cause is likely animal waste applications and septic system discharges. Nitrate had four exceedances and total nitrogen exceeded the target in two samples, both under moist conditions and mid-range flows. The Total Phosphorus target was only exceeded in one sample under moist conditions during the spring thaw event. Nitrites had no exceedances.

The biological monitoring for macroinvertebrates was not conducted at this site, again due to the unstable substrate and in-stream erosion occurring at or below the water line at the monitoring site. One habitat evaluation was completed in 2014, and the site scored below the target as an indicator of a healthy habitat. This site is heavily silted and smothered with undercut, eroding and collapsing banks at and under the normal flow line. There are no riffles or runs present at this site. The riparian area consists of a narrow row of trees, a filter strip, and row crops.

Figure 53: Stites Ditch–Rock Creek, HUC 051201010703



4.1.4 Elkenberry Ditch-Rock Creek HUC 051201010704 Subwatershed

The Elkenberry Ditch subwatershed contains 18,666 acres, or 28% of the entire Rock Creek watershed. There are over 32 miles of streams and an estimated 35 miles of legal tile in the subwatershed. Over seven miles of the Rock Creek is on the 2012 Indiana 303(d) List of Impaired Waters. Four miles are due to both *E. coli* and impaired biotic communities, and the remainder is due to impaired biotic communities. The majority of the streams have riparian buffers or grass filter strips; therefore, it estimated that only 6.5 miles of buffers are needed in this subwatershed.

Land use in the subwatershed is 86% cropland and pastures/hay (16,081 acres), 9% woodlands (1122 acres) and wetlands (620 acres), and 5% open water and rural residential areas. Agricultural activities include both farming and livestock operations. Soils are classified as HEL/PHEL in 39% of the subwatershed (7,292 acres), with the majority of that being in the western portion. Tillage transect data indicates that there is more no-till and reduced tillage in the Huntington County portion of this subwatershed than in the Wells County area. Based on the 2013 data, conventional tillage was used on approximately 7,000 acres in this subwatershed. Field observations included: conventional tillage at seven locations along stream channels; three dairy operations and two beef cattle operations with animals in large feedlots; a chicken operation located near the Rock Creek; approximately 600 feet of unstable and collapsed stream bank at one location and six additional sites with in-stream and gully erosion; and logging activity at one site on the Rock Creek main channel. There are three CFOs listed for this watershed, however two sites were not constructed. The number of animals in the watershed is estimated at over 32,000 on 89 unregulated farms, and includes chickens, turkey, ducks, horses, sheep, swine, beef and dairy cattle, and buffalo. One farming/dairy operation next to the Rock Creek is certified as organic. At one location, beef cattle are allowed to pasture through a shallow stream that is a tributary to the Rock Creek.

The small communities of Rockford, Plum Tree and Rock Creek Center are located in this subwatershed on approximately 100 acres. Rural residences with on-site septic systems are estimated to be 282. One NPDES site, an active stone quarry is adjacent to the Rock Creek channel. No compliance issues have been reported in the recent past, but the quarry has been stockpiling material in the maintenance easement, floodplain area. An industrial landfill and a clean-up site are located near the Rock Creek and the community of Rockford, but these sites have not been in operation for many years, and no issues were found.

Six sites in this subwatershed have been monitored by IDEM from 1991 – 2008. The station located at CR 200N was monitored for chemistry and macroinvertebrates in 1991. The chemistry samples resulted in no exceedances of the standard targets, and the macroinvertebrate study resulted in a high number of organisms that are intolerant to pollution. A second location, on the Rock Creek in the J.E. Roush Fish and Wildlife area, just downstream from the Elkenberry Ditch tributary was evaluated for chemical and macroinvertebrate health in 1991 and again in 1998. This site had no exceedances of the water quality targets during either event; however based on the number and diversity of taxa, the macroinvertebrate count completed in 1991 had a higher quality biological community than the count completed in 1998.

Two locations were monitored in 2003. The site on the Rock Creek at Huntington CR 500E was monitored for chemical tests and included a fish survey. Dissolved oxygen and turbidity exceeded the water quality target on one occasion. The fish survey revealed 24 different species, ranging from tolerant common carp and white sucker to higher quality fish such as bass and longear sunfish. The other site was on the Rock Creek located at State Road 3 was only monitored for chemistry. At this site, *E. coli* was measured five times over a 30-day period, and resulted in 273 cfu/100mL geometric mean, exceeding the 125 cfu/100mL geometric mean target for *E. coli*. Of those five samples, two exceeded the single sample target. Turbidity results also measured over the 25 NTU target on two occasions.

Monitoring was conducted at two additional sites in 2008. Chemical monitoring was conducted at CR 300N, where *E. coli* was measured five times over a 30-day period, with a geometric mean of 342cfu/100mL, exceeding the geometric mean target. Turbidity results ranged from 14 to 154.1 NTUs and also exceeded the water quality target in six out of eight samples. The other site was located approximately ½ mile north of CR 300N. This site was monitored for chemical tests, macroinvertebrate evaluations and a fish survey. Total Phosphorous measured 0.537 mg/L on one occasion, over the target of 0.3 mg/L; the *E. coli* geometric mean results from the 5 tests over the 30 day period was 380 cfu/100mL; and turbidity results ranged from 14.9 to 573 NTUs, and exceeded the target of 25 NTUs during nine out of ten monitoring events. The macroinvertebrate community was comprised of a mix of organisms, from pollution sensitive taxa to pollution tolerant taxa. Damselfly was the predominant species present, followed by midges and Caddis Fly. The fish survey also included a wide variety of species at the monitoring site, including large and small mouth bass, rock bass, sunfish, logperch, catfish, minnows, suckers and carp.

There are three RCCD monitoring sites in this subwatershed. Site 8 is located on CR 100N, site 9 is on CR 200N; and site 10 is at State Rd. 3 in Huntington County. Sites 8 and 9 in general had higher macroinvertebrate ratings than the other sites in the Rock Creek monitoring program from 2002-2010. At site 8, out of the 39 monitoring events, 10 were rated poor, 16 fair, 11 good, and 2 excellent. At site 9 the ratings were 5 poor, 19 fair, 14 good, and 1 excellent. Site 10 pollution tolerance ratings were 22 poor, 13 fair and 4 good. It is suspected that silting and sediment in the stream at this location may account for the decreased ratings. Habitat evaluations at the sites tend to mirror the macroinvertebrate ratings. Site 8 scored from 29-73, with 27 events scoring a 40 or higher. Out of those, 18 events scored above 50. The target of 60 or more was met on one event, and fell just short of the target on four occasions. Site 9 scored from 31-73 throughout the monitoring period. A total of 26 assessments scored 40 or higher, and the target of 60 or more was met on three monitoring events, and came close on an additional event. Site 10 habitat assessments scored from 30-56, with 21 assessments scoring 40 or higher. The habitat target was not attained at this site during the monitoring period.

Current project monitoring was conducted at two sites in this subwatershed. Site 10, near the mouth of the Rock Creek in the DNR fish and wildlife area, reflects the entire drainage in the Rock Creek watershed. Site 11, also in the DNR fish and wildlife area, is located on the Elkenberry Ditch, just prior to emptying into the Rock Creek, and is representative of the western portion of the Elkenberry Ditch subwatershed area. Samples were collected a total of 12 times at both sites throughout the monitoring period.

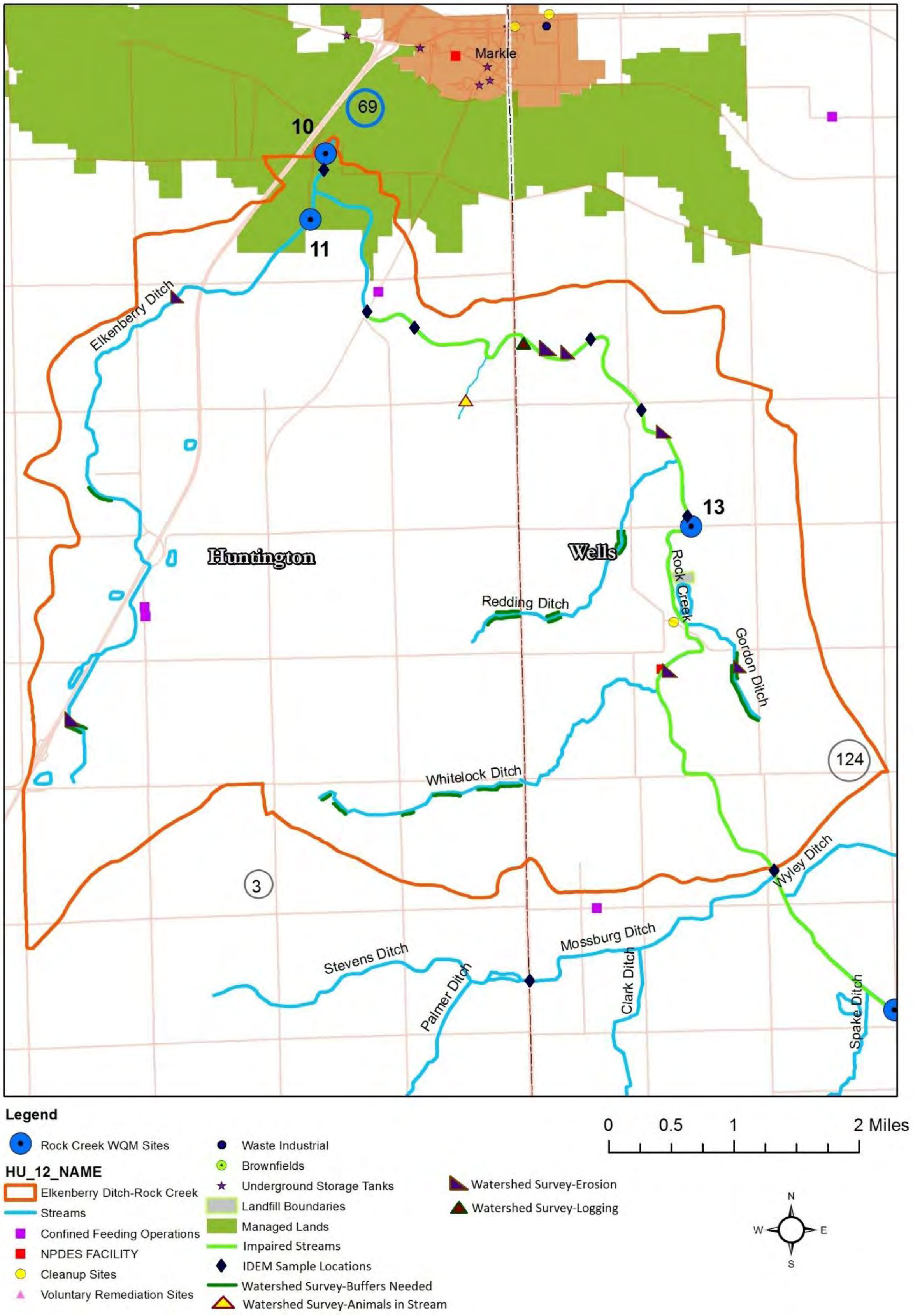
A review of the data collected at Site 10 will be discussed first. Dissolved Oxygen only exceeded the target in one sample. Dissolved Oxygen Saturation exceeded 100% on five occasions during moist and dry conditions with warm temperatures. Turbidity measurements exceeded the target for stream health in six samples (50% of the samples). *E. coli* exceeded the target for full body contact in five samples over all flow conditions, indicating both non-point and point sources. The nitrate target level was exceeded in seven out of 12 samples (58%) during high flow, moist conditions and mid-flow levels. Total nitrogen and total phosphorus both had three exceedances during times of agricultural activity, suggesting surface runoff is carrying the nutrients to the streams. Nitrite did not exceed the target during the monitoring program.

Habitat evaluations and biological monitoring was collected one time each year in 2013 and 2014. Site 10 is mostly natural with a limestone stream bed covered with varying sized rocks. Silting and smothering of the stream bed is a concern, but the aquatic habitat and riffle/run areas provide for diverse communities of aquatic insects. The stream banks are stable and the area is heavily forested. A snail bed is located just downstream from this monitoring location. The habitat evaluations both scored above the target for fish and macroinvertebrate health, with a good rating, and were among the highest scores in the project area. The macroinvertebrate counts resulted in excellent ratings on both occasions and had the highest pollution tolerance index scores of all the sites in the project area.

Site 11 provides insight to the pollutants that are coming into the Rock Creek from the western portion of the Elkenberry Ditch subwatershed. The Dissolved Oxygen levels exceeded the maximum target in four samples. Dissolved Oxygen Saturation exceeded the 100% target in six samples (50% of the time). Turbidity measurements exceeded the target in three samples, all during periods of high flow and moist conditions. Due to the large forest area at this location and upstream of this site, it suggests that organic matter from the forested area observed in the stream in addition to the agricultural activities in the watershed could be contributing to these levels. *E. coli* exceeded the target in six samples (50%) across all flow conditions. This was the only site in the project area where the nitrite level exceeded the target in the laboratory analysis. This occurred in two samples, one in the spring and the other one in the fall; indicating inputs from agricultural activities. Nitrate samples exceeded the target in six samples (50%) across all flow conditions, and total nitrogen exceeded the target in one sample during high flow. Total phosphorus exceeded the target in three samples, during high flow and moist conditions; also indicating agricultural activities as the source of the contaminants.

This site is located on the Elkenberry Ditch just before it enters the Rock Creek. The majority of the time this stream is narrow and shallow over bedrock as it comes through the DNR fish and wildlife area. The habitat evaluation at this site initially scored just under the target for a good rating, but the following year was considerably higher and met the target. In general, the substrate is silted and smothered with a minimum of free rock. Because the area is heavily forested, it is shaded and there is an abundance of organic matter. This site is the location of a crossing for DNR maintenance vehicles, so some bank erosion is occurring from this use. The macroinvertebrate collection changed from poor to good over the monitoring project period. It is suspected that the lack of a diverse aquatic community is due to the fact that the stream is so shallow and slow during most of the year.

Figure 54: Elkenberry Ditch–Rock Creek HUC, 051201010704



4.1.5 Rock Creek 10-digit HUC (HUC: 0512010107) Watershed Summary

The Rock Creek subwatershed has the most rural landscape of the project area. It contains over 131 miles of drainage ditches and streams; and 11.4 miles of the Rock Creek main channel are on the 2012 Indiana 303(d) List of Impaired Waters due to *E. coli* and impaired biotic communities.

Of the project area, this watershed has the highest percentage (89%) and acres (59,877 acres) of agricultural land use. It was noted during the windshield survey that some farm fields had been fall tilled, and drainage tiles were being installed at four locations. Tillage transect data from 2013 indicates that conventional tillage is used on approximately 50% of the cropland, but changes based on cropping rotations. During the desktop survey, it was noted that over 40 grass waterways are located in the watershed, covering approximately 30 acres. There are 10 confined feeding operations (CFOs) within the watershed. Eight are within a half mile of a ditch or stream, and the remaining two are within 1 mile of a ditch or stream. At one location, a shallow stream runs through a pasture, and animals (beef cattle) have direct access to the water. Manure land application from these operations tend to be in close proximity of the animal facility and therefore the nearby streams, as evidenced by the presence of manure transport lines observed during the windshield survey. Some pasture areas were documented, but the acreage was minimal. Also, a number of hobby farms containing horses, beef cattle, hogs and sheep were observed, and based on the desktop survey have been estimated at 392 locations.

When the Rock Creek channel was reconstructed in the late 1960's to early 1970's, the plan included easements on both sides of the channel for grass or natural woody vegetation. Nearly all of this riparian area remains today and is used for maintenance of the channel. It is estimated that only about four miles along the Rock Creek have less than a 30-foot buffer. It was also calculated that 45 miles of buffer strips could be installed on the tributaries that are currently unbuffered. Stream bank erosion totaling over 750 feet was observed at five locations. Overall, this watershed has the most in-steam and gully erosion with twenty-five sites identified during the watershed survey.

The only incorporated community in the Rock Creek watershed is the town of Poneto which consists of 77 homes, and is served by Poneto's wetland wastewater treatment facility (a NPDES facility) which had one observed overflow in 2014 to the Rock Creek. The unincorporated towns and small communities of Liberty Center Wellsburg, Travisville, Rockford, Buckeye, Plum Tree, and Rock Creek Center are also in the watershed and together total approximately 310 acres, but otherwise it remains very rural in population. Based on visual estimates and review of GIS maps, the watershed contains an estimated 1,049 rural residences with on-site septic systems that may be contributing nutrients and pathogens to the local waters. An additional NPDES site is located in the watershed, as well as two remediation clean-up sites. A closed solid waste landfill and an active stone quarry are both adjacent to the main channel. Water quality compliance issues for these sites were not found during the desktop survey; however quarry material has been stockpiled within the Rock Creek floodplain maintenance area.

Based on the water quality monitoring data; nutrients, *E. coli* and turbidity are all issues in this watershed. The predominance of agricultural activities that include tillage and animal manure land application combined with the number of rural residences with on-site septic systems can be attributed to the high levels of nutrients and *E. coli* in the Rock Creek watershed. Nutrients including Nitrate, Nitrite, Total Nitrogen and Total Phosphorus were monitored during the planning process. Nitrate levels exceeded the target in 52.6% of the samples (30 out of 57). The Nitrite level at the Elkenberry-Rock Creek site 11 measured over the target on two occasions, and was the only site to exceed the target. Total Nitrogen exceeded the target in eight samples out of 55 (14.5%), and Total Phosphorus exceeded the target in 12 samples out of 55 (21.8%).

All of the monitoring data suggests that *E. coli* is a problem across the entire project area. The Rock Creek watershed area exceeded the state standard for full-body recreational contact in 26 of the 58 samples, or 44.8% of the time, across all flow conditions. This indicates that *E. coli* is coming from a combination of sources; from agricultural activities to residential on-site septic systems and waste water treatment facility overflows.

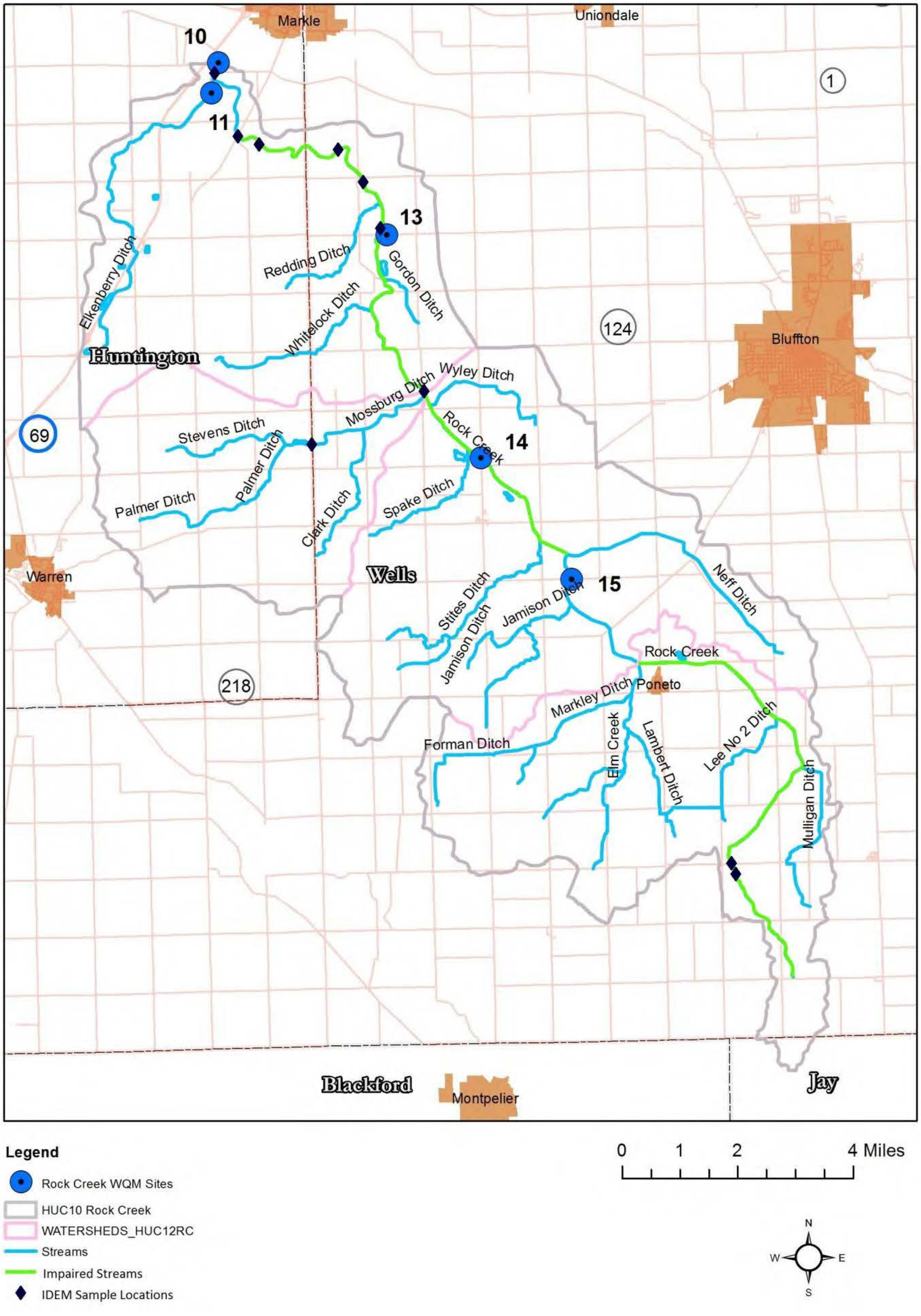
The annual average turbidity measurements for all Rock Creek monitoring sites exceeded both the Indiana average and the water quality target for fish and macroinvertebrate health. However, due to the amount of buffers along the Rock Creek main channel, the levels were lower in the Rock Creek watershed than in the rest of the project area.

Dissolved oxygen levels exceeded the water quality target of 12 mg/L in 12 samples out of 57 (21%), and saturation levels were over 100% in 23 samples out of 57 (40%). Dissolved oxygen and saturation dipped below the minimum level of 4 mg/L for aquatic organism health on one occasion which had *E. coli* test results that were well above the target. It was noted that the water was tan/black in color on that event, and is being attributed to runoff of animal waste that had been recently applied to an adjoining field.

The habitat evaluations noted bedrock and medium to large rocks on the stream substrate, but all sites were listed as smothered and/or silted. The Rock Creek has grass buffers and wooded riparian areas along almost the entire main channel, with row crops beyond the buffer areas. Site 10 is located in the J.E. Roush Fish and Wildlife area and is the most natural site being monitored in this watershed where the riparian area has been largely undisturbed and consists of forest and wetlands; however turbidity levels in the stream have been over the target in 41% of the monitoring samples. Upstream erosion is believed to be the cause of the elevated turbidity levels, but since undercut banks were noted at all sites during the habitat evaluations, this raises the issue that turbidity may also be from in-stream conditions or eroding stream banks at or under the water line.

The macroinvertebrate studies were averaged for the two testing events, resulting in one fair rating, two good ratings, and one excellent rating. At least two types of native mussels were discovered on the Rock Creek main channel at site 13. One mussel was 3 ½” – 4” in size and others were ¾” and in clusters. A snail bed is located downstream from site 10, and minnows and sunfish were observed during the monitoring events. The Elkenberry Ditch (site 11), a tributary to the Rock Creek, is very narrow and shallow during most of the summer months, often less than a foot in depth at the monitoring site, and heavily shaded with an abundance of organic matter from the forested area which accounts for the low level of macroinvertebrates present at this site.

Figure 55: Rock Creek (HUC: 0512010107) Watershed



4.2 Subwatersheds of the Wabash River-Griffin Ditch Watershed

4.2.1 Johns Creek-Wabash River HUC 051201010801

The Johns Creek subwatershed totals 16,413 acres. There are 32 miles of streams in this subwatershed, with nearly three miles being the scenic Wabash River. Additional drainage is provided by over 24 miles of legal tile. The majority of the streams have riparian buffers or grass filter strips, but it is estimated that 10 miles remain unbuffered. The Wabash River is included on the 2012 IDEM 303(d) list of impaired waters due to *E. coli* and nutrients.

The major land use in the subwatershed is farming and livestock operations. Row crops (12,948 acres) account for 79% of the subwatershed area. Woodlands (725 acres) and wetlands (220 acres) cover 5% of the land area. The remaining land is used for urban and rural residences. Soils classified as HEL/PHEL total 4,466 acres (27%); and the soils throughout the project area are not suited to on-site septic systems. As with other areas in the project, conventional tillage was observed and is estimated to be used on approximately 50% of the crop acres, but tillage operations change based on cropping rotations. There are seven CFOs containing approximately 10,655 animals (swine and dairy), and an estimated 83 unregulated hobby farms with an additional 18,000 animals in the subwatershed. Horses, sheep, and dairy and beef cattle were all observed on pasture or feedlots during the windshield survey.

Almost one-half of the City of Bluffton (1,767 acres), which includes the downtown business area and low density urban residences, is within this subwatershed. The urban area includes over 2,000 residences, schools, parks, a hospital, government buildings, businesses, and industry. Much of the urban land surface is covered by buildings, pavement and compacted landscapes with impaired drainage. This greatly increases the volume and velocity of stormwater runoff to the Wabash River. Common sources of pollutants observed in the urban area includes: sediment from building sites, street construction and utility work; lawn care nutrient and pesticide applications; and grass clippings, leaf and plant debris, oils and other household waste in areas where they can be washed into storm drains. The City of Bluffton municipal waste water treatment facility services this area; however, in the area outside the city limits, there are estimated to be 394 rural on-site septic systems. Five NPDES sites are listed in this watershed; however, three sites have been terminated. There are nine industrial waste sites, one environmental clean-up site, and 17 underground storage tanks (11 leaking, and 6 non-leaking). Field observations noted over two miles of the Wabash River Greenway Trail, 150 acres of native habitat that borders the Wabash River, and two 2-stage ditches installed within a half mile of the Wabash River. One is on the Paxson Ditch and the other on the Johnson Drain.

IDEM has two monitoring sites in this subwatershed. Both are located on the Wabash River near CR 450E and River Road, just east of Bluffton. One station monitored in 1995 and 1997 for chemistry, resulted in exceedances in ammonia nitrogen on both occasions. The other station was monitored in 1993, and had no exceedances of the water quality targets, and the macroinvertebrate sampling completed at this site indicates that a large number of pollution intolerant organisms were present, but the diversity of taxa that was present was very low. The USGS operated a stream gauge station at this location from 2007 to 2015. The station has recently been moved downstream, but past stream flow discharge information is available.

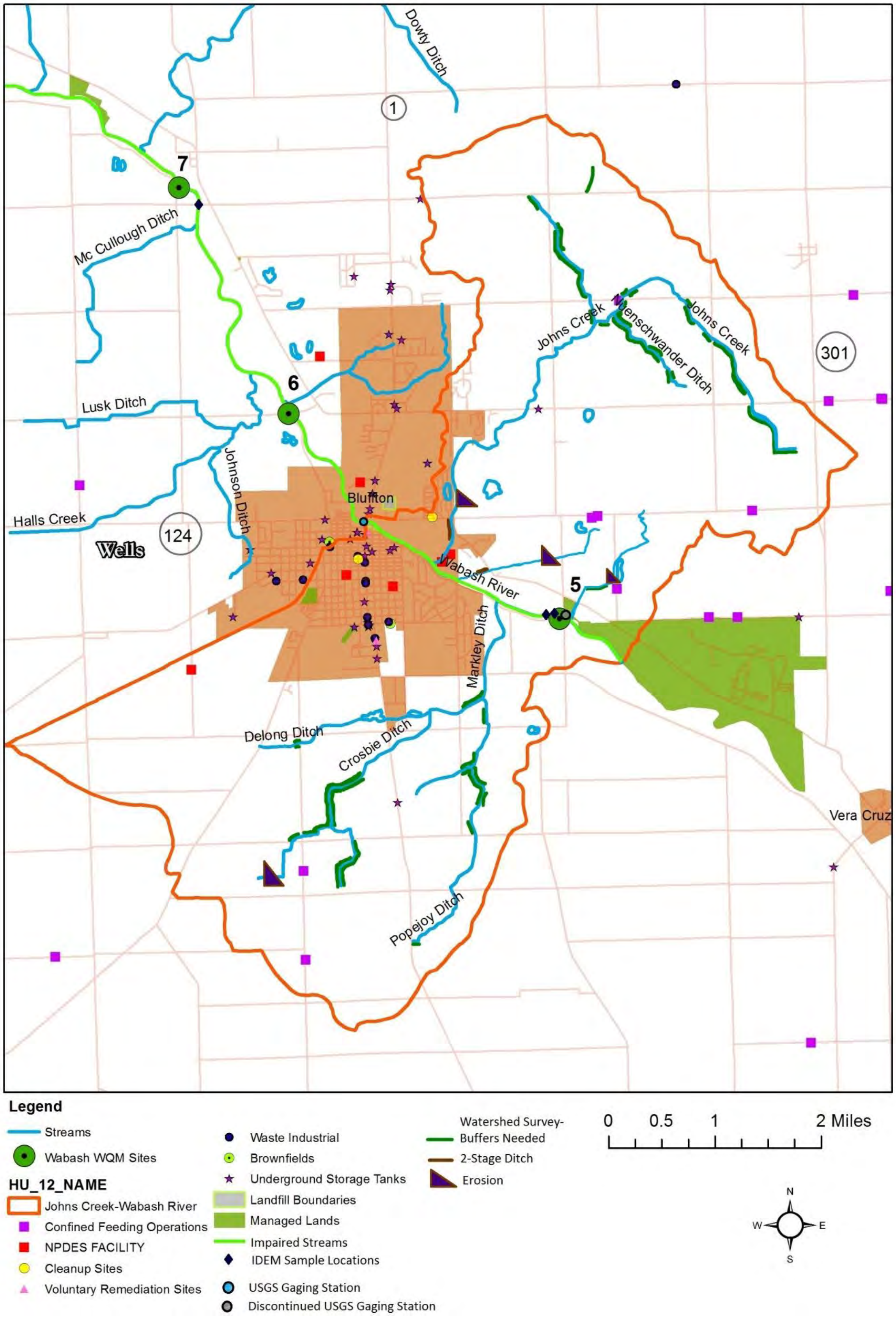
Current monitoring conducted as a part of this project are sites 5 and 6. Site 5 is at the upstream end and site 6 is just downstream of the subwatershed boundary. Dissolved Oxygen levels remained within the target range for aquatic health in all samples at site 5; while site 6 had one exceedance of the 12 mg/L maximum target. Dissolved Oxygen Saturation levels exceeded 100% in five of the 12 samples (41.6%) at both site 5 and 6. The average concentration of turbidity at site 5 was 185.51 NTUs, and site 6 was at 197.55 NTUs. Both sites exceeded the 25 NTU target and the Indiana average of 36 NTU in all samples at both sites across all flow conditions. Sediment, algae and organic matter are all believed to be contributing to the high turbidity measurements.

The Nitrate average concentration at site 5 was 17.25 mg/L and test results ranged from 0.13 mg/L on the 4/25/14-4/26/14 monitoring event to 59.49 mg/L on the 6/13/14-6/15/14 event. Site 6 average concentration was 20.14 mg/L and results ranged from 0.19 mg/L on the 8/4/15-8/5/15 event to 60.47 mg/L on the 6/13/14-6/15/14 event. The number of exceedances of the water quality target for site 5 was five out of 12 samples; and site 6 had seven out of 12 samples that exceeded the Nitrate target of 10 mg/L. Site 5 also had one exceedance of the Nitrite target of 1 mg/L on 11/21/13-11/23/13. Total Nitrogen results exceeded the target in four samples (25%) at site 5, and in two samples at site 6; however, the annual average concentration remained under the target level of 10 mg/L for Total Nitrogen. The Total Phosphorus target was exceeded in seven out of 12 samples (58%) at site 5, and in eight out of 12 samples (66%) at site 6. The annual average concentration was 0.433 mg/L at site 5, and 0.506 mg/L at site 6; both over the 0.3 mg/L target level for Total Phosphorus.

E. coli exceeded the target for full body contact at both sites across all flow conditions indicating both non-point and point sources. Site 5 had exceedances in seven out of 12 samples (58%), and site 6 had exceedances in eight out of 12 samples (66%). Test results at site 5 ranged from 0 to 1,767 cfu/100mL and the annual average concentration was 569 cfu/100mL. Site 6 test results ranged from 67 to 2,200 cfu/100mL, with an annual average concentration of 605 cfu/100mL. It was anticipated that *E. coli* levels would be increased, due to the known input of failing septic systems from the McKinney and Paxson ditches.

Habitat evaluations at site 5 resulted in a good rating. The stream bottom consists of large boulder rock that is silted and smothered, but there is an abundance of in-stream habitat, such as tree roots, shrubs, downed trees, undercut banks, shallow areas, and riffles and runs. The Wabash River Greenway and Bluffton Native Habitat border the river at this site. The biological monitoring also resulted in a good rating with a variety of pollution intolerant macroinvertebrates present in the samples. Site 6 habitat evaluations initially scored under the target for aquatic health, but the following evaluation resulted in a score just over the target to earn a good rating. At the time of the first evaluation, the water level was knee deep, versus the level being chest deep on the second event. This increased the available fish cover that was observed and increased the evaluation score. This site has medium to large rock bottom that is severely silted and smothered. The clay banks are very steep and slippery, and eroded. There is some in-stream habitat, mainly downed trees and overhanging trees and shrubs. The riparian area is rural residential and row crop. The macroinvertebrate sampling at this site resulted in poor and fair ratings, due to the lack of organisms present.

Figure 56: Johns Creek-Wabash River, HUC 051201010801



4.2.2 Dowty Ditch-Wabash River HUC 051201010802

Dowty Ditch is the largest subwatershed in the Wabash River-Griffin Ditch watershed at 17,250 acres. There are nearly 5 miles of the Wabash River, 35 miles of streams and approximately 26 miles of drainage tile in this subwatershed. It is estimated that buffers are needed on 13 miles of the tributary streams. The Wabash River is included on the 2012 IDEM 303(d) list of impaired waters due to *E. coli* and nutrients.

Land use is made up of 12,870 acres of agricultural lands (74.6%), forests 1,327 acres (7.6%), wetlands 202 acres (1.1%), urban area 2,577 acres (14.9%) and less than 2% in other uses. There are 6,384 acres of HEL/PHEL soils (37%) in this subwatershed, and soils are not suited to on-site septic systems. Conventional tillage is estimated to be used on 50% of the cropland acres throughout this watershed. There are three CFOs containing 2,400 swine and 240,000 chickens, and an estimated 104 unregulated farms and hobby farms with over 110,600 animals in the subwatershed.

The urban area includes just over one-half of the City of Bluffton (1,986 acres), adjoining subdivisions outside the city limits (1,062 acres) and the small rural communities of Murray (65 acres) and Kingsland (44 acres). The urban area consists of over 2,500 residences, businesses, and industries. The City of Bluffton, adjoining sub-divisions, and Lancaster Elementary school are serviced by the Bluffton sewer treatment plant, which has had three discharges to the Wabash River. The rural communities of Murray, located next to the Wabash River, and Kingsland, and the remaining rural residences account for the estimated 452 on-site septic systems that are possibly contributing nutrients and *E. coli* to the streams and river. There are two golf courses, a stone quarry, 21 underground storage tanks (12 not leaking, 9 leaking), two industrial waste sites, one Brownfield site, and one NPDES site (Bluffton sewer treatment plant) in the subwatershed. This urban area contributes to increased volume and velocity of stormwater runoff to the Wabash River as well as sediment from individual building sites, street construction and utility work; golf course and lawn care nutrient and pesticide applications; and grass clippings, leaf and plant debris, oils and other household waste in areas where they can be washed into storm drains

Windshield observations noted that a 2-stage ditch is located on the Walter Johnson Drain; conventional tillage was observed at several locations; manure stockpiles were noted at two locations; animals (beef cattle) have direct access to the Lusk Drain; in-stream erosion and gully erosion was observed at five sites; and BMPs were not being maintained at a large commercial construction site allowing sediment to enter the road side ditch.

IDEM monitored two locations in this subwatershed. The IDEM station located southeast of Hale Street in Bluffton, IN was sampled for chemistry and macroinvertebrates in 1991. The chemistry results were all within the recommended water quality targets. The macroinvertebrate assessment showed that the majority of organisms collected were intolerant to pollution, the predominant species were caddis flies and mayflies; however the diversity of taxa of the sample was very low. The second site, located at CR 300N was sampled for chemistry in 1998. *E. coli* results exceeded the single sample target on three occasions out of five in a 30-day period. The geometric mean for the period was 704 cfu/100mL, which also exceeded the target geometric mean of 125 cfu/100mL. Turbidity results from the five sampling events ranged from 62-1000

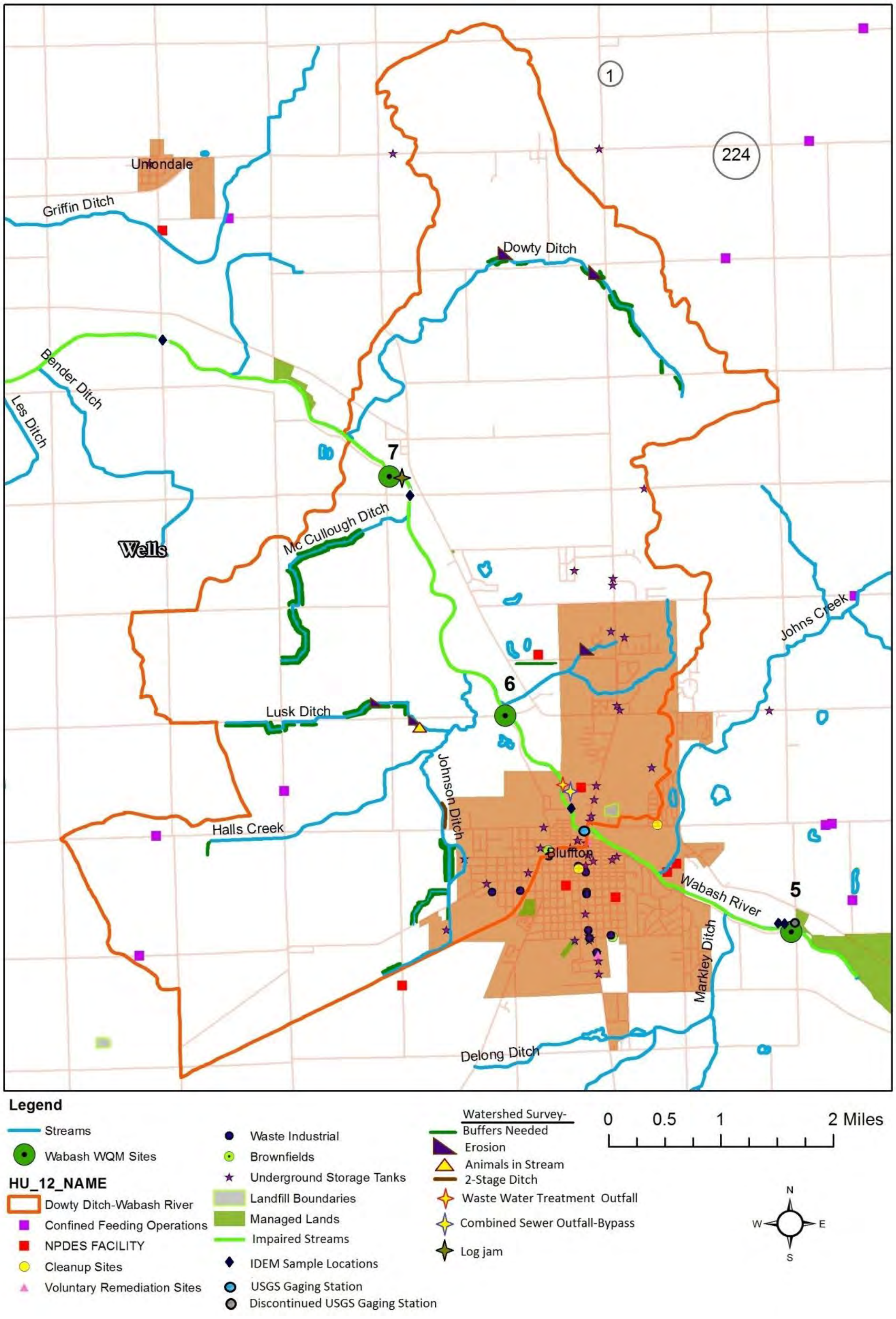
NTU, all exceeding the criteria of 25 NTU for protection of fish and macroinvertebrate health. The USGS stream gauge station located at the SR1 Main Street Bridge was operated from 1930-1971, then discontinued. Water quality data collected at this station from 1968-1971 included temperature, discharge, and suspended sediment. The station was reactivated in early 2015 to measure gage height and precipitation.

Current project monitoring data from site 7 was used as an indicator of water quality for this subwatershed. Monitoring was completed at the site on 14 occasions. Dissolved Oxygen levels exceeded the maximum target in two samples, and Dissolved Oxygen Saturation levels exceeded 100% in five samples. The average concentration of Turbidity was 175.58 NTUs, and the target for aquatic health was exceeded in all samples across all flow conditions.

Nitrate results exceeded the target in nine out of 14 samples (64%) across all flow conditions, and the annual average concentration was 20.34 mg/L, twice the target level. Nitrite was exceeded in one sample, but the average concentration remained well under the target. Total Nitrogen results exceeded the target in three samples during high flow and moist conditions, and had the highest level recorded for all samples that were collected throughout the project. The average concentration of Total Phosphorus was 0.504 mg/L and exceeded the water quality target in nine out of 12 samples (75%) across all flow conditions. This site had the most exceedances of the Total Phosphorus target of all the monitoring sites. *E. coli* exceeded the target for full body contact, with 11 out of 14 samples (78.5%) over the target across all flow conditions, and this site also had the highest number of *E. coli* exceedances of all the monitoring sites.

Habitat evaluations and biological monitoring was completed four times throughout the monitoring period. The site scored above the target for aquatic health receiving a good rating on all monitoring events. This location has a bedrock substrate with large rocks and boulders that is silted and smothered, however the in-stream habitat is diverse and includes roots, shrubs, downed trees, shallow areas, undercut banks, riffles and runs, and several places with aquatic plants throughout the stream section. A wide forested riparian area lines one side of the river. A tree lined buffer separates the river from the county gravel road and row crops on the other side. The macroinvertebrate collections resulted in good and excellent ratings, which were expected due to the abundance and variety of habitat available within this section of the Wabash River.

Figure 57: Dowty Ditch–Wabash River, HUC 051201010802



4.2.3 Bender Ditch-Wabash River HUC 051201010803

The Bender Ditch is the smallest subwatershed in the Wabash River-Griffin Ditch watershed. It contains 10,257 acres, almost four miles of the Wabash River, 12 miles of tributary streams and approximately 15 miles of county tile. Just over five miles of streams are unbuffered, and gully erosion was identified at two sites. The Wabash River is included on the 2012 IDEM 303(d) list of impaired waters due to *E. coli* and nutrients.

Cropland is the dominate land use at 9,008 acres (88%). There are 512 acres of forest (5%) and over 138 acres of wetlands (1%). The remaining area includes the river corridor, and rural homes and farmsteads. Approximately 2,438 acres (23.7%) are classified as HEL/PHEL. Based on the 2013 tillage transect information an estimated 4,500 acres are conventionally tilled, but this amount changes based on crop rotations. The 32-acre “Acres Along the Wabash” nature preserve is located along the Wabash River. An estimated 154 rural homes have on-site septic systems. There are no CFOs in the subwatershed, but 59 unregulated farms and hobby farms contain over 20,000 animals, including beef and dairy cattle, swine, horses, chickens, turkeys and ducks. The Uniondale waste treatment facility outfall is located at the Wabash River in this subwatershed and has one documented release with elevated *E. coli* levels, but also regularly exceeds their permit for phosphorous levels. The only developed area is a part of the Northern Wells High School/Middle School complex, which is served by the Ossian waste water treatment facility.

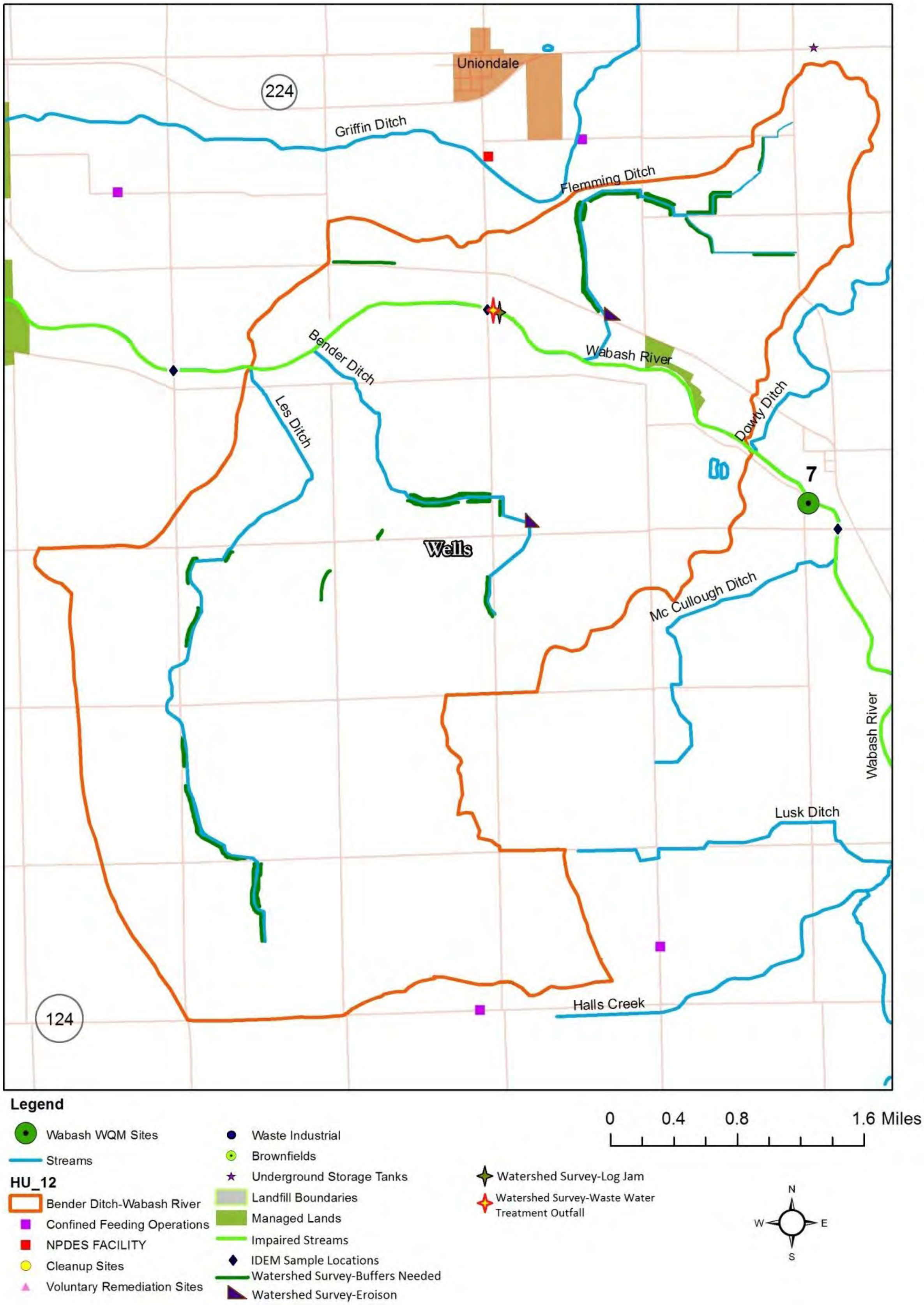
IDEM collected chemistry data at one site in this subwatershed in June 2003. The site, located at CR 100W, had dissolved oxygen results of 14.2 mg/L and 15.3 mg/L on two out of five monitoring events, exceeding the target concentration of 12 mg/L. *E. coli* also exceeded the water quality target on two occasions with results of 816 cfu/100mL and 46,110 cfu/100mL. The *E. coli* geometric mean of 201 cfu/100mL, calculated from five equally spaced samples over a 30-day period also exceeded the target of 125 cfu/100mL. Turbidity measurements were elevated in four of the five samples, indicating a threat to fish and macroinvertebrate health.

Current monitoring activities were conducted at site 8, which located downstream from the subwatershed boundary; however, the site is a flood reduction impoundment area on the J.E. Roush Fish and Wildlife property. The Wabash River spreads out over several acres and no longer has the same characteristics. The monitoring site is wide and deep, making it beyond the capability of the monitoring equipment to collect flow measurements and unsafe to conduct biological studies. The chemical and habitat evaluations still provide some measure of water quality, but the conclusions are limited by the lack of information. Taking this into consideration, the results from site 8 will be discussed, but Bender Ditch subwatershed will be combined with the Griffin Ditch subwatershed for further evaluation.

Monitoring data was collected on 11 monitoring events. Dissolved oxygen levels exceeded the maximum target in two samples, and dissolved oxygen saturation levels exceeded 100% in four samples. Turbidity measurements exceeded the target for aquatic health in all 11 samples, and the average concentration was 197.04 NTUs, almost eight times the target level. Nitrate results exceeded the target in eight out of the 11 samples (72%), ranging from 0.11 mg/L to 43.47 mg/L, and an average concentration of 18.98 mg/L, nearly double the target level. Total nitrogen results exceeded the target in two samples, but the average concentration was under the target at 7.95 mg/L. Total phosphorus samples ranged from 0.07 mg/L to 1.16 mg/L, and exceeded the target in seven samples (63%). *E. coli* also exceeded the target for full body contact in seven samples, and ranged from 33 cfu/100mL to 2,333 cfu/100mL. The average concentration for *E. coli* was 506 cfu/100 mL, more than two times the target.

One habitat evaluation was completed at site 8. The substrate was determined to be smaller coarse rock that is smothered and silted. It is a deep area with underwater roots, and downed trees and logs. Shrubs and small trees hang over a combination of stable and eroding steep banks. There are no riffles or runs present at the site. The riparian area is forested wetland bottomlands. The habitat evaluation scored just below the target for aquatic health. Biological monitoring was not conducted.

Figure 58: Bender Ditch–Wabash River, HUC 051201010803



4.2.4 Griffin Ditch-Wabash River HUC 051201010804

The Griffin Ditch subwatershed contains 13,823 acres. A total of six miles of the Wabash River, nearly 12 miles of streams, and an estimated 20 miles of county tile drain the subwatershed. Approximately 5.5 miles of streams are lacking buffer strips, and 100 feet of stream bank erosion was observed on the Wabash River in the J. E. Roush Fish and Wildlife area. In-stream and gully erosion was identified at four additional sites. The Wabash River is included on the 2012 IDEM 303(d) list of impaired waters due to *E. coli* and nutrients.

Agriculture is the primary land use, with cropland and pastures totaling 10,593 acres (76.6%). Forests account for 1,036 acres (7.4%), and wetlands cover only 113.5 acres (0.82%). Urban areas total over 1,600 acres (11.5%), and the remainder of the area includes the river corridor and open space. Approximately 4,964 acres (35%) are classified as HEL/PHEL, and soils are not suited to on-site septic systems. Agricultural operations include both grain farming and livestock operations. Conventional tillage was observed, and is estimated to total 5,000 acres; however, cover crops are known to be used in this area. Two CFOs are listed for this subwatershed; however, one site has been voided leaving one CFO with 1,600 swine. Approximately 73 unregulated animal operations and hobby farms house over 63,700 animals, including beef and dairy cattle, swine, sheep, horses, chickens, turkeys and ducks.

This subwatershed includes the towns of Markle (782 acres) and Uniondale (165 acres), and a portion of the Norwell High School/Middle School complex. The town of Markle operates a traditional waste water treatment plant (NPDES site) with three documented overflows to the Wabash River. The town of Uniondale operates a wetland waste treatment facility (NPDES site) with the emergency overflow to the Griffin Ditch. The Norwell School complex is connected to the Ossian waste water treatment plant. There are 249 rural homes with on-site septic systems that are potentially contributing pollutants to the river and streams. Other sites of concern include ten underground storage tanks (6 leaking), and two industrial clean-up sites.

IDEM has two monitoring stations in this subwatershed on the Wabash River. Chemistry and macroinvertebrate communities were monitored once at Wells County CR 300W in 1991. Dissolved oxygen was lower than the minimum 4.0 mg/L target established for fish and aquatic health; however, the macroinvertebrate survey showed a significant number of pollution intolerant organisms present, such as mayflies, and caddis flies; but the mix of taxa was very low. The second station located at State Road 3 in Huntington Co., just south of Markle, IN, has been monitored regularly from 1991-2013 and over 230 samples have been collected at this site. Dissolved oxygen exceeded the maximum target of 12 mg/L, in 46 samples (20%) with results as high as 15.39 mg/L. Six of the samples dropped under the minimum target of 4 mg/L, with the lowest result being 2.87 mg/L which can result in fish kills and impaired biotic communities.

Nitrate+nitrite exceeded the target of 10 mg/L in approximately 10% of the samples. Concentrations were as much as 2.4 times over the target. Total phosphorus results were over the target of 0.3 mg/L in more than 50% of the samples, with the highest concentration being 1.2 mg/L, or four times the target established in the Wabash River TMDL. Elevated pH levels were recorded in 14 samples, and on one occasion was 9.24. *E. coli* monitoring was completed 75 times from 1991-2003, and 32 samples (43%) exceeded the state standard of 235 cfu/100mL.

Turbidity was collected from 2007-2013, and 82% of the samples were over the target of 25.0 NTUs, which is the criteria used for the protection of fish and macroinvertebrate health.

This projects water quality monitoring data from sites 8 and 9 are used in evaluating the health of the combined drainage area of the Bender Ditch and Griffin Ditch-Wabash River subwatersheds. Site 8 data was discussed in the previous Bender Ditch-Wabash River subwatershed section. At site 9, a total of eleven samples were collected during the monitoring program. Dissolved oxygen levels exceeded the maximum target in one sample following a rain event where fast moving water could have elevated the level. Dissolved oxygen saturation levels exceeded 100% in three samples. The average concentration of turbidity over the monitoring period was 192.04 NTUs, exceeding the target for aquatic health in all samples over high, medium and low flow and moist conditions.

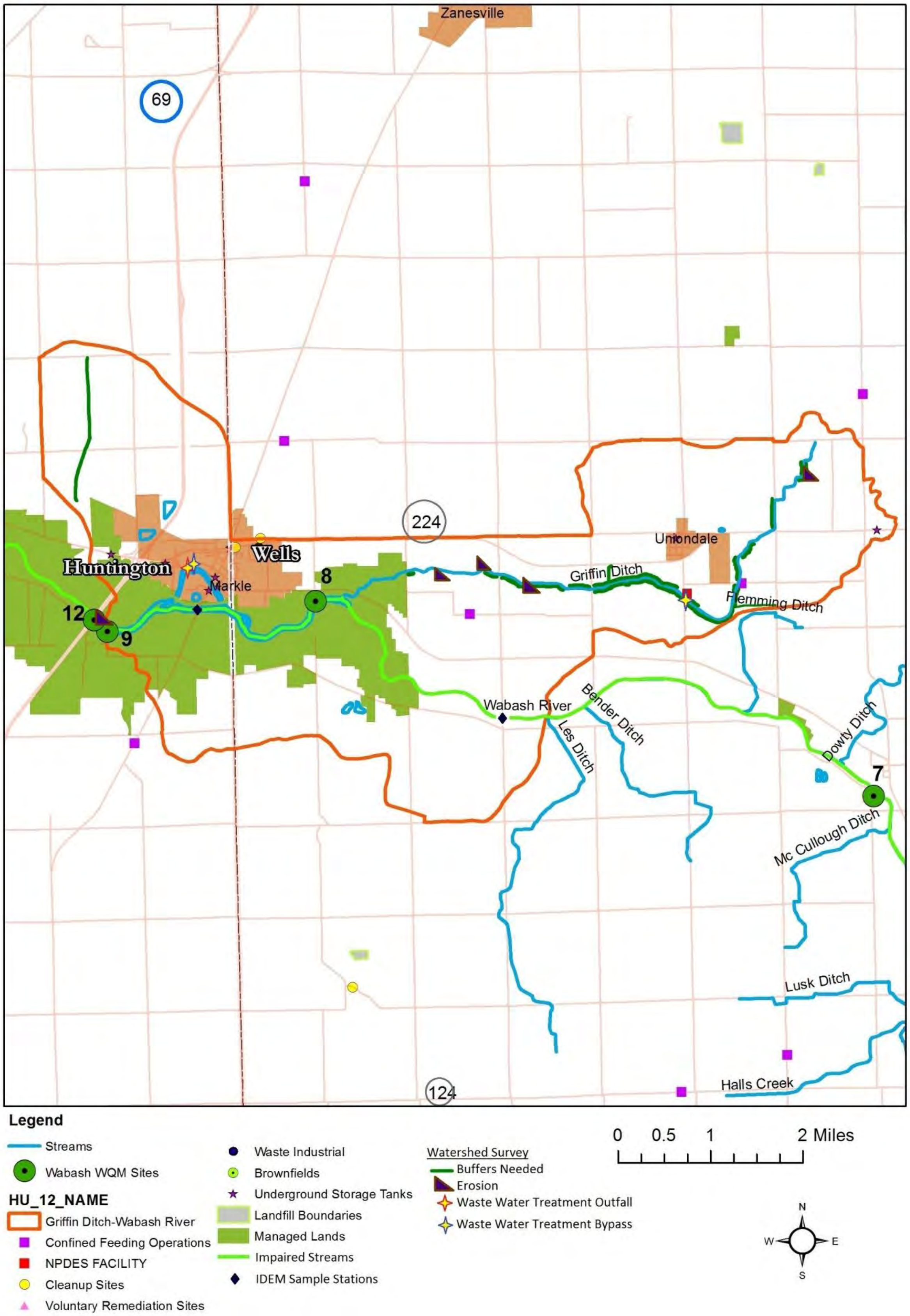
Nitrate samples ranged from 0.11 mg/L to 41.18 mg/L, more than four times the target level, and exceeded the target in nine out of eleven samples (81.8%), and had an average concentration of 18.86 mg/L. Total nitrogen results exceeded the target in three samples, but nitrite results did not exceed the target in any sample. The total phosphorus results exceeded the target in eight out of eleven samples (72%) and had an average concentration of 0.411 mg/L, which is over the target. *E. coli* results only exceeded the target in four samples, but still had an average concentration of 503 cfu/100mL, which is over two times the target for full body contact.

Only one habitat evaluation and biological study was completed at this site. The river has large rocks and boulders on the bottom that is smothered and silted, but a variety of in-stream habitat exists. Underwater tree roots, downed trees and logs, shallow areas, overhanging shrubs and trees, and riffles and runs all contribute to a diverse aquatic community. The banks are stable and the riparian area is forested wetlands. The habitat score was well above the minimum target to be rated as good for aquatic health. The macroinvertebrate collection revealed an abundance and variety of organisms at this site. The majority was pollution intolerant organisms and as such, the site received an excellent rating.

Site 12 on the Wabash River is downstream from the mouth of the Rock Creek, and represents the combined drainage for the Wabash River and Rock Creek watersheds. Data was collected during 11 monitoring events. The dissolved oxygen level exceeded the target on one occasion during a time of increased flow. The dissolved oxygen saturation levels exceeded 100% on four occasions. Turbidity exceeded the target in ten samples over all flow conditions. Nitrate levels exceeded the target in seven samples, ranging from 0.06 mg/L to 44.62 mg/L. Nitrate levels met the target only during low flow. Total nitrogen results exceeded the target of 10 mg/L in only one sample during moist conditions. Total phosphorus levels exceeded the target in three samples, during moist and dry conditions and during low flow. *E. coli* results were exceeded 50% of the time during mid-range flow, dry conditions, and low flow, and had an average concentration of 433 cfu/100mL, above the 235 cfu/100mL target for full body contact.

Habitat evaluations and macroinvertebrate collections were conducted two times at this site. Similar to the conditions at site 9, this site averaged 89.5 on a scale of 100 for habitat, and macroinvertebrates scores ranked good and excellent.

Figure 59: Griffin Ditch–Wabash River, HUC 051201010804



4.2.5 Griffin Ditch-Wabash River 10-digit HUC (HUC: 0512010108) Watershed Summary

Seventeen miles of the scenic Wabash River are included in the Griffin Ditch-Wabash River subwatershed. The watershed contains at total of 117 stream miles. The entire main stem of the Wabash River in the watershed is included on the 2012 IDEM 303(d) list of impaired waters due to *E. coli* and nutrients. This watershed also includes over 2,800 acres of fish and wildlife areas and nature preserves. Approximately 80% of this subwatershed (46,271 acres) is used for agricultural purposes with row crops being the dominate use. Fall tillage operations were observed during the windshield survey and it is estimated that conventional tillage is performed on 50% of the crop acres. This watershed also contained some cover crop fields and several pasture/hay areas. Eleven confined feeding operations (CFOs) are located within the watershed. Ten of these CFO facilities are located less than a half mile from a stream.

The riparian area along the Wabash River tends to be greater than 30 feet in width. It was noted during the windshield survey that there are more forested areas, including fence rows and field borders in this subwatershed, believed to be due to the amount of floodplain present along the river corridor. Many of the streams also have forested riparian areas, but some of them are narrow and not as effective as they could be. In-stream, stream bank and gully erosion was identified at 16 sites in this watershed. Based on the IndianaMap GIS website, it is estimated that an additional 35 miles of buffer or filter strips would benefit the watershed area. The desktop survey also noted 25 grassed waterways within the watershed totaling over 18 acres.

The Wabash River runs through the City of Bluffton, which covers a total area of 8.36 square miles (5,350 acres). The City of Bluffton contains approximately 9,900 people, the largest population center in the project area, with 4,532 housing units, and over 500 businesses, which include various industrial sites. The towns of Markle (population 1,095) and Uniondale (population 310), and unincorporated communities of Murray and Kingsland are also located within the watershed. The developed areas total 6,944 acres which is 12.03% of the watershed. In the rural areas of the watershed, the number of houses average eight per square mile, but the areas adjoining the Bluffton city limits averages 18 homes per square mile, and the western part of the watershed, north of the Wabash River averages 13 homes per square mile. Based on these estimates, there are more than 925 homes in the watershed that have on-site waste water systems that may be contributing nutrients and bacteria to the local streams. The city of Bluffton and town of Markle operate traditional waste water treatment facilities, and the town of Uniondale has a wetland treatment system. Recent NPDES reports show that Bluffton, Markle and Uniondale have all had wastewater discharges to the Wabash River. There are a total of nine NPDES facilities in the watershed; ten industrial waste sites, two Brownfield remediation sites, and four remediation clean-up sites.

Stakeholders identified concerns related to urban development, including residential runoff from chemically treated lawns (fertilizers and pesticides), construction site and road construction erosion causing sedimentation, runoff from asphalt streets and parking lots, lack of green space and dumping and trash in the river and streams. Observations during the windshield survey of the watershed area confirmed these issues as possible contributions of pollutants. Other items noted during the surveys include streams adjacent to or crossing two golf courses, and an active stone quarry, which presents unique concerns for the watershed. Additionally, there are approximately 353,437 acres in the Upper Wabash River Basin located upstream of this subwatershed that contributes pollutants to the project area.

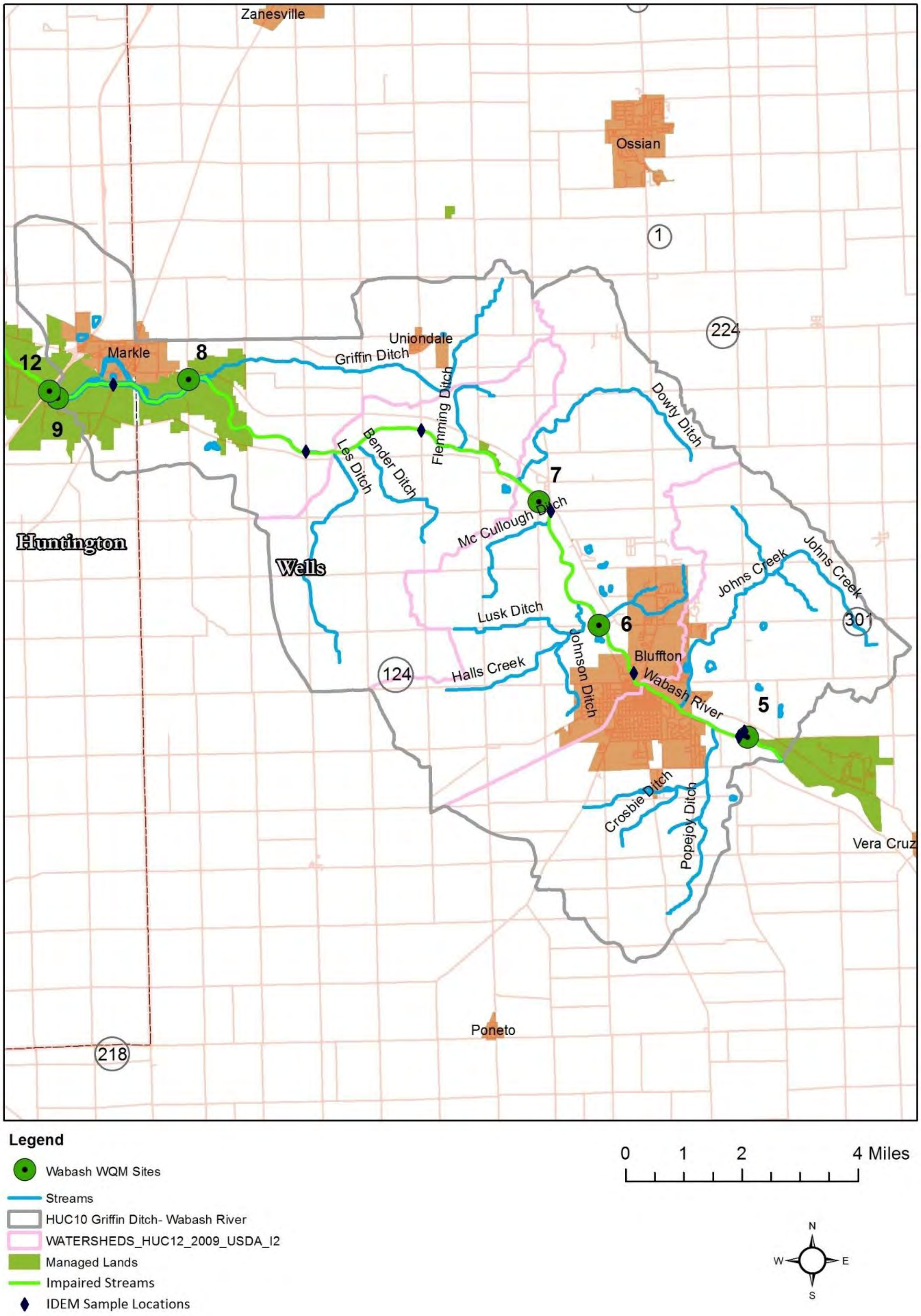
The water quality monitoring data indicate that *E. coli*, nutrients and turbidity are the main concerns in this subwatershed. Due to the size of the river, you would expect that the volume of water would dilute contaminants; but that does not appear to generally be the case. The *E. coli* average concentrations ranged from 433 cfu/100 mL to 605 cfu/100 mL. These levels were above the state water quality standard for full body contact 71% of the time, suggesting that there are continuous inputs of *E.coli* along the entire length of the Wabash River in the project area. The majority of occurrences were at a time of normal to low flow during late fall and again during the summer months. The high flow event on 3/15/14 yielded no test results over the target on the Wabash River; suggesting *E. coli* levels were diluted and resulted in all sites meeting the water quality standard on this date.

Total nitrogen and nitrates, as well as total phosphorus levels have been over the water quality targets throughout the monitoring period. Total nitrogen samples had exceedances 21% of the time, while the nitrate target was exceeded in 63.3% of the samples. The nitrate average concentrations ranged from 15.37 mg/L to 20.34 mg/L, which is 1.5 – 2 times the target level. Total phosphorus exceeded the target concentration in 59.4% of the samples. It is believed that some of these nutrients are coming from human activities in the populated areas along the river, such as lawn care and urban runoff, but seasonal occurrences also point to agricultural activities and septic discharges.

Turbidity measurements were over the target level for fish and macroinvertebrate health 96% of the time throughout the monitoring period. The average concentrations ranged from 175.58 – 197 NTUs for the sites in the rural landscape. The one exception was site 12 in the DNR fish and wildlife area where the turbidity average concentration was 71.22 NTUs, which is still nearly three times higher than the target level. This is due to a combination of sediment, organic matter and algae present in the river. This is further supported by the dissolved oxygen saturation levels. They tend to be lower during the winter-spring season staying within the state standard; then rising to levels of super saturation during the summer-fall cycle. This suggests that those levels are affected by seasonal occurrences of plant and algae growth which is fueled by excessive nutrients.

The habitat evaluations on the Wabash River list the substrate as being large size rock and boulders with some bedrock locations, but all sites were rated as silted and smothered with undercut banks. The riparian areas varied from medium to wide with a combination of forests, grasses, row crops, and urban areas. Site 6, downstream from the City of Bluffton, scored the lowest on the evaluation due to siltation and erosion, narrow riparian areas, and man-made alterations at the site. The macroinvertebrate pollution tolerance index ranked the Wabash River sites ranging from good to excellent, except for site 6 which received scores of poor and fair, and seems to be impacted the most by urban influences mentioned above.

Figure 60: Wabash River-Griffin Ditch (HUC: 0512010108) Watershed



4.3 Subwatersheds of the Eight Mile Creek Watershed

4.3.1 Maple Creek-Eight Mile Creek HUC 051201010901

Maple Creek subwatershed is the most rural in the Eight Mile Creek Watershed. It contains 12,420 acres, over 19 miles of streams, and approximately 32 miles of county tile. It is estimated that 13 miles of streams lack buffer areas, and gully erosion was identified at two locations.

The dominate land use is agricultural farming and livestock operations. Cropland and pastures total over 11,103 acres, or 89% of the area. Forests and wetlands make up almost 5% of the subwatershed (589 acres), and the rest is rural homes, farmsteads and rural communities. The landscape is relatively flat in this subwatershed, with approximately 2,240 acres (18%) that are classified as HEL/PHEL, and soils that are not suited to on-site septic systems. An estimated 5,400 acres were planted by conventional tillage and one manure stockpile was observed during the windshield survey. Cover crops are known to be used by farmers in this area. There are five CFOs listed for this subwatershed, however one site has been voided. The remaining four CFOs house over 13,260 animals. Approximately 66 unregulated animal operations and hobby farms have beef and dairy cattle, swine, horses, chicken, turkeys and ducks totaling approximately 33,880 additional animals.

This subwatershed includes the small unsewered communities of Craigville (65 acres) and Tocsin (90 acres). There are estimated to be 293 rural residences with on-site septic systems in this subwatershed that are potentially contributing pollutants to the streams. Only one NPDES clean-up site is within the subwatershed boundaries, and no compliance issues were found for this site.

Historical water monitoring data was not found for this subwatershed, therefore the review of this project water quality monitoring data at sites 3 and 4 is the only available date used to evaluate the contributions from this area. Site 4 is near the middle of the subwatershed and site 3 is less than a mile downstream from the subwatershed boundary.

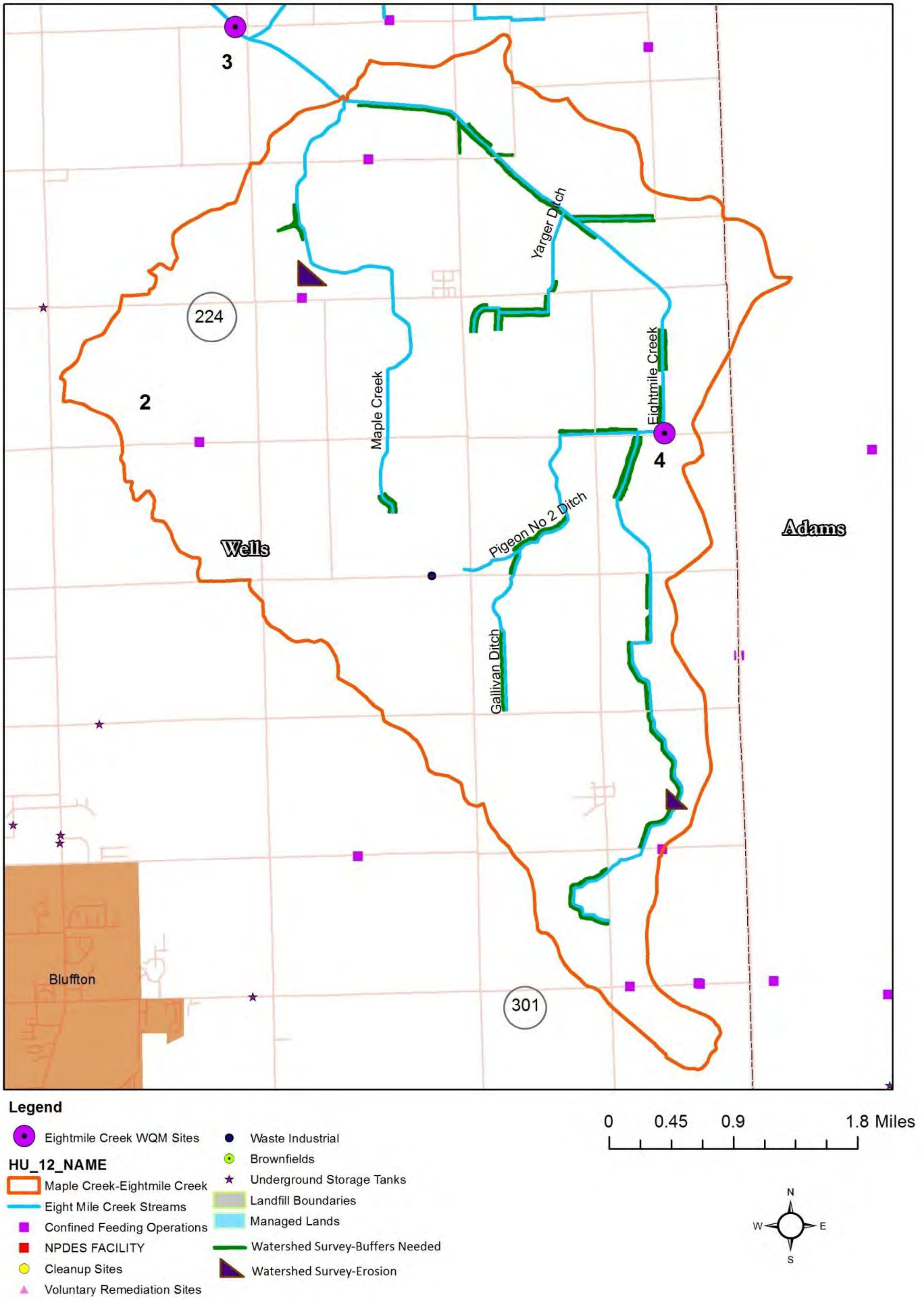
A total of 12 samples were collected at both sites during the monitoring program. Dissolved oxygen levels exceeded the maximum target in two samples at site 4 and one sample at site 3, during dry low flow periods in both hot and cold weather conditions. Dissolved oxygen saturation levels exceeded 100% in three samples at site 4 and four samples at site 3 in June, July, August and September during dry low flow and moist periods when the weather was hot. Turbidity exceeded the target for aquatic health in seven of the 12 samples at both site 3 and 4 throughout the monitoring period. Turbidity at both sites is over three times the target level, which can also contribute to the exceedances of the dissolved oxygen and dissolved oxygen saturation tests.

Nitrate results at site 4 ranged from 0.04 mg/L to 46.9 mg/L; and results at site 3 ranged from 0 mg/L to 35.46 mg/L. Both sites exceeded the water quality target in seven out of 12 samples (58%). The total nitrogen target was exceeded in two samples at site 4, one during moist conditions following a wet weather event and the other at low flow following spring planting. Site 3 had one exceedance of the total nitrogen target following a wet weather event. Total nitrogen average concentration at site 4 was 18.7 mg/L, and at site 3 was 16.8 mg/L; both one and a half times the target for water quality. Both sites also exceeded the total phosphorus target in four samples throughout the monitoring project. Results ranged from 0.06 mg/L to 1.32 mg/L at site 4, and from 0.05 mg/L to 0.71 mg/L at site 3. The exceedances occurred during high flow events and in fall to early winter periods, suggesting phosphorus in surface runoff as the cause for the exceedances.

E. coli is also a concern for this subwatershed. *E. coli* exceeded the target for full body contact in seven of the 12 samples (58%) at site 4, with the highest recorded result of all the monitoring sites (3,800 cfu/100mL) occurring on the 11/1/13-11/3/13 monitoring date following a rain event. The *E. coli* target was exceeded across all flow conditions. Site 4 also had the highest average concentration of *E. coli* at 766 cfu/100ml, indicating that surface and tile drainage are contributing to the pollutant load. Site 3 had similar *E. coli* test results, but on a smaller scale. The target was exceeded in eight out of 12 samples (66%) and exceedances were across all flow conditions; however the range of results were lower in comparison, from 0 cfu/100mL to 1,800 cfu/100mL, and the average concentration was 441 cfu/100mL.

Habitat evaluation and biological studies were completed once each year at both sites. The substrate is considered small and fine rock that is silted and smothered. The monitoring sites are shallow and there is very little in-stream habitat, only some occasional larger rock and undercut banks. The banks are stable to eroding, steep and grassed, but void of trees or shrubs for shading. Riffles and runs are non-existent or of minimal size and effect. The riparian area consists of narrow filter strips with row crops beyond. The stream is designed as a drainage ditch and maintained for that purpose. The habitat score for both sites were below the target that would be considered conducive to warm water fauna. As with some of the other monitoring sites, initially the sites rated poor to fair on the macroinvertebrate collection index. However, by the second assessment, both sites improved in both number and variety of specimens collected and received a good rating.

Figure 61: Maple Creek-Eight Mile Creek, HUC 051201010901



4.3.2 Moser Lake-Eight Mile Creek HUC 051201010902

The Moser Lake subwatershed of the Eight Mile Creek encompasses 12,421 acres; nearly the same amount as the Maple Creek subwatershed. There are almost 18 miles of streams in the subwatershed, and over 20 miles of county drainage tile. Buffers are lacking on approximately 12 miles of streams. Five 2-stage ditches are in this subwatershed on the Eight Mile Creek. The entire 6.5 miles of the Eight Mile Creek in this subwatershed is on the 2012 Indiana 303(d) List of Impaired Waters due to *E. coli* and impaired biotic communities.

Cropland and pasture/hay land is the primary land use on over 10,314 acres (83%). Over 4,284 acres (34%) are classified as HEL/PHEL. Forests (557 acres) and wetlands (125 acres) account for just over 5% of the area. Conventional tillage is estimated on 49% of the crop land (5,000 acres). There are five grassed waterways in this subwatershed totaling over 8 acres of conservation cover. Three CFOs are listed for this subwatershed, but one permit has been voided. The remaining two CFO sites house approximately 2,000 swine, and 680 veal cattle. There are approximately 58 unregulated livestock operations and hobby farms located in the subwatershed with an estimated 12,400 additional animals, including: beef and dairy cattle, swine, horses, chicken and ducks. Field observations noted conventional tillage, a manure stockpile and cover crops in the subwatershed area. The Wells Co. Surveyor has installed 2-stage ditches in this subwatershed. Four are located within the Town of Ossian on the Eight Mile Creek, two east of State Road 1 and two west of State Road 1; and the fifth 2-stage ditch site is on the Eight Mile Creek east of CR 1000N.

The urban area includes the town of Ossian, part of the rural community of Kingsland and rural homes on 1,304 acres, or almost 11% of the subwatershed. The town of Ossian operates a waste water treatment plant (NPDES facility) that serves the 1,385 homes, and 110 businesses and manufacturing facilities; however, a number of reported sewage treatment overflows impact the water quality in the Eight Mile Creek. Two additional NPDES facilities are listed as being in the subwatershed, but records indicate that they have both been terminated. The Ossian town dump is noted to be along the Eight Mile Creek, but it has not been open for a number of years, and no information was found for the site. Visual counts estimate 369 rural residences with on-site septic systems, but the soils are defined as being unsuitable for these systems. Three industrial waste clean-up sites are also within the town of Ossian. No compliance issues were found for these sites.

A total of ten locations in the Moser Lake subwatershed have been sampled by IDEM. Four sites are located on the Eight Mile Ditch east of State Road 1 next to the Brook Ridge Estates subdivision and five sites are within the Town of Ossian on the west site of State Road 1. The only site outside of Ossian to be sampled was Moser Lake located near CR 100E and CR1000N.

Moser Lake was monitored for chemistry in 1991, 1996, and 1999. Dissolved oxygen saturation levels ranged from 5.5 % – 47.3%, all considered low for fish and aquatic health. Dissolved oxygen fell to 0.5 mg/L on one event, well below the 4.0 mg/L minimum target, and exceeded the maximum target of 12 mg/L during another event. Total phosphorus had one exceedance of the suggested target.

The 1998 monitoring results at the site between Lafever and Mill Streets show that water quality targets were exceeded for nitrogen ammonia, total phosphorus, and turbidity. The macroinvertebrate community was mostly comprised of midges and worms that are fairly tolerant to pollution; and the diversity of taxa in the sample was low. The fish survey also included a majority of pollution tolerant species including: carp, creek chub, green sunfish, yellow bullhead catfish, minnows and shiners.

During 2003, one site on the Eight Mile Creek east of State Road 1 was monitored for chemistry, macroinvertebrate communities and a fish survey. Four turbidity measurements ranged from 34.6 – 110 NTUs, and exceeded the recommended target of 25 NTUs for the protection of macroinvertebrate and fish health. The macroinvertebrate collection identified a higher abundance of sediment tolerant organisms present, compared to the number of pollution intolerant mayflies, and caddis flies. Overall, the diversity of the community was very low. The fish survey also resulted in a number of pollution tolerant species, including: orange spotted sunfish, green sunfish, yellow bullhead catfish, creek chubs, and minnows and shiners. A second site on the Wm. Smith drain, a tributary to the Eight Mile Creek near Wood Creek Drive, was sampled for chemistry. At this site, *E. coli* exceeded the target in three single samples; however the geometric mean of the five samples collected over the 30-day period met the geometric mean target. Turbidity exceeded the water quality target in all samples.

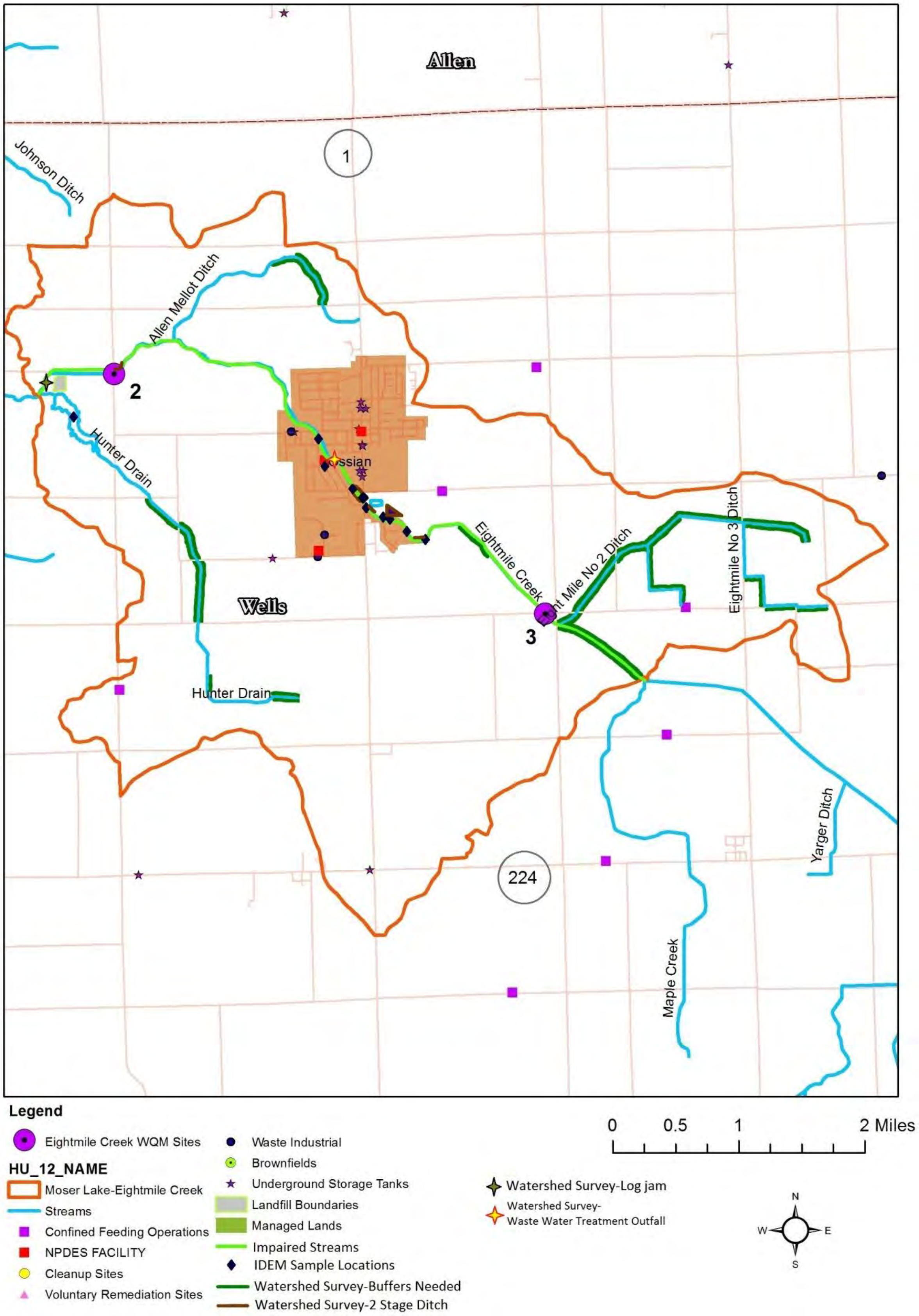
In 2005, chemistry samples were collected at three stations on the Eight Mile Creek east of State Road 1, and at the State Road 1 Bridge, the Wm. Smith drain near Eight Mile Creek, and east of Lynn Drive near the Ossian waste water treatment plant. The monitoring on Eight Mile east of State Road 1 resulted in: four exceedances of the *E. coli* target, ranging from 240 cfu/100ml to 87,000 cfu/100mL; nitrogen ammonia exceeding the target of 0.21 mg/L with a result of 10.2 mg/L; and total phosphorus measuring 1.77 mg/L, exceeding the target of 0.3 mg/L. The State Road 1 Bridge site had an exceedance of the dissolved oxygen saturation level, but all other tests were within the recommended standard. The Wm. Smith drain recorded a dissolved oxygen result of 17.77 mg/L, in exceedances of the 12 mg/L target; dissolved oxygen saturation at 197.4%; and turbidity result of 99 NTUs, above the target for aquatic health. The site east of Lynn Drive recorded exceedances of the water quality target for *E. coli* at 980 cfu/100mL (four times the target level); nitrogen ammonia at 3.8 mg/L (18 times the target), and total phosphorus at 4.23 mg/L (14 times the target).

Current water quality monitoring used to evaluate this subwatershed was conducted at site 2 at CR 1000N at a 2-stage ditch location. Monitoring samples were collected a total of 14 times throughout the monitoring project. Dissolved oxygen levels exceeded the maximum target in five samples under moist, dry and low flow conditions, in both extremely warm and cold weather. Dissolved oxygen saturation levels exceeded 100% in eight samples out of 14 (57%) during both warm and cold weather and across the various flow conditions except during high flows. Turbidity exceeded the target for aquatic health in only four of the 14 samples during mid, moist and high flow conditions.

Based on the monitoring data, nutrients and *E. coli* have proven to be concerns at this site. Nitrate results exceeded the water quality target in all samples. The average concentration was the highest in the entire project area at 34.48 mg/L, more than three times the water quality target level. The nitrite target was also exceeded in one sample, which was the only site in this subwatershed to exceed the target for Nitrite. This site also had the most exceedances of total nitrogen in the project, with five samples out of 12 (41%) exceeding the target. Total phosphorus results exceeded the water quality target in seven samples out of 12 (58%), and the average concentration was 1.09 mg/L, which is also three times the target level. *E. coli* exceeded the target for full body contact in eight out of 14 samples (57%), with an average concentration of 552 cfu/100mL. The exceedances occurred across all flow conditions. The samples with the three highest results occurred in November of each year under moist, mid-range flow and dry conditions. It is believed that overflows from the Ossian waste water treatment facility are having a dramatic impact on the test results at this site.

Habitat evaluations and biological studies were completed twice each year. This location is a site of a 2-stage ditch. The stream substrate is small to medium rock that is silted and smothered. In-stream habitat consists of aquatic plants and undercut banks with riffles and runs. The banks are generally stable with minimal erosion, and small trees and shrubs overhang the stream. The riparian area on one side of the stream is wide and constructed as a 2-stage ditch with established grass and residential property and cropland in the upland area. The other side is a steep bank with a narrow tree line that separates the stream from adjoining residential property. Just downstream, concrete construction debris has been placed on the bank, possibly in an attempt to stop erosion. Large trees have become unstable and fallen into the creek. The macroinvertebrate collections have received index ratings of good and excellent due to the variety and abundance of organisms present at the site.

Figure 62: Moser Lake-Eight Mile Creek, HUC 051201010902



4.3.3 Big Creek-Eight Mile Creek HUC 051201010903

Big Creek subwatershed contains 11,414 acres and is the most rural in the Eight Mile Creek watershed. A total of almost 24 miles of streams and 14 miles of county tile drain the subwatershed area. Most of the streams have adequate buffer strips and riparian area, however it is estimated that just over 9 miles are unbuffered. Severe bank erosion observed at two locations in this subwatershed is estimated to total 500 feet. Gully erosion was also observed at one site.

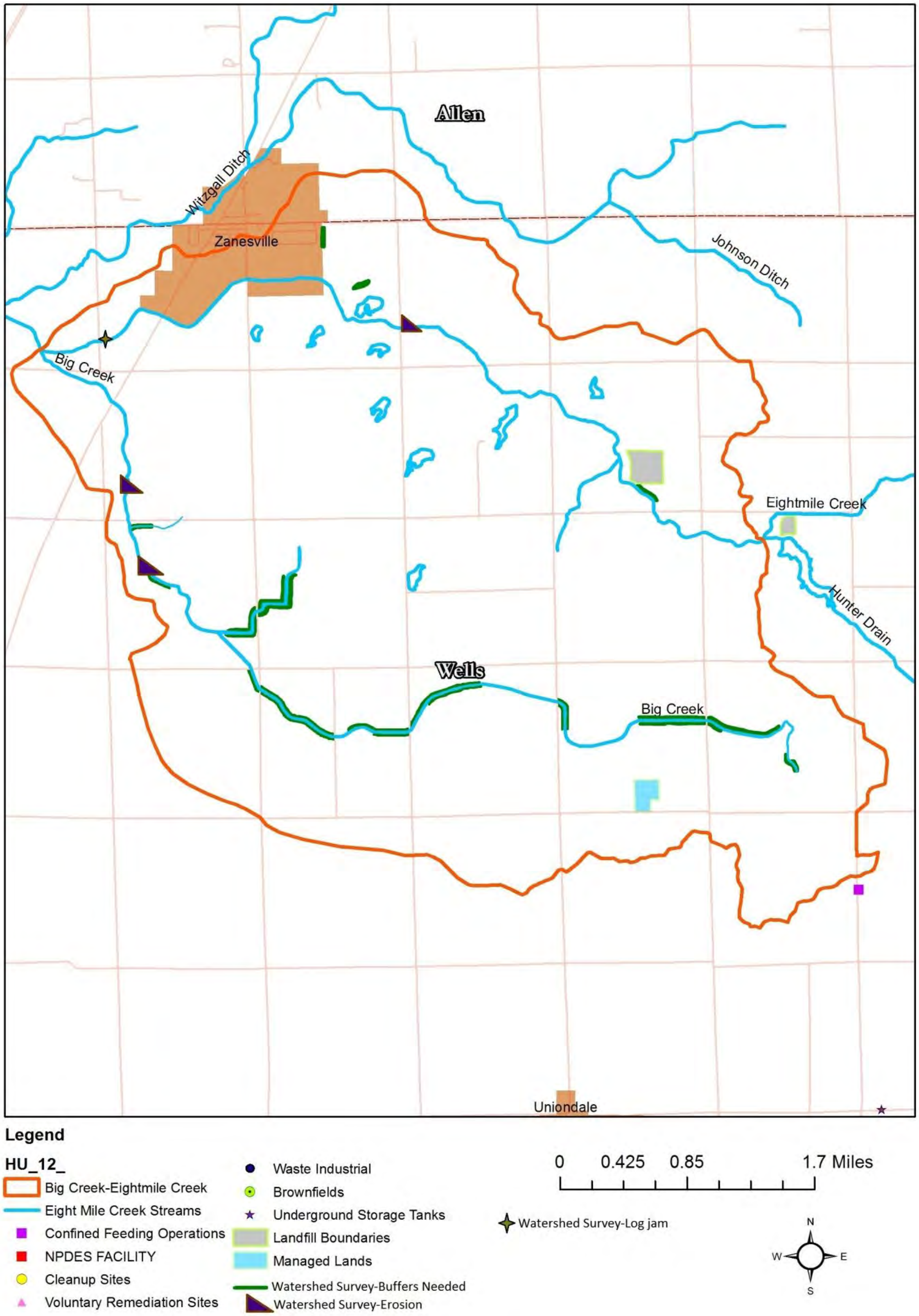
Agriculture is the dominate land use with cropland (9,065 acres) and pasture/hay lands (317 acres) accounting for 82.1% of the area. Forests cover over 988 acres (8.6%) and wetlands total 262 acres (2.2%). The largest percentage of HEL/PHEL soils in the Eight Mile Creek watershed are contained this subwatershed, at 5,908 acres (52%). Based on the 2013 tillage transect, it is estimated that 4,000 acres are conventionally tilled, but varies from year to year based on crop rotations due to landowners using reduced tillage or no-till on soybeans, but conventional tillage on corn. Approximately 650 acres of Conservation Reserve Program grass plantings were noted during the windshield survey. The desktop survey noted eleven conservation grass waterways in this subwatershed totaling over 15 acres. There are 97 unregulated livestock operations or hobby farms containing over 138,000 animals, including beef and dairy cattle, swine, horses, chickens turkeys and ducks. There are no CFOs in this subwatershed.

This subwatershed contains over one-half of the town of Zanesville (345 acres) which is serviced by a waste water treatment facility outside the project area. However, other common urban pollution sources, such as erosion from increased quantity and velocity of stormwater runoff, fertilizer use on lawns and parks, and contaminants from oils, road salts, etc. are still concerns in this subwatershed. The Northern Wells Landfill is located next to the Eight Mile Creek. It is a closed facility that continues to be monitored and inspected on a routine basis and no current compliance issues were noted. There are no NPDES sites in the subwatershed. Approximately 380 rural homes and farmsteads have on-site septic systems that are potentially contributing nutrients and pathogens to the streams.

IDEM does not have any monitoring locations in this subwatershed; however, a site is located approximately one-half mile downstream in the Pleasant Run Ditch-Eight Mile Creek subwatershed that is discussed in the next section.

Due to the locations of this projects water quality monitoring test sites, data is not available that is specific to this subwatershed; therefore the Big Creek subwatershed was combined with the Pleasant Run Ditch subwatershed for the purpose of evaluating and discussing the monitoring data. Data collected at site 1 is used as the indicator of the accumulated drainage area from the Big Creek and Pleasant Run Ditch-Eight Mile Creek subwatersheds. A review of the data results for this combined area is included in the Pleasant Run Ditch-Eight Mile Creek subwatershed section (Section 4.3.4 on page 139).

Figure 63: Big Creek-Eight Mile Creek, HUC 051201010903



4.3.4 Pleasant Run Ditch-Eight Mile Creek HUC 051201010904

Pleasant Run Ditch subwatershed encompasses 15,437 acres and is the largest subwatershed in the Eight Mile Creek watershed. There are approximately 29 miles of streams and 14 miles of county drainage tile. Buffers and riparian area is prevalent throughout the area, but eight miles of unbuffered streams would benefit from filter strips. In-stream and gully erosion was noted at three locations. The 5.6 miles of the Eight Mile Creek that runs through this subwatershed is on the 2012 Indiana 303(d) List of Impaired Waters due to impaired biotic communities.

Land use includes 11,623 acres of cropland (75%), 648 acres of pasture and grass plantings (4.2%), 1,151 acres of forest (7.4%), 310 acres of wetlands (2%), and 1,465 acres of urban area. Soils classified as HEL/PHEL cover 4,617 acres (29.9%). Farm operators use more reduced tillage and no-till in this subwatershed compared to the rest of the Eight Mile Creek watershed. Based on 2013 transect tillage reports, an estimated 4,200 acres (36%) are conventionally tilled. Nine conservation grass waterways totaling approximately seven acres are located in this subwatershed. There are no CFO facilities, but 133 livestock operations and hobby farms house over 43,000 animals; including beef and dairy cattle, swine, sheep, horses, chickens, turkey and ducks. Three locations of dairy cattle in feed lots and pastures in upland areas to nearby streams were observed during the windshield survey.

This subwatershed contains the remaining portion of the town of Zanesville (218 acres), and the large industrial area that includes the General Motors facility at the I-69/I-469 interchange on an estimated 678 acres. The same urban pollution concerns apply to this subwatershed as were detailed in the Big Creek section (4.3.3) above. There are seven underground storage tank sites (4 not leaking, 3 leaking), and three industrial waste sites in the area. Rural residences are more concentrated in this subwatershed due to the proximity to employment and amenities offered by nearby Fort Wayne, IN. On-site septic systems in this subwatershed service approximately 594 rural homes and farmsteads.

IDEM has two monitoring stations in this subwatershed. One station is located on the Witzgall Ditch between Indianapolis and Feighner Roads in Allen County, IN. This site was sampled in 1998. The chemistry resulted in exceedances of the water quality targets for nitrogen ammonia (14 mg/L), and nitrogen, nitrate+nitrite (13 mg/L). The macroinvertebrate collection lists the predominant organisms as the fairly tolerant midges and pollution tolerant aquatic worms; however the overall sample contained a large variety of different taxa that are intolerant to pollution. The fish survey also shows a variety of species, from the pollution tolerant creek chub and green sunfish to the fairly intolerant Johnny darter and sand shiner. The second location monitored in this subwatershed is on the Eight Mile Creek at CR 500W in Wells County. Chemistry and macroinvertebrate assessments were conducted in 1991, and again in 2004. All chemistry results met the recommended target. In 1991, the macroinvertebrate community was dominated by midges, which are fairly tolerant to pollution; however mayflies, caddis flies, and riffle beetles that are intolerant to pollution were also present in the sample. The 2004 sample was dominated by caddis flies and mayflies, and included midges, and black flies.

The current the water monitoring results from location site 1 for this project are used to evaluate both the Pleasant Run Ditch and Big Creek-Eight Mile Creek subwatersheds. Samples were collected on 12 events throughout the monitoring project. Dissolved oxygen levels exceeded the maximum water quality target in only one sample that occurred on 4/25/14-4/26/14 following a wet weather event. Dissolved oxygen saturation levels exceeded 100% in four samples out of 12 during both warm and cold weather and across various flow conditions. Turbidity exceeded the target for aquatic health in five samples out of 12. The exceedances occurred under high flow, moist and dry conditions. The average concentration for Turbidity was 84.49 NTUs, which is over three times the target level.

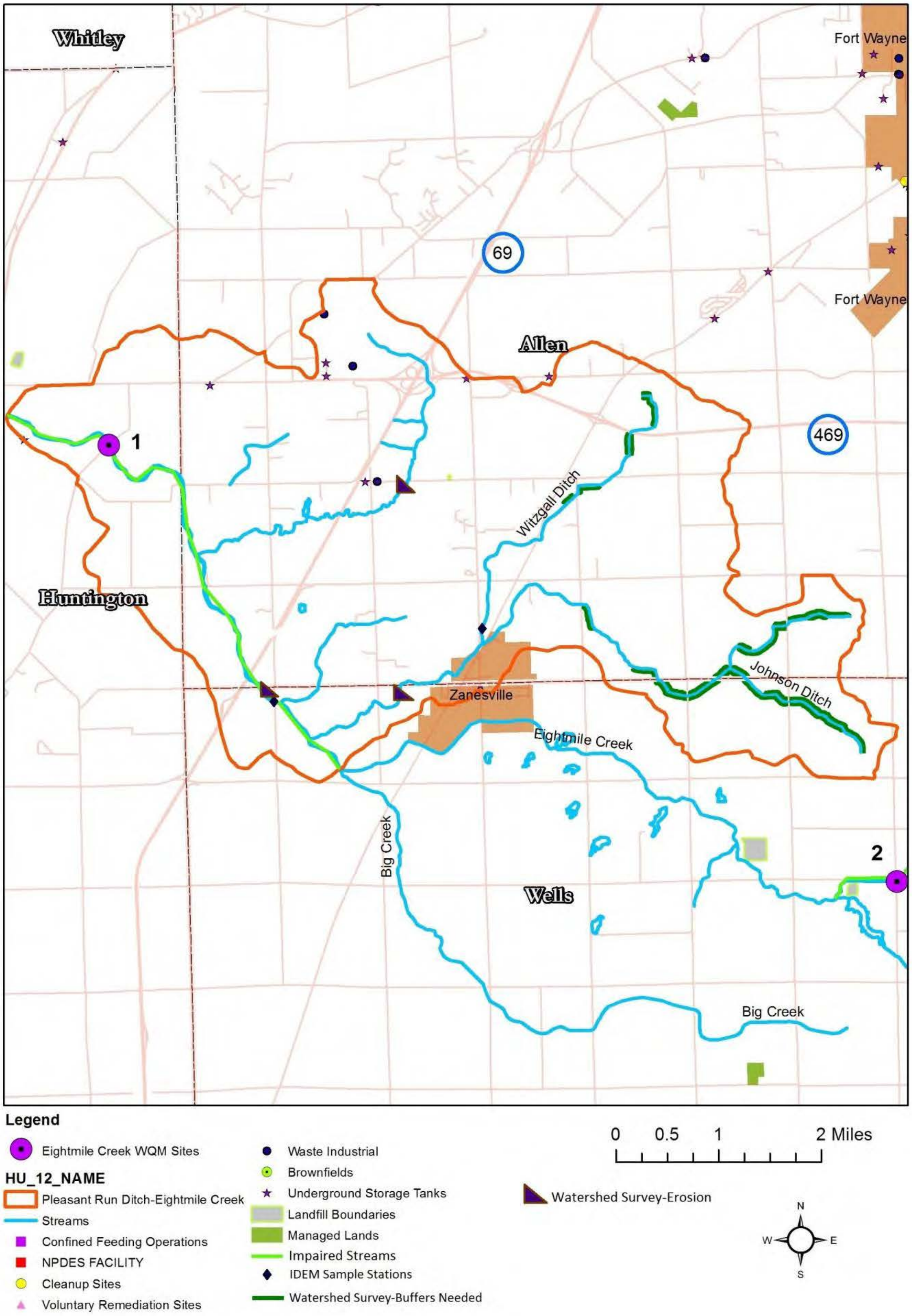
Site 1 exceeded the nitrate target in five samples out of 12 (41%), which was the lowest number of exceedances when compared to the other Eight Mile Creek sites. The nitrate average concentration was 9.34 mg/L, meeting the water quality target as well as being the lowest concentration of all the monitoring sites in the project area. The total nitrogen results exceeded the target on one occasion, on 4/5/14 which was due to spring melt. The total phosphorus tests exceeded the target level in four samples out of 12 (33%). The exceedances coincide with fall agricultural activities, and spring runoff during wet weather events. In general, when comparing the Eight Mile Creek monitoring results for these nutrients, this site has less exceedances and lower concentrations than the other sites. This may be due to the increased amount of buffers, forest, wetlands and conservation areas; or may be due to dilution of the pollutants by the time they reach this site.

E. coli exceeded the target for full body contact in seven out of 14 samples (50%), with an average concentration of 497 cfu/100mL. The exceedances occurred across all flow conditions. The samples with the three highest results occurred in August and November under dry and moist conditions, indicating both inputs from surface and sub-surface sources.

Habitat evaluations and biological studies were completed two times during the monitoring program (9/12/13 and 9/6/14). In the initial assessment, the stream substrate had both small and large rock that was silted, and the in-stream habitat consisted of roots, aquatic plants and undercut banks with riffles and runs. The banks were a combination of stable and eroding, with trees over hanging and shading the stream. The riparian area was a forested buffer with grass filter strip adjoining row crops and residential property. The ranking for the site resulted in a good rating meaning that it was conducive for warm water fauna. When the second evaluation was completed, the site had dramatically changed. Ditch maintenance had been completed on approximately three miles of the stream. All trees on the banks and in the buffer area had been cut and cleared. The stream bottom was now very sandy, and most of the in-stream habitat was removed. The riparian area was now void of grass and trees, just bare soil. It was not apparent if seeding had yet occurred. This time the site received a rating below the water quality target.

During the first macroinvertebrate collection, only a few organisms were found which resulted in a rating of fair. On the second event, a variety of organisms from the various groups were collected, resulting in an improved score and a rating of excellent. It was expected that the results would have been much less due to the recent habitat alterations, but that did not seem to be the case. It was suggested that maybe the removal of sediment during the ditch maintenance actually improved the conditions for the macroinvertebrates. This site will continue to be monitored to further evaluate the changes in the habitat and biotic communities.

Figure 64: Pleasant Run Ditch-Eight Mile Creek, HUC 051201010904



4.3.5 Eight Mile Creek 10-digit HUC (HUC: 0512010109) Watershed Summary

The Eight Mile Creek watershed contains over 112 miles of streams and ditches, and approximately 6.5 miles of the Eight Mile Creek are listed on the 2012 Indiana 303(d) List of Impaired Waters due to *E. coli* and impaired biotic communities, and another 5.6 miles is listed due to impaired biotic communities.

Agriculture is the primary land use on approximately 85% of the land area (43,956 acres). This watershed contains the largest amount of grasslands (909 acres) and pasture/hay land (1,071 acres) in the Upper Wabash River Phase 2 project area. There are six CFOs in the watershed, all in the eastern, more rural part of the watershed, and all are located within a half mile of a stream. As with the rest of the project area, fall tillage was observed during the windshield survey and conventional tillage is estimated on 18,600 acres (42%), however more cover crops fields were established in this subwatershed.

The western portion of this subwatershed is more rolling and has more slope than the rest of the nearly flat project area. The windshield survey revealed that a larger portion of the grasslands, pastures/hay land and woodlands are located in this area. The desktop survey showed 31 grassed waterway have been installed on approximately 33 acres to reduce the erosion from farm fields entering the streams; however, over 1300 feet of stream bank erosion and was observed in the Big Creek subwatershed. The majority of the streams have filter strips, but based on the windshield and desktop surveys, it is estimated that the installation of approximately 52 miles of additional buffer areas would be a benefit to the watershed. A 2-stage ditch (1,750 feet) was installed in 2012 on the Eight Mile Creek by the Wells County Surveyor's office and this location is a water quality monitoring site. It will be assessed for the possible benefits to water quality, and as an option to reduce flooding. It was discovered that four additional 2-stage ditch areas are located on the Eight Mile Creek in the Town of Ossian.

The urban areas in this subwatershed are the towns of Ossian (population 3,289) and Zanesville (population 600), and smaller communities of Tocsin and Craigville. The town of Ossian operates a municipal waste water facility to service the 1,385 homes, and 110 businesses and manufacturing facilities. There are three NPDES permitted facilities and seven industrial waste sites within the watershed. NPDES reports show that the town of Ossian waste water treatment plant has had overflow discharges to the Eight Mile Creek three times in the last year due to storm events or equipment issues. The North Wells landfill also borders the Eight Mile Creek. The landfill was capped in 1995, but continues to be inspected. Past landfill inspection reports have listed sparse vegetation and leachate as compliance issues that require monitoring and corrective action. Discharges from this site would be a water quality issue.

Most of the development in the watershed is considered low intensity (1,022 acres), but there are also medium intensity (262 acres) and high intensity (678 acres) areas. In the eastern portion of the watershed, and more rural areas south and west of Ossian, the average number of homes equal 14 per square mile. The number of homes per square mile increases to 31 in the north-western portion of the watershed due to the proximity to jobs, shopping, and other amenities that are offered in Allen County and Fort Wayne, IN. Based on these averages and estimating the square mile areas using the IndianaMap GIS site over 1,600 homes in the watershed have septic systems. As discussed previously, limited suitability of soils and lack of maintenance contributes nutrients and bacteria to local streams.

The Eight Mile Creek water quality monitoring data indicates that turbidity, nutrients and *E. coli* are concerns in this subwatershed. Turbidity measurements were above the target level 53% of the time throughout the monitoring period. Turbidity levels were elevated across all flow conditions during the monitoring period. This would indicate that organic matter, as well as sediment in the stream is contributing to the stream degradation.

Nitrates regularly exceeded the target levels. Of the 48 samples collected during the monitoring program, 33 samples (68.75%) exceeded the nitrate water quality target. Most of the exceedances occurred during high flow, moist conditions and mid-range flows indicating nutrients were being carried into the streams during wet weather events. Due to the topography of this watershed, and the primary land use being agriculture, storm water runoff and erosion from agricultural activities are believed to be a major contributor of these nutrients. All four Eight Mile Creek sites exceeded the total nitrogen target on the 4/25/14-4/26/14 monitoring event, which indicates runoff from a recent weather event was the probable cause. Overall, the total nitrogen samples only had nine exceedances out of the 48 samples (18.75%). Three of the sites remained within the water quality target the majority of the time. The exception is site 2 in the Moser Lake subwatershed. It is located downstream from the town of Ossian and exceeded the nitrate target in all samples across all flow conditions, and had an annual average concentration of 34.48 mg/L throughout the monitoring period, over three times the water quality target. It was also the only Eight Mile Creek site to exceed the nitrite target in one sample, and had five of the nine exceedances of the total nitrogen target.

Total phosphorus monitoring results exceeded the target in 19 of the 48 samples (39.5%), with three sites each having four exceedances, and site 2 with seven out of 12 samples over the water quality target. Most of the target exceedances occurred during high flow and moist conditions. Again, the exception to the monitoring results is site 2. That site exceeded the total phosphorus target in seven samples across all flow conditions, had the highest result of total phosphorus at 2.39 mg/L out of all 15 monitoring sites in the project area, and had an annual average concentration of 1.099 mg/L, three times the water quality target.

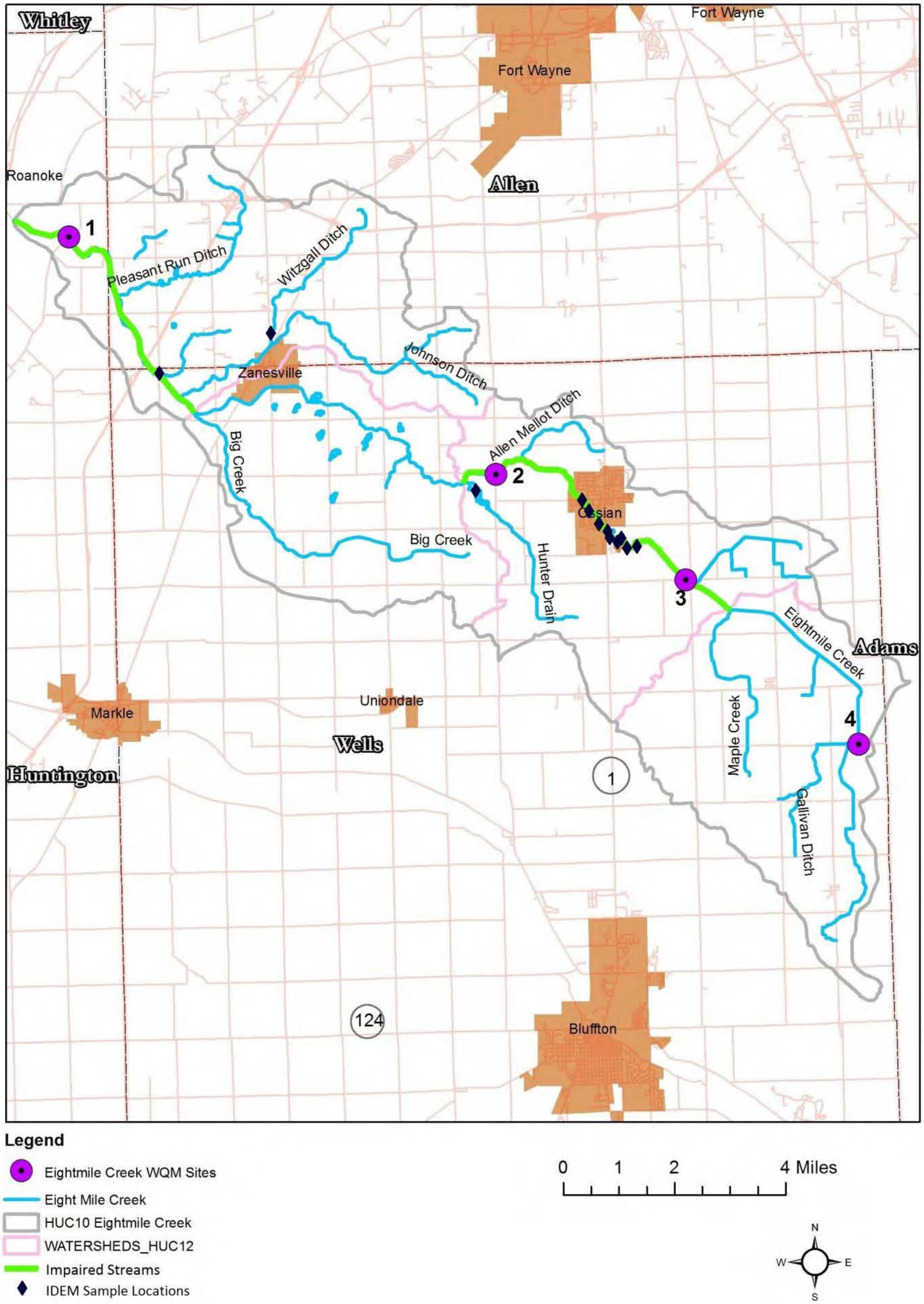
E. coli exceeded the state standard for full body contact in 30 out of 50 samples (60% of the time). All four monitoring sites had the highest exceedances on 11/1/13-11/3/13 between 400 cfu/100mL and 3800 cfu/100mL and on 11/21/13-11/23/13 between 267 cfu/100mL and 1833 cfu/100mL. These events occurred at periods of normal flow. Due to the timing of these events, animal manure land applications and on-site septic systems are believed to be the cause. Site 4 had the highest sample result of all 15 monitoring sites in the project area, as well as the highest annual average concentration of 766 cfu/100mL, over three times the water quality target for full body contact.

In general, site 1 monitoring results tend to be lower than the other monitoring sites in the Eight Mile Creek watershed and may be due to having a larger percentage of woodlands, grass lands, hay lands and conservation waterways than the remainder of the watershed area, or the concentrations of nutrients are diluted by this point.

Habitat evaluations and macroinvertebrate sampling on the Eight Mile Creek ranged lower overall from the other watersheds in the Phase 2 project area. The substrate of the stream ranged from small fine material at site 4 to a combination of small material and larger rocks downstream at site 1. Silting of the substrate was noted along with undercut banks and shallow areas of cover. Many man-made changes have occurred to the entire length of the Eight Mile Creek and the riparian area ranges from narrow to medium width with adjacent cropland. Initially sites 1 and 2 met the standard to be considered conducive to warm water fauna, but later evaluations indicated changes to the habitat that lowered the scores and resulted in all sites failing to reach the target for good aquatic health. Three miles of riparian buffer was cleared at site 1 near the end of the monitoring period, leaving no buffers and exposed soil at the monitoring site. This location will continue to be monitored to determine the effects of the ditch maintenance at this site.

Biological monitoring was conducted at three of the sites once each year, and twice each year at site 2. On the first monitoring event, the macroinvertebrate ratings ranged from poor to fair with the exception of site 2, which was rated as good. The following monitoring event resulted in an increase of organisms present at the sites and the ratings improved to good and excellent. Site 2 rated better overall than the other sites in this watershed, which may be due to the benefits of the 2-stage ditch at the monitoring location.

Figure 65: Eight Mile Creek (HUC: 0512010109) Watershed



5.0 Review of Watershed Problems and Causes

5.1 Summary of Watershed Inventory

The goal of the watershed inventory is to identify activities that might be contributing to nonpoint source pollution. These were discussed in detail in the individual subwatershed sections; therefore, this is an overall summary of the land use information and water quality impairments.

Land Use

The Headwaters-Rock Creek subwatershed has the greatest number of total stream miles (39 miles) in the project area; with the Dowty Ditch-Wabash River and Stites Ditch-Rock Creek with the next greatest number at 35 miles each. The Griffin Ditch-Wabash River only has 12 miles of streams, but drains the largest number of acres per stream miles (1,151 acres). Bender Ditch-Wabash River also has 12 miles of streams and drains an estimated 854 acres per stream mile; followed by Mossburg Ditch-Rock Creek, which has 13 miles of streams and drains approximately 833 acres per stream mile.

The Griffin Ditch-Wabash River only has 12 miles of streams in the subwatershed, and 6 miles (50%) are on the IDEM 303(d) list. The same applies to the Moser Lake-Eight Mile Creek with 6.5 miles of impaired streams out of a total 18 stream miles (36.1%) and Bender Ditch-Wabash River subwatersheds with 4 miles of impaired streams out of a total 12 stream miles (33%). The Elkenberry Ditch-Rock Creek subwatershed has the largest number of stream miles (7 miles) on the IDEM 303(d) list of impaired waters, however based on the total number of stream miles in the subwatershed; this only equals 21.9%. The Stites Ditch-Rock Creek contains the greatest amount of drainage tile (40 miles), followed by Elkenberry Ditch-Rock Creek (35 miles), Maple Creek-Eight Mile Creek (32 miles) and Headwaters-Rock Creek (32 miles) subwatersheds.

The Stites Ditch-Rock Creek is the largest subwatershed in the project area, and has the highest percentage of agricultural land use (91%). It is followed by the Headwaters-Rock Creek (90%), Mossburg Ditch-Rock Creek (90%), Maple Creek-Eight Mile Creek (89%), Bender Ditch-Wabash River (88%), and Elkenberry Ditch-Rock Creek (86%) subwatersheds. In comparison to the total subwatershed acres, the Stites Ditch-Rock Creek, Headwaters-Rock Creek and Maple Creek-Eight Mile Creek subwatersheds also contain the least percentage of woodlands and wetlands, 4.2%, 4.1%, and 4.7% respectively. The Big Creek-Eight Mile Creek subwatershed has the highest percentage of HEL/PHEL soils at 52%, followed by Mossburg Ditch-Rock Creek with 41.5%, Elkenberry Ditch-Rock Creek with 39% and Dowty Ditch-Wabash River with 37%.

Nearly 100 miles of streams were identified in the project area as lacking buffer areas that would adequately provide filtering of sediment and nutrients along the stream reaches. The Maple Creek- Eight Mile subwatershed is in need of 13 miles of stream buffers on its 32 miles of streams (68.4%). The Dowty Ditch-Wabash River subwatershed, on the other hand, was also estimated to require 13 miles of stream buffers on its 26 miles of streams or only 37.1% of the stream miles in that subwatershed. The Moser Lake-Eight Mile Creek subwatershed is estimated to have 12 miles of streams lacking buffers on its 18 miles of streams (66.6%), followed by 10 miles of stream buffers out of 32 miles of streams (31.2%) in the Johns Creek-Wabash River subwatershed. In-stream, stream bank and gully erosion was identified in all subwatersheds.

The Stites Ditch-Rock Creek subwatershed had the highest number with 9 sites; followed by Elkenberry Ditch-Rock Creek with 7 sites and Mossburg Ditch-Rock Creek with 6 sites.

Based on tillage transect information the subwatersheds that have the highest percentage of conventional tillage in the project area are Stites Ditch-Rock Creek (53.7%), Headwaters-Rock Creek (53%), Johns Creek-Wabash River (50%), Bender Ditch-Wabash River (49.9%), and Dowty Ditch-Wabash River (49.7%). The largest number of CFO's is located in the Johns Creek-Wabash River subwatershed, followed by the Stites Ditch-Rock Creek and Maple Creek-Eight Mile Creek subwatersheds. The Pleasant Run Ditch- Eight Mile Creek subwatershed has the highest number of hobby farms (133), and based on the acreage in the subwatershed, it would be the most concentrated in the project area. The Big Creek-Eight Mile Creek subwatershed with 97 hobby farms would be the fifth highest in the number of hobby farms, but would rate as the second most concentrated subwatershed for hobby farms.

The Pleasant Run Ditch-Eight Mile Creek has the greatest number of on-site septic systems (594), and greatest concentration of systems based on the total subwatershed acres. Dowty Ditch-Wabash River subwatershed has the next greatest number of septic systems (452), but is rated as fourth in concentration compared to the total acres. The Big Creek-Eight Mile Creek subwatershed with 380 septic systems is ranked as fifth by number of systems, but would be the second highest in concentration of systems when compared to the total acreage in the subwatershed. The same applies to the Moser Lake-Eight Mile Creek rated sixth by number of systems (369), but rated third by concentration.

The Dowty Ditch-Wabash River subwatershed contains the largest amount of development in the project area (3,159 acres), which includes part of the City of Bluffton, surrounding subdivisions, and smaller rural communities. The Johns Creek-Wabash River subwatershed contains approximately 1,767 acres of developed area; followed by the Moser Lake-Eight Mile Creek subwatershed (1,024 acres) and Griffin Ditch-Wabash River subwatersheds (947 acres). Waste water treatment facilities for the urban areas are located in the Headwaters-Rock Creek subwatershed, Dowty Ditch-Wabash River subwatershed, Griffin Ditch-Wabash River subwatershed, and Moser Lake-Eight Mile Creek subwatershed. Overflows to the streams and river have occurred at all waste treatment locations.

The Johns Creek-Wabash River subwatershed contains the greatest number of NPDES sites (5), leaking underground storage tanks (11), industrial waste sites (10), and environmental clean-up sites (2). Moser Lake-Eight Mile Creek has three NPDES sites, five leaking underground storage tanks, and three industrial waste sites; followed by Dowty Ditch-Wabash River with two NPDES sites, ten leaking underground storage tanks, and two industrial waste sites.

<u>Water Quality Information</u>

Based on historic water quality data and the current water quality assessment, water quality impairments were identified during the watershed inventory process. These include elevated nutrients (nitrate, nitrite, total nitrogen, and total phosphorus), *E. coli*, and turbidity, as well as poor macroinvertebrate communities and low-scoring habitat evaluations. Figures 66–68 highlight locations where the water monitoring data results failed to meet the selected target.

Nutrients

Nutrients have long been identified as a pollutant concern in the Upper Wabash River – Phase 2 project watersheds. Current sampling efforts show the nitrate levels exceeded the target of 10 mg/L, a State of Indiana standard for waters designated as a drinking water source, at all 15 monitoring sites in all subwatersheds. Out of the 178 nitrate samples collected, 109 samples (61%) exceeded the target. The majority of exceedances occurred from mid-range flow to high flow conditions; however, exceedances in dry and low flow conditions occurred in the Moser Lake-Eight Mile Creek, all four Wabash River subwatersheds, and Elkenberry Ditch-Rock Creek subwatershed. Average nitrate concentrations ranged from 9.34 mg/L to 34.48 mg/L. The Pleasant Run/Big Creek-Eight Mile Creek subwatershed average was the only one that met the target. The Moser Lake-Eight Mile Creek subwatershed had the highest average.

The nitrite level of 1mg/L was exceeded two times in the Elkenberry Ditch-Rock Creek subwatershed during dry and moist conditions. It was also exceeded once each in the Johns Creek-Wabash River subwatershed during low flow and Maple Creek-Eight Mile Creek subwatershed during high flow. The Elkenberry Ditch-Rock Creek was the only subwatershed to have an average concentration of 1.508 mg/L that exceeded the target level.

Total nitrogen levels exceeded the target of 10 mg/L in at least one sample at all monitoring locations in all subwatersheds during moist conditions or high flow events. Additional exceedances of the total nitrate target included: Moser Lake-Eight Mile Creek subwatershed exceeded the target during twice during low flow, and once each during dry conditions and mid-range flows. The Maple Creek-Eight Mile Creek subwatershed had an additional exceedance during mid-range flow. The Johns Creek-Wabash River subwatershed also had one exceedance each during low flow and dry conditions. The Stites Ditch-Rock Creek subwatershed had an additional exceedance under mid-range flow conditions.

The total phosphorus target of 0.3 mg/L is the Wabash River TMDL target selected by IDEM. This target was exceeded in 78 of the 178 samples (44%) that were collected during the monitoring period. All sites exceeded the target on at least one occasion. Several monitoring sites exceeded the target in multiple samples over all flow conditions. The Dowty Ditch-Wabash River subwatershed had the most exceedances (11 out of 14), followed by Johns Creek-Wabash River subwatershed (9 out of 11), Griffin Ditch/Bender Ditch-Wabash River subwatershed (8 out of 11), Moser Lake-Eight Mile Creek subwatershed. All of the Rock Creek subwatershed sites only exceeded the target during moist conditions or high flow. Average concentrations for total phosphorus ranged from 0.17 mg/L in the Elkenberry Ditch-Rock Creek subwatershed to 1.099 mg/L in the Moser Lake-Eight Mile Creek subwatershed.

E. coli

E. coli has historically been a concern for water quality in the project area. Current sampling shows that all subwatersheds in the project area exceeded the *E. coli* target of 235 cfu/100mL for full body contact. All monitoring sites had at least three events that exceeded the target, and the average concentrations ranged from 295 cfu/100mL to 766 cfu/100mL. The Dowty Ditch-Wabash River had the most exceedances in 11 out of 14 samples (79%). The Moser Lake-Eight Mile Creek, Maple Creek-Eight Mile Creek, Johns Creek-Wabash River, and Dowty Ditch-Wabash River subwatersheds had exceedances across all flow conditions. The Pleasant Run/Big

Creek-Eight Mile Creek and Stites Ditch-Rock Creek subwatersheds had exceedances across the various flow conditions except during high flow. In the Rock Creek watershed, the Headwaters-Rock Creek subwatershed was the only one to have an exceedance during low flow. The Maple Creek-Eight Mile Creek subwatershed had the highest single result of 3,800 cfu/100mL.

Turbidity

The water quality target for turbidity of 25 NTUs is based on the Minnesota TMDL criteria for the protection of fish and macroinvertebrate health. A total of 175 turbidity samples were completed throughout the monitoring project, 114 samples (65%) exceeded the target. During two spring sampling events, following snow and ice melt and early wet weather events, all 15 monitoring sites exceeded the target during both events. The turbidity average concentration ranged from 44.64 NTUs in the Stites Ditch/Mossburg Ditch-Rock Creek subwatershed to 197.55 NTUs in the Johns Creek-Wabash River subwatershed. All of the Wabash River subwatersheds had the highest number of exceedances across all flow conditions. The Griffin Ditch/Bender Ditch-Wabash River subwatershed exceeded the target in 100% of the (11) samples, followed by the Johns Creek-Wabash River subwatershed with 95% (23 out of 24 samples), and the Dowty Ditch-Wabash River with 11 out of 13 samples (85%). Turbidity levels also exceeded the target during low flow in the Maple Creek-Eight Mile Creek subwatershed, and Stites Ditch-Rock Creek subwatershed.

Macroinvertebrate Communities

The Hoosier Riverwatch Pollution Tolerance Index (PTI) was used to evaluate the macroinvertebrate communities. The index score of 0-10 is considered poor, 11-16 is rated as fair, 17-22 is good, and 23 or more is considered excellent. The water quality target that was selected for this parameter was >10. The macroinvertebrate communities were sampled a minimum of two times during the project, and the index scores were averaged to obtain an overall rating. One location within the Dowty Ditch-Wabash River subwatershed failed to meet the target with a rating of 7.5. Locations that met the target but rated as fair include Maple Creek-Eight Mile Creek, Moser Lake-Eight Mile Creek, and Elkenberry Ditch-Rock Creek subwatersheds. The remaining subwatersheds scored a good rating or higher.

Habitat

The Hoosier Riverwatch Citizen's Qualitative Habitat Evaluation Index (CQHEI) was used for the habitat evaluations. The CQHEI score of >60 is considered to be conducive to support aquatic life, and was selected for the target. The habitat evaluations were completed a minimum of two times during the monitoring project. The index scores were then averaged to obtain an overall rating. The average scores ranged from a low of 30 at a location in the Maple Creek-Eight Mile subwatershed, to 89.5 at a site in the Griffin Ditch-Wabash River subwatershed. Locations not meeting the target included sites in the Stites Ditch-Rock Creek, Griffin Ditch-Wabash River, Dowty Ditch-Wabash River, and all of the four Eight Mile Creek subwatersheds.

Figure 66: Water Quality Monitoring Exceedances – Rock Creek, HUC 0512010107

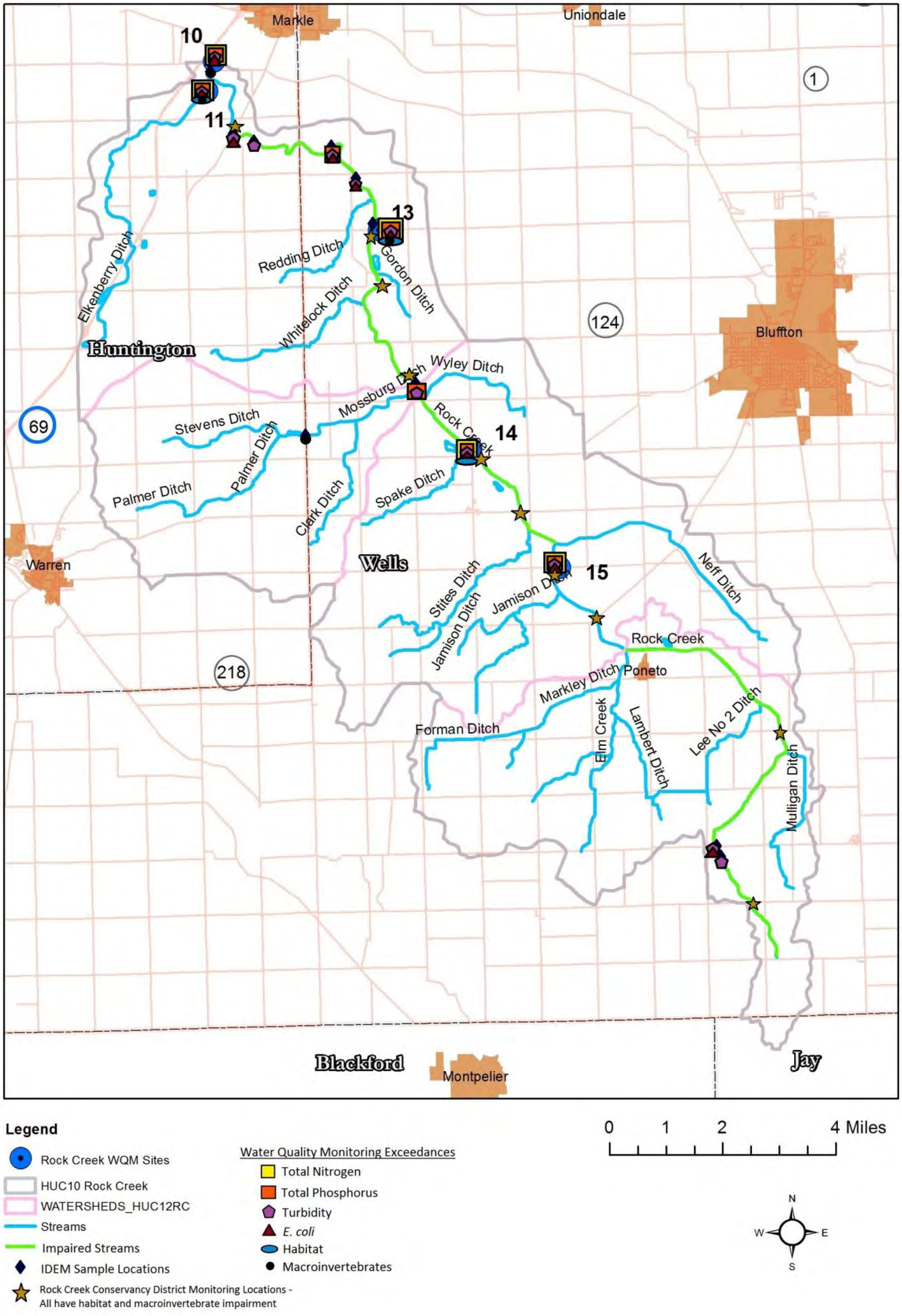


**Figure 67: Water Quality Monitoring Exceedances–
Griffin Ditch-Wabash River, HUC 0512010108**

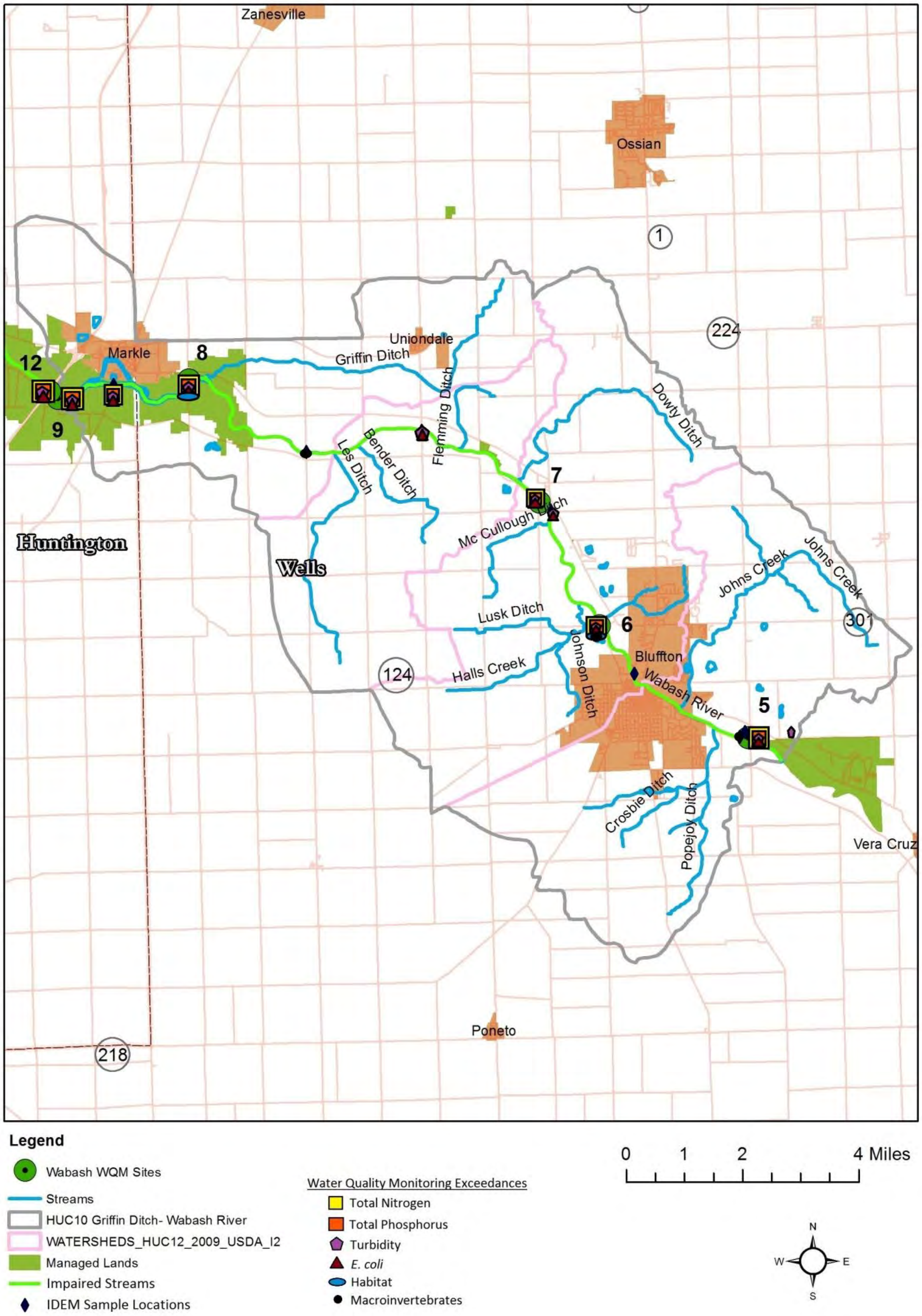
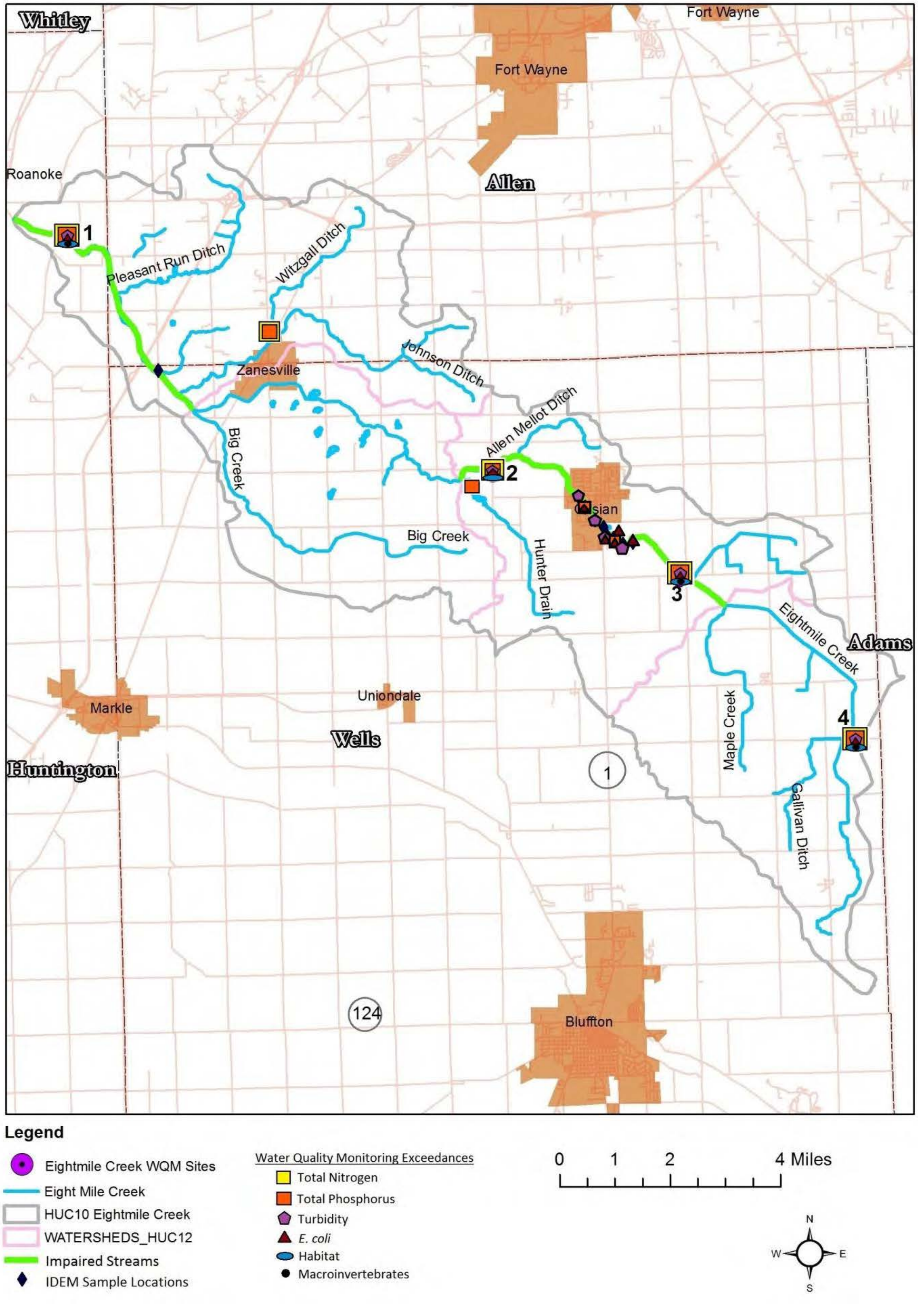


Figure 68: Water Quality Monitoring Exceedances – Eight Mile, HUC 0512010109



5.2 Analysis of Stakeholder Concerns

A list of initial watershed concerns was generated by stakeholders, UWRBC members and steering committee members at public meetings early in the planning process. The list was reviewed several times by the UWRBC members and steering committee members and then compared to the watershed inventory information to see what evidence supported or did not support the concern. The list of concerns was further evaluated to determine whether the concern was quantifiable, whether it is within the scope of the watershed management plan, and if it is something that the group wants to focus on. The following tables represent a work in progress and additional concerns, problems, causes and sources may be added upon additional analysis of monitoring data or as additional watershed information comes to light.

Table 5-1: Stakeholder Concerns

Stakeholder Concerns	Supported by Data?	Evidence	Able to Quantify?	Outside of Scope?	Group wants to focus on?
Log jams and debris in the river and streams.	Yes	Observed during watershed inventory: Rock Creek–2, Wabash River–1, Eight Mile-2.	Yes	No	Yes
Encourage 2-stage ditches.	Yes	Two possible sites for a 2-stage ditch on Eight Mile Creek.	Yes	No	Yes
Flooding along the river and streams.	Yes	Observed in all watersheds during spring snow/ice melt.	Yes	No	Yes
In-stream and stream bank erosion causing sedimentation.	Yes	Sediment and undercut banks noted at all sites on CQHEI; turbidity exceeded target levels in 60% of the samples; windshield survey noted erosion in all watersheds.	Yes	No	Yes
Agriculture fertilizer (nitrogen and phosphorus) runoff into streams.	Yes	61% of nitrate and 57% of total phosphorus results exceeded target levels	Yes	No	Yes
Manure management; stockpiling and application practices.	Yes	3 manure stockpiles present in watersheds (1 in each); 56% of *E. coli,* 61% nitrate and 57% total phosphorus results exceeded target levels	Yes	No	Yes
Tillage to the edge of stream banks; no filter strips or riparian area.	Yes	Observed during watershed inventory – (buffers needed - Rock Creek 48 mi., Wabash River-Griffin 35 mi., Eight Mile 38 mi.)	Yes	No	Yes
Conservation tillage has low adoption rates.	Yes	Tillage Transect: 87% corn production, 22% bean production using conventional tillage = 66,405 acres	Yes	No	Yes

Stakeholder Concerns	**Supported by Data?**	**Evidence**	**Able to Quantify?**	**Outside of Scope?**	**Group wants to focus on?**
Lack of buffers and filter strips on streams.	Yes	Observed during watershed inventory – needed on Rock Creek 48 mi., Wabash River-Griffin 35 mi., Eight Mile38 mi.	Yes	No	Yes
Residential runoff from chemically treated lawns (fertilizers and pesticides).	No	More detailed data is needed within targeted urban/residential areas. The stakeholders would like to address this issue if future evidence is found.	No	No	Yes
Construction Site (and road construction) erosion causing sedimentation.	No	More detailed data is needed. The stakeholders would like to address this issue if future evidence is found.	No	No	Yes
High *E. coli* levels.	Yes	*E. coli* exceeded target levels in 56% of samples	Yes	No	Yes
Failing septic systems, severely limiting soils, lack of maintenance.	Yes	4,000 rural on-site septic systems are estimated to be in the project area on severely limiting soils. It is very likely that some are failing; *E. coli* target level exceeded in 56% of samples; nitrate target exceeded in 61% of samples; total phosphorus exceeded target in 57% of samples	Yes	No	Yes
Wastewater treatment in unincorporated communities.	Yes	There are 9 rural unincorporated communities in project area with on-site septic systems.	Yes	No	Yes
Runoff from asphalt streets and parking lots.	No	Impervious area 3% of the project area. More detailed data is needed within targeted urban areas	No	No	Yes
Wetlands drained and forests cleared.	Yes	USDA verification, Observed during watershed inventory	Yes	No	Yes
Lack of green space and trails.	Yes	Observed during watershed inventory	Yes	No	Yes
Dumping, trash in river and streams.	Yes	Observed during water testing and watershed inventory – River clean ups have removed 4 truckloads of debris	Yes	No	Yes

It should be noted that flooding concerns are listed as being outside the scope of the watershed management plan and will only be addressed in relation to the effect it has on the water quality within the watersheds or for BMPs that are intended to improve water quality but also reduce flooding impacts as a secondary benefit.

5.3 *Identified Problems*

After several reviews and evaluations of the stakeholder concerns and watershed inventory information, the UWRBC members and steering committee identified problems associated with each concern. As the UWRBC steering committee continued their review of the concerns, they realized that some of the concerns were actually problems or causes of pollution in the watershed. The problems were identified, and the concerns related to those problems were grouped together. Table 5-2 reflects the group of concerns that represent the problem or the condition that exists in the watershed.

Table 5-2: Problems identified for the Wabash River Watershed – Phase 2 project area based on stakeholder and inventory concerns.

Stakeholder Concerns:	Problems:
• Log jams and debris in the river and streams. • In-stream and stream bank erosion causing sedimentation. • Dumping, trash in river and streams.	Restricted/redirected flow within the stream or river.
• Flooding along the river and streams. • In-stream and stream bank erosion causing sedimentation. • Tillage to the edge of stream banks; no filter strips or riparian area. • Conservation tillage has low adoption rates. • Lack of buffers and filter strips on streams. • Construction site (and road construction) erosion causing sedimentation. • Wetlands drained and forests cleared. • Lack of green space and trails.	Sediment and increased levels of turbidity threatens the water quality health of the streams and river in the watershed.
• Encourage 2-stage ditches. • Tillage to the edge of stream banks; no filter strips or riparian area. • Conservation tillage has low adoption rates. • Lack of buffers and filter strips on streams. • Runoff from asphalt streets and parking lots. • Wetlands drained and forests cleared. • Lack of green space, native habitat and trails.	Increased surface drainage and tile drainage throughout the watersheds threatens water quality.
• Flooding along the river and streams. • Agriculture fertilizer (nitrogen and phosphorus) runoff into streams. • Manure management; stockpiling and application practices. • Conservation tillage has low adoption rates. • Lack of buffers and filter strips on streams. • Residential runoff from chemically treated lawns (fertilizers and pesticides). • Failing septic systems, severely limiting soils, lack of maintenance. • Wastewater treatment in unincorporated communities. • Wetlands drained and forests cleared. • Lack of green space and trails.	Excess nutrients increase aquatic plants and algae. Algae blooms in the river and streams threaten aquatic communities and may pose a human health risk.

Stakeholder Concerns:	**Problems:**
• Flooding along the river and streams. • Manure management; stockpiling and application practices. • Lack of buffers and filter strips on streams. • High *E. coli* levels. • Failing septic systems, severely limiting soils, lack of maintenance. • Wastewater treatment in unincorporated communities. • Runoff from asphalt streets and parking lots. • Wetlands drained and forests cleared. • Lack of green space and trails.	E. coli and other pathogens pose a health risk for recreational activities throughout the watersheds.
• Log jams and debris in the river and streams. • Encourage 2-stage ditches. • Agriculture fertilizer (nitrogen and phosphorus) runoff into streams. • Manure management; stockpiling and application practices. • Tillage to the edge of stream banks; no filter strips or riparian area. • Conservation tillage has low adoption rates. • Lack of buffers and filter strips on streams. • Residential runoff from chemically treated lawns (fertilizers and pesticides). • Construction site (and road construction) erosion causing sedimentation. • Failing septic systems, severely limiting soils, lack of maintenance. • Wastewater treatment in unincorporated communities. • Wetlands drained and forests cleared. • Lack of buffers and filter strips on streams. • Lack of green space, native habitat and trails. • Dumping, trash in river and streams.	Lack of education on the economic benefit of BMPs. Competing land uses limit BMP implementation that would/could improve water quality. Individuals lack knowledge of BMPs, where they could/should be implemented, and how to fund practices. General public's lack of understanding or sense of responsibility for how and why their actions impact water quality.

5.4 Potential Causes for Water Quality Impairments

The UWRBC members and steering committee evaluated the list of problems that had been identified and developed a list of the potential causes of impairment that keep the streams and river in the project area from meeting their designated uses (e.g. aquatic life use, recreational use, and fishable uses).

Table 5-3: Problems and potential causes of water quality impairments in the Upper Wabash River Phase 2 project area.

Problems:	**Potential Causes:**
Restricted/redirected flow within the stream or river.	• Log jams and debris in the river and streams. • In-stream sand and silt bars. • Lack of floodplain management.
Sediment and increased levels of turbidity threatens the water quality health of the streams and river in the watershed.	• Turbidity levels exceed the target established for fish and macroinvertebrate health. • Sediment, organic matter and algae in the streams and river.
Increased surface and subsurface flow throughout the watersheds threatens water quality.	• Wetlands drained and forests cleared. • Loss of ponding areas in the watershed and floodplain storage. • Lack of floodplain management causing flooding along the river and streams. • Increase of tile installation. • Traditional ditch maintenance. • Lack of green space, native habitat and trails.
Excess nutrients increase aquatic plants and algae, and algal blooms threaten aquatic communities and can pose a human health risk.	• Excess nutrients – nitrogen and phosphorus in the water. • Nitrate and total nitrogen levels exceed state targets. • Total phosphorus levels exceed state targets.
E. coli and other pathogens pose a health risk for recreational activities throughout the watersheds.	• E. coli levels exceed state standard.
Lack of education on the economic benefit of BMPs. Competing land uses limit BMP implementation that would/could improve water quality. Individuals lack knowledge of BMPs, where they could/should be implemented and how to fund practices. General public's lack of understanding or sense of responsibility for how and why their actions impact water quality.	• Lack of education to land users on the economic benefit of BMPs. • Lack of appreciation for and understanding of environmental benefits versus financial benefits. • Lack of education to land users, funders, and the general public on the use of BMPs. • Lack of education to the public about their contribution to the health of the streams and river.

6.0 Identifying Sources of Pollution

6.1 Problems, Potential Causes, and Potential Sources

From the list of problems and potential causes, the UWRBC members and steering committee developed a list of potential sources; or in other words, the location or activity that the pollutant(s) come from, lack of awareness, or loss of a particular land use.

Table 6-1: Problems, potential causes, and potential sources of water quality impairments in the Upper Wabash River Phase 2 project area.

Problem:	**Restricted/redirected flow within the stream or river.**
Potential Causes:	• Log jams and debris in the river and streams. • In-stream sand and silt bars. • Lack of floodplain management.
Potential Sources:	• 7 locations where the trees are falling into the streams and river due to unstable banks or diseased and dying trees: Mossburg Ditch-Rock Creek; Johns Creek, Dowty Ditch, and Griffin Ditch-Wabash River, and Moser Lake, Big Creek and Pleasant Run Ditch-Eight Mile Creek subwatersheds. • Unanchored cut trees and cut fire wood observed in the Johns Creek-Wabash River and Elkenberry Ditch-Rock Creek subwatersheds during the windshield survey.
Problem:	**Sediment and increased levels of turbidity threatens the water quality health of the streams and river in the watershed.**
Potential Causes:	• Turbidity levels exceed the target established for fish and macroinvertebrate health. • Sediment, organic matter and algae in the streams and river.
Potential Sources:	• 50 locations of in-stream, stream bank and gully erosion were observed in all subwatersheds. The most sites are located in the Stites Ditch-Rock Creek, Mossburg Ditch-Rock Creek, and Elkenberry Ditch-Rock Creek subwatersheds; followed by the Griffin Ditch-Wabash River, Dowty Ditch-Wabash River, and Johns Creek-Wabash River subwatersheds. • 100 miles of streams and river lack forested buffers and grass filter strips. All subwatersheds lack buffers. The Maple Creek, and Moser Lake-Eight Mile Creek subwatersheds and Bender Ditch and Griffin Ditch -Wabash River subwatersheds need buffers on more than 40% of their stream miles. • Low adoption rates of conservation tillage. Conventional tillage is used on 56% of the agricultural acres in all subwatersheds. The Stites Ditch and Headwaters-Rock Creek, and Johns Creek and Bender Ditch-Wabash River subwatersheds are estimated to have conventional tillage on 50% or more of the cropland acres. • Lack of buffer areas at tile inlets. 296 miles of county tile plus private tile are in the project area. Tile inlet buffers are needed in all subwatersheds. The Stites Ditch, Elkenberry Ditch and Headwaters-Rock Creek, and Maple Creek-Eight Mile Creek subwatershed contain the most miles of drainage tile. • 32% of watershed is HEL/PHEL soils. The subwatersheds with the highest percentage of HEL/PHEL soils are: Big Creek-Eight Mile Creek; Mossburg Ditch and Elkenberry Ditch-Rock Creek; and Dowty Ditch-Wabash River subwatersheds. • Observed that cropland buffer areas (fence rows and fence borders) were lacking in all watersheds. • USDA verification of removal and lack of wetlands and riparian areas throughout all watersheds. The subwatersheds with the less than 5% wetlands and woodlands are: Headwaters, and Stites Ditch-Rock Creek; and Maple Creek-Eight Mile Creek.

Table 6-1: Problems, potential causes, and potential sources of water quality impairments in the Upper Wabash River Phase 2 project area.

Problem:	**Increased surface and subsurface flow throughout the watersheds threatens water quality.**
Potential Causes:	• Wetlands drained and forests cleared. • Loss of ponding areas in the watershed and floodplain storage. • Lack of floodplain management causing flooding along the river and streams. • Increase of tile installation. • Traditional ditch maintenance. • Lack of green space, native habitat and trails.
Potential Sources:	• USDA verification of removal and lack of wetlands and riparian areas throughout all watersheds. The subwatersheds with the less than 5% wetlands and woodlands are: Headwaters, and Stites Ditch-Rock Creek; and Maple Creek-Eight Mile Creek. • 100 miles of streams and river lack forested buffers and grass filter strips. All subwatersheds lack buffers. The Maple Creek, and Moser Lake-Eight Mile Creek subwatersheds and Bender Ditch and Griffin Ditch -Wabash River subwatersheds need buffers on more than 40% of their stream miles. • Low adoption rates of conservation tillage that could reduce run-off. Conventional tillage is used on 56% of the agricultural acres in all subwatersheds. The Stites Ditch and Headwaters-Rock Creek, and Johns Creek and Bender Ditch-Wabash River subwatersheds are estimated to have conventional tillage on 50% or more of the cropland acres. • Increase of tile installation in the watersheds; 4 new installation sites observed in the Headwaters, Stites Ditch, Mossburg Ditch and Elkenberry Ditch-Rock Creek subwatersheds. • Lack of buffer areas at tile inlets. 296 miles of county tile plus private tile are in the project area. Tile inlet buffers are needed in all subwatersheds. The Stites Ditch, Elkenberry Ditch and Headwaters-Rock Creek, and Maple Creek-Eight Mile Creek subwatershed contain the most miles of drainage tile. • Ditch maintenance is preformed on nearly all streams, and was observed in the Headwaters-Rock Creek and Pleasant Run Ditch-Eight Mile Creek subwatersheds. • Lack of green space and native habitat in urban areas observed in urban landscapes.

Table 6-1: Problems, potential causes, and potential sources of water quality impairments in the Upper Wabash River Phase 2 project area.

Problem:	**Excess nutrients increase aquatic plants and algae, and algal blooms in the river and streams threaten aquatic communities and can pose a human health risk.**
Potential Causes:	• Excess nutrients – nitrogen and phosphorus in the water. • Nitrate and total nitrogen levels exceed state targets. • Total phosphorus levels exceed state targets.
Potential Sources:	• Unknown amount of over application of fertilizer on cropland and residential areas, and limited use of soil testing and variable rate fertilizer applications based on responses to social surveys. • Lack of buffer areas at tile inlets. 296 miles of county tile plus private tile are in the project area. Only a few buffer areas were observed, and tile inlet buffers are needed in all subwatersheds. The Stites Ditch, Elkenberry Ditch and Headwaters subwatersheds of the Rock Creek, and Maple Creek-Eight Mile Creek subwatershed contain the most miles of drainage tile. • Increase of tile installation in watersheds; 4 new installation sites observed in the four Rock Creek subwatersheds: Headwaters, Stites Ditch, Mossburg Ditch and Elkenberry Ditch. • Observed that cropland buffer areas (fence rows and fence borders) were lacking in all watersheds. • 27 CFOs in the project area; 24 located within a ½ mile of the streams and river, and 3 located within 1 mile of the streams and river. The highest number of CFOs is in the Johns Creek-Wabash River, Stites Ditch-Rock Creek, and Maple Creek-Eight Mile Creek subwatersheds. • Animal waste runoff from land applications, manure stock piles, and 1,050 hobby farms. Two manure distribution lines were observed in the Stites Ditch-Rock Creek subwatershed, three manure stockpiles were observed in the Stites Ditch-Rock Creek, Dowty Ditch-Wabash River, and Moser Lake-Eight Mile Creek subwatersheds. An estimated 1,050 hobby farms are located throughout all subwatersheds, with the heaviest concentrations located in the Pleasant Run Ditch, and Big Creek subwatersheds of the Eight Mile Creek, Dowty Ditch-Wabash River subwatershed, and Headwaters-Rock Creek subwatershed. • 100 miles of streams and river lack forested buffers and grass filter strips. Tillage goes to the edge of banks. All subwatersheds lack buffers. The Maple Creek, and Moser Lake-Eight Mile Creek subwatersheds and Bender Ditch and Griffin Ditch - Wabash River subwatersheds need buffers on more than 40% of their stream miles. • 12 documented municipal wastewater treatment plant sanitary sewer overflows to the Headwaters-Rock Creek, Dowty Ditch and Griffin Ditch-Wabash River subwatersheds, and Moser Lake-Eight Mile Creek subwatershed. • Over 3,900 on-site septic systems on severely limited soils throughout all watersheds. It is likely that failing and/or lack of maintenance, and outdated direct connect on-site septic systems are present in all watersheds. The subwatersheds with the heaviest concentration of septic systems based on subwatershed area are: Pleasant Run Ditch, Big Creek and Moser Lake-Eight Mile Creek, and Dowty Ditch-Wabash River. • USDA verification of removal and lack of wetlands and riparian areas throughout all watersheds. The subwatersheds with the less than 5% wetlands and woodlands are: Headwaters, and Stites Ditch-Rock Creek; and Maple Creek-Eight Mile Creek.

Table 6-1: Problems, potential causes, and potential sources of water quality impairments in the Upper Wabash River Phase 2 project area.

Problem:	**E. coli and other pathogens pose a health risk for recreational activities throughout the watersheds.**
Potential Causes:	E. coli levels exceed state standard.
Potential Sources:	• Lack of wastewater treatment in 10 unincorporated communities in all of the Rock Creek subwatersheds, Johns Ditch and Dowty Ditch-Wabash River, and Maple Creek-Eight Mile Creek subwatersheds. • Over 3,900 on-site septic systems on severely limited soils throughout all watersheds. It is likely that failing and/or lack of maintenance, and outdated direct connect on-site septic systems are present in all watersheds. The subwatersheds with the heaviest concentration of septic systems based on subwatershed area are: Pleasant Run Ditch, Big Creek and Moser Lake-Eight Mile Creek, and Dowty Ditch-Wabash River. • Animal waste runoff from land applications and 1,050 hobby farms. Two manure distribution lines were observed in the Stites Ditch-Rock Creek subwatershed. An estimated 1,050 hobby farms are located throughout all subwatersheds, with the heaviest concentrations located in the Pleasant Run Ditch, and Big Creek subwatersheds of the Eight Mile Creek, Dowty Ditch-Wabash River subwatershed, and Headwaters-Rock Creek subwatershed. • Abundance of animal waste generated and brought into the watershed. Three manure stockpiles were observed in the Stites Ditch-Rock Creek, Dowty Ditch-Wabash River, and Moser Lake-Eight Mile Creek subwatersheds. • 12 documented municipal wastewater treatment plant sanitary sewer overflows to the Headwaters-Rock Creek, Dowty Ditch and Griffin Ditch-Wabash River subwatersheds, and Moser Lake-Eight Mile Creek subwatershed.
Problems:	1) **Lack of education on the economic benefit of BMPs.** 2) **Competing land uses limit BMP implementation that would/could improve water quality.** 3) **Individuals lack knowledge of BMPs, where they could/should be implemented and how to fund practices.** 4) **General public's lack of understanding or sense of responsibility for how and why their actions impact water quality.**
Potential Causes:	• Lack of appreciation for and understanding of environmental benefits versus financial benefits. • Lack of education to land users, funders and the general public on the use of BMPs. • Lack of education to the public about their contribution to the health of the streams and river. • Lack of understanding and appreciation for natural areas.
Potential Sources:	• Lack of education to land users on the economic and environmental value of BMPs evidenced by project social surveys. • Lack of avenues to get the public to participate in educational activities. • Limited community involvement in environmental activities as evidenced by lack of participation in river clean-up and monitoring events. • Competition from other causes. • Lack of stewardship for Mother Nature.

6.2 Pollutant Load Estimates

Nonpoint source pollution comes from many sources found throughout the watershed on public and private lands. As rainfall and snowmelt runoff moves over and through the ground it picks up and carries away natural and human-made pollutants depositing them into streams, lakes, rivers, wetlands and ground waters.

The water quality targets listed in Table 3-4 (page 85) represent the quantitative value used to measure whether or not the applicable water quality standard is attained for each pollutant of concern. Those numeric water quality targets are then translated into the loading capacity of a stream or river. EPA defines loading capacity as "the greatest amount of loading that a water can receive without violating water quality standards". The loading capacity provides a reference, which helps guide pollutant reduction efforts needed to bring a stream or river into compliance with water quality standards. Two methods have been used to understand the loading of nutrients and pathogens in the water bodies in the project area; measured results from the water quality monitoring events and hydrologic simulation models.

Measured Results from Water Quality Monitoring

The water quality monitoring data collected throughout the project shows the actual levels of contaminants in the streams and river at a specific time. The parameter test results are often related to stream flow rates. For instance, sediment and turbidity concentrations typically increase with rising flows as a result of factors such as channel scour from higher velocities. Other parameters, such as nitrogen or *E. coli*, may be more concentrated at low flows and more diluted by increased water volumes at higher flows.

The monitoring data results for nutrients and *E. coli* can be combined with the flow data to estimate the current loads and target loads in the water bodies. Current loading estimates for each monitoring site is calculated by multiplying the average pollutant concentration, the stream flow measurement, and a conversion factor to transform each concentration measurement into "load" for that point in time. The estimated target loads are calculated by multiplying the stream flow by the water quality target (Table 3-4, page 85) for the individual parameter, and the conversion factor.

Most of the 12-digit HUC subwatersheds have a water monitoring site located near the outlet of that drainage area; therefore, the water monitoring locations were assigned to each subwatershed based on their location (Table 6-2). The exceptions are the Mossburg Ditch-Rock Creek, Bender Ditch-Wabash River, and Big Creek-Eight Mile Creek subwatersheds. Monitoring site 13 has been assigned to the Mossburg Ditch-Rock Creek subwatershed. The Bender Ditch and Griffin Ditch-Wabash River subwatersheds will be treated as a single drainage area at monitoring site 9, and the Big Creek and Pleasant Run Ditch-Eight Mile Creek subwatersheds will be treated as a single drainage area at monitoring site 1.

It is important to note that the UWRBC Phase 2 project area receives pollutant loading from the upstream Upper Wabash River Basin watershed containing approximately 353,437 acres. The accumulated pollutant loading from the upstream area is illustrated by the current load and target load at Site 5 on the Wabash River at the most upstream point on the Wabash River in this project area. Site 11 on the Elkenberry Ditch, a tributary to the Rock Creek channel only takes into consideration the drainage from the western portion of the subwatershed. Site 12 is the total of the entire Wabash River as well as the entire Rock Creek watershed to that monitoring point. These sites are shown for comparison purposes and to provide for further evaluation across the project area.

Table 6-2: Monitoring Sites Used for Load Estimates

Monitoring Sites	Subwatershed Name	12-digit HUC
1	Pleasant Run/Big Creek-Eight Mile Creek	051201010904 & 051201010903
2	Moser Lake-Eight Mile Creek	051201010902
3	Maple Creek-Eight Mile Creek	051201010901
6	Johns Creek-Wabash River	051201010801
7	Dowty Ditch-Wabash River	051201010802
9	Bender Ditch/Griffin Ditch-Wabash River	051201010803 & 051201010804
10	Elkenberry Ditch-Rock Creek	051201010704
13	Mossburg Ditch-Rock Creek	051201010702
14	Stites Ditch-Rock Creek	051201010703
15	Headwaters-Rock Creek	051201010701
5	Upstream Wabash River watershed that is not in the project area.	
11	Western portion of Elkenberry Ditch subwatershed	
12	Total of all of the Wabash River and Rock Creek subwatersheds	

There are some limitations in using the measured data to estimate loads and load reductions. The sampling methods did not allow for continuous flow measurements at each site, and the only USGS gage in the project area is located on the Wabash River at the most upstream point. Due to its location, it does not allow for accurate estimations of continuous flow for the downstream subwatersheds, or take into consideration the impoundment area in the J.E. Roush Fish and Wildlife area (site 8) on the Wabash River; which is too deep and wide to conduct flow measurements.

The measured data from each monitoring location may be somewhat skewed due to the accumulation and/or assimilation of the nutrients and *E. coli* as it moves through the individual watersheds. Additionally, the UWRBC used turbidity as a measurement of the cloudiness of the water versus monitoring for total suspended solids; therefore, we were not able to estimate sediment loads in the project area which would have been useful in determining the effects of gully, stream bank and in-stream erosion in the project area.

The measured current load estimates and target loads in the following table are expressed in pounds per year (lbs/yr) for nutrients, and billions of organisms per year (G-org/yr) for *E.coli*.

Table 6-3: Measured Current Load and Target Load Estimates by Subwatershed. (Pounds Per Year or Billions of Organisms Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed		**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**	***E. coli***
			Current Load Target Load (lbs/yr)	*Current Load Target Load (lbs/yr)*	*Current Load Target Load (lbs/yr)*	*Current Load Target Load (lbs/yr)*	*Current Load Target Load (G-org/yr)*
Eight Mile Creek	Pleasant Run/ Big Creek	1	1,408,827 1,508,843	7,227 150,891	765,770 1,508,837	41,245 45,260	340,419 160,909
	Moser Lake	2	1,792,150 519,833	4,380 51,976	500,342 519,833	57,086 15,622	130,288 55,438
	Maple Creek	3	551,369 328,135	2,920 32,850	200,458 328,135	8,176 9,855	65,759 34,996
Wabash River–Griffin Ditch	Johns Creek	6	28,161,648 13,984,683	160,527 1,398,461	12,749,377 13,984,683	707,370 419,531	3,842,681 1,491,379
	Dowty Ditch	7	24,760,359 12,173,699	121,107 1,217,367	10,398,368 12,173,699	613,054 365,219	3,222,333 1,298,246
	Bender Ditch/ Griffin Ditch	9	34,009,768 18,031,876	230,826 1,803,173	13,950,227 18,031,876	740,950 540,930	4,116,015 1,922,989
Rock Creek	Elkenberry Ditch	10	3,313,470 2,056,337	17,958 205,641	1,376,050 2,056,337	46,793 61,685	479,503 219,299
	Mossburg Ditch	13	1,617,753 1,434,888	7,373 143,518	667,220 1,434,888	25,623 43,070	317,811 153,022
	Stites Ditch	14	1,358,603 864,247	14,308 86,432	551,880 864,247	15,695 25,915	115,866 92,166
	Headwaters	15	599,038 478,296	2,044 47,815	230,388 478,296	9,198 14,381	69,950 51,011
Upstream Wabash River watershed not in project area		5	22,677,231 13,146,205	259,004 1,314,657	10,878,533 13,146,205	586,263 394,419	3,397,047 1,401,963
Western portion of Elkenberry Ditch subwatershed		11	211,043 159,359	24,017 15,914	77,526 159,359	2,701 4,745	36,156 16,996
Total Wabash River & Rock Creek subwatersheds		12	29,758,158 19,356,680	173,813 1,935,668	11,402,819 19,356,680	526,111 580,715	3,805,921 2,064,269

Based on the annual measured current loads, the largest contributors of nitrate, nitrite, total nitrogen, total phosphorus and *E. coli* in the project area are the Wabash River subwatersheds; Johns Creek, Dowty Ditch and Bender Ditch/Griffin Ditch. The Elkenberry Ditch-Rock Creek subwatershed also ranked high as a contributor of nitrate, nitrite, total nitrogen and *E. coli,* while the Moser Lake-Eight Mile Creek subwatershed is a major contributor of nitrate and total phosphorus.

To calculate the total current and target loads for the UWRBC Phase 2 project area, the downstream monitoring locations in each subwatershed are used because they include the accumulation and/or assimilation of the pollutant loads throughout each subwatershed. Site 1 represents the entire Eight Mile Creek subwatershed, Site 9 represents the entire Wabash River subwatershed, and Site 10 represents the entire Rock Creek subwatershed. The total current and target loads for Sites 1, 9, and 10 are added together. The total current and target loads for Site 5 (upstream Wabash River watershed area) are subtracted from the totals to reflect the actual loading within the project area.

Table 6-4: Measured Current Load and Target Load Estimates for UWRBC Phase 2 Project Area. (Pounds Per Year or Billions of Organisms Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed		**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**	***E. coli***
			Current Load Target Load (lbs/yr)	*Current Load Target Load (lbs/yr)*	*Current Load Target Load (lbs/yr)*	*Current Load Target Load (lbs/yr)*	*Current Load Target Load (G-org/yr)*
Eight Mile Creek	Pleasant Run/ Big Creek	1	1,408,827 1,508,843	7,227 150,891	765,770 1,508,837	41,245 45,260	340,419 160,909
Wabash River–Griffin Ditch	Bender Ditch/ Griffin Ditch	9	34,009,768 18,031,876	230,826 1,803,173	13,950,227 18,031,876	740,950 540,930	4,116,015 1,922,989
Rock Creek	Elkenberry Ditch	10	3,313,470 2,056,337	17,958 205,641	1,376,050 2,056,337	46,793 61,685	479,503 219,299
TOTALS			38,732,065 21,597,056	256,011 2,159,705	16,092,047 21,597,050	828,988 647,875	4,935,937 2,303,197
Upstream Wabash River watershed not in project area		5	22,677,231 13,146,205	259,004 1,314,657	10,878,533 13,146,205	586,263 394,419	3,397,047 1,401,963
Phase 2 Project Area Loading			16,054,834 8,450,851	-2,993 845,048	5,213,514 8,450,845	242,725 253,456	1,538,890 901,234

In total, the annual measured current load in the Phase 2 project area is 38,732,065 pounds of nitrate, 256,011 pounds of nitrite, 16,092,047 pounds of total nitrogen, 828,988 pounds of total phosphorus, and 4,935,937 billions of organisms of *E. coli* in the project area.

The annual measured loading estimates were then normalized by the total area draining to the sample location. The total drainage area for each sample location was derived from the L-THIA watershed delineator tool developed by Purdue University, Agricultural and Biological Engineering department with support from USEPA, USDA, US Army CERL, and the Corps of Engineers.

Table 6-5: Measured Current Load and Target Load Estimates by Subwatershed. (Pounds Per Acre Per Year or Billions of Organisms Per Acre Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed **(Acres*)** ***Based on Purdue University L-THIA watershed delineator.**		**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**	***E. coli***
			Current Load Target Load (lbs/ac/yr)	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (G-org/ac/yr)*
Eight Mile Creek	Pleasant Run/ Big Creek (50,338 acres)	1	27.99 29.97	0.14 3.00	15.21 29.97	0.82 0.90	6.76 3.20
	Moser Lake (21,530 acres)	2	83.24 24.14	0.20 2.41	23.24 24.14	2.65 0.73	6.05 2.57
	Maple Creek (15,108 acres)	3	36.50 21.72	0.19 2.17	13.27 21.72	0.54 0.65	4.35 2.32
Wabash River–Griffin Ditch	Johns Creek (370,754 acres)	6	75.96 37.72	0.43 3.77	34.39 37.72	1.91 1.13	10.36 4.02
	Dowty Ditch (381,733 acres)	7	64.86 31.89	0.32 3.19	27.24 31.89	1.61 0.96	8.44 3.40
	Bender Ditch/ Griffin Ditch (410,719 acres)	9	82.81 43.90	0.56 4.39	33.97 43.90	1.80 1.32	10.02 4.68
Rock Creek	Elkenberry Ditch (66,637 acres)	10	49.72 30.86	0.27 3.09	20.65 30.86	0.70 0.93	7.20 3.29
	Mossburg Ditch (53,208 acres)	13	30.40 26.97	0.14 2.70	12.54 26.97	0.48 0.81	5.97 2.88
	Stites Ditch (29,944 acres)	14	45.37 28.86	0.48 2.89	18.43 28.86	0.52 0.87	3.87 3.08
	Headwaters (20,089 acres)	15	29.82 23.81	0.10 2.38	11.47 23.81	0.46 0.72	3.48 2.54
Upstream Wabash River watershed not in project area (353,437 acres)		5	64.16 37.20	0.73 3.72	30.78 37.20	1.66 1.12	9.61 3.97
Western portion of Elkenberry Ditch subwatershed (6,136 acres)		11	34.39 25.97	3.91 2.59	12.63 25.97	0.44 0.77	5.89 2.77
Total Wabash River & Rock Creek subwatersheds (477,393 acres)		12	62.33 40.55	0.36 4.05	23.89 40.55	1.10 1.22	7.97 4.32

When the loading is based on the per acre rate, the greatest contributor of nitrate and total phosphorus is the Moser Lake-Eight Mile Creek subwatershed. The Wabash River subwatersheds; Johns Creek, Dowty Ditch, and Bender Ditch/Griffin Ditch are significant contributors of all nutrients and *E. coli*. The Stites Ditch-Rock Creek is a major contributor of nitrite, and the Elkenberry Ditch-Rock Creek is a major contributor of *E. coli*.

Table 6-6: Measured Current Load and Target Load Estimates for UWRBC Phase 2 Project Area. (Pounds Per Acre Per Year or Billions of Organisms Per Acre Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed	**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**	***E. coli***
		Current Load Target Load (lbs/ac/yr)	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (G-org/ac/yr)*
Eight Mile Creek	1	27.99	0.14	15.21	0.82	6.76
50,338 acres		29.97	3.00	29.97	0.90	3.20
Wabash River–Griffin Ditch	9	82.81	0.56	33.97	1.80	10.02
410,719 acres		43.90	4.39	43.90	1.32	4.68
Rock Creek	10	49.72	0.27	20.65	0.70	7.20
66,637 acres		30.86	3.09	30.86	0.93	3.29
Total Per Acre Per Year		73.40	0.49	30.50	1.57	9.35
527,694 acres		40.93	4.09	40.93	1.23	4.36

Hydrologic Simulation Model Results

Various hydrologic simulation models were compared and evaluated for use in determining estimates of the pollutant loads in the water bodies. The load duration curve (LDC) approach was selected because it uses the project monitoring sites which allows for comparison between the measured load and modeled load for each subwatershed. It also provides a way to characterize the water quality concentrations at the full range of flow conditions. With this model the frequency and magnitude of water quality standard exceedances, allowable loadings, and the size of load reductions are more easily understood. The pattern of impairment can be examined to see if it occurs across all flow conditions, corresponds strictly to high flow events, or conversely, only to low flows.

The LDC presents the flow conditions plotted as a percent of time that a given flow occurs within the stream (curve). The flow ranges fall into five flow zones; high flow (0-10), moist conditions (10-40), mid-range flow (40-60), dry conditions (60-90), and low flow (90-100). Each parameter sample result (point) is plotted against the "percent of time" for the day of sampling; and a pattern develops which describes the characteristics of the water quality impairment. The points (sample results) that plot above the curve indicate an exceedance of the water quality target, while those below the curve show compliance. Exceedances observed in the high (0-10) and moist range (10-40) generally reflect potential nonpoint source contributions associated with surface runoff or storm water loads, while exceedances in the low flow zone (90-100) indicates the influence of point sources.

When using the LDC method, EPA recommends that the 90th percentile of the measured load be used as a "margin of safety" to account for the uncertainty associated with water quality that varies across different flow conditions. For example, the loading capacity as calculated at the mid-point of each of the five flow zones and the loading capacity calculated at the minimum flow in each zone can vary greatly. In some cases, an overall load reduction value results in no reduction needed, but with further review of the waste load allocation over time, loads above the target during a specific flow condition are often offset by loads significantly under the target during the other flow conditions resulting in a no net load reduction. When this is the case, it is necessary to look at the load allocations under the various flow conditions to identify a link between the source of the pollutant and delivery mechanism to determine under what conditions reductions may be needed.

The modeled target load, observed load, required reduction for each flow regime, and overall required reduction are displayed in the load reduction reports. *E. coli* load reduction reports only provide the target load, observed loads and required reduction information by flow regime, and do not give the overall loads and required reduction.

For the subwatersheds with more than one monitoring location, the downstream location is used to indicate the load for the entire or combined subwatersheds. Again, site 5 is the accumulated pollutant loading from the upstream Wabash River area; site 11 on the Elkenberry Ditch, a tributary to the Rock Creek channel only takes into consideration the drainage from the western portion of the subwatershed; and site 12 is a total of all of the Wabash River and Rock Creek subwatersheds.

Table 6-7: LDC Modeled Load and Target Load Estimates by Subwatershed. (Pounds Per Year)

Red text indicates values exceed modeled water quality targets.

Subwatershed		**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**
			Modeled Load Target Load (lbs/yr)	*Modeled Load Target Load (lbs/yr)*	*Modeled Load Target Load (lbs/yr)*	*Modeled Load Target Load (lbs/yr)*
Eight Mile Creek	Pleasant Run/ Big Creek	1	1,487,908 1,509,877	7,201 150,990	179,675 1,509,877	16,918 45,297
	Moser Lake	2	1,594,802 520,202	4,745 52,020	276,090 520,202	74,325 15,607
	Maple Creek	3	678,400 328,380	4,008 32,839	128,987 328,380	7,147 9,851
Wabash River – Griffin Ditch	Johns Creek	6	27,559,471 13,994,279	192,319 1,399,428	7,519,949 13,994,279	195,312 419,827
	Dowty Ditch	7	28,978,795 12,182,025	222,541 1,218,202	8,513,552 12,182,025	315,572 365,460
	Bender Ditch/ Griffin Ditch	9	28,415,443 18,044,268	231,844 1,804,425	11,509,972 18,044,268	433,043 541,328
Rock Creek	Elkenberry Ditch	10	7,354,746 2,057,782	22,156 205,780	1,797,362 2,057,782	27,120 61,732
	Mossburg Ditch	13	3,440,337 1,435,874	12,370 143,587	548,226 1,435,874	112,938 43,077
	Stites Ditch	14	1,218,490 1,119,010	21,889 111,902	399,084 1,119,010	6,388 33,569
	Headwaters	15	922,293 478,657	2,154 47,866	215,124 478,657	6,183 14,359
Upstream Wabash River watershed not in project area		5	27,206,516 13,155,414	268,020 1,315,540	6,585,549 13,155,414	160,418 394,664
Western portion of Elkenberry Ditch subwatershed		11	283,777 159,498	50,538 15,951	79,789 159,498	9,231 4,785
Total Wabash River & Rock Creek subwatersheds		12	27,108,477 19,369,962	304,994 1,936,997	6,196,934 19,369,962	116,253 581,098

Based on the annual modeled load estimates, the Johns Creek, Dowty Ditch, and Bender Ditch/Griffin Ditch subwatersheds are the largest contributors of all nutrients. The Elkenberry Ditch-Rock Creek subwatershed is a major contributor of nitrate, nitrite and total nitrogen; and the Mossburg Ditch-Rock Creek subwatershed is a major contributor of total phosphorus.

To calculate the total modeled load and modeled target load for the UWRBC Phase 2 project area, the downstream monitoring locations in each subwatershed are used. Site 1 represents the entire Eight Mile Creek subwatershed, Site 9 represents the entire Wabash River subwatershed, and Site 10 represents the entire Rock Creek subwatershed. The total modeled load and target load for Sites 1, 9, and 10 are added together. The modeled load and target load for Site 5 (upstream Wabash River watershed area) are subtracted from the totals to reflect the actual modeled loading within the project area.

Table 6-8: LDC Modeled Load and Target Load Estimates for the UWRBC Phase 2 Project Area. (Pounds Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed		**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**
			Modeled Load Target Load (lbs/yr)	*Modeled Load Target Load (lbs/yr)*	*Modeled Load Target Load (lbs/yr)*	*Modeled Load Target Load (lbs/yr)*
Eight Mile Creek	Pleasant Run/ Big Creek	1	1,487,908 1,509,877	7,201 150,990	179,675 1,509,877	16,918 45,297
Wabash River – Griffin Ditch	Bender Ditch/ Griffin Ditch	9	28,415,443 18,044,268	231,844 1,804,425	11,509,972 18,044,268	433,043 541,328
Rock Creek	Elkenberry Ditch	10	7,354,746 2,057,782	22,156 205,780	1,797,362 2,057,782	27,120 61,732
TOTALS			37,258,097 21,611,927	261,201 2,161,195	13,487,009 21,611,927	477,081 648,356
Upstream Wabash River watershed not in project area		5	27,206,516 13,155,414	268,020 1,315,540	6,585,549 13,155,414	160,418 394,664
Phase 2 Project Area Loading			10,051,581 8,456,513	-26,759 845,655	6,901,460 8,456,513	316,663 253,692

The load duration curve estimates the modeled loads in the UWRBC Phase 2 project area to be 37,258,097 pounds of nitrate, 241,261 pounds of nitrite, 13,487,009 pounds of total nitrogen, and 477,081 pounds of total phosphorus.

The annual modeled loading estimates were also normalized by the total area draining to the sample location and represented in pounds per acre per year. The total drainage area for each sample location was derived from the L-THIA watershed delineator tool developed by Purdue University, Agricultural and Biological Engineering department with support from USEPA, USDA, US Army CERL, and the Corps of Engineers.

Table 6-9: LDC Modeled Load and Target Load Estimates by Subwatershed. (Pounds Per Acre Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed (Acres*) *Based on Purdue University L-THIA watershed delineator.		**Site**	**Nitrate**	**Nitrite**	**Total Nitrogen**	**Total Phosphorus**
			Modeled Load Target Load (lbs/ac/yr)	*Modeled Load Target Load (lbs/ac/yr)*	*Modeled Load Target Load (lbs/ac/yr)*	*Modeled Load Target Load (lbs/ac/yr)*
Eight Mile Creek	Pleasant Run/ Big Creek (50,338 acres)	1	29.56 29.99	0.14 3.00	3.57 29.99	0.34 0.90
	Moser Lake (21,530 acres)	2	74.07 24.16	0.22 2.42	12.82 24.16	3.45 0.73
	Maple Creek (15,108 acres)	3	44.90 21.74	0.27 2.17	8.54 21.74	0.47 0.65
Wabash River – Griffin Ditch	Johns Creek (370,754 acres)	6	74.33 37.75	0.52 3.77	20.28 37.75	0.53 1.13
	Dowty Ditch (381,733 acres)	7	75.91 31.91	0.58 3.19	22.30 31.91	0.83 0.96
	Bender Ditch/ Griffin Ditch (410,719 acres)	9	69.18 43.93	0.56 4.39	28.02 43.93	1.05 1.32
Rock Creek	Elkenberry Ditch (66,637 acres)	10	110.37 30.88	0.33 3.09	26.97 30.88	0.41 0.93
	Mossburg Ditch (53,208 acres)	13	64.66 26.99	0.23 2.69	10.30 26.99	2.12 0.81
	Stites Ditch (29,944 acres)	14	40.69 37.37	0.73 3.74	13.33 37.37	0.21 1.12
	Headwaters (20,089 acres)	15	45.91 23.83	0.11 2.38	10.71 23.83	0.31 0.72
Upstream Wabash River watershed not in project area (353,437 acres)		5	76.98 37.22	0.76 3.72	18.63 37.22	0.45 1.12
Western portion of Elkenberry Ditch subwatershed (6,136 acres)		11	46.25 25.99	8.24 2.60	13.00 25.99	1.50 0.78
Total Wabash River & Rock Creek subwatersheds (477,393 acres)		12	56.78 40.57	0.64 4.06	12.98 40.57	0.24 1.22

Based on the annual modeled load estimates per acre, the Elkenberry Ditch-Rock Creek subwatershed is the largest contributor of nitrate; followed by the Dowty Ditch-Wabash River, Johns Creek-Wabash River, and Moser Lake-Eight Mile Creek subwatersheds. The western portion of the Elkenberry Ditch-Rock Creek is the leading contributor of nitrite. The Bender Ditch-Wabash River subwatershed is the highest contributor for total nitrogen; followed by the Elkenberry Ditch-Rock Creek subwatershed and Dowty Ditch and Johns Creek subwatersheds of the Wabash River. The Moser Ditch-Eight Mile Creek is the largest contributor of total phosphorus. Additional major contributors include the Mossburg Ditch-Rock Creek, Bender Ditch/Griffin Ditch and Dowty Ditch-Wabash River subwatersheds.

Table 6-10: LDC Modeled Load and Target Load Estimates for the UWRBC Phase 2 Project Area. (Pounds Per Acre Per Year)

Red text indicates values exceed current water quality targets.

Subwatershed	Site	Nitrate	Nitrite	Total Nitrogen	Total Phosphorus
		Current Load Target Load (lbs/ac/yr)	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (lbs/ac/yr)*	*Current Load Target Load (lbs/ac/yr)*
Eight Mile Creek	1	29.56	0.14	3.57	0.34
50,338 acres		29.99	3.00	29.99	0.90
Wabash River–Griffin Ditch	9	69.18	0.56	28.02	1.05
410,719 acres		43.93	4.39	43.93	1.32
Rock Creek	10	110.37	0.33	26.97	0.41
66,637 acres		30.88	3.09	30.88	0.93
Total Per Acre Per Year		70.61	0.49	25.56	0.90
527,694 acres		40.96	4.09	40.96	1.23

Measured vs. Modeled Loads

Tables 6-11 through 6-20 compare the loads derived from the measured data and the modeled data. Nitrate, nitrite, total nitrogen and total phosphorus estimates are based on pounds per year and pounds per acre per year. Because the LDC model does not estimate an overall load or target load for E. coli, our measured estimates are the only source to estimate *E. coli* concentrations in the project area. The *E. coli* annual and per acre estimates are based on billions of organisms per year and billions of organisms per acre per year.

Table 6-11: Measured Loads vs. Modeled Loads - Nitrate.

Subwatershed		Site	Nitrate				
			Measured Load **(lbs/yr)**	*Modeled Load* **(lbs/yr)**	*Comparison: Measured/ Modeled*	*Measured Load* **(lbs/ac/yr)**	*Modeled Load* **(lbs/ac/yr)**
Eight Mile Creek	Pleasant Run/ Big Creek	1	1,408,827	1,487,908	95%	27.99	29.56
	Moser Lake	2	1,792,150	1,594,802	112%	83.24	74.07
	Maple Creek	3	551,369	678,400	81%	36.50	44.90
Wabash River – Griffin Ditch	Johns Creek	6	28,161,648	27,559,471	102%	75.96	74.33
	Dowty Ditch	7	24,760,359	28,978,795	85%	64.86	75.91
	Bender Ditch/ Griffin Ditch	9	34,009,768	28,415,443	120%	82.81	69.18
Rock Creek	Elkenberry Ditch	10	3,313,470	7,354,746	45%	49.72	110.37
	Mossburg Ditch	13	1,617,753	3,440,337	47%	30.40	64.66
	Stites Ditch	14	1,358,603	1,218,490	111%	45.37	40.69
	Headwaters	15	599,038	922,293	65%	29.82	45.91
Upstream Wabash River watershed not in project area		5	22,677,231	27,206,516	83%	64.16	76.98
Western portion of Elkenberry Ditch subwatershed		11	211,043	283,777	74%	34.39	46.25
Total Wabash River & Rock Creek subwatersheds		12	29,758,158	27,108,477	110%	62.33	56.78

Table 6-12: Measured Loads vs. Modeled Loads for Nitrate for the UWRBC Phase 2 Project Area.

Subwatershed		**Site**	**Nitrate**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	1,408,827	1,487,908	95%	27.99	29.56
Wabash River – Griffin Ditch	Bender Ditch/ Griffin Ditch	9	34,009,768	28,415,443	120%	82.81	69.18
Rock Creek	Elkenberry Ditch	10	3,313,470	7,354,746	45%	49.72	110.37
TOTALS			**38,732,065**	**37,258,097**	**104%**	**73.40**	**70.61**
Upstream Wabash River watershed not in project area		5	22,677,231	27,206,516	83%	64.16	76.98
Phase 2 Project Area Loading			16,054,834	10,051,581	160%	30.42	19.05

Table 6-13: Measured Loads vs. Modeled Loads - Nitrite.

Subwatershed		**Site**	**Nitrite**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	7,227	7,201	100.3%	0.14	0.14
	Moser Lake	2	4,380	4,745	92%	0.20	0.22
	Maple Creek	3	2,920	4,008	73%	0.19	0.27
Wabash River – Griffin Ditch	Johns Creek	6	160,527	192,319	83%	0.43	0.52
	Dowty Ditch	7	121,107	222,541	54%	0.32	0.58
	Bender Ditch/ Griffin Ditch	9	230,826	231,844	99.5%	0.56	0.56
Rock Creek	Elkenberry Ditch	10	17,958	22,156	81%	0.27	0.33
	Mossburg Ditch	13	7,373	12,370	60%	0.14	0.23
	Stites Ditch	14	14,308	21,889	65%	0.48	0.73
	Headwaters	15	2,044	2,154	95%	0.10	0.11
Upstream Wabash River watershed not in project area		5	259,004	268,020	97%	0.73	0.76
Western portion of Elkenberry Ditch subwatershed		11	24,017	50,538	48%	3.91	8.24
Total Wabash River & Rock Creek subwatersheds		12	173,813	304,994	57%	0.36	0.64

Table 6-14: Measured Loads vs. Modeled Loads for Nitrite for the UWRBC Phase 2 Project Area.

Subwatershed		**Site**	**Nitrite**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	7,227	7,201	100.3%	0.14	0.14
Wabash River – Griffin Ditch	Bender Ditch/ Griffin Ditch	9	230,826	231,844	99.5%	0.56	0.56
Rock Creek	Elkenberry Ditch	10	17,958	22,156	81%	0.27	0.33
	TOTALS		**256,011**	**261,201**	**98%**	**0.49**	**0.49**
Upstream Wabash River watershed not in project area		5	259,004	268,020	97%	0.73	0.76
Phase 2 Project Area Loading			-2,993	-6,819	44%	-0.57	-1.29

Table 6-15: Measured Loads vs. Modeled Loads – Total Nitrogen.

Subwatershed		**Site**	**Total Nitrogen**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	765,770	179,675	426%	15.21	3.57
	Moser Lake	2	500,342	276,090	181%	23.24	12.82
	Maple Creek	3	200,458	128,987	155%	13.27	8.54
Wabash River – Griffin Ditch	Johns Creek	6	12,749,377	7,519,949	170%	34.39	20.28
	Dowty Ditch	7	10,398,368	8,513,552	122%	27.24	22.30
	Bender Ditch/ Griffin Ditch	9	13,950,227	11,509,972	121%	33.97	28.02
Rock Creek	Elkenberry Ditch	10	1,376,050	1,797,362	77%	20.65	26.97
	Mossburg Ditch	13	667,220	548,226	122%	12.54	10.30
	Stites Ditch	14	551,880	399,084	138%	18.43	13.33
	Headwaters	15	230,388	215,124	107%	11.47	10.71
Upstream Wabash River watershed not in project area		5	10,878,533	6,585,549	165%	30.78	18.63
Western portion of Elkenberry Ditch subwatershed		11	77,526	79,789	97%	12.63	13.00
Total Wabash River & Rock Creek subwatersheds		12	11,402,819	6,196,934	184%	23.89	12.98

Table 6-16: Measured Loads vs. Modeled Loads for Total Nitrogen for the UWRBC Phase 2 Project Area.

Subwatershed		**Site**	**Total Nitrogen**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	765,770	179,675	426%	15.21	3.57
Wabash River – Griffin Ditch	Bender Ditch/ Griffin Ditch	9	13,950,227	11,509,972	121%	33.97	28.02
Rock Creek	Elkenberry Ditch	10	1,376,050	1,797,362	77%	20.65	26.97
TOTALS			**16,092,047**	**13,487,009**	**119%**	**30.50**	**25.56**
Upstream Wabash River watershed not in project area		5	10,878,533	6,585,549	165%	30.78	18.63
Phase 2 Project Area Loading			5,213,514	6,901,460	76%	9.88	13.08

Table 6-17: Measured Loads vs. Modeled Loads – Total Phosphorus.

Subwatershed		**Site**	**Total Phosphorus**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	41,245	16,918	244%	0.82	0.34
	Moser Lake	2	57,086	74,325	77%	2.65	3.45
	Maple Creek	3	8,176	7,147	114%	0.54	0.47
Wabash River – Griffin Ditch	Johns Creek	6	707,370	195,312	362%	1.91	0.53
	Dowty Ditch	7	613,054	315,572	194%	1.61	0.83
	Bender Ditch/ Griffin Ditch	9	740,950	433,043	171%	1.80	1.05
Rock Creek	Elkenberry Ditch	10	46,793	27,120	173%	0.70	0.41
	Mossburg Ditch	13	25,623	112,938	23%	0.48	2.12
	Stites Ditch	14	15,695	6,388	246%	0.52	0.21
	Headwaters	15	9,198	6,183	149%	0.46	0.31
Upstream Wabash River watershed not in project area		5	586,263	160,418	365%	1.66	0.45
Western portion of Elkenberry Ditch subwatershed		11	2,701	9,231	29%	0.44	1.50
Total Wabash River & Rock Creek subwatersheds		12	526,111	116,253	453%	1.10	0.24

Table 6-18: Measured Loads vs. Modeled Loads for Total Phosphorus for the UWRBC Phase 2 Project Area.

Subwatershed		**Site**	**Total Phosphorus**				
			Measured Load ***(lbs/yr)***	*Modeled Load* ***(lbs/yr)***	*Comparison: Measured/ Modeled*	*Measured Load* ***(lbs/ac/yr)***	*Modeled Load* ***(lbs/ac/yr)***
Eight Mile Creek	Pleasant Run/ Big Creek	1	41,245	16,918	244%	0.82	0.34
Wabash River – Griffin Ditch	Bender Ditch/ Griffin Ditch	9	740,950	433,043	171%	1.80	1.05
Rock Creek	Elkenberry Ditch	10	46,793	27,120	173%	0.70	0.41
	TOTALS		**828,988**	**477,081**	**174%**	**1.57**	**0.90**
Upstream Wabash River watershed not in project area		5	586,263	160,418	365%	1.66	0.45
Phase 2 Project Area Loading			242,725	316,663	77%	0.46	0.60

Table 6-19: Measured Loads – *E. coli*.

Subwatershed		**Site**	***E. coli***	
			Measured Load (G-org/yr)	*Measured Load (G-org/ac/yr)*
Eight Mile Creek	Pleasant Run/Big Creek	1	340,419	6.76
	Moser Lake	2	130,288	6.05
	Maple Creek	3	65,759	4.35
Wabash River – Griffin Ditch	Johns Creek	6	3,842,681	10.36
	Dowty Ditch	7	3,222,333	8.44
	Bender Ditch/Griffin Ditch	9	4,116,015	10.02
Rock Creek	Elkenberry Ditch	10	479,503	7.20
	Mossburg Ditch	13	317,811	5.97
	Stites Ditch	14	115,866	3.87
	Headwaters	15	69,950	3.48
Upstream Wabash River watershed not in project area		5	3,397,047	9.61
Western portion of Elkenberry Ditch subwatershed		11	36,156	5.89
Total Wabash River & Rock Creek subwatersheds		12	3,805,921	7.97

Table 6-20: Measured Loads for *E. coli* for the UWRBC Phase 2 Project Area.

Subwatershed		**Site**	***E. coli***	
			Measured Load (G-org/yr)	*Measured Load (G-org/ac/yr)*
Eight Mile Creek	Pleasant Run/Big Creek	1	340,419	6.76
Wabash River – Griffin Ditch	Bender Ditch/Griffin Ditch	9	4,116,015	10.02
Rock Creek	Elkenberry Ditch	10	479,503	7.20
	TOTALS		**4,935,937**	**9.35**
Upstream Wabash River watershed not in project area		5	3,397,047	9.61
Phase 2 Project Area Loading			1,538,890	2.92

6.3 Target Load Reductions Needed

Based on a review of the measured versus modeled loads, the measured load data was used to rank the subwatersheds by the current loading per acre for nitrate, total phosphorus and *E. coli*. The measured load data shows that nitrate will need to be reduced by 44% to reach the target load; however nitrite and total nitrogen do not require any reductions. The phosphorus reduction of 22% will exceed the Wabash River TMDL of a 4% reduction for phosphorus; however, the reduction of 53% indicated by the measured load data for *E. coli* will meet the target load for the project area, but is below the TMDL recommended reduction of 87%. These individual subwatershed load reductions shown in the following charts are used in addition to other characteristics in the subwatersheds to identify critical areas in the project area and also used in determining long-term goals.

Table 6-21: Measured vs. Modeled Load Reduction Estimates – Nitrate.

Subwatershed		**Site**	**Nitrate**					
			Measured Reduction (lbs/yr)	*Measured Reduction (lbs/ac/yr)*	*%*	*Modeled Reduction (lbs/yr)*	*Modeled Reduction (lbs/ac/yr)*	*%*
Eight Mile Creek	Pleasant Run/Big Creek	1	-	-	-	-	-	-
	Moser Lake	2	1,272,317	59.10	71%	1,074,600	49.91	67%
	Maple Creek	3	223,234	14.78	40%	350,020	23.16	52%
Wabash River – Griffin Ditch	Johns Creek	6	14,176,965	38.24	50%	13,565,192	36.58	49%
	Dowty Ditch	7	12,586,660	32.97	51%	16,796,770	44.00	58%
	Bender Ditch/ Griffin Ditch	9	15,977,892	38.91	47%	10,371,175	25.25	36%
Rock Creek	Elkenberry Ditch	10	1,257,133	18.86	38%	5,296,964	79.49	72%
	Mossburg Ditch	13	182,865	3.43	11%	2,004,463	37.67	58%
	Stites Ditch	14	494,356	16.51	36%	99,480	3.32	8%
	Headwaters	15	120,742	6.01	20%	443,636	22.08	48%
Upstream Wabash River watershed not in project area		5	9,531,026	26.97	42%	14,051,102	39.75	52%
Western portion of Elkenberry Ditch subwatershed		11	51,684	8.42	24%	124,279	20.26	44%
Total Wabash River & Rock Creek subwatersheds		12	10,401,478	21.78	35%	7,738,515	16.21	29%

🟥 >50 lbs/ac/yr 🟩 30-50 lbs/ac/yr 🟧 10-30 lbs/ac/yr 🟦 0-10 lbs/ac/yr 🟨 No reduction required

THE MEASURED NITRITE AND TOTAL NITROGEN RESULTS REQUIRE NO REDUCTIONS.

Table 6-22: Measured vs. Modeled Load Reduction Estimates – Total Phosphorus.

Subwatershed		**Site**	**Total Phosphorus**					
			Measured Reduction (lbs/yr)	*Measured Reduction (lbs/ac/yr)*	*%*	*Modeled Reduction (lbs/yr)*	*Modeled Reduction (lbs/ac/yr)*	*%*
Eight Mile Creek	Pleasant Run/Big Creek	1	-	-	-	-	-	-
	Moser Lake	2	41,464	1.92	73%	58,718	2.72	79%
	Maple Creek	3	-	-	-	-	-	-
Wabash River – Griffin Ditch	Johns Creek	6	287,839	0.78	41%	-	-	-
	Dowty Ditch	7	247,835	0.65	40%	-	-	-
	Bender Ditch/ Griffin Ditch	9	200,020	0.48	27%	-	-	-
Rock Creek	Elkenberry Ditch	10	-	-	-	-	-	-
	Mossburg Ditch	13	-	-	-	69,861	1.31	62%
	Stites Ditch	14	-	-	-	-	-	-
	Headwaters	15	-	-	-	-	-	-
Upstream Wabash River watershed not in project area		5	191,844	0.54	33%	-	-	-
Western portion of Elkenberry Ditch subwatershed		11	-	-	-	4,446	0.72	48%
Total Wabash River & Rock Creek subwatersheds		12	-	-	-	-	-	-

🟥 >1.0 lbs/ac/yr 🟩 0.5-1.0 lbs/ac/yr 🟧 0-0.5 lbs/ac/yr 🟨 No reduction required

Table 6-23: Measured Load Reduction Estimates for *E. coli*.

Subwatershed		**Site**	***E. coli***		
			Measured Reduction G-org/yr	*Measured Reduction G-org/ac/ yr*	*%*
Eight Mile Creek	Pleasant Run/Big Creek	1	179,510	3.56	53%
	Moser Lake	2	74,850	3.48	57%
	Maple Creek	3	30,763	2.03	47%
Wabash River – Griffin Ditch	Johns Creek	6	2,351,302	6.34	61%
	Dowty Ditch	7	1,924,087	5.04	60%
	Bender Ditch/Griffin Ditch	9	2,193,026	5.34	53%
Rock Creek	Elkenberry Ditch	10	260,204	3.91	54%
	Mossburg Ditch	13	164,789	3.09	52%
	Stites Ditch	14	23,700	0.79	20%
	Headwaters	15	18,939	0.94	27%
Upstream Wabash River watershed not in project area		5	1,995,084	5.64	59%
Western portion of Elkenberry Ditch subwatershed		11	19,160	3.12	53%
Total Wabash River & Rock Creek subwatersheds		12	1,741,652	3.65	46%

🟥 >5 G-org/ac/yr 🟩 3-5 G-org/ac/yr 🟧 2-3 G-org/ac/yr 🟦 0-2 G-org/ac/yr

Target Reductions Based on Flow Events

Another advantage of the load duration curve framework is the ability to provide meaningful connections between the load allocations and implementation efforts that will most effectively address water quality concerns. In general, waste load allocations from waste water treatment plants can play a significant role in nutrient and *E. coli* levels during low flow conditions. Actions to address this might involve review of facility permits and compliance. Under high flow conditions, stream bank erosion and channel processes may account for higher loading of total sediment. Implementation efforts might include bank stabilization practices. Water quality concerns during mid-range flows and moist conditions may be the result of runoff from impervious surfaces in urban areas; while in agricultural watersheds the saturated soils and the larger drainage area are potentially contributing pollutants in runoff. Low impact development techniques might be used in urban areas and conservation practices such as cover crops would be appropriate in agricultural areas. Tables 6-24 through 6-28 display the subwatersheds with exceedances during the various flow zones.

Table 6-24: Nitrate LDC Flow Zones - Modeled Loads Exceed Target Loads and Required Reductions.

NITRATE – LDC FLOW ZONE LOADS, TARGET LOADS AND REQUIRED REDUCTION							
Subwatershed		**Site**	***Flow Zone***	***90th Percentile Load (lbs/y)***	***Target Load (lbs/y)***	***Required Reduction (lbs/y)***	***%***
Eight Mile Creek	Pleasant Run/ Big Creek	1	Moist	5,278,236	483,315	4,794,921	91%
			Mid-range	810,559	372,282	438,277	54%
	Moser Lake	2	Moist	2,351,600	344,918	2,006,682	85%
			Mid-range	1,594,802	215,178	1,379,624	86%
			Dry	229,643	34,255	195,388	85%
			Low Flow	80,961	20,670	60,291	74%
	Maple Creek	3	Moist	1,673,164	161,629	1,511,535	90%
			Mid-range	411,808	92,137	319,671	78%
Wabash River – Griffin Ditch	Johns Creek	6	Moist	94,899,234	4,557,543	90,341,691	95%
			Mid-range	5,753,364	2,441,189	3,312,175	58%
			Dry	7,094,410	2,080,916	5,013,494	71%
	Dowty Ditch	7	Moist	85,478,109	5,388,334	80,089,775	94%
			Mid-range	6,032,348	2,830,597	3,201,751	53%
			Dry	8,041,687	2,423,469	5,618,218	70%
			Low Flow	498,451	417,757	80,694	16%
	Bender Ditch/ Griffin Ditch	9	Moist	84,484,470	4,955,218	79,529,252	94%
			Mid-range	12,974,940	3,894,090	9,080850	70%
			Dry	5,610,181	2,720,742	2,889,439	52%
Rock Creek	Elkenberry Ditch	10	Moist	10,695,026	1,311,941	9,383,085	88%
			Mid-range	1,443,487	550,646	892,841	62%
	Mossburg Ditch	13	Moist	7,774,507	1,720,055	6,064,452	78%
			Mid-range	746,921	414,607	332,314	44%
	Stites Ditch	14	Mid-range	1,389,672	374,052	1,015,620	73%
	Headwaters	15	Moist	2,562,362	247,269	2,315,093	90%
			Mid-range	228,892	138,992	89,900	39%

Table 6-24: Nitrate LDC Flow Zones - Modeled Loads Exceed Target Loads and Required Reductions (continued).

Subwatershed	Site	Flow Zone	90th Percentile Load (lbs/y)	Target Load (lbs/y)	Required Reduction (lbs/y)	%
Upstream Wabash River watershed not in project area	5	Moist	97,871,283	4,573,293	93,297,990	95%
		Mid-range	5,822,823	2,724,681	3,098,142	53%
		Dry	7,800,021	1,779,313	6,020,708	77%
Western portion of Elkenberry Ditch subwatershed	11	Moist	591,789	188,406	403,383	68%
		Mid-range	238,060	49,020	189,040	79%
		Dry	91,947	9,647	82,300	90%
Total Wabash River & Rock Creek subwatersheds	12	Moist	99,640,766	6,075,410	93,565,356	94%
		Mid-range	13,371,322	4,260,269	9,111,053	68%
		Dry	3,177,380	1,560,196	1,617,184	51%

Modeled nitrate loads exceeded the target load in all subwatersheds during mid-range flow conditions; and twelve out of the thirteen subwatersheds exceeded the target load during moist conditions. This suggests that nitrates are readily available in all watersheds from sources such as fertilizer and animal or human waste; and is washed into the streams and river by surface runoff and through subsurface tile drainage.

The Moser Lake-Eight Mile Creek; Johns Creek, Dowty Ditch and Bender Ditch-Wabash River subwatersheds; and western portion of the Elkenberry Ditch-Rock Creek, upstream Wabash River watershed, and the combined watersheds of the Wabash River and Rock Creek exceeded the target load during dry periods. The Moser Lake-Eight Mile Creek and Dowty Ditch-Wabash River subwatersheds also exceeded the target load during low flow, suggesting that there is a continuous source of nitrates available in those subwatersheds which could be from waste treatment facilities or on-site septic systems.

Table 6-25: Nitrite LDC Flow Zones - Modeled Loads Exceed Target Loads and Required Reductions.

NITRITE – LDC FLOW ZONE LOADS, TARGET LOADS AND REQUIRED REDUCTION							
Subwatershed		Site	Flow Zone	90th Percentile Load (lbs/y)	Target Load (lbs/y)	Required Reduction (lbs/y)	%
Eight Mile Creek	Pleasant Run/Big Creek	1	Moist	51,783	48,333	3,450	7%
Wabash River – Griffin Ditch	Dowty Ditch	7	Moist	600,768	538,835	61,933	10%
Upstream Wabash River watershed not in project area		5	Moist	610,390	457,330	153,060	25%
			Dry	215,591	177,930	37,661	17%
Western portion of Elkenberry Ditch subwatershed		11	Moist	40,771	18,841	21,930	54%
			Dry	40,796	964	39,832	98%

Nitrite modeled loads exceeded the target load during moist conditions in the Pleasant Run Ditch-Eight Mile Creek and Dowty Ditch-Wabash River subwatersheds. The upstream Wabash River watershed and western portion of the Elkenberry Ditch-Rock Creek subwatershed exceeded the target load during both moist and dry conditions. Potential sources may be storm water runoff from agricultural activities during moist conditions and point sources such as septic system inputs during dry conditions.

Table 6-26: Total Nitrogen LDC Flow Zones - Modeled Loads Exceed Target Loads and Required Reductions.

TOTAL NITROGEN – LDC FLOW ZONE LOADS, TARGET LOADS AND REQUIRED REDUCTION

Subwatershed		**Site**	*Flow Zone*	*90th Percentile Load (lbs/y)*	*Target Load (lbs/y)*	*Required Reduction (lbs/y)*	*%*
Eight Mile Creek	Pleasant Run/Big Creek	1	Moist	2,162,833	483,315	1,679,518	78%
			Dry	77,271	66,740	10,531	14%
	Moser Lake	2	Moist	1,469,640	344,918	1,124,722	77%
			Mid-range	256,591	215,178	41,413	16%
			Dry	57,312	34,255	23,057	40%
			Low Flow	20,871	20,670	201	1%
	Maple Creek	3	Moist	819,702	161,629	658,073	80%
Wabash River – Griffin Ditch	Johns Creek	6	Moist	38,947,727	4,557,543	34,390,184	88%
	Dowty Ditch	7	Moist	47,343,201	5,388,334	41,954,867	89%
	Bender Ditch/Griffin Ditch	9	Moist	53,588,730	955,218	48,622,512	91%
Rock Creek	Elkenberry Ditch	10	Moist	5,466,058	1,311,941	4,154,117	76%
	Mossburg Ditch	13	Moist	3,148,023	1,720,055	1,427,968	45%
	Headwaters	15	Moist	1,213,961	247,269	966,692	80%
Upstream Wabash River watershed not in project area		5	Moist	46,278,971	4,573,293	41,705,678	90%
			Low Flow	410,764	375,629	35,135	9%
Western portion of Elkenberry Ditch subwatershed		11	Moist	341,030	188,406	152,624	45%
			Dry	15,213	9,647	5,566	37%
Total Wabash River & Rock Creek subwatersheds		12	Moist	50,655,138	6,075,410	44,579,728	88%
			Dry	1,799,618	1,560,196	239,422	13%

All of the subwatersheds in the project except for the Stites Ditch-Rock Creek subwatershed exceeded the modeled target load for total nitrogen during moist conditions. The Pleasant Run Ditch-Eight Mile Creek, western portion of the Elkenberry Ditch-Rock Creek, and the combined Wabash River and Rock Creek subwatersheds also exceeded the target load during dry conditions.

The Moser Lake-Eight Mile Creek requires load reductions across the various flow conditions suggesting sources such as fertilizer and animal waste in surface runoff and tile drainage, as well as discharges from waste water treatment facilities or rural septic systems that contribute to the cause of those levels. Based on the modeled load duration curves the Stites Ditch-Rock Creek subwatershed requires no load reductions for total nitrogen.

Table 6-27: Total Phosphorus LDC Flow Zones - Modeled Loads Exceed Target Loads and Required Reduction.

TOTAL PHOSPHORUS – LDC FLOW ZONE LOADS, TARGET LOADS AND REQUIRED REDUCTION

Subwatershed		Site	*Flow Zone*	*90th Percentile Load (lbs/y)*	*Target Load (lbs/y)*	*Required Reduction*	
						(lbs/y)	*%*
Eight Mile Creek	Pleasant Run/Big Creek	1	Moist	207,404	14,498	192,906	93%
			Low Flow	1,975	887	1,088	55%
	Moser Lake	2	Moist	128,896	10,348	118,548	92%
			Mid-range	7,326	6,457	869	12%
			Dry	5,125	1,029	4,096	80%
			Low Flow	2,336	621	1,715	73%
	Maple Creek	3	Moist	41,752	4,847	36,905	88%
			Mid-range	5,811	2,763	3,048	52%
Wabash River – Griffin Ditch	Johns Creek	6	Moist	2,295,200	136,725	2,158,475	94%
			Mid-range	183,179	73,237	109,942	60%
			Dry	96,207	62,426	33,781	35%
			Low Flow	14,293	11,362	2,931	21%
	Dowty Ditch	7	Moist	1,781,346	161,651	1,619,695	91%
			Mid-range	183,997	84,917	99,080	54%
			Dry	117,559	72,704	44,855	38%
			Low Flow	13,556	12,534	1,022	8%
	Bender Ditch/Griffin Ditch	9	Moist	2,364,521	148,657	2,215,864	94%
			Mid-range	148,175	116,822	31,353	21%
			Dry	115,442	81,621	33,821	29%
			Low Flow	53,885	36,902	16,983	32%
Rock Creek	Elkenberry Ditch	10	Moist	215,051	39,358	175,693	82%
			Mid-range	17,786	16,520	1,266	7%
			Dry	11,957	7,245	4,712	39%
	Mossburg Ditch	13	Moist	159,834	51,600	108,234	68%
	Headwaters	15	Moist	47,560	7,417	40,143	84%
Upstream Wabash River watershed not in project area		5	Moist	2,421,176	137,200	2,283,976	94%
			Mid-range	151,767	81,742	70,025	46%
			Dry	67,244	53,378	13,866	21%
Western portion of Elkenberry Ditch subwatershed		11	Moist	15,078	5,654	9,424	63%
Total Wabash River & Rock Creek subwatersheds		12	Moist	2,545,240	182,263	2,362,977	93%
			Dry	71,029	46,808	24,221	34%
			Low Flow	38,730	29,996	35,734	23%

Total phosphorus target loads were exceeded during moist conditions in twelve out of the thirteen subwatersheds. The Maple Creek and Moser Lake subwatersheds in Eight Mile Creek, all of the Wabash River – Griffin Ditch subwatersheds, Elkenberry Ditch-Rock Creek subwatershed and the upstream Wabash River watershed also exceeded the target load during mid-range flows.

Moser Lake-Eight Mile Creek and Johns Creek, Dowty Ditch, and Bender Ditch-Wabash River subwatersheds exceeded the target load across the various flow conditions. The Elkenberry Ditch-Rock Creek subwatershed and upstream Wabash River watershed requires load reductions under dry conditions; and the Pleasant Run Ditch-Eight Mile Creek requires reductions during low flow. The western portion of the Elkenberry Ditch-Rock Creek and the combined drainage of the Wabash River and Rock Creek subwatersheds also require load reductions during dry conditions and low flow. This could be due to surface runoff from urban areas as well as agricultural activities, tile drainage, on-site septic system failure, and waste water treatment facility discharges. The Stites Ditch-Rock Creek subwatershed does not require any reductions in total phosphorus loads.

Table 6-28: *E. coli* LDC Flow Zones - Modeled Loads Exceed Target Loads and Required Reductions.

***E. coli* – LDC FLOW ZONE LOADS, TARGET LOADS AND REQUIRED REDUCTION**							
Subwatershed		**Site**	***Flow Zone***	***90th Percentile Load (lbs/y)***	***Target Load (lbs/y)***	***Required Reduction (lbs/y)***	***%***
Eight Mile Creek	Pleasant Run/ Big Creek	1	Moist	299,702	51,502	248,200	83%
			Mid-range	186,296	39,676	146,620	79%
			Dry	22,338	7,118	15,220	68%
			Low Flow	4,672	3,139	1,533	33%
	Moser Lake	2	Moist	331,128	36,756	294,372	89%
			Mid-range	153,081	22,922	130,159	85%
			Dry	77,672	3,650	74,022	95%
			Low Flow	5,110	2,190	2,920	57%
	Maple Creek	3	Moist	189,399	17,228	172,171	91%
			Mid-range	21,353	9,819	11,534	54%
			Dry	3,176	1,424	1,752	55%
Wabash River – Griffin Ditch	Johns Creek	6	Moist	1,348,274	485,815	862,459	64%
			Mid-range	2,037,576	260,209	1,777,367	87%
			Dry	1,221,582	221,811	999,771	82%
			Low Flow	141,146	40,369	100,777	71%
	Dowty Ditch	7	Moist	3,842,392	574,364	3,268,028	85%
			Mid-range	2,237,706	301,746	1,935,960	87%
			Dry	737,921	258,347	479,574	65%
			Low Flow	67,890	44,530	23,360	34%
	Bender Ditch/ Griffin Ditch	9	Moist	2,871,674	528,192	2,343,482	82%
			Mid-range	1,609,395	415,078	1,194,317	74%
			Low Flow	371,899	131,108	240,791	65%
Rock Creek	Elkenberry Ditch	10	Moist	623,347	139,832	483,515	78%
			Mid-range	366,752	58,692	308,060	84%
			Dry	205,313	25,733	179,580	87%
	Mossburg Ditch	13	Moist	796,941	183,340	613,601	77%
			Mid-range	302,074	44,205	257,869	85%

Table 6-28: *E. coli* LDC Flow Zone - Modeled Loads Exceed Target Loads And Required Reductions (continued)

Subwatershed		**Site**	***Flow Zone***	***90th Percentile Load (lbs/y)***	***Target Load (lbs/y)***	***Required Reduction (lbs/y)***	***%***
Rock Creek	Stites Ditch	14	Dry	77,380	25,368	52,012	67%
	Headwaters	15	Moist	65,080	26,353	38,727	60%
			Mid-range	63,620	14,819	48,801	76%
			Dry	3,833	2,884	949	24%
			Low Flow	6,351	1,862	4,489	71%
Upstream Wabash River watershed not in project area		5	Moist	628,275	487,494	140,781	22%
			Mid-range	651,817	290,431	361,386	55%
			Dry	1,417,113	189,654	1,227,459	87%
			Low Flow	63,510	40,041	23,469	37%
Western portion of Elkenberry Ditch subwatershed		11	Moist	223,380	20,075	203,305	91%
			Mid-range	7,665	5,220	2,445	32%
			Dry	2,081	1,022	1,059	51%
Total Wabash River & Rock Creek subwatersheds		12	Moist	2,838,496	647,620	2,190,876	77%
			Mid-range	1,479,272	454,133	1,025,139	69%
			Dry	369,818	166,294	203,524	55%
			Low Flow	763,726	106,580	657,146	86%

All subwatersheds in the project area exceeded the target load during at least one flow regime, requiring reductions to the *E. coli* loads in all subwatersheds. The most exceedances occurred during moist conditions and mid-range flow. The Pleasant Run Ditch-Eight Mile Creek, Moser Lake-Eight Mile Creek, Johns Creek-Wabash River, Dowty Ditch-Wabash River, Headwaters-Rock Creek, upstream Wabash River watershed, and the combined drainage of the Wabash River and Rock Creek subwatersheds all exceeded the target load across the various flow conditions. This indicates continuous sources of *E. coli* within the river and streams coming from a combination of waste water treatment plants, failing or illicit on-site septic systems, and animal waste handling and application.

The Maple Creek-Eight Mile Creek, Elkenberry Ditch-Rock Creek, and Stites Ditch-Rock Creek exceeded the target load during dry conditions, and the Bender Ditch-Wabash River exceeded the target load during low flow. Because those are more rural subwatersheds in the project area it is suspected that failing septic systems may be the cause of the inputs.

7.0 Water Quality Improvement Goals

7.1 Water Quality Goals and Indicators

The steering committee reviewed the stakeholder concerns, monitoring data, and potential causes and sources of pollution and developed a list of broad concerns for project goals. Specific concerns were grouped together and outlined below:

Broad Concerns for Project Goals

1. Nutrients and *E. coli* Goals = Water Quality Concerns
    - Over application of fertilizers and animal waste, and limited use of variable rate technology.
    - Lack of cropland and tile inlet buffer areas, wetlands and riparian areas.
    - Discharges from on-site septic systems and municipal waste water treatment facilities.
2. Sediment Goals = Erosion Concerns
    - Channelization, in-stream and stream bank erosion.
    - Lack of riparian areas, buffers and filter strips.
    - Low adoption of conservation tillage and tillage to edge of stream banks.
    - Construction site erosion.
3. Habitat and Recreation Goals = Habitat Protection and Restoration Concerns
    - Loss of riparian area habitat and natural ecosystems resulting in impaired biotic communities.
    - Lack of green space and connecting trails for recreation.
4. Flooding/Floodplain Goals = Flow Concerns
    - Log jams and in-stream obstructions due to unstable banks and downed trees.
    - Lack of upland areas for water storage.
    - Floodplain restoration needed to provide natural flood control benefits.
5. Education/Outreach Goals = Lack of Knowledge Concerns
    - Competing land uses limit BMP implementation that could improve water quality.
    - Limited community involvement in environmental activities to benefit the health of the watershed.
    - Lack of appreciation for and understanding of environmental benefits versus financial benefits.

The broad concerns were then refined into specific goal statements to address the water quality problems along with goal indicators to measure progress towards each goal. Long-term, short-term and scaled goals of five, ten and twenty years were developed based on the measured results for load reductions and average target concentrations of the pollutants.

As stated previously, the UWRBC Phase 2 project area receives pollutant loading from the upstream Wabash River watershed containing approximately 350,394 acres that is outside of this project area. The accumulated pollutant loading from the upstream area adds to the current loads within the project area, and it is expected that the goals will only be achieved if BMPs are implemented in the upstream Wabash River watershed.

Education and outreach also plays a critical role in changing attitudes and behavior of the stakeholders. Social indicator surveys conducted throughout the planning process were also used to evaluate the awareness, and acceptance to practice adoption to meet the project goals.

Nutrients and *E. coli* Goal Statement

Excess nutrients and *E. coli* impact our stream and river environments by causing increased plant and algal growth. When these plants die and decompose, it depletes the dissolved oxygen in the water resulting in a decrease in aquatic and biotic communities. Exceedances of the nitrate, phosphorus and *E. coli* allowable loads and target concentrations support the stakeholder concerns of excess nutrients and *E.coli* in the streams and river.

Nitrate Long-term Goal: Reduce nitrate loading by 44.24% from 38,732,065 lbs/yr to 21,597,056 lbs/yr; a reduction of 17,135,009 lbs/yr; and reduce average annual concentrations from 17.56 mg/L to 10 mg/L (43.05%) in the Upper Wabash River Phase 2 project area by the year 2035 to meet water quality targets.

Nitrate Scaled Goals: Reduce nitrate loading by 11.06% (4,283,766 lbs/yr); and reduce the average annual concentrations by 10.76% or 1.89 mg/L (from 17.27 mg/L to 15.67 mg/L) by 2020. Reduce nitrate loading an additional 11.06% (4,283,766 lbs/yr); and reduce average annual concentrations from 15.67 mg/L to 13.78 mg/L (1.89 mg/L, 11.06%) by 2025. Reduce nitrate loading by an additional 22.12% (8,567,505 lbs/yr) for a total of reduction of 17,135,037 lbs/yr or 44.24%; and reduce average annual concentrations from 13.78 mg/L to 10 mg/L (3.78 mg/L, 21.53%) by 2035.

Phosphorus Long-term Goal: Reduce phosphorus loading by 21.85% from 828,988 lbs/yr to 647,875 lbs/yr; a reduction of 181,114 lbs/yr; and reduce the phosphorus average annual concentration by 0.0821 mg/L (21.49% reduction) from 0.3821 mg/L to 0.3 mg/L in the Upper Wabash River Phase 2 project area by the year 2035 to meet water quality targets.

Phosphorus Scaled Goals: Reduce phosphorus loading by 5.46% (45,262 lbs/yr) and reduce the average annual concentration by 0.0205 mg/L (5.37% reduction) by 2020. Reduce phosphorus loading an additional 5.46% (45,262 lbs/yr) and reduce the average annual concentration by an additional 5.46% (0.0205 mg/L). Reduce phosphorus loading by an additional 10.93% (90,608 lbs/yr) for a total reduction of 21.85%; and reduce the average annual concentration by an additional 0.0411 mg/L (10.74%) by 2035 for a total reduction of 21.49 % or 0.0821 mg/L.

***E. coli* Long-term Goal:** Reduce *E. coli* loading by 53.34% from 4,935,937 G-org/yr to 2,303,197 G-org/yr and reduce the average annual concentration in the Upper Wabash River Phase 2 project area by 51.07% from 480.24 cfu/100mL to 235 cfu/100mL by the year 2035.

***E. coli* Scaled Goals:** Reduce *E. coli* loading by 13% (641,672 G-org/yr) from 4,935,937 G-org/yr to 4,294,265 G-org/yr and reduce the average annual concentration by 12.76% (61.28 cfu/100 ml) from 480.24 cfu/100 ml to 418.96 cfu/100 ml by 2020. Reduce *E. coli* loading by an additional 13.34% (658,454 G-org/yr) and reduce the average annual concentration by an additional 12.76% (61.28 cfu/100 ml) by 2025. Reduce *E. coli* loading by an additional 27%

(1,332,703 G-org/yr) for a total of 53.34% (total of 2,632,829 G-org/yr) and reduce the average annual concentration by an additional 25.55% (122.70 cfu/100 ml) for a total reduction of 51.07% (245.24 cfu/100 ml) by year 2035 to reach the state standard of 235 cfu/100 ml for full-body contact for *E. coli*.

Goal Indicators:
Water quality monitoring data will be used as the primary indicator to show progress towards attaining these goals. The monitoring data will be used to model load duration curves and target concentrations across flow conditions to document changes in the nutrient and *E. coli* levels over time. Other indicators include tracking best management practices implemented in the project area, and using models to estimate load reductions.

Sediment Goal Statement

Turbid water is caused by suspended matter including clay, silt, and organic and inorganic matter; and can be the result of soil erosion, urban runoff, algal blooms, and bottom sediment disturbances. Because turbidity was measured during the planning process versus measuring total suspended sediments, load models were not available. However, turbidity concentrations and habitat assessments collected throughout the planning process confirm sediment is a problem in the project area.

Sediment Long-term Goal: Reduce erosion and sediment in the project area streams and river by reducing the average concentration of turbidity measurements from 106.96 NTUs to the Indiana average of 36 NTUs (66.34 % reduction) by year 2035.

Sediment Scaled Goal: Reduce erosion and sediment by reducing the average concentration of turbidity measurements by 16.58% (from 106.96 NTUs to 89.22 NTUs) by 2020. Reduce erosion and sediment by reducing the average concentration of turbidity measurements by an additional 16.58% (to 71.48 NTUs) by 2025. Reduce erosion and sediment by reducing the average concentration of turbidity measurements by an additional 33.18% (to 35.99 NTUs) by 2035.

Goal Indicators:
Turbidity measurements will be used as the primary indicator to show progress towards attaining this goal. To better define the amount of sediment reduction needed, total suspended solids (TSS) monitoring will be considered for inclusion in monitoring programs. If TSS monitoring data is available, it will be used to model load duration curves and target concentrations across flow conditions to document changes in the sediment loading. Other indicators include tracking best management practices implemented in the project area, and using models to estimate load reductions.

Habitat and Recreation Goal Statement

Stream side vegetation (riparian areas) and wetlands are important components to a stream ecosystem. They provide bank support and stabilization, erosion and flood control, water quality protection, fish and wildlife habitat, migration corridors, a buffer from development, and scenic beauty. Green space and trails also provide a number of these benefits to nature and the public by connecting natural areas, cultural and historic sites and communities. Biological monitoring and habitat evaluations confirm that the project area has impaired biological communities and altered habitats. These goals address stakeholders concerns about habitat degradation and corridor protection, as well as the lack of green spaces and trails for recreational purposes.

Habitat Long-term Goal: Restore natural habitat and protect natural land uses within the stream and river corridors in the project area to meet or exceed the CQHEI target of 60 at all project monitoring sites (an increase from 53%) by 2035. When combined with other goals to reduce sediment and nutrient loadings, this should improve the Pollution Tolerance Index (PTI) rating at all sites to meet the fair to excellent ratings (a score of 11 or better) by the year 2035.

Recreation Long-term Goal: Develop partnerships with local government agencies, parks departments, and trails groups to plan and install 5 miles of connecting trails and green space along the river corridor for recreational purposes by 2035.

Goal Indicators:
Biological monitoring and habitat assessments will be used to document changes in the environmental conditions to determine improvement in habitat quality and diversity of biological communities. Social indicators may also be used to assess changes in awareness, attitudes and behavior related to habitat quality. The UWRBC will form a trails sub-committee to work on the planning and installation of connecting trails within the project area. Recreation goals will be evaluated based on the success of the partnerships with other groups, and the amount of trails planned and installed in the project area, as well as trails that connect the project area to adjoining communities.

Flooding/Floodplain Management Goal Statement

Log jams, downed trees and in-stream obstructions due to unstable stream banks contribute to flooding along the river and streams. Floodplain land uses for agriculture and urban activities without buffer areas can compromise habitat and water quality. Additionally, the lack of upland water storage areas in the watersheds and predominance of subsurface tile contribute to increased river and stream water levels and flow velocities during storm events. The steering committee noted the importance of restoring the floodplain to natural land uses (wooded areas, grasslands, and wetlands) for the purposes of flood control. Because this goal would require stakeholder attitude changes, it is expected that this will be an education and outreach effort that will take place over an extended period of time.

Flooding/Floodplain Management Long-term Goals: Increase the amount of riparian areas on local streams and rivers by 5% by 2035.

Flooding/Floodplain Management Short-term Goal: Increase stakeholder awareness of the benefits of upland storm water storage areas and floodplain management practices; such as riparian forest buffers, riparian herbaceous cover, bottomland timber establishment, 2-stage ditches, and wetland creation, enhancement and restoration by 2020.

Goal Indicators:
Social indicator data will be used as the primary indicator to assess changes in awareness, attitudes and behavior, as well as tracking participation in educational outreach activities. The

implementation of best management practices, such as grass plantings or riparian buffers; and windshield surveys and habitat evaluations will be used to measure physical changes to floodplain areas.

Education/Outreach Goal Statement

The steering committee identified a number of education and outreach objectives. Most notably was the issue of competing land uses that limit the use of best management practices that could improve water quality but due to financial considerations are often not implemented; and a general lack of appreciation for and understanding of the environmental benefits versus the financial benefits. Also of concern was the lack of community involvement in environmental activities that benefit the health of the watershed. Awareness and education is needed regarding conservation tillage, fertilizer use, animal waste storage and application, managing drainage water, septic systems, and storm water runoff, as well as the variety of best management practices available to landowners.

Education/Outreach Long-term Goal: Promote the streams and river in the project area to educate landowners and land users about best management practices and provide information on what individuals and communities can do to improve the water quality in the streams and river so that they meet their designated use for aquatic habitat by the year 2035.

Education/Outreach Short-term Goals: Increase individual and community participation in community events such as water monitoring, river clean-up events, and other public outreach activities related to water quality and habitat improvement by 200 people by 2020. Increase community awareness of water quality issues specifically related to nutrient, sediment and bacterial loading and the effects on aquatic habitats. Increase stakeholder participation in conservation programs that put best management practices on the ground.

Goal Indicators

Track participation in water quality program activities, river and stream clean-ups, workshops and field days. Track participation in conservation cost-share programs. Collect social indicator data from stakeholder surveys to document changes in awareness, attitudes and behavior related to water quality improvements. Water monitoring data and habitat assessments will also be conducted and evaluated to document physical changes in habitat or biological quality.

7.2 Critical Land Areas

Critical land areas (CLA) can be described as those areas where there is a need for best management practices to address nonpoint sources of pollution, or areas in need of protection to prevent degradation of the natural resource. Identifying and prioritizing critical areas for improvement enables stakeholders to focus their efforts to those areas in the watershed that will result in the greatest benefit.

A number of factors were considered in determining critical land areas and priority rankings. The watershed inventory, GIS mapping, water quality monitoring data, and load calculations were evaluated against the list of potential sources for each parameter for each subwatershed in the project area. Pollutant sources that were identified as important were: land use, highly erodible soil, number of small unregulated farms and confined feeding operations, number of animals in the subwatershed; waste water treatment facility discharges and the estimated number of on-site septic systems. Critical areas were also based on the water quality data, and the exceedances of the water quality targets. It was noted that flow conditions played a large role on the water quality data exceedances; therefore, exceedances under the various conditions were also evaluated. Based on the percent of the factors that are met, the subwatersheds are categorized as high, medium, low or no priority for further critical land area refinement.

Critical Land Areas for Nutrients

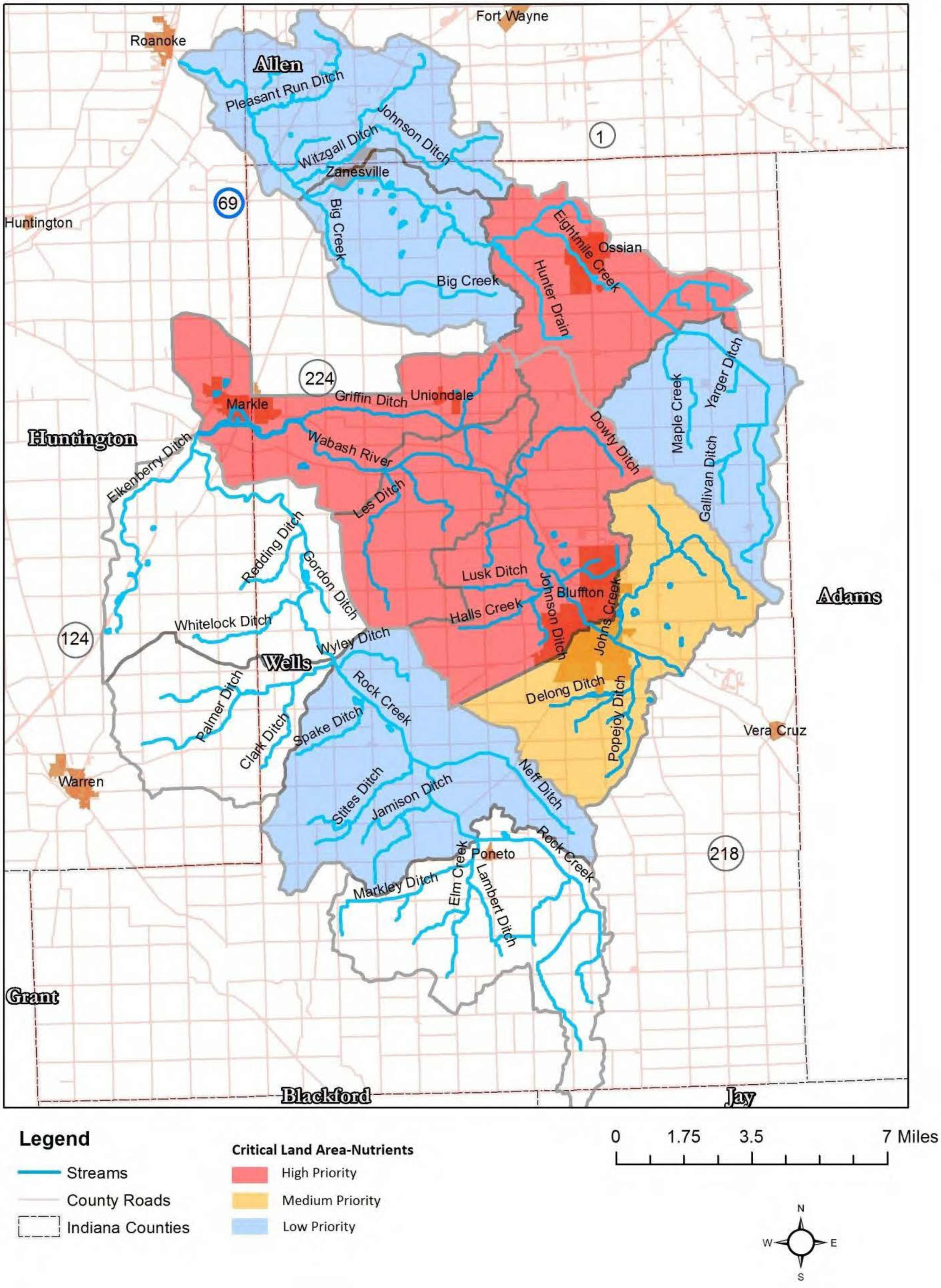
Nutrients are readily available in the Upper Wabash River – Phase 2 project watersheds from sources such as human and animal waste, urban and agricultural fertilizer use, rural septic systems and waste water treatment facilities. A variety of potential sources of pollution were used to evaluate the subwatersheds for the critical land areas for nutrients. These included: land use, tillage operations, HEL/PHEL soils, streams that are lacking buffers, CFOs, hobby farms, animals in the subwatersheds, septic systems, and NPDES sites. Measured load reductions and exceedances of water quality targets were also used in determining critical land areas.

Table 7-1: Critical Land Area for Nutrients

	Pleasant Run / Big Creek (Eight Mile Creek)	Moser Lake (Eight Mile Creek)	Maple Creek (Eight Mile Creek)	Johns Creek (Wabash River)	Dowty Ditch (Wabash River)	Bender Ditch / Griffin Ditch (Wabash River)	Elkenberry Ditch (Rock Creek)	Mossburg Ditch (Rock Creek)	Stites Ditch (Rock Creek)	Headwaters Rock Creek
Potential Sources of Nutrients										
% agricultural land use	79	83	89	79	75	82	86	90	91	90
% conventional tillage	40	48	49	50	50	49	44	46	54	53
% of HEL/PHEL soils	39	34	18	27	37	31	39	41.5	20	24
% of streams lacking buffers	33	67	68	31	37	44	20	31	23	13
# of CFOs	0	2	4	7	3	1	1	1	5	3
# of CFO animals	0	2,680	13,260	10,655	242,400	1,600	30,100	2,077	10,720	5,538
# of hobby farms	230	58	66	83	104	132	89	50	131	122
# of unregulated farm animals (STEPL input data)	181,543	12,427	33,886	17,945	110,609	83,996	3,001	300 (est.)	750 (est.)	492
# of septic systems per acre	974 1:28 ac	369 1:34 ac	293 1:42 ac	394 1:42 ac	452 1:38 ac	503 1:48 ac	282 1:66 ac	125 1:87 ac	380 1:62 ac	262 1:64 ac
# of WWTP Overflows	0	3	0	0	3	4	0	0	0	1
# of NPDES sites	0	3	0	15	12	2	1	0	0	1
Measured Load Reduction Required (lbs/ac/yr)										
Nitrate	0	59.10	14.77	38.25	32.97	38.90	18.85	3.42	16.51	6.00
Nitrite	0	0	0	0	0	0	0	0	0	0
Total Nitrogen	0	0	0	0	0	0	0	0	0	0
Phosphorus	0	1.93	0	0.78	0.65	0.48	0	0	0	0
Number of Flow Conditions that have Load Reduction Requirements										
Nitrate	2	4	2	3	4	3	2	2	1	2
Nitrite	1	0	0	0	1	0	0	0	0	0
Total Nitrogen	2	4	1	1	1	1	1	1	0	1
Phosphorus	2	4	2	4	4	4	3	1	0	1
% of Exceedances of Target Concentration										
Nitrate	45	100	64	58	64	82	58	50	57	50
Nitrite	0	0	8	0	0	0	0	0	0	0
Total Nitrogen	8	42	8	25	25	27	25	8	29	8
Phosphorus	33	64	33	75	79	73	25	21	14	17
SCORE	**6**	**13**	**6**	**11**	**15**	**12**	**5**	**2**	**7**	**5**
	26%	**56%**	**26%**	**48%**	**65%**	**52%**	**22%**	**8%**	**30%**	**22%**
High priority: over 50%; Medium priority: 35-49%; Low priority: 25-35%; Not priority: <25%.										

Based on these criteria, Moser Lake-Eight Mile Creek, Dowty Ditch and Bender Ditch/Griffin Ditch-Wabash River are the high priority critical land areas for nutrients. Johns Creek-Wabash River, Pleasant Run/Big Creek-Eight Mile Ditch, Maple Creek-Eight Mile Ditch and Stites Ditch-Rock Creek would also be considered critical land areas for nutrients.

Figure 69: Critical Land Areas for Nutrients



Critical Land Areas for *E. coli*

Critical land areas for *E. coli* were based on the potential sources of *E.coli* which included: tile drainage, confined feeding operations, hobby farms, on-site residential septic systems and waste water treatment facilities. The water quality monitoring data measured load reductions, average annual concentration, exceedances of the water quality targets, and number of flow zones that require load reductions were also used in determining the critical areas for *E. coli*.

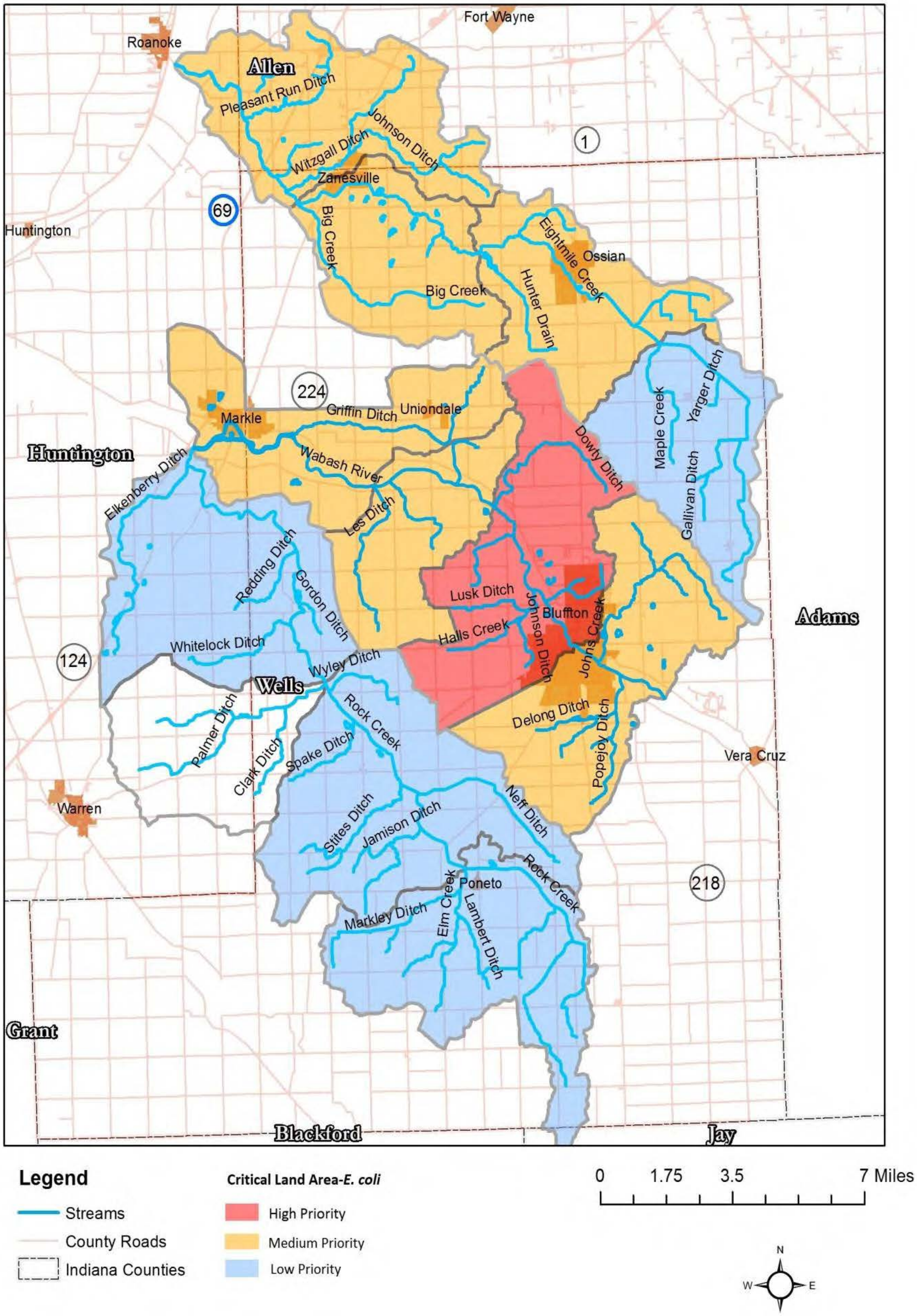
Table 7-2: Critical Land Area for *E. coli*

	Pleasant Run / Big Creek (Eight Mile Creek)	Moser Lake (Eight Mile Creek)	Maple Creek (Eight Mile Creek)	Johns Creek (Wabash River)	Dowty Ditch (Wabash River)	Bender Ditch / Griffin Ditch (Wabash River)	Elkenberry Ditch (Rock Creek)	Mossburg Ditch (Rock Creek)	Stites Ditch (Rock Creek)	Headwaters Rock Creek
Potential Sources of *E. coli*										
# of acres per mile of tile in watershed	959	621	388	684	663	688	533	542	511	524
# of CFOs	0	2	4	7	3	1	1	1	5	3
# of CFO animals	0	2,680	13,260	10,655	242,400	1,600	30,100	2,077	10,720	5,538
# of hobby farms	230	58	66	83	104	132	89	50	131	122
# of unregulated farm animals (STEPL input data)	181,543	12,427	33,886	17,945	110,609	83,996	3,001	300 (est.)	750 (est.)	492
# of septic systems per acre	974 1:28 ac	369 1:34 ac	293 1:42 ac	394 1:42 ac	452 1:38 ac	503 1:48 ac	282 1:66 ac	125 1:87 ac	380 1:62 ac	262 1:64 ac
# of WWTP Overflows	0	3	0	0	3	4	0	0	0	1
***E. coli* Water Quality Monitoring Data**										
measured load reduction (G-org/ac/yr)	6.76	6.05	4.35	10.36	8.44	10.02	7.20	5.97	3.87	3.48
measured average concentration (cfu/100mL)	497.17	552.29	441.58	605.50	583.28	503.00	513.83	488.07	295.42	322.25
% of exceedances of target (235 cfu/100mL)	70	62	73	67	79	36	50	42	50	33
# of flow conditions with load reductions	4	4	3	4	4	3	3	2	1	4
SCORE	**7**	**7**	**3**	**7**	**10**	**7**	**4**	**0**	**3**	**3**
	64%	**64%**	**27%**	**64%**	**91%**	**64%**	**36%**	**0%**	**27%**	**27%**

High priority: >75%; Medium priority: 50-74%; Low priority: 25-50%; Not priority: <25%.

Based on these criteria, Dowty Ditch-Wabash River would be considered the highest priority subwatershed for *E. coli*. Pleasant Run/Big Creek-Eight Mile Creek, Moser Lake-Eight Mile Creek, Johns Creek-Wabash River, and Bender Ditch/Griffin Ditch-Wabash River are also considered critical land areas for *E. coli*.

Figure 70: Critical Land Areas for *E. coli*



Critical Land Areas for Sediment

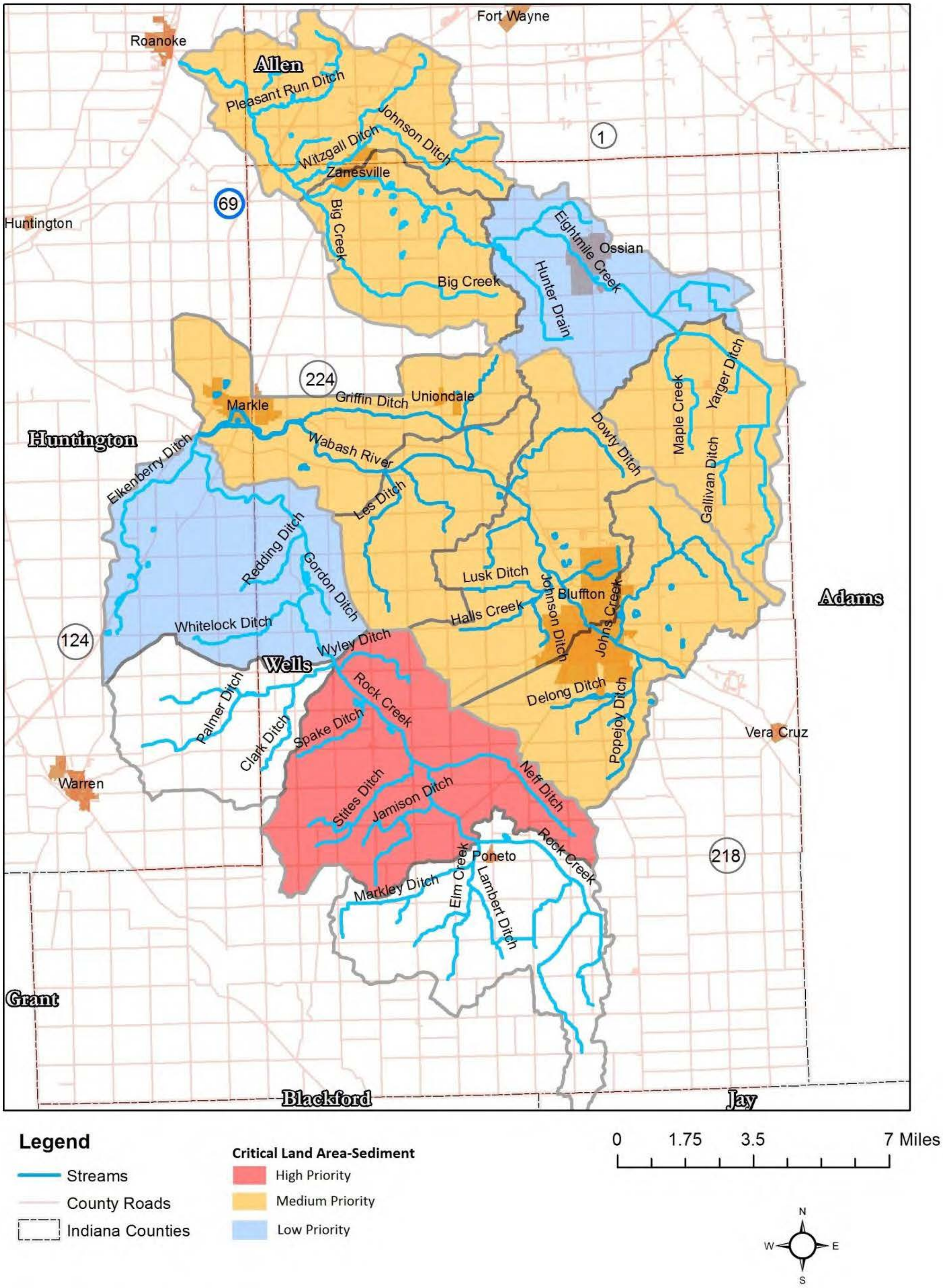
Highly erodible and potentially highly erodible soils, land use, conventional tillage, and streams lacking buffers were used along with turbidity measurements and habitat assessments to determine the sediment based critical areas.

Table 7-3: Critical Land Area for Sediment

	Pleasant Run / Big Creek (Eight Mile Creek)	Moser Lake (Eight Mile Creek)	Maple Creek (Eight Mile Creek)	Johns Creek (Wabash River)	Dowty Ditch (Wabash River)	Bender Ditch / Griffin Ditch (Wabash River)	Elkenberry Ditch (Rock Creek)	Mossburg Ditch (Rock Creek)	Stites Ditch / (Rock Creek)	Headwaters Rock Creek
Potential Sources of Sediment										
% of agricultural land use	79	83	89	79	75	82	86	90	91	90
% of HEL/PHEL soils	41	34	18	27	37	29	39	42	20	24
% conventional tillage	42	48	49	50	50	49	44	46	54	53
% streams lacking buffers	33	67	68	31	37	44	20	31	23	13
feet of streambank erosion	500	0	0	0	0	100	600	0	160	0
Measured Water Quality Data										
turbidity average concentration (NTUs)	84.49	63.95	89.68	197.55	175.58	192.04	58.40	44.64	60.23	51.14
habitat average score less than CQHEI target of 60	59.00	50.88	41.50	54.50	78.88	87.00	82.00	60.88	47.00	65.50
% turbidity exceedances of target = 25 NTUs	41.67	38.46	50.00	100.00	84.62	100.00	50.00	23.08	28.57	33.33
SCORE	**4**	**3**	**4**	**4**	**4**	**4**	**3**	**2**	**5**	**2**
	50%	**38%**	**50%**	**50%**	**50%**	**50%**	**38%**	**25%**	**63%**	**25%**
High priority: >50%; Medium priority: 40-50%; Low priority: 30-39%; Not a priority: <30%.										

The Stites Ditch-Rock Creek is the most critical land area for sediment, followed by Pleasant Run/Big Creek-Eight Mile Creek, Maple Creek-Eight Mile Creek, and the Wabash River subwatersheds of Johns Creek, Dowty Ditch, and Bender Ditch/Griffin Ditch.

Figure 71: Critical Land Areas for Sediment



Critical Land Areas for Habitat and Biology

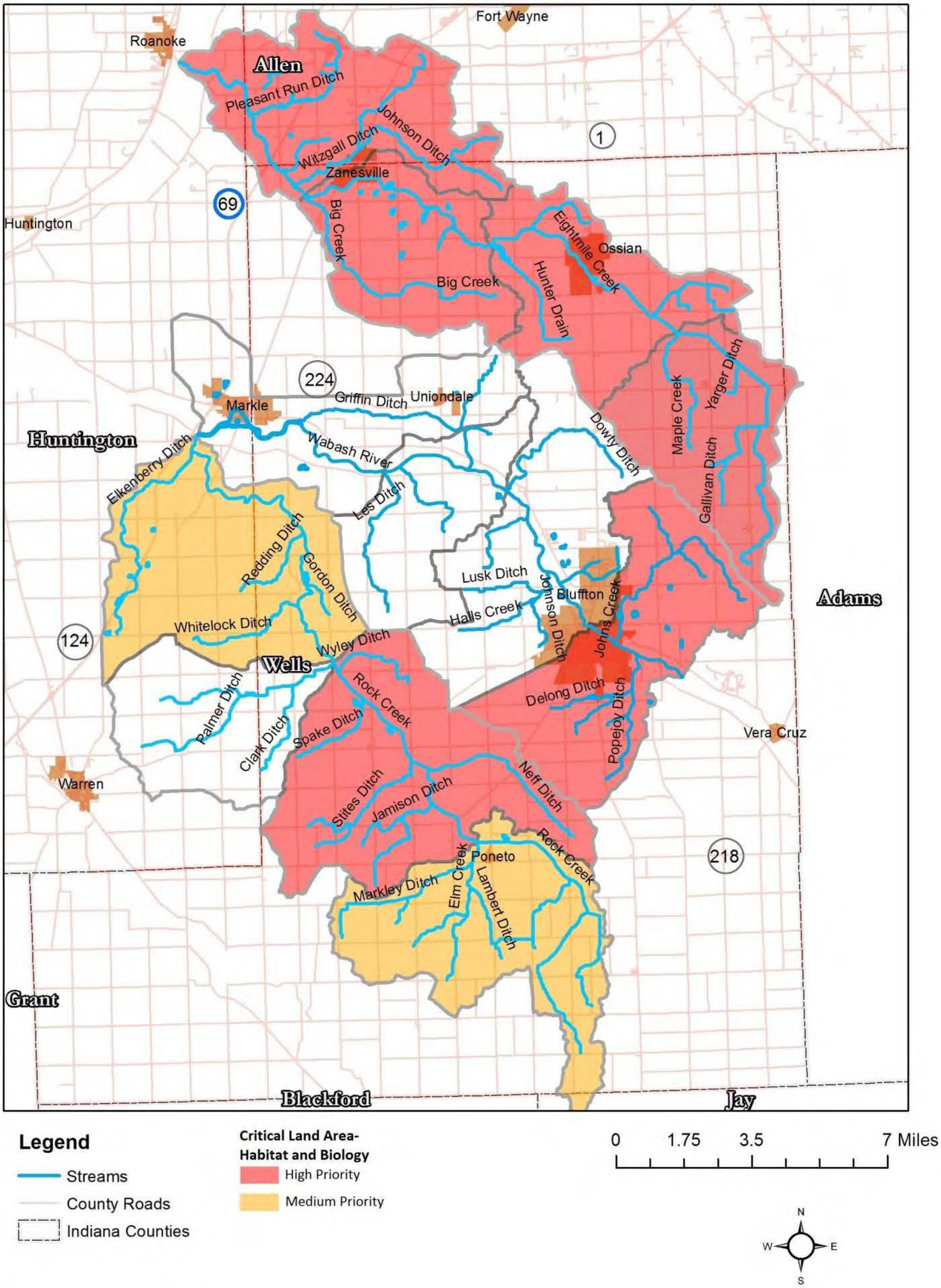
The IDEM 303(d) listing of impaired waters and the evaluations of the stream habitat and biology assessments collected during the monitoring activities were used to determine critical areas for habitat and biological communities.

Table 7-4: Critical Land Area for Habitat and Biology

	Pleasant Run / Big Creek (Eight Mile Creek)	Moser Lake (Eight Mile Creek)	Maple Creek (Eight Mile Creek)	Johns Creek (Wabash River)	Dowty Ditch (Wabash River)	Bender Ditch / Griffin Ditch (Wabash River)	Elkenberry Ditch (Rock Creek)	Mossburg Ditch (Rock Creek)	Stites Ditch / (Rock Creek)	Headwaters Rock Creek
Measured Water Quality Data										
habitat average score less than CQHEI target of 60	59.00	50.88	41.50	54.50	78.88	87.00	82.00	60.88	47.00	65.50
macroinvertebrate PTI average: less than 17 (good) rating	17.50	21.75	15.00	7.50	25.00	26.00	31.50	25.00	22.50	20.50
IDEM 303(d) Listing for Impaired Biotic Communities										
IDEM 303(d) list of impaired biotic communities	1	1	0	0	0	0	1	0	1	1
SCORE	**2**	**2**	**2**	**2**	**0**	**0**	**1**	**0**	**2**	**1**
	67%	**67%**	**67%**	**67%**	**0%**	**0%**	**33%**	**0%**	**67%**	**33%**
High priority: =67%; Medium priority: =33%; Not a priority = 0%.										

Based on these criteria, the Eight Mile subwatersheds, Pleasant Run/Big Creek, Moser Lake, and Maple Creek, as well as Johns Creek-Wabash River and Stites Ditch-Rock Creek are the critical land areas for habitat and biology.

Figure 72: Critical Land Areas for Habitat and Biology



Critical Land Areas for Flooding/Floodplain Management

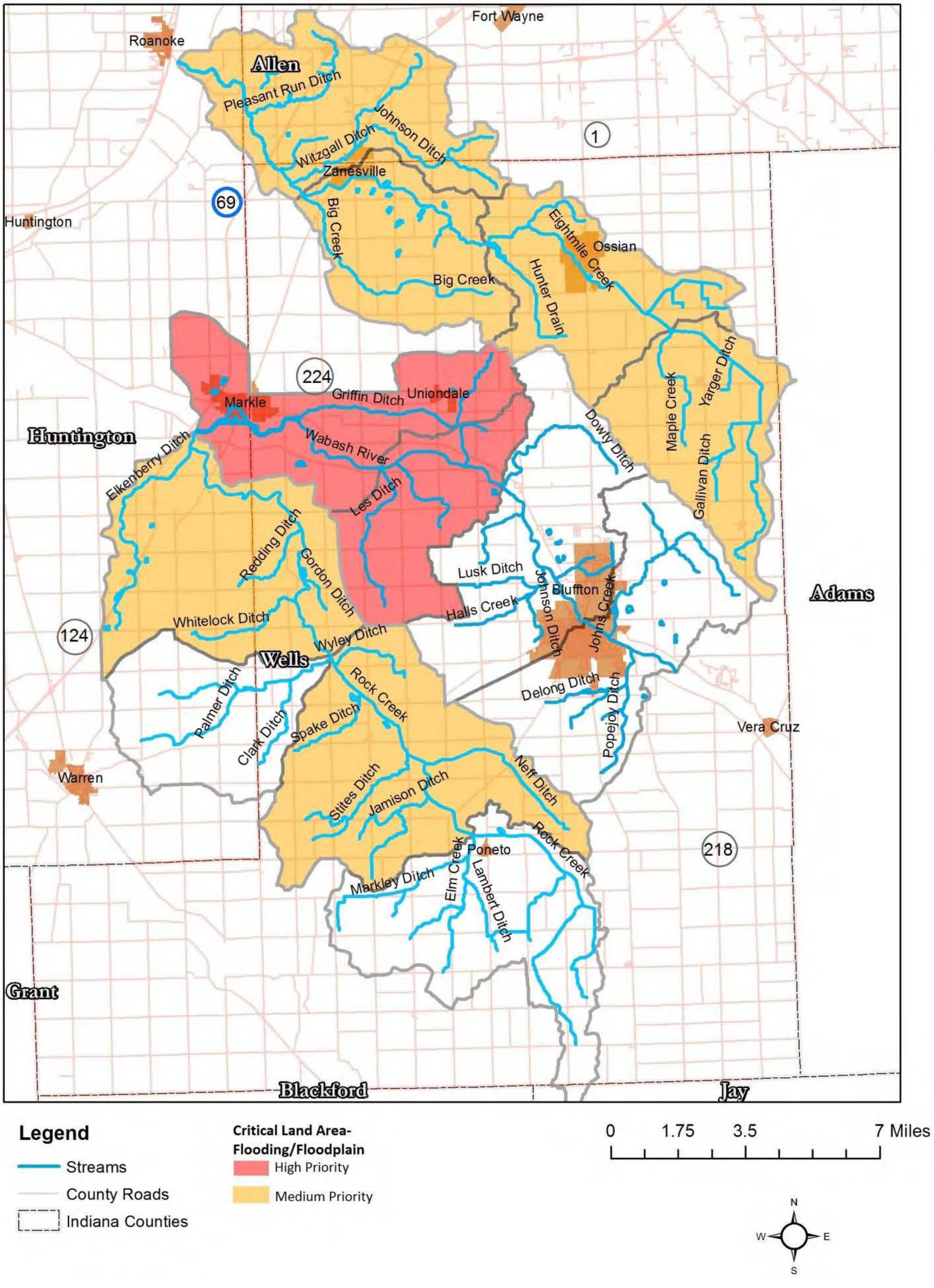
Critical land area for flooding and flood plain management were evaluated by using the percent of streams that are lacking buffer areas and the streambank erosion observed in the project area.

Table 7-5: Critical Land Area for Flooding/Floodplain Management

	Pleasant Run / Big Creek (Eight Mile Creek)	Moser Lake (Eight Mile Creek)	Maple Creek (Eight Mile Creek)	Johns Creek (Wabash River)	Dowty Ditch (Wabash River)	Bender Ditch / Griffin Ditch (Wabash River)	Elkenberry Ditch (Rock Creek)	Mossburg Ditch (Rock Creek)	Stites Ditch / (Rock Creek)	Headwaters Rock Creek
Measured Water Quality Data										
% streams lacking buffers	33	67	68	31	37	44	20	31	23	13
feet of streambank erosion	500	0	0	0	0	100	600	0	160	0
SCORE	**1**	**1**	**1**	**0**	**0**	**2**	**1**	**0**	**1**	**0**
	50%	**50%**	**50%**	**0%**	**0%**	**100%**	**50%**	**0%**	**50%**	**0%**
High priority: =100%; Medium priority: =50%; Not a priority = 0%.										

The Bender Ditch/Griffin Ditch-Wabash River subwatershed is rated as the highest priority critical land area for flooding and floodplain management. The Eight Mile Creek subwatersheds; Pleasant Run/Big Creek, Moser Lake, and Maple Creek; as well as the Elkenberry Ditch and Stites Ditch in the Rock Creek watershed are also critical land areas for flooding and floodplain management.

Figure 73: Critical Land Areas for Flooding/Floodplain Management



7.3 Summary of Critical Land Areas

The individual critical land areas for nutrients, E. coli, sediment, and habitat and biology were then combined to determine the overall ranking for prioritizing watershed activities that will address the most critical areas first. The subwatersheds were grouped as High Priority, Medium Priority, Low Priority and Not a Priority based on the overall ranking results. High Priority CLA subwatersheds represent the drainage areas where water quality practices will initially be focused, followed by the Medium Priority and Low Priority subwatersheds. Subwatersheds with no critical parameters are not a priority for present water quality implementation practices.

Table 7-6: Priority Critical Land Areas

	Pleasant Run / Big Creek (Eight Mile Creek)	Moser Lake (Eight Mile Creek)	Maple Creek (Eight Mile Creek)	Johns Creek (Wabash River)	Dowty Ditch (Wabash River)	Bender Ditch / Griffin Ditch (Wabash River)	Elkenberry Ditch (Rock Creek)	Mossburg Ditch (Rock Creek)	Stites Ditch / (Rock Creek)	Headwaters Rock Creek
CLA–Nutrients SCORE	**6**	**13**	**6**	**11**	**15**	**12**	**5**	**2**	**7**	**5**
%	**26%**	**56%**	**26%**	**48%**	**65%**	**52%**	**22%**	**8%**	**30%**	**22%**
High priority: over 50%; Medium priority: 35-49%; Low priority: 25-35%; Not priority: <25%.										
CLA–*E. coli* SCORE	**7**	**7**	**3**	**7**	**10**	**7**	**3**	**0**	**3**	**3**
%	**64%**	**64%**	**27%**	**64%**	**91%**	**64%**	**27%**	**0%**	**27%**	**27%**
High priority: >75%; Medium priority: 50-74%; Low priority: 25-50%; Not priority: <25%.										
CLA–Sediment SCORE	**4**	**3**	**4**	**4**	**4**	**4**	**3**	**2**	**5**	**2**
%	**50%**	**38%**	**50%**	**50%**	**50%**	**50%**	**38%**	**25%**	**63%**	**25%**
High priority: >50%; Medium priority: 40-50%; Low priority: 30-39%; Not a priority: <30%.										
CLA–Habitat & Biology SCORE	**2**	**2**	**2**	**2**	**0**	**0**	**1**	**0**	**2**	**1**
%	**67%**	**67%**	**67%**	**67%**	**0%**	**0%**	**33%**	**0%**	**67%**	**33%**
High priority: =67%; Medium priority: =33%; Not a priority = 0%.										
CLA–Flooding/ Floodplain Mgmt. SCORE	**1**	**1**	**1**	**0**	**0**	**2**	**1**	**0**	**1**	**0**
	50%	**50%**	**50%**	**0%**	**0%**	**100%**	**50%**	**0%**	**50%**	**0%**
High priority: =100%; Medium priority: =50%; Not a priority = 0%.										
# of CRITICAL LAND AREAS	**5**	**5**	**5**	**4**	**3**	**4**	**4**	**0**	**5**	**2**
High Priority: 5; Medium Priority: 3-4; Low Priority: 1-2; Not a priority: 0										

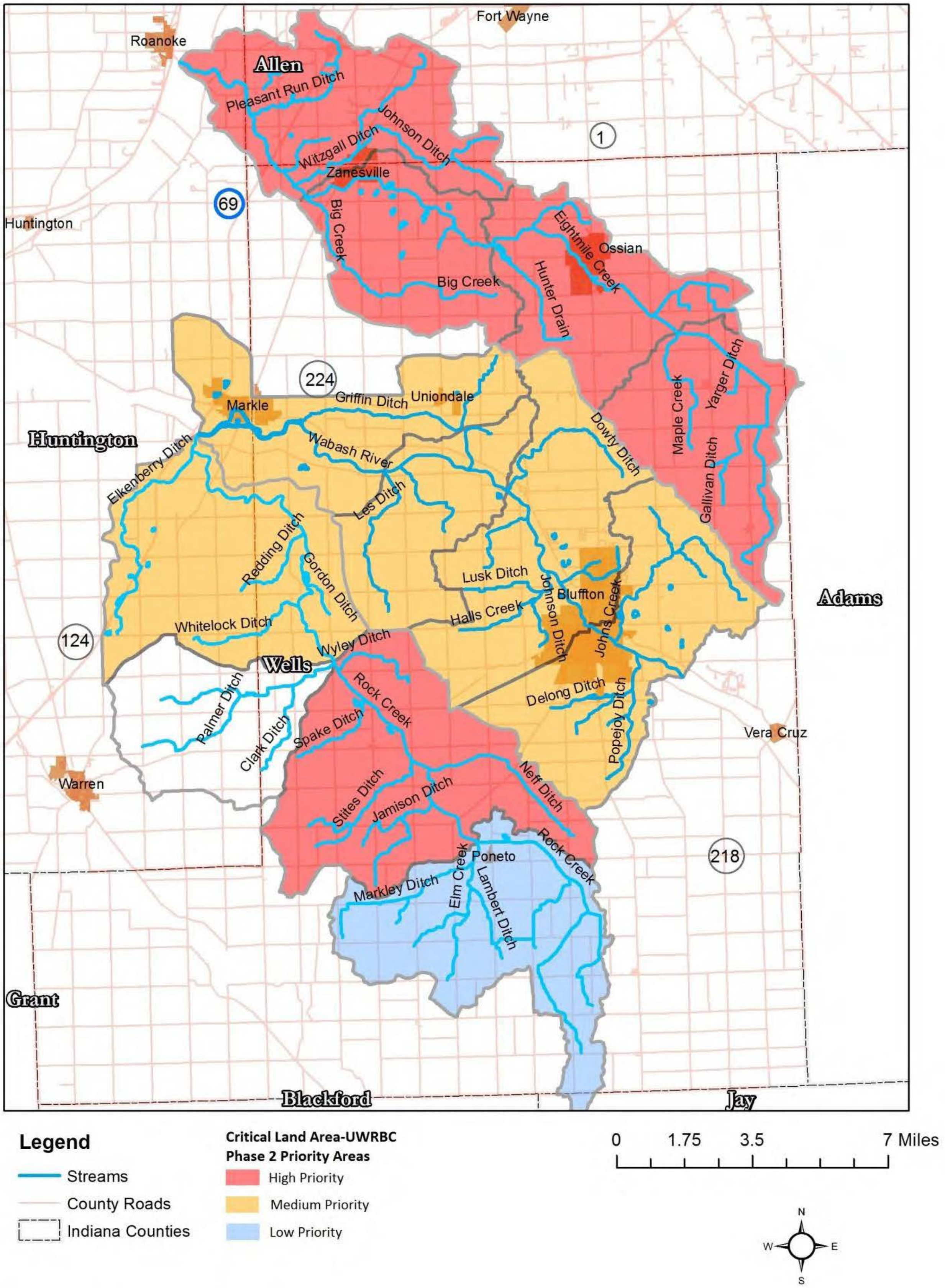
<u>High Priority Critical Land Areas:</u> Pleasant Run/Big Creek-Eight Mile Creek, Moser Lake-Eight Mile Creek, Maple Creek-Eight Mile Creek, and Stites Ditch-Rock Creek.

<u>Medium Priority Critical Land Areas:</u> Johns Creek-Wabash River, Dowty Ditch-Wabash River, Bender Ditch/Griffin Ditch-Wabash River, and Elkenberry Ditch-Rock Creek.

<u>Low Priority Critical Land Area:</u> Headwaters Rock Creek

<u>Not a Priority Critical Land Area:</u> Mossburg Ditch-Rock Creek

Figure 74: Priority Critical Land Areas



8.0 Implementation Strategies

Developing and implementing programs and practices in the Upper Wabash River – Phase 2 project area is the primary objective to achieve the plan's goals; however resources, manpower, and equipment are all limiting factors. In order for the watershed management plan to be successful, costs associated with meeting the objectives must be considered. Additionally, project partners will prove to be valuable during implementation efforts through leveraging of funds and technical support. Measurements of success are also necessary, as they provide a way to evaluate progress towards each goal. These items have been incorporated into the action register (Pages 209-220) that provides the details of the tasks that need to be accomplished to meet the objectives and goals.

8.1 Objectives to Reach Goals

The UWRBC Steering Committee and stakeholders have identified the following objectives:

- Develop and promote a cost-share program for implementing BMPs.
- Work with landowners to install best management practices using the cost-share program.
- Develop and conduct a water quality monitoring program and public monitoring events.
- Develop and provide educational opportunities for stakeholder participation; including workshops and field days on water quality issues, BMPs, septic systems, etc.; hold events for stakeholder participation, such as river clean-ups, river floats or other activities.
- Promote current USDA Farm Bill, ISDA or other conservation programs.
- Work with partners, other groups and agencies to promote and install best management practices.

Indicators for water quality improvement such as water monitoring data, habitat and biological assessments, and pollutant load modeling will be used to evaluate progress and aid in the review of the effectiveness of the selected objectives. Social data will also be used to help track progress towards the goals and objectives.

8.2 Best Management Practices and Estimated Load Reductions

A variety of best management practices (BMPs) are available for on-the-ground implementation. Many of these practices result in the reduction of nutrients, *E. coli*, and sediment, as well as improve habitat and riparian corridors, and reduce flooding concerns. A list of BMPs developed by the Steering Committee was reviewed and the practices were evaluated for their effectiveness in reducing nutrients, *E. coli* and sediment.

The Steering Committee members, with technical assistance from NRCS and ISDA staff, identified a list of best management practices which could be used to achieve the water quality goals described in this plan (pages 184-187). Consideration was given to practices that are easily adopted or expanded. This list does not include all practices that could be beneficial, but is a starting point for developing future implementation programs. This list is primarily focused on practices for agricultural lands, which is the predominant land use in the Upper Wabash River – Phase 2 project area. Some practices can also be applied or adapted to urban areas. Additional practices or alternative technologies may be both possible and necessary to reach the water quality goals. Descriptions of the practices are included in Appendix I.

List of Best Management Practices

- Agronomy Consultations by a Certified Crop Advisor
- Amending Soil Properties with Gypsum Products
- Bottomland Timber Establishment
- Clearing and Snagging
- Conservation Cover
- Conservation Tillage-Residue and Tillage Management, Mulch Till and No Till/Strip Till
- Cover Crops
- Critical Area Planting
- Diversion
- Drainage Water Management
- Field Borders & Filter Strips
- Grassed Waterway & Grade Stabilization Structures
- Greenways and Trails
- Heavy Use Area Protection
- Livestock Exclusion (access control, fence, pipeline, watering facility, etc.)
- Low Impact Development Workshops
- Nutrient Management & Pest Management
- Open Channel – Two Stage Ditch
- Precision/Variable Rate Technology – Equipment Modifications
- Prescribed Grazing (fence, pipeline, watering facility, etc.)
- Rain Gardens & Rain Barrels
- Riparian Forest Buffer & Herbaceous Cover
- Roof Runoff Structure
- Septic System Care and Maintenance Workshops
- Stormwater Runoff Control
- Soil Sampling
- Stream Crossing (access road, fence)
- Tree and Shrub Establishment
- Underground Outlet (Blind inlet)
- Waste Utilization
- Water and Sediment Control Basin
- Wetland Creation, Enhancement and Restoration

The list of BMPs was compared and assigned to the critical land use areas for each pollutant of concern based on the benefit provided by the practice. Education and outreach programs are considered a suggested BMP for all critical areas. Region 5 Model load reduction estimates were calculated for nitrogen, phosphorus, and sediment based on the implementation of a single BMP. In some instances data is not available to estimate load reductions for the BMP or management measure. It is very important to understand that these are only estimates for BMP effectiveness and that results will vary by field within the subwatersheds in the project area.

The UWRBC Phase 2 project area receives pollutant loading from the upstream Wabash River watershed containing approximately 353,437 acres that is outside of this project area. The accumulated pollutant loading from the upstream area adds to the loading from within the project area, and it is expected that the goals will only be achieved if these same BMPs are implemented in the upstream Wabash River watershed.

Table 8-1: Best Management Practices or Measures for Critical Areas with Expected Load Reductions

Critical Land Area	**Reason for being Critical**	**Suggested BMP or Measure**	**Estimated Load Reduction for a single BMP***		
			Nitrogen lbs/yr	**Phosphorus lbs/yr**	**Sediment tons/yr**
Critical Area for Nutrients (nitrogen and phosphorus) High Priority Moser Lake, Dowty Ditch, Bender Ditch/ Griffin Ditch Medium Priority Johns Creek Low Priority Pleasant Run Ditch/Big Creek, Maple Creek, Stites Ditch	Fertilizer Application	Agronomy Consultations	N/A	N/A	N/A
		Amending Soil Properties with Gypsum Products	ND	ND	ND
		Nutrient Management (& Pest Management when required for practice implementation)	ND	ND	ND
		Precision/Variable Rate Technology	ND	ND	ND
		Soil Sampling	N/A	N/A	N/A
		Underground Outlet (Blind Inlet)	ND	ND	ND
		Drainage Water Management	ND	ND	ND
	Tillage Practices	Conservation Cover (20 ac.)	83	42	29
		Conservation Tillage - Mulch Till and No Till/StripTill (100 ac.)	304–333	152 –166	115 –124
		Cover Crops (100 ac.)	291	146	103
		Field Borders & Filter Strips (40 ac. benefitted)	152	77	51
		Grassed Waterway & Grade Stabilization Structures	171	85.5	85.5
		Riparian Forest Buffer & Riparian Herbaceous Cover (20 ac. benefitted)	48 – 83	24 – 42	19 – 29
	Livestock & Manure Application	Diversion (modeled as Gully Stabilization)	86.4	43.2	43.2
		Livestock Exclusion (modeled as Fence - 500 ft.)	76.5	38.3	38.3
		Prescribed Grazing (20 ac.)	68	34	25
		Stream Crossing	10.7	5.8	5.8
		Waste Utilization (management system - 50 dairy cattle on feedlot)	1803	195	N/A
	Urban	Low Impact Development Workshops	N/A	N/A	N/A
		Rain Gardens and Rain Barrels	N/A	N/A	N/A
		Septic System Care and Maintenance Workshop	N/A	N/A	N/A

Critical Land Area	Reason for being Critical	Suggested BMP or Measure	Estimated Load Reduction for a single BMP*		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Critical Area for *E. coli* High Priority Dowty Ditch Medium Priority Pleasant Run Ditch/Big Creek, Moser Lake, Johns Creek, Bender Ditch/ Griffin Ditch, Low Priority Maple Creek, Elkenberry Ditch, Stites Ditch, Headwaters Rock Creek	Fertilizer Application	Drainage Water Management	ND	ND	ND
		Precision/Variable Rate Technology	ND	ND	ND
		Underground Outlet (Blind Inlet)	ND	ND	ND
	Livestock & Manure Application	Diversion (modeled as Gully Stabilization)	86.4	43.2	43.2
		Livestock Exclusion (modeled as Fence - 500 ft.)	76.5	38.3	38.3
		Prescribed Grazing (20 ac.)	68	34	25
		Stream Crossing	10.7	5.8	5.8
		Waste Utilization (management system - 50 dairy cattle on feedlot)	1803	195	N/A
	Tillage Practices	Field Borders & Filter Strips (40 ac. benefitted)	152	77	51
		Riparian Forest Buffer & Riparian Herbaceous Cover (20 ac. benefitted)	48 – 83	24 – 42	19 – 29
	Residential	Septic System Care and Maintenance Workshop	N/A	N/A	N/A
Critical Area for Sediment High Priority Stites Ditch Medium Priority Pleasant Run Ditch/Big Creek, Maple Creek, Johns Creek, Dowty Ditch Bender Ditch/ Griffin Ditch, Low Priority Moser Lake, Elkenberry Ditch	Tillage Practices	Amending Soil Properties with Gypsum Products	ND	ND	ND
		Bottomland Timber Establishment/ Tree and Shrub Establishment (20 ac. treated)	48	24	19
		Conservation Tillage - Residue & Tillage Management, Mulch Till and No Till/Strip Till (100 ac.)	304 –333	152 –166	115 –124
		Cover Crops (100 ac.)	291	146	103
		Field Borders & Filter Strips (40 ac. benefitted)	152	77	51
		Grassed Waterway & Grade Stabilization Structures	171	85.5	85.5
		Riparian Forest Buffer & Riparian Herbaceous Cover (20 ac. benefitted)	48 – 83	24 – 42	19 – 29
		Underground Outlet (Blind Inlet)	ND	ND	ND
		Water and Sediment Control Basin	SS	SS	SS
	In-stream Erosion	Clearing and Snagging	ND	ND	ND
		Open Channel – Two Stage Ditch	67.2	33.6	33.6
	HEL/PHEL	Conservation Cover (40 ac.)	155	78	53
	Livestock	Critical Area Planting (2 ac.)	10	5	4
		Diversion (modeled as Gully Stabilization)	86.4	43.2	43.2
		Heavy Use Area Protection (1 ac.)	12	6	6
		Prescribed Grazing (20 ac.)	68	34	25
		Stream Crossing	10.7	5.8	5.8
	Urban	Low Impact Development Workshops	N/A	N/A	N/A
		Stormwater Runoff Control	ND	ND	ND

Critical Land Area	Reason for being Critical	Suggested BMP or Measure	Estimated Load Reduction for a single BMP*		
			Nitrogen lbs/yr	**Phosphorus lbs/yr**	**Sediment tons/yr**
Critical Area for Habitat & Biology High Priority Pleasant Run Ditch/Big Creek, Moser Lake, Maple Creek, Johns Creek, Stites Ditch Medium Priority Elkenberry Ditch, Headwaters Rock Creek	Low habitat evaluation scores and biotic assessment	Bottomland Timber Establishment/ Tree and Shrub Establishment (20 ac. treated)	48	24	19
		Critical Area Planting (2 ac.)	10	5	4
		Field Borders & Filter Strips (40 ac. benefitted)	152	77	51
		Greenways and Trails (1 ac.)	11	5	6
		Riparian Forest Buffer & Riparian Herbaceous Cover (20 ac. benefitted)	48 – 83	24 – 42	19 – 29
		Wetland Creation, Enhancement and Restoration (20 ac. Benefitted)	68	34	25

**All load reductions are Region 5 Model calculation examples.*
ND = No data to perform calculations; N/A = Not applicable for Region 5 Model; SS = site specific.

Based on the estimated load reductions and the percentages of land use available for BMP implementation, the practices that would make the most impact in reducing nutrients and sediment are conservation tillage, cover crops, filter strips and field borders, conservation cover, grassed waterways, and waste management practices. The actual number and types of BMPs implemented and the associated load reductions will depend upon several factors including site specific conditions, willing landowners and available resources.

The following tables show the load reduction goals and the number of acres of individual BMPs (conservation tillage, cover crops, filter strips and field borders, conservation cover, grassed waterways, and waste management practices) that would be needed to meet the 5-year, 10-year and 20-year load reduction goals for nitrate and total phosphorus. The sediment goal is based on the average concentration of turbidity measurements; therefore current load reduction estimates are not available.

Table 8-2: Load Reductions Necessary to Meet Goals.

	Nitrate (lbs/year)	Phosphorus (lbs/year)
Measured Load	38,732,065	828,988
2035 Target Load	21,597,056	647,875
Load Reduction Needed	**17,135,009**	**181,113**
Load Reduction to meet 2020 Goal	4,283,766	45,262
Additional Load Reduction to meet 2025 Goal	4,283,766	45,262
Additional Load Reduction to meet 2035 Goal	8,567,505	90,608
Total Reduction	**17,135,037**	**181,132**

Table 8-3: Estimated Acres needed to meet Nitrate Load Reduction Goals.

UWRBC Phase 2 Project Area Ag Land Use: 150,104 acres Upstream Wabash River Watershed Ag Land Use: 286,409 acres			Estimated Acres to meet 2020 Nitrate Load Reduction Goal of 4,283,766 lbs/yr.		Additional Estimated Acres to meet 2025 Nitrate Load Reduction Goal of 4,283,766 lbs/yr.		Additional Estimated Acres to meet 2035 Nitrate Load Reduction Goal of 8,567,505 lbs/yr.	
Suggested BMP **(acres used to calculate load reduction)**	**Load Reduction Per Acre (lbs/yr)**		**Project Area (acres)**	**Upstream Watershed (acres)**	**Project Area (acres)**	**Upstream Watershed (acres)**	**Project Area (acres)**	**Upstream Watershed (acres)**
	Project Area	**Upstream Watershed**						
Conservation Cover (50ac.)	3.8	3.14 - 5.18	500,264	568,736	500,264	568,736	1,000,524	1,137,466
Conservation Tillage-Mulch Till (50ac.)	3.26	2.8 - 5.08	583,129	604,445	583,129	604,445	1,166,255	1,208,884
Conservation Tillage-No Till/ StripTill (50ac.)	3.56	3.08 – 5.56	533,989	551,614	533,989	551,614	1,067,956	1,103,223
Cover Crops (50ac.)	3.12	2.56 - 4.14	609,296	706,403	609,296	706,403	1,218,587	1,412,800
Field Borders & Filter Strips (2 ac./50 ac. benefitted)	98	81.5–134.5	19,398	21,103	19,398	21,103	38,796	42,204
Grassed Waterway (1 ac. /1000 ft.)	459	459	4,142	5,193	4,142	5,193	8,283	10,383
Waste Utilization (mgmt. system– 1 ac. feedlot, 50 dairy cattle)	1803	1803 – 1816	1,054	1,319	1,054	1,319	2,109	2,638

In order to meet the nitrate load reduction goals, multiple BMPs will need to be implemented on the same parcel or tract of land. It is also apparent that practices will need to be implemented in the upstream watershed area. Based on the load reduction per acre amounts, it is unrealistic to expect that the practices implemented on agricultural acres will be sufficient to meet the load reduction goals; therefore other pollution reduction efforts, such as low impact development practices in urban areas and septic system maintenance throughout the project area, is likely to have an important effect on water quality by reducing both nutrients and *E. coli*.

Table 8-4: Estimated Acres to meet Phosphorus Load Reduction Goals.

UWRBC Phase 2 Project Area Ag Land Use: 150,104 acres Upstream Wabash River Watershed Ag Land Use: 286,409 acres			Estimated Acres to meet 2020 Phosphorus Load Reduction Goal of 45,262 lbs/yr.		Additional Estimated Acres to meet 2025 Phosphorus Load Reduction Goal of 45,262 lbs/yr.		Additional Estimated Acres to meet 2035 Phosphorus Load Reduction Goal of 90,608 lbs/yr.	
Suggested BMP (acres used to calculate load reduction)	**Load Reduction Per Acre (lbs/yr)**		**Project Area (acres)**	**Upstream Watershed (acres)**	**Project Area (acres)**	**Upstream Watershed (acres)**	**Project Area (acres)**	**Upstream Watershed (acres)**
	Project Area	**Upstream Watershed**						
Conservation Cover (50ac.)	1.9	1.58 – 2.6	10,572	11,981	10,572	11,981	21,163	23,987
Conservation Tillage-Mulch Till (50ac.)	1.64	1.4 – 2.54	12,248	17,631	12,248	17,631	24,518	25,620
Conservation Tillage-No Till/ StripTill (50ac.)	1.78	1.54 – 2.78	11,284	11,656	11,284	11,656	22,589	23,335
Cover Crops (50ac.)	1.56	1.28 – 2.06	12,876	14,904	12,876	14,904	25,775	29,835
Field Borders & Filter Strips (2 ac./50 ac. benefitted)	49	41 – 68	410	443	410	443	821	887
Grassed Waterway (1 ac. /1000 ft.)	229	229	88	110	88	110	176	220
Waste Utilization (mgmt. system– 1 ac. feedlot, 50 dairy cattle)	195	195 -197	103	129	103	129	206	258

As stated previously, the UWRBC Phase 2 project area receives pollutant loading from the upstream Upper Wabash River Basin watershed that contains approximately 353,437 acres. The accumulated pollutant loading from the upstream area adds to the current loads within the project area. The loading from the upstream area represents 56% of the nitrate load reduction that is needed to meet the target load; 106% of the phosphorus load reduction that is needed to meet the target load; and 76% of the *E. coli* load reduction that is needed to meet the target load as outlined in the goals identified in this plan. The load reduction goals will only be achieved if a variety of BMPs are also implemented in the upstream Upper Wabash River Basin watershed using NRCS, ISDA, and local SWCD conservation cost-share and promotional programs.

8.3 Action Register and Schedule

The Action Register will help guide the implementation of both on-the-ground land use management practices and education and outreach activities of the UWRBC. It identifies the scheduled objectives, milestones, estimated costs, and potential project partners for each of the goals in this watershed management plan.

The action register covers a 5-year timeline to meet the initial goals outlined in this plan. Included in the action register is the development and promotion of a cost-share program, an education and outreach (E&O) program, and water quality monitoring. The costs are based on the salary for the watershed coordinator and water quality consultants to conduct a three-year cost-share/implementation project, education and outreach activities and water quality monitoring program.

It is anticipated that the three-year cost-share/implementation project conducted by the UWRBC will generate significant interest in the best management practices (BMPs) and future BMP projects will be funded through the Farm Service Agency (FSA), Natural Resource Conservation Service (NRCS), Indiana State Department of Agriculture (ISDA), Soil and Water Conservation District (SWCD) programs or other federal, state or local agencies. The UWRBC will support partner agencies with education and outreach and volunteer monitoring as available. Practice implementation costs are based on NRCS Conservation Activity Plan and Technical Service Provider payment rates.

The action register was based on the funding that would realistically be available within the project area and the volume of practices that could reasonably be installed within a five-year time period.

Table 8-5: Action Register and Schedule of UWRBC Activities

Action Register and Schedule

5-year Nutrient Goals: Reduce nitrate loading by 11.06% (4,283,766 lbs/yr) and reduce the annual average concentration of nitrate by 10.76% (1.89 mg/L) by 2020.

Reduce phosphorus loading by 5.46% (45,262 lbs/yr) and reduce the annual average concentration by 5.37% (0.0205 mg/L) by 2020.

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Develop Nutrient and Pest Management plans and implement on 2,500 acres of cropland.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	Technical Service Providers, NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr*		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Provide cost-share for agronomy consultations and development of nutrient and pest management plans on 500 acres annually. ($15.50/ac)	$38,750		
		Provide cost-share for small farm producers to conduct soil sampling on 500 acres annually. ($1/ac)	$2,500		
		Identify alternate funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Amend Soil Properties with Gypsum Products on 1,000 acres of cropland.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement 200 acres of gypsum applications. ($35/ac)	$35,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase Conservation Tillage - residue and tillage management, mulch till and no till/strip till by 5,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CTIC, CCSI, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement 1,000 acres of conservation tillage. (avg. $20/ac)	$100,000		
		Provide cost-share for equipment modifications. (avg. $4,000 each)	$20,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Implement Precision/ Variable Rate Technology for fertilizer and manure application on 1,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct 1 public meeting program featuring BMPs beginning in 2015.	$10,000/yr*		
		Provide cost-share for equipment modifications. (avg. $7,500 each)	$37,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement cover crops on 2,500 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CCSI, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct 1 field day featuring BMPs beginning in 2015.	E&O program		
		Promote Soil Health with partners.	E&O program		
		Using all funding sources, implement cover crops on 500 acres annually. (avg. $40/ac)	$100,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase landowner awareness of Drainage Water Management practices (Underground Outlet-blind inlet, Saturated Buffers, etc.).	Agricultural Landowners & Operators; County Surveyors; Tile Installers; Contractors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Purdue Extension WQ Program, TNC, LICA	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Develop survey to evaluate barriers to using practices.	E&O program		
		Using all funding sources, install one drainage water mgmt. practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants,
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Restrict livestock access from 1,000 feet of watershed streams and increase Prescribed Grazing and Waste Utilization on 500 acres.	Landowners with livestock; livestock access to watershed streams	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E& O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement livestock exclusion practices (fence, stream crossings, etc.) on 1,000 feet of streams, and prescribed grazing and waste utilization on 500 ac. over 5 years.	Exclusion: $10,000 Grazing: $14,000 Waste Utilization: $23,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Develop a Low Impact Development educational program.	Urban residents; Contractors; Developers	Conduct 1 public meeting featuring BMPs beginning in 2015.	E& O program	SWCDs, Purdue Extension, Area Plan Commission	IDEM 319 Grants, ISDA Clean Water Indiana Grants, Private Grants
		Survey local contractors on use of low impact development measures	E&O program		
Promote Rain Gardens and Rain Barrels.	Urban and rural residential landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	SWCDs, Purdue Extension	IDEM 319 Grants, , ISDA Clean Water Indiana Grants, Private Grants
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
Increase awareness of septic system problems and maintenance.	Rural residential landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	SWCDs, Purdue Extension, IOWPA, Health Departments	IDEM 319 Grants, Private Grants
		Conduct 1 workshop program featuring BMPs beginning in 2015.	E&O program		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Table 8-5: Action Register and Schedule of UWRBC Activities

Action Register and Schedule

5-year *E. coli* Goal: Reduce *E. coli* loading by 13% (641,672 G-org/yr) and reduce the average annual concentration by 12.76% (61.28 cfu/100mL) by 2020.

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase landowner awareness of Drainage Water Management practices (Underground Outlet-blind inlet, Saturated Buffers, etc.).	Agricultural Landowners & Operators; County Surveyors; Tile Installers; Contractors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Purdue Extension WQ Program, TNC, LICA	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Develop survey to evaluate barriers to using practices.	E&O program		
		Using all funding sources, install one drainage water mgmt. practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Precision/ Variable Rate Technology for fertilizer and manure application on 1,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Provide cost-share for equipment modifications. ($7,500 each)	$37,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement livestock practices (fencing, diversion, waste utilization, etc.) at 5 "hobby farm" locations.	Livestock "hobby farms"	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	$10,000/yr*		
		Using all funding sources, annually implement livestock practices on 1 hobby farm. ($5,000 to $6,000 ea)	$20,000 - $30,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Increase awareness of septic system problems and maintenance	Rural residential landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	SWCDs, Purdue Extension, IOWPA, Health Departments	IDEM 319 Grants, Private Grants
		Conduct 1 workshop program featuring BMPs beginning in 2015.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

5-year Sediment Goal: Reduce average concentrations of turbidity measurements from 106.96 NTUs to 89.22 NTUs (16.58%) by 2020.

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Amend Soil Properties with Gypsum Products on 1,000 acres of cropland.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement 200 acres of gypsum applications. ($35/ac)	$35,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Bottomland Timber Establishment/ Tree and Shrub Establishment on 50 acres of floodplain areas.	Agricultural Landowners & Operators; Landowners of floodplain areas.	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants,
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement bottomland timber and tree and shrub establishment practices on 10 acres. ($825/ac)	$41,250		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase Conservation Tillage - residue and tillage management, mulch till and no till/strip till by 5,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CTIC, CCSI, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	$10,000/yr*		
		Using all funding sources, annually implement 1,000 acres of conservation tillage. (avg. $20/ac)	$100,000		
		Provide cost-share for equipment modifications. (avg. $4,000 each)	$20,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement cover crops on 2,500 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CCSI, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Promote Soil Health with partners.	E&O program		
		Using all funding sources, annually implement cover crops on 500 acres. (avg. $40/ac)	$100,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement buffer practices on 20 acres. ($9/ac to $825/ac.)	$10,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Increase Grassed Waterway & Grade Stabilization Structures on 20 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension,	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement grass waterway and grade stabilization structures on 4 acres annually. (WW-$4,200/ac)	WW: $84,000; Structure $5,000 ea		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase landowner awareness of Drainage Water Management practices (Underground Outlet-blind inlet, Saturated Buffers, etc.).	Agricultural Landowners & Operators; County Surveyors; Tile Installers; Contractors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Purdue Extension WQ Program, TNC, LICA	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Develop survey to evaluate barriers to using practices.	E&O program		
		Using all funding sources, install one drainage water mgmt. practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Promote Water and Sediment Control Basins and install practice if possible	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, install one WASCOB practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Promote and complete Clearing and Snagging practice in 5 locations to reduce in-stream sedimentation.	Landowners along streams and river; County Surveyors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, County Surveyors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, Ditch Maintenance Funds
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, complete clearing and snagging at 5 locations. ($8,000/500 ft.)	$40,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Increase awareness on the use of 2-stage ditches, and implement a 2- stage ditch as possible.	Landowners along streams and river; County Surveyors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, TNC, Purdue Extension, County Surveyors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, Ditch Maintenance Funds
		Personal visits with landowners.	$10,000/yr *		
		Conduct 1 field day program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement two-stage ditches	Unable to determine		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement livestock practices – stream crossing, prescribed grazing, waste utilization, diversion, critical area plantings, and/or heavy use area protection - at 5 locations.	Landowners with livestock	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement 500 acres/or 5 locations of prescribed grazing, waste utilization, diversions, etc. (Grazing $28/ac, diversion $6/ft, heavy use $1.50/ft2, waste utilization $47/ac)	Depending on practice installed		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Investigate Low Impact Development programs.	Urban residents; Contractors; Developers	Survey local contractors on use of low impact development measures	E&O program	SWCDs, Purdue Extension, Area Plan Commission	IDEM 319 Grants, ISDA Clean Water Indiana Grants, Private Grants
Develop educational program and implement Stormwater Runoff Control practices as possible.	Urban, rural development sites; Contractors; Developers; City and Town Officials	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	SWCDs, IDEM Rule 5 staff, Purdue Extension, Area Plan Commission	IDEM 319 Grants, ISDA Clean Water Indiana Grants, Private Grants
		Survey local contractors and developers on use of stormwater runoff control practices.	E&O program		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Table 8-5: Action Register and Schedule of UWRBC Activities

Action Register and Schedule

20-year Habitat and Recreation Goals: Restore natural habitat and protect natural land uses within stream and river corridors to meet their aquatic life use to meet or exceed the CQHEI target of 60 at all project monitoring sites by 2035.

Develop partnerships with local government agencies, parks departments and trail groups to plan and install 5 miles of connecting trails and green space along the river corridor for recreational purposes by 2035.

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Bottomland Timber Establishment/ Tree and Shrub Establishment on 50 acres of floodplain areas.	Agricultural Landowners & Operators; Landowners of floodplain areas	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Critical Area Plantings on 3,000 feet of streambanks, or 4 acres of other areas needing stabilization to reduce erosion.	Agricultural Landowners & Operators; Landowners of floodplain areas; County Surveyors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR, County Surveyors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement critical area plantings on 3,000 feet of streambanks, or 4 acres of other areas needing stabilization. ($325/ac)	$1,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Promote Greenways and Trails for outdoor recreation opportunities	Landowners, County Residents, Local Government	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	IDNR, Local Government, Acres, Inc., local trail groups	IDNR Outdoor Recreation Grants, Private Grants
		Identify alternative funding sources for trail development	E&O program		
Increase Wetland Creation, Enhancement and Restoration on 20 acres for water storage and water quality improvement.	Agricultural Landowners & Operators; Suburban and rural landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, DNR, USF&W, TNC, Acres Inc.	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants, Private Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement wetland creation, enhancement and restoration on 20 acres. ($500 - $4,500/ac)	$10,000 - $90,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

Flooding/Floodplain Management Goal: Increase stakeholder awareness of the benefits of upland storm water storage areas and floodplain management practices by 2020; and increase the amount of riparian areas on streams and the Wabash River by 5% by 2035.

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Table 8-5: Action Register and Schedule of UWRBC Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Implement Bottomland Timber Establishment/ Tree and Shrub Establishment on 50 acres of floodplain areas.	Agricultural Landowners & Operators; Landowners of floodplain areas	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Promote Greenways and Trails for outdoor recreation opportunities	Landowners, County Residents, Local Government	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	IDNR, Local Government, Acres, Inc., local trail groups	IDNR Outdoor Recreation Grants, Private Grants
		Identify alternative funding sources for trail development	E&O program		
Increase Wetland Creation, Enhancement and Restoration on 20 acres for water storage and water quality improvement.	Agricultural Landowners & Operators; Suburban and rural landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, DNR, USF&W, TNC, Acres Inc.	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants, Private Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement wetland creation, enhancement and restoration on 20 acres. ($500 - $4,500/ac)	$10,000 - $90,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Table 8-5: Action Register and Schedule of UWRBC Activities

Action Register and Schedule					
Education and Outreach Programs and Activities					
Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Host BMP field days, and workshops annually.	Community Residents, Landowners, Agricultural Producers	Conduct E&O program featuring BMPs beginning in 2015.	$6,000/yr*	NRCS, CTIC ISDA, CCSI, SWCDs, Purdue Extension, DNR, Ag Vendors, others	IDEM 319 Grants, Water Indiana Grants, Ag Vendors, Private Grants
		Identify additional partners for E&O programs.	E&O program		
		Identify alternative funding sources to increase BMP installation.	E&O program		
Continue water quality monitoring and Hoosier Riverwatch volunteer monitoring activities	Community Volunteers, Schools, FFA and other Youth Groups	Conduct E&O program featuring monitoring activities.	$2,000/yr*	ISDA, SWCDs, Hoosier Riverwatch	IDEM 319 Grants, SWCDs, Private Grants
		Identify funding sources to continue monitoring programs.	E&O program		
Develop strategies to reduce CSO impacts to waterways.	Waste treatment facilities, City and Town Officials	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	SWCDs, Purdue Extension, Health Departments	City / Town Funding, User Fees
Provide opportunities for stakeholder involvement in environmental activities.	Community Volunteers, Businesses, Schools, FFA and other Youth Groups	Conduct E&O program featuring river clean-ups, water quality monitoring, canoe floats, and other events.	$1,000/yr*	ISDA, SWCDs, Hoosier Riverwatch, IDNR, Parks Department	SWCDs, Businesses, Private Grants
		Identify funding sources to continue programs.	E&O program		
Share and communicate activities on a regular basis.	Community members; Community groups; Local Government Officials	Conduct E&O program with updates to website, social media, newsletters, public meetings, media releases, fairs, river events, etc.	$500/yr*	NRCS, ISDA, SWCDs, IDNR, Parks Departments, and others	UWRBC Funding, Private Grants
Develop partner list and track stakeholder participation.	Community members	Conduct E&O program that will include developing partner list and track stakeholder participation.	$500/yr*	NRCS, ISDA, SWCDs	UWRBC Funding, SWCDs

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

9.0 Project Tracking and Future Activities

9.1 Evaluating Effectiveness of Project

Indicators for measuring progress have been identified for each goal established by the Steering Committee and stakeholders. Water quality monitoring data, habitat, and biological surveys will continue to be collected throughout practice implementation and will be compared to the baseline data contained in this plan. Meadow-Wood Environmental Laboratory will serve as the Water Quality Coordinator and perform laboratory testing at a cost of approximately $39,000 over the three-year implementation period. Following implementation, on-going volunteer water quality monitoring will be conducted using the UWRBC monitoring equipment and Hoosier Riverwatch methods. Load reduction estimates based on actual monitoring data will be used for comparison to the baseline modeling to show improvements in water quality.

Best management practices installed throughout the implementation program will be mapped and modeled for their respective load reductions. This information will be reviewed by the Steering Committee and partners to determine the success or failures of installed practices and used for evaluating the watershed management plan action items or when considering revisions and refinement to the implementation strategies.

Social data will be used to track stakeholder attitudes, awareness, behaviors and participation in conservation programs and the implementation of best management practices that directly affect water quality improvement and protection. Surveys and questionnaires will be used to gather the social data, and personal interviews will be completed with landowners interested in applying for financial assistance programs. The social data will be evaluated by the Steering Committee and partners to determine the effectiveness of our education and outreach efforts, as well as identify improvements for future implementation programs.

The overall project progress will be tracked using the action register (Appendix J) as a guide for the schedule of activities to be completed throughout the implementation project. A tracking database will be developed by the UWRBC to include measureable items such as workshops held, BMPs installed, meetings held, stakeholder and volunteer participation, etc.; and will be updated quarterly with completed items. Individual landowner contacts and information will also be tracked for installed and future projects.

Information about the watershed management plan, implementation project, water quality monitoring and educational and outreach events will be posted to the Upper Wabash River Basin Commission website (http://uwrbc.org) and other social media as wells as in news releases provided to media outlets advertising project events.

9.2 Future Watershed Activities

The Upper Wabash River Basin Commission has been awarded an IDEM 319 grant to implement best management practices in the project area over a three-year period based on the approval of this plan. The implementation project includes developing and promoting a BMP cost-share program, BMP implementation, water quality monitoring, and education and outreach activities. The critical areas, BMPs, goals and objectives outlined in this watershed management plan will be the basis for the implementation grant project.

Support from the Upper Wabash River Basin Commission members, steering committee, partners and stakeholders is necessary for the success of future programs and for achieving the goals and objectives outlined in this plan. The UWRBC members and steering committee will continue to meet bi-monthly to provide guidance and review findings and progress of the project activities.

This watershed management plan will be reviewed and updated as goals, objectives and strategies are met; and as proven technologies and additional management measures are approved. At a minimum, it is expected that the plan will be reevaluated annually within the three-year implementation period and on a five-year basis thereafter. Revisions to the plan can be completed at any time due to changes in water quality, land use, regulations, attitudes and behavior or for other reasons that are deemed appropriate.

The Upper Wabash River Basin Commission continues to conduct water monitoring activities and partners with the NRCS, ISDA and SWCDs in the Phase 1 project area; and is committed to future planning and implementation projects in the proposed Phase 3 project area. The UWRBC will work to integrate this watershed management plan and the plan that was developed for the Phase 1 project area into a regional effort for the entire area under the jurisdiction of the UWRBC to capitalize on the potential shared resources.

This watershed management plan will be available to the public through the UWRBC, local libraries, County Surveyor offices and Soil and Water Conservation Districts in Adams, Jay, Wells and Huntington Counties.

For additional information on this watershed management plan or future activities, contact the Upper Wabash River Basin Commission, 117 W. Harvest Road, Bluffton, IN 46714. Phone 260/824-0624 ext. 3.

Appendix A - Acronym Key

AIMS	Assessment Information Management System (IDEM)
BMP	Best Management Practice
°C	Degrees Celsius
CAFO	Confined Animal Feeding Operations
CCSI	Conservation Cropping Systems Initiative
CFO	Confined Feeding Operations
CSO	Combined Sewer Overflows
cfs	Cubic Feet per Second
cfu/mL	Colony Forming Units per Milliliters
CLA	Critical Land Area
CQHEI	Citizens Qualitative Habitat Evaluation Index
CR	County Road
CREP	Conservation Reserve Enhancement Program
CTIC	Conservation Technology Information Center
DNR	Department of Natural Resources
DSC	Division of Soil Conservation
DO	Dissolved Oxygen
E&O	Education and Outreach
ECHO	Enforcement and Compliance History Online (US EPA)
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
F&W	Division of Fish and Wildlife
G-org/yr	Billions of Organisms per Year
GIS	Geographical Information Systems
HEL	Highly Erodible Land
HR	Hoosier Riverwatch Volunteer Monitoring Locations
HRW	Hoosier Riverwatch
HUC	Hydrologic Unit Code
IAC	Indiana Administrative Code
IC	Indiana Code (also referred to as IAC - Indiana Administrative Code)
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IOWPA	Indiana Onsite Waste Water Professionals Association, Inc.
ISDA	Indiana State Department of Agriculture
L-THIA	Long-Term Hydrologic Impact Assessment
LARE	Lake and River Enhancement Program
LICA	Land Improvement Contractors Association
lbs/yr	Pounds per Year
LDC	Load Duration Curve
mg/L	Milligrams per Liter
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
ND	No Data

NO_2	Nitrite
NO_3	Nitrate
NPDES	National Pollution Discharge Elimination System
NPS	Non-point Source Pollution
NRCS	Natural Resources Conservation Service
NTU	Nephelometer Turbidity Units
NWIS	National Water Information System (USGS)
PHEL	Potentially Highly Erodible Land
PTI	Pollution Tolerance Index
RCCD	Rock Creek Conservancy District
RWA	Rapid Watershed Assessments
Rule 5	Construction/Land Disturbance Storm Water Permitting (327 IAC 15-5, Rule 5)
SS	Site Specific
STATSGO	State Soil Geographic Database
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
STORET	Storage and Retrieval Data Warehouse (US EPA)
STP	Sewer Treatment Plants
SWCD	Soil and Water Conservation District
TDR	Transfer of Development Rights
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
US Army CERL	Construction Engineering Research Laboratory
US EPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWRBC	Upper Wabash River Basin Commission
WASCOB	Water and Sediment Control Basin
WC	Watershed Coordinator
WMP	Watershed Management Plan
WQM	Water Quality Monitoring
WWTP	Waste Water Treatment Plants

<u>Wells County Comprehensive Plan Zoning</u>

R-1	Single Family Residential
R-2	Two Family Residential
R-3	Multi-Family Residential
M-1	Manufactured Home Community
M-2	Manufactured Home Subdivision
S-1	Suburban Residential
A-R	Agricultural Residential
A-1	Agricultural Intensive
C-1	Conservation

Appendix B – Education and Outreach Meetings and Events

1) Upper Wabash River Basin Commission Steering Committee Meetings

The UWRBC Steering Committee meetings are held bi-monthly opposite the Upper Wabash River Basin Commission meetings. The meetings are held at 12 noon at the Wells Co. USDA Service Center, 117 W. Harvest Road, Bluffton, IN.

- January 30, 2013 – Discussed additional individuals to invite to serve on the steering committee, planned kick off meeting, and discussed outreach methods. Attendance: 4.
- March 27, 2013 – Set meeting schedule, reviewed grant tasks and calendar, discussed newsletter and website status. Looking into river clean-up and trails projects. Attendance: 7.
- May 21, 2013 – Discussed the water quality monitoring program and updated monitoring site selections. Reviewed equipment quotes for monitoring activities. The website has been converted to the new hosting service. Discussed the desktop survey, river clean-up, water monitoring education events, and septic system workshop. Attendance: 5
- August 6, 2013 – Continued to plan the septic workshop and pre and post surveys were reviewed. A report of the river clean-up and monitoring education event was provided. A promotional brochure on the WMP activities was reviewed. Attendance: 7
- September 24, 2013 – The QAPP was approved, and monitoring was conducted. A report on the water quality monitoring activities was given, and future monitoring dates were scheduled. The second river clean-up and the septic workshop plans were discussed. The desktop survey and windshield survey are underway. Attendance: 4
- November 26, 2013 – The draft watershed management plan was reviewed. An update on the water monitoring activities was provided. Flyers advertising the manure management workshop were distributed, and the December newsletter draft was reviewed for input. Public displays will be developed for the Wells and Huntington Co. SWCD Annual Meetings scheduled for February 2014. Attendance: 7
- January 28, 2014 – The draft watershed management plan was distributed to steering committee members. Water monitoring activities and the windshield survey results were discussed. A display is planned for the Huntington and Wells County SWCD annual meetings, and a presentation on volunteer water quality monitoring will be included. The WMP update meeting was planned. Attendance: 6
- March 25, 2014 – The watershed management plan updates and windshield survey items were discussed. Water monitoring data was reviewed and discussed. The steering committee members reviewed the stakeholder concerns and identified problems, causes and sources of nonpoint source pollution. A report of the WMP update meeting was provided. Attendance: 8
- May 20, 2014 – The steering committee reviewed comments from of the watershed management plan draft. A summary of the project activities was provided. The water monitoring activities and educational events were discussed. The May newsletter was distributed. The Wetland, Buffer and 2-stage Ditch workshop was scheduled and planned. Another river clean-up was discussed and scheduled. The list of problems, causes and sources of nonpoint source pollution was refined. Attendance: 4
- July 29, 2014 – The WMP updates were discussed. Members reported on the Wetland, Buffer and 2-Stage Ditch workshop, and the list of problems, causes and sources of nonpoint source pollution was reviewed and condensed again. The water quality

monitoring results were reviewed and a report on the educational activities was provided. Another river clean-up event was scheduled. Attendance: 5

- September 23, 2014 – Updates to the watershed management plan were reviewed, and discussion followed on the critical areas, setting goals and choosing best management practices. A summary of the grant tasks was provided. Attendance: 4
- November 25, 2014 – Load reductions, targets, goal statements and critical land areas were discussed and the grant task list was reviewed. Water monitoring results and recent man-made changes at a water monitoring site were discussed. Plans for the Fertilizer Workshop were reviewed. Attendance: 5
- January 27, 2015 – A report on the Fertilizer Workshop was provided and the list of grant tasks was reviewed. Updates to load reductions, targets, critical areas and goals were reviewed for additional input. A review of the best management practices to include in the plan was conducted. A plan for volunteer participation was suggested and discussed. Attendance: 6
- March 24, 2015 – The revised draft of the WMP was discussed. Project activity updates were provided. A report on the public displays at the Huntington, Jay and Wells Co. SWCD Annual Meetings was provided. Best management practices were reviewed and discussed. Future educational activities were also discussed. Attendance: 3

2) Upper Wabash River Basin Commission Meetings

The UWRBC meetings are held bi-monthly on the 2nd Tuesday in February, April, June, August, October and December at 7 a.m. - changed to 8 a.m. on June 10, 2014 - at the Wells Co. Government Annex, 223 W. Washington St., Bluffton, IN.

- February 12, 2013 – The watershed management planning grant kick off meeting details and water monitoring under the grant agreement were discussed. Attendance: 10.
- April 9, 2013 – A list of grant tasks was reviewed. The Watershed Coordinator reported that the water monitoring QAPP is being developed and the desktop survey has begun. Water monitoring was discussed, and water monitoring education events have been scheduled. Newsletters and the website were also discussed. Attendance: 11.
- June 11, 2013 – The first draft of the watershed management plan was reviewed. Updates were provided on the desktop survey, water monitoring, QAPP, newsletters, website and workshop survey information. Water monitoring equipment quotes were reviewed. Water monitoring education and river clean-up events have been scheduled. Attendance: 9
- August 13, 2013 – A report of the monitoring educational events and river clean-up was provided. Additional grant tasks were discussed. The desktops survey is ongoing. The septic workshop planning items were reviewed. Attendance: 10
- October 8, 2013 – Updates were provided on the desktop and windshield survey. The water monitoring QAPP was approved and monitoring was started. Monitoring dates were noted. The newsletter was distributed. Stakeholder concerns were reviewed. A report on the river clean-up event was provided. The Septic System workshop and workshop surveys and brochures were discussed. Attendance: 10
- December 10, 2013 – The list of grant tasks was reviewed. A report of the Septic System workshop was provided, and plans for the Manure Management workshop were discussed. The December newsletter was distributed, and it was noted that the website

was updated and public displays were being developed. Water quality monitoring events were also discussed. Attendance: 8

- February 11, 2014 – The Watershed Coordinator reported on grant activities, including: the Manure Management workshop, survey results, the draft WMP plan submission, WMP update meeting for input on stakeholder concerns, public displays for SWCD Annual Meetings, and planning for a Wetland, Buffer and 2-Stage Ditch workshop. Water monitoring activities and testing results were discussed. Attendance: 10
- April 8, 2014 – A report on the WMP update meeting was provided. Updates on the Wetland, Buffer and 2-Stage Ditch workshop, newsletter, website and Facebook page were also provided and discussed. Water quality monitoring data results were reviewed. The initial list of stakeholders concerns, problems, causes and sources of nonpoint pollution was reviewed and discussed. Attendance: 12
- June 10, 2014 – The Watershed Coordinator reported on grant activities, including: the review of the stakeholder concerns by the steering committee and SWCDs, area meetings with partners and stakeholders, Facebook reach, website updates, river clean-up and Wetland, Buffer and 2-Stage Ditch workshop plans, and draft of the WMP. The Water Quality Coordinator reported on monitoring activities and discussed the monitoring results. The stakeholder concerns were reviewed for additional input in developing goals for the WMP. Attendance: 12
- August 12, 2014 – Updates on grant activities was provided, and the water monitoring schedule was reviewed. A river clean-up, and fertilizer field day was discussed. Water quality monitoring data charts were reviewed and a summary of the results were discussed. Attendance: 10
- October 14, 2014 – Updates on grant activities was provided along with the tracking of stakeholder attendance and participation. Load reductions, goals and BMP selection were also discussed. Attendance: 10
- December 9, 2014 – A report of a stakeholder meeting with the Roanoke Lions Club was given. Updates on grant activities and tracking of stakeholder attendance and participation was provided. The Fertilizer workshop plans were discussed. Critical areas, goals and BMPs to be included in the WMP were discussed. Attendance: 10
- February 10, 2015 – A report of the Fertilizer Workshop was provided. A newsletter and website updates are the only grant items that need to be completed. The final draft WMP was discussed and will be submitted to IDEM. Attendance: 11

3) Watershed Management Plan (WMP) Kick-Off Meeting

The WMP kick-off meeting was held on February 27, 2013, at 7 p.m. at the Wells Co. Public Library. Media releases were published in local newspapers and flyers were distributed to 63 people via e-mail lists to announce the project and solicit input. Tony Garton, a retired high school teacher and previous Wells County Council member, was the guest speaker. He talked about community involvement and volunteering. Information about the UWRBC past projects and the current IDEM 205(j) grant was presented. Stakeholders were invited to join the Steering Committee and encouraged to become involved in the watershed management planning process. A presentation on water quality monitoring was used to gain interest in the project. A total of 23 people participated in the event, and 4 additional citizens contacted the Watershed Coordinator to inquire about the project and provide input to the list of concerns as a result of the media coverage of the public meeting.

4) Quarterly Newsletters

Quarterly newsletters were distributed by the UWRBC via e-mail and at meetings, as well as forwarded by partner SWCDs to landowners on their e-mail list. The number listed is from the UWRBC e-mail distribution.

- The first quarterly newsletter was distributed in April 2013 to 123 interested citizens and was posted on the UWRBC website. UWRBC grant partners were also asked to distribute the newsletter to their e-mail lists. It included information on the Upper Wabash River Basin Commission, meeting schedule, watershed management plan maps and activities, and opportunities for stakeholders to participate in the project.
- The July 2013 newsletter was distributed to 125 people via e-mail and posted on the UWRBC website. It included information on the purpose of the watershed management plan, water monitoring education event and river clean-up, and volunteer opportunities.
- The September 2013 newsletter was distributed to over 120 people via e-mail and posted on the UWRBC website. Information on the watershed management plan progress was highlighted in this issue. The stakeholder concerns, watershed impairments, land use, and volunteer monitoring opportunities were included. The newsletter also included a follow up to the river clean-up events and notice of the Septic System Workshop.
- The December 2013 newsletter was distributed to 76 people via e-mail and posted on the UWRBC website. It was also distributed to over 120 additional people by the Wells Co. SWCD via e-mail. The Manure Management workshop was advertised, stakeholder concerns were noted, and pictures of the Eight Mile Creek, Wabash River and Rock Creek were included. Volunteer monitoring opportunities was also advertised.
- Information on the UWRBC watershed management planning project was included in the Wells Co. SWCD/Rock Creek Conservancy District Annual Report, and Huntington Co. SWCD Annual Report. The Annual Report and WMP introduction brochures were distributed to 88 people on 2/20/14 at the Wells Co. SWCD meeting, and distributed to 90 people on 2/25/14 at the Huntington Co. SWCD meeting.
- The May 2014 newsletter was distributed to 81 individuals via e-mail, and posted to the UWRBC website. The Wells Co. SWCD also distributed the newsletter to over 120 additional people. An update on the planning process, problems, causes and sources of pollution and goals and strategies were highlighted. Water monitoring data charts were included along with pictures of the monitoring sites. Future events and volunteer opportunities were also noted.
- The August 2014 newsletter was distributed to 84 individuals via e-mail and posted to the UWRBC website. The Wells Co. SWCD also distributed the newsletter. The newsletter included information on volunteer opportunities to assist with the river clean-up, and water quality monitoring. An update on the WMP was provided along watershed inventory information, nonpoint pollution problems, causes and sources, goals and strategies, monitoring results, and information on the Wells Co. SWCD cover crop field day.
- The December 2014 newsletter was distributed to 130 individuals via e-mail and posted to the UWRBC website. The Wells Co. SWCD also distributed the newsletter to over 130 individuals. The newsletter included an update on the WMP and advertised the Nutrient Management Workshop.
- The March 2015 newsletter was distributed to 154 individuals via e-mail and posted to the UWRBC website. The Wells Co. SWCD also distributed the newsletter. It included

information on the watershed inventory, goals developed by the steering committee, future cost-share program, and volunteer opportunities for water quality monitoring.

5) Media Notices, News Releases and Media Articles

Media notices and news releases were submitted to the Bluffton News Banner, Huntington Herald Press, Decatur Daily, and Portland Commercial Review for publication.

- 2/6/13 – UWRBC meeting notice (2/12/13)
- 2/22/13 – UWRBC Watershed Management Plan Kick off meeting (2/27/13)
- 2/26/13 – News-Banner Article – WMP Kick off meeting
- 2/28/13 – News-Banner Article – WMP Kick off meeting
- 3/22/13 – Steering Committee 3/27/13 meeting notice and published notice
- 4/4/13 – UWRBC 4/9/13 meeting notice
- 5/15/13 – Steering Committee 5/21/13 meeting notice
- 6/5/13 – UWRBC 6/11/13 meeting notice
- 6/10/13 – Living with the Wabash River education event (6/15/13)
- 6/14/13 – News-Banner Article - Living with the Wabash River education event
- 7/18/13 – Understanding the Wabash River education event (7/27/13)
- 7/18/13 – De-trash the Wabash River clean-up event media notice (7/27/13)
- 7/20/13 – News-Banner Article – De-trash the Wabash River clean-up event
- 7/25/13 & 7/27/13 – News-Banner Articles – Understanding the Wabash River and De-trash River clean-up events
- 7/29/13 – News-Banner Article – De-trash the Wabash River clean-up event
- 7/31/13 – Steering Committee 8/6/13 meeting notice
- 8/8/13 – UWRBC 8/13/13 meeting notice
- 9/16/13 – De-trash the Wabash River clean-up event media notice (9/28/13)
- 9/18/13 – Steering Committee 9/24/13 meeting notice
- 9/21/13 – News-Banner Article – De-trash the Wabash River clean-up event
- 9/25/13 – The Advertiser – De-trash the Wabash notice
- 9/30/13 – News-Banner Article – De-trash the Wabash River clean-up event
- 10/3/13 – UWRBC 10/8/13 meeting notice
- 10/4/13 – Septic System Workshop media notice (10/21/13)
- 10/5/13 – News-Banner Article – Septic System Workshop
- 10/19/13 – News-Banner Article – Septic System Workshop
- 10/22/13 – News-Banner Article – Septic System Workshop
- 11/21/13 – Manure Management Workshop media notice (12/11/13)
- 11/21/13 – Steering Committee 11/26/13 meeting notice
- 11/26/13 – News Banner Article – Manure Management Workshop
- 12/3/13 – UWRBC 12/10/13 meeting notice
- 1/22/14 – Steering Committee 1/28/14 meeting notice
- 2/6/14 – UWRBC 2/11/14 meeting notice
- 3/5/14 – Watershed Management Plan Update meeting notice (3/19/14)
- 3/8/14 – News-Banner Article – WMP Update meeting
- 3/10/14 – News-Banner Article – WMP Update meeting
- 3/12/14 – News-Banner Article – WMP Update meeting

- 3/18/14 – Steering Committee 3/25/14 meeting notice
- 3/20/14 – News-Banner Article – WMP Update meeting
- 4/3/14 – UWRBC 4/8/14 meeting notice
- 5/15/14 – Steering Committee 5/20/14 meeting notice
- 6/4/14 – UWRBC 6/10/14 meeting notice
- 6/7/14 – News-Banner Article – De-trash the Wabash clean-up event
- 6/16/14 – News-Banner Article – De-trash the Wabash clean-up event
- 6/16/14 – News-Banner Editorial – De-trash the Wabash clean-up event
- 6/19/14 – Wetland, Buffer and 2-Stage Ditch media notice (6/26/14)
- 6/21/14 – News-Banner Article – Wetland, Buffer and 2-Stage Ditch field day
- 7/25/14 – Steering Committee 7/29/14 meeting notice
- 7/27/14 – Huntington Co. Tab Article – Splash on the Wabash
- 8/7/14 – UWRBC 8/12/14 meeting notice
- 9/9/14 – News-Banner Article – De-trash the Wabash River clean-up event
- 9/18/14 – Steering Committee 9/23/14 meeting notice
- 9/19/14 – News Sentinel Wabash River article
- 10/7/14 – UWRBC 10/14/14 meeting notice
- 11/20/14 - Steering Committee 11/25/14 meeting notice
- 12/4/14 – UWRBC 12/9/14 meeting notice
- 12/31/14 – Nutrient Management Workshop media notice (1/7/15)
- 1/20/15 – Steering Committee 1/27/15 meeting notice
- 2/4/15 – UWRBC 2/10/15 meeting notice
- 3/17/15 – Steering Committee 3/25/15 meeting notice
- 4/8/15 – UWRBC 4/14/15 meeting notice

6) Website

The UWRBC information was previously posted to the Wells Co. SWCD website as a sub-domain. The UWRBC had a new separate website developed, and the Phase I planning and implementation program information was transferred to the new website. Workshop and field day flyers, educational events, and planning information were posted to the website throughout the project. Quarterly website updates included: (4/15/13) website redesign; (6/10/13) educational event information added; (7/6/13) July newsletter added, educational workshop information added; (9/17/13) added pictures of education events, and river clean ups; (10/4/13) added September newsletter; (11/7/13) added septic system workshop information; (1/2/14) added December newsletter, workshop flyer, and pictures; (1/29/14) updated information, added pictures; (3/5/14, 3/12/14) added WMP update meeting flyer, and educational events; (6/20/14) added Wetland, Buffer and 2-Stage Ditch field day flyer, updated WMP items; (9/9/14-9/10/14) added updated WMP draft, newsletter, photos and event information; (11/10/14) updated website with pictures and field day information; (12/10/14, 12/31/14) added December newsletter, Nutrient Management Workshop flyer, and updated information; (3/20/15) added March newsletter, and updated event information.

7) Displays, Workshops and Field Days

The UWRBC conducted a variety of educational workshops and field days, and had public displays at local community events. Flyers were distributed by the UWRBC and partners via e-mail and posted on social media.

- October 21, 2013 – The septic system workshop was held immediately following the Wells Co. Regional Sewer District meeting at the Wells Co. Government Annex in Bluffton. Workshop flyers were distributed to 107 individuals via e-mail. 36 people attended the event. Alice Quinn, Indiana State Department of Health, presented information covering on-site septic systems. L.A. Brown, a local septic installer presented the "Funeral for a Septic System". Local health department staff answered questions from the group. A total of 24 surveys were distributed with 15 being returned (63% response). The "Funeral for a Septic System" was posted by the Bluffton News-Banner on their blog and on You-Tube and was viewed by over 100 people.
- December 11, 2013 – The Manure Management Workshop was held at the Wells Co. Public Library, Bluffton. Workshop flyers were e-mailed to 128 people by the UWRBC, and distributed to additional contact lists by the Wells Co. SWCD. The Wells Co. Purdue Extension office also advertised the event. 46 people attended the workshop. Melissa Lehman, from Agronomic Solutions presented information on soil sampling, value of manure, and manure handling. Bill Horan, Purdue Extension Educator Wells Co., provided updated to the Category 14 Rules. Kelly Barkell and Adam Jones, USDA-NRCS staff talked about USDA cost-share programs and best management practices and provided soil health demonstrations. PARP credits were available to landowners. Surveys were distributed to 36 people, with 28 completing and returning them (78% participation). Distributed 32 copies of the December 2013 newsletter and UWRBC watershed management plan introduction brochure. 30 packets containing information on manure management BMPs, and fertilizer recommendations were distributed to 30 individuals.
- February 20, 2014 – Wells Co. SWCD Annual Meeting display. 88 people attended the event. 79 UWRBC WMP brochures were distributed, and UWRBC watershed management plan information was included in the annual report that was distributed to the 88 participants.
- February 25, 2014 – Huntington Co. SWCD Annual Meeting display. 90 people attended the event. The Watershed Coordinator spoke on the planning process, and invited stakeholders to provide input. 3 UWRBC WMP brochures and 2 planning update notices were distributed.
- March 19, 2014 – The Watershed Management Plan Update meeting was held at the Wells Co. Public Library in Bluffton. The featured speaker, Bev Balash, Bluffton Middle School 8th Grade Teacher, provided information on the Hoosier Riverwatch water monitoring conducted at the Wabash River by the 8th Grade Students. A review of the watershed management plan and discussion of the watershed characteristics and monitoring data was followed by a discussion of the nonpoint source pollution problems, causes, and sources. Meeting flyers were e-mailed to 141 individuals, and advertised on local TV stations when the original date of 3/12/14 had to be postponed due to a snow storm. 12 individuals attended the event. 8 out of 10 surveys were completed and returned (80% response).

- June 26, 2014 – The Wetland Buffer and 2-Stage Ditch Field Day was held at Bluffton's Native Habitat area north of the Wabash River in Bluffton. Flyers were e-mailed to 145 individuals and posted on the website and Facebook. An additional 138 people were reached through Facebook. 19 individuals attended the field day. Speakers included Doug Sundling, Project Consultant for the City of Bluffton; Ken Brunswick, Friends of the Limberlost; Kelley Barkell and Andrew Pursifull, USDA-NRCS; Julie Harrold, ISDA-Div. of Soil Conservation; Jarrod Hahn, Wells Co. Surveyor; and Kent Wamsley, The Nature Conservancy. Participants learned about the history of the native habitat, the benefits of wetlands, cost-share programs and technical assistance, and the CREP program. A tour of the native habitat area and 2-Stage ditch was allowed participants to ask questions and see the benefits of the practices. 16 folders with native habitat, wetland and program information were distributed. 6 out of 12 surveys were returned (50% response).
- January 7, 2015 – The Nutrient Management Workshop was held at the Wells Co. Community Center in Bluffton. Flyers were distributed via e-mail to 130 individuals, and distributed to 130 additional people by the Wells Co. SWCD. The flyer was also posted at 2 public locations and posted to the UWRBC Facebook page with a reach of 145, 3 shares and 1 like. The featured speakers were: Matt Prible, a local manure applicator that uses variable rate technology; Dan Coffin of Soil and Plant Nutritional Concepts; Mike Werling, Adams Co. no-till farmer; and Kelley Barkell, USDA-NRCS District Conservationist. 30 people attended the event. 4 local Ag product vendors displayed their products and services. The workshop focused on maximizing the efficiency of fertilizer while minimizing the impact on the environment. 4R Nutrient Stewardship brochures were distributed to 17 participants, and the WMP brochures were distributed to 18 participants. 14 out of 16 surveys were returned (88% response).
- February 24, 2015 – Huntington Co. SWCD Annual Meeting display – The UWRBC display included information on the watershed inventory, volunteer opportunities, monitoring information, and future cost-share program. Distributed 16 WMP brochures and spoke with individuals about the project. Attendance: 88.
- February 25, 2015 – Jay Co. SWCD Annual Meeting display – The UWRBC display included information on the WMP and volunteer opportunities for water quality monitoring. Distributed 5 WQM brochures and spoke with individuals on the project volunteer opportunities. Attendance: over 150.
- February 26, 2015 – Wells Co. SWCD Annual Meeting display – The UWRBC display included information on the watershed management plan, watershed inventory, volunteer opportunities, monitoring information, and future cost-share program. Distributed 37 WMP brochures and spoke with individuals about the project. Attendance: 105.
- March 12, 2015 – Little River Wetlands Project meeting display – The UWRBC display included information on the watershed management plan, watershed inventory, volunteer opportunities, monitoring information, and future cost-share program. Distributed 5 WMP brochures and 2 volunteer water quality monitoring brochures and spoke with individuals about the project. Attendance: 11.

8) Water Quality Monitoring Education and Outreach

The UWRBC used water quality monitoring activities and river clean-up events to educate the community about water quality issues and encourage participation in the project. Flyers were distributed by the UWRBC Watershed Coordinator and partner Soil & Water Conservation Districts via e-mail and posted on social media.

- June 15, 2013 – Living with the Wabash River: Water Quality Coordinator, Neil Ainslie presented historical information on the Wabash River and provided hands-on instruction of water monitoring activities. The education event was co-sponsored by the Bluffton Parks Department. 12 individuals attended the event. Event information distributed to 72 individuals via e-mail.
- July 27, 2013 – Understanding the Wabash River: Water Quality Coordinator, Neil Ainslie provided hands-on instruction of Hoosier Riverwatch water monitoring activities with the assistance of the Watershed Coordinator and 3 Hoosier Riverwatch volunteers. The education event was co-sponsored by the Bluffton Parks Department. Four cub scouts and five adults (9 participants) collected macroinvertebrates and conducted the Hoosier Riverwatch chemical tests. Attendance: 14. Event information distributed to 72 individuals via e-mail.
- February 20, 2014 –The Water Quality Coordinator presented a program on volunteer monitoring activities at the Wells Co. SWCD/Rock Creek Conservancy District Annual Meeting. Attendance 88.
- April 19, 2014 – Volunteer water quality monitoring was completed in the Phase 1 project area in an effort to provide continuity over the UWRBC watershed area and promote volunteer water monitoring programs. 10 people participated in the volunteer effort.
- April 21, 2014 – The Water Quality Coordinator presented a water quality monitoring program at the Senior Explorations event hosted by the Bluffton Parks Department. Attendance 6.
- June 24, 2014 – The Water Quality Coordinator, Watershed Coordinator, and adult volunteer presented a hands-on “It’s Alive” program to 15 adults and 30 children. The program was hosted by and a part of the Wells Co. Library children’s series. Macroinvertebrates were viewed by the participants and water quality indicator information was discussed. Attendance: 50.
- July 26, 2014 – Splash on the Wabash – The Water Quality Coordinator presented hands-on opportunities for participants to view and identify macroinvertebrates found in the Wabash River. The Watershed Coordinator provided hands-on opportunities for participants to complete the Hoosier Riverwatch water monitoring chemical tests. It was estimated that over 150 individuals, children and adults, participated in the event.

9) Other Education and Outreach Activities

Additional education and outreach activities included the Watershed Coordinator attending various public meetings and partner meetings and events to share updates on the watershed management planning progress, and conducting river clean up events. A Facebook page was also created to reach participants through social media.

- The Watershed Coordinator attended the USDA, Bluffton Service Center FAC meeting to report on activities and develop partnerships for field days and other activities. Attendance: 6.
- July 27, 2013 – De-trash the Wabash: 13 volunteers participated in the clean-up event from the White Bridge (CR 450E) to Rotary Park along the Wabash River Greenway in

Bluffton. Flyers were distributed to 76 individuals via e-mail and posted at 5 public locations.

- August 8, 2013 – Attended Wells Co. SWCD meeting to report on activities and gather input on the stakeholder concerns for the WMP. Attendance: 6.
- September 3, 2013 – Attended the Wells Co. Commissioners meeting. Reported on planning activities, river clean up opportunities, and septic system meeting.
- September 28, 2013 – De-trash the Wabash: 14 volunteers participated in the clean-up event from the Rotary Park along the Wabash River to the Main Street Bridge in Bluffton. 260 flyers distributed via e-mail, and posted at public locations.
- March 7, 2014 – Created UWRBC Facebook page. Friends were invited to the page, and by 3/12/14, a total of 92 likes had been added for the page.
- April 21, 2014 – The Watershed Coordinator and UWRBC member met with the Huntington County Commissioners and provided information on the planning effort. Attendance: 12.
- April 22, 2014 – The Watershed Coordinator attended the Lower Salamonie Watershed Blue-Green Algae meeting. Talked with 4 project landowners.
- May 12, 2014 – The Watershed Coordinator gave an interview to the Bluffton News-Banner on the watershed management planning process, concerns, BMPs, and events. Featured in the N-B Progress Edition. Distribution to over 3,500 homes in Wells County.
- May 13, 2014 – Attended Wells Co. SWCD meeting for input into watershed management plan. Attendance: 6.
- May 20, 2014 – Attended the Huntington Co. SWCD meeting for input into the watershed management plan. Attendance: 7.
- May 28, 2014 – Attended the Jay Co. SWCD meeting for input into the watershed management plan. Attendance: 9.
- June 14, 2014 – De-trash the Wabash River clean-up event. Event flyers were distributed via e-mail to 77 individuals and posted on the UWRBC website and Facebook page. 12 volunteers participated in the clean-up event from the White Bridge to the Main Street Bridge in Bluffton.
- June 20, 2014 – Facebook page posts updated. Wetland, Buffer, and 2-Stage Ditch field day promoted. Facebook reach: 209.
- August 19, 2014 – Watershed Coordinator, Water Quality Consultant and UWRBC Chair met with Kevin Kilbane of the News-Sentinel for an article on the Wabash River and current watershed management plan project.
- September 10, 2014 – Facebook page posts updated. Wabash River clean-up event reach: 328. Steering Committee meeting post reach: 16.
- September 13, 2014 – De-trash the Wabash River clean-up event. Event flyers were distributed via e-mail to 78 individuals and posted on the UWRBC website and Facebook page. 13 participants conducted the river clean-up from the Main Street Bridge in Bluffton to the Gerber Bridge approximately 2 miles downstream.
- September 19, 2014 – The Watershed Coordinator attended the Wells Co. SWCD Cover Crop Field Day and talked with landowners about the WMP and anticipated cost-share program opportunities. Attendance: 60.
- November 3, 2014 – Roanoke Lions Club – The Watershed Coordinator presented information on the planning progress, watershed characteristics, and future projects.

Public display was used for presentation and 14 UWRBC WMP brochures were distributed. Attendance: 14.

- February 10, 2015 – The Watershed Coordinator attended the Wells Co. SWCD meeting and provided updates on the WMP. Attendance: 8.
- March 12, 2015 – The Watershed Coordinator attended the Wells Co. SWCD meeting and provided updates on the WMP. Attendance: 7.
- March 15, 2015 – The Watershed Coordinator met with staff from the Wells/Adams Co. NRCS staff, ISDA resource conservationist, and SWCD staff to review BMP selection to be included in the WMP. Attendance: 5.

10) Brochures

A number of brochures were developed and distributed at various education events to inform the general public on the UWRBC activities, BMPs and to promote volunteer opportunities.

- UWRBC Watershed Management Plan introduction brochure:
  4 distributed at the Septic System Workshop
  32 distributed at the Manure Management Workshop
  79 + 37 distributed at the Wells Co. SWCD/Rock Creek Conservancy District Annual Meetings
  3 + 16 distributed at the Huntington Co. SWCD Annual Meetings
  16 distributed at Wetland, Buffer and 2-Stage Ditch Field Day
  18 distributed at the Nutrient Management Workshop
  14 distributed at the Roanoke Lions Club meeting
  5 distributed at the Little River Wetland Project meeting
- UWRBC Septic System brochure (developed during the 2009-2013 grant):
  11 distributed at the Septic System Workshop
- UWRBC Volunteer Water Quality Monitoring brochure:
  5 distributed at the Jay Co. SWCD Annual Meeting
  2 distributed at the Little River Wetland Project meeting

11) Surveys

Social Indicator surveys were conducted at the educational workshops and field days to evaluate stakeholder knowledge and willingness to act. The results of the surveys are included in Appendix C.

Appendix C – Social Indicator Surveys

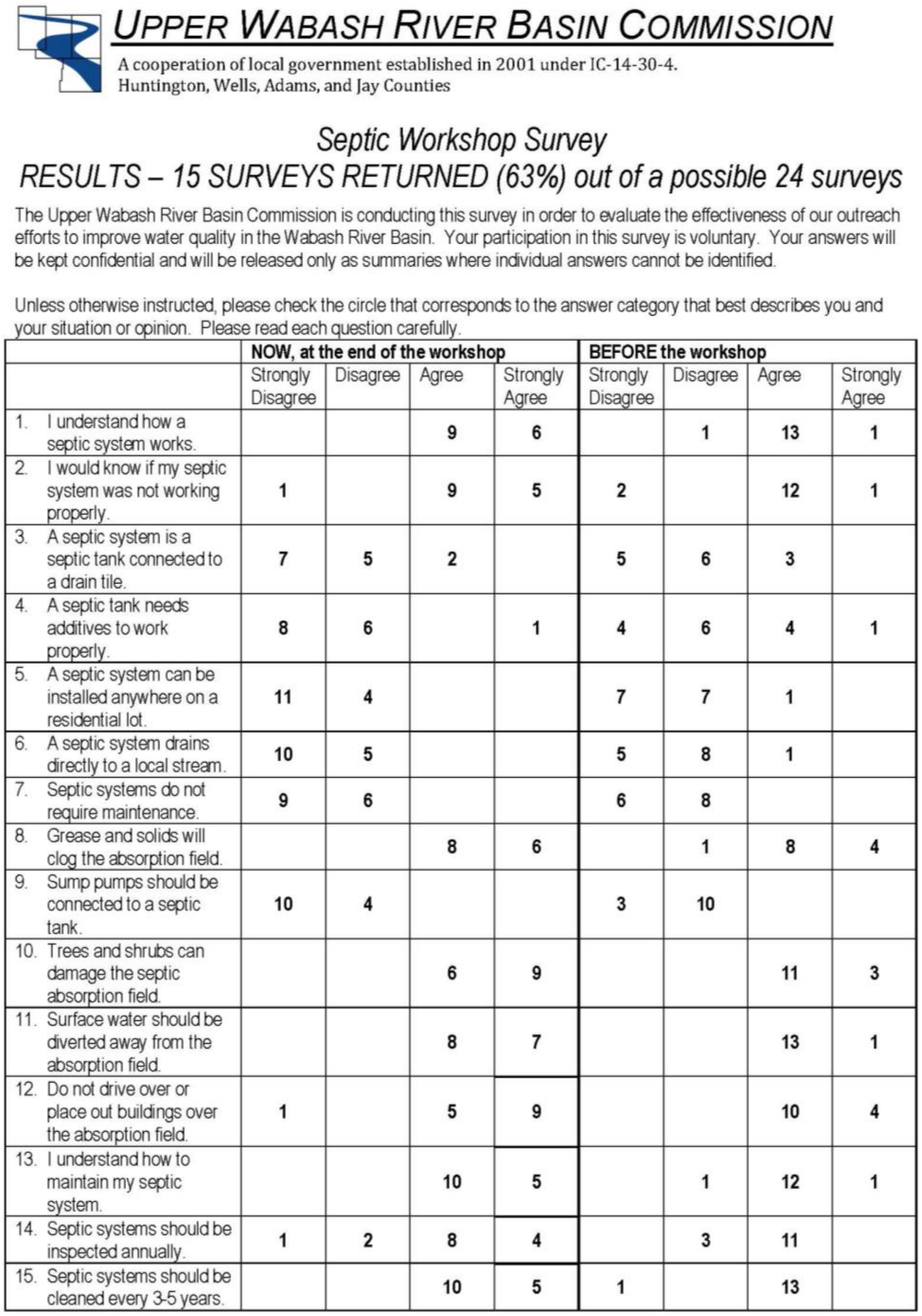
A total of five participant surveys were conducted throughout the project at workshops, field days, and public meetings. The Social Indicators Data Management and Analysis Tool (SIDMA) was used to develop the surveys. Following the events, the participant's answers were entered into SIDMA and indicator scores were generated to provide a mean value of the participant's responses.

The SIDMA awareness indicator used to assess the increased knowledge of nonpoint pollution issues was the "awareness of types of pollutants impairing waterways" and the "awareness of sources of pollutants impairing waterways". The attitude indicator for "willingness to take action to improve water quality" was used to assess the stakeholder's likelihood to act. The SIDMA awareness indicator values have a range of 1-2; with 1 being less aware and 2 being more aware of the types of pollutants and sources. The SIDMA attitude indicator also has a value range of 1-2; 1 being less positive and 2 being a more positive response to act on the part of the participant.

The surveys were conducted at: 1) the Septic System Workshop; 2) the Manure Management Workshop; 3) the WMP Update Meeting; 4) the Wetland, Buffer and 2-Stage Ditch Field Day; and 5) the Nutrient Management Workshop.

1) Septic System Workshop – October 21, 2013

Surveys were distributed to 24 participants, and 15 were returned with a completion rate of 63%. The survey was designed to measure the participant's knowledge about septic system functions and maintenance before and after the workshop. Nine questions on the pre-post survey generated an agreeable answer, and six questions generated a disagreeable answer. The survey results indicate that approximately 37% of the answers changed from agreeing to strongly agreeing; and from disagreeing to strongly disagreeing based on the particular questions. The SIDMA indicator scores for awareness of pollution issues could not be calculated based on the questions; but the willingness to take action to improve water quality generated a mean value of 1.86 showing the participants are more likely to take action.



UPPER WABASH RIVER BASIN COMMISSION

A cooperation of local government established in 2001 under IC-14-30-4.
Huntington, Wells, Adams, and Jay Counties

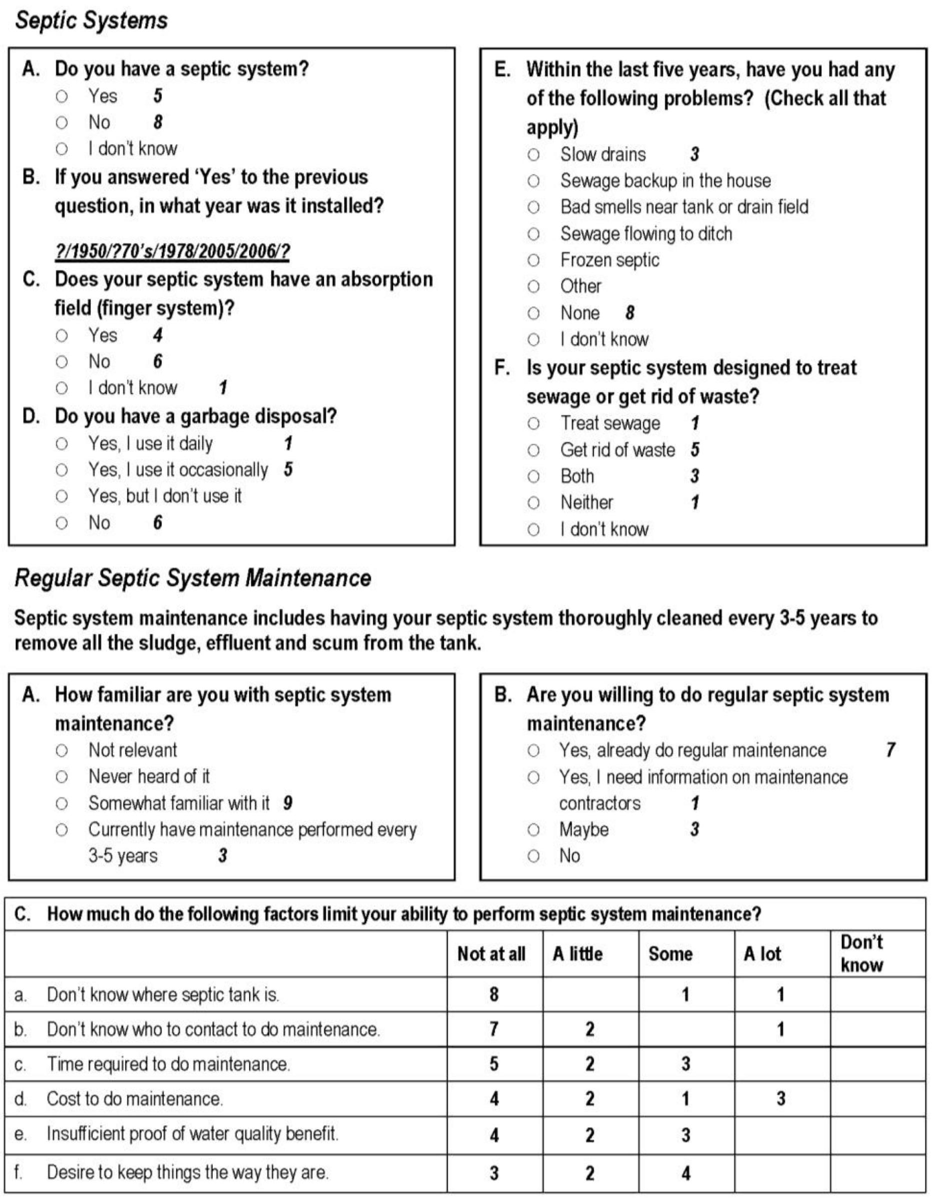
Septic Workshop Survey

RESULTS – 15 SURVEYS RETURNED (63%) out of a possible 24 surveys

The Upper Wabash River Basin Commission is conducting this survey in order to evaluate the effectiveness of our outreach efforts to improve water quality in the Wabash River Basin. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, please check the circle that corresponds to the answer category that best describes you and your situation or opinion. Please read each question carefully.

	NOW, at the end of the workshop				**BEFORE the workshop**			
	Strongly Disagree	Disagree	Agree	Strongly Agree	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I understand how a septic system works.			9	6		1	13	1
2. I would know if my septic system was not working properly.	1		9	5	2		12	1
3. A septic system is a septic tank connected to a drain tile.	7	5	2		5	6	3	
4. A septic tank needs additives to work properly.	8	6		1	4	6	4	1
5. A septic system can be installed anywhere on a residential lot.	11	4			7	7	1	
6. A septic system drains directly to a local stream.	10	5			5	8	1	
7. Septic systems do not require maintenance.	9	6			6	8		
8. Grease and solids will clog the absorption field.			8	6		1	8	4
9. Sump pumps should be connected to a septic tank.	10	4			3	10		
10. Trees and shrubs can damage the septic absorption field.			6	9			11	3
11. Surface water should be diverted away from the absorption field.			8	7			13	1
12. Do not drive over or place out buildings over the absorption field.	1		5	9			10	4
13. I understand how to maintain my septic system.			10	5		1	12	1
14. Septic systems should be inspected annually.	1	2	8	4		3	11	
15. Septic systems should be cleaned every 3-5 years.			10	5	1		13	



Septic Systems

A. Do you have a septic system?
- ○ Yes ***5***
- ○ No ***8***
- ○ I don't know

B. If you answered 'Yes' to the previous question, in what year was it installed?

?/1950/?70's/1978/2005/2006/?

C. Does your septic system have an absorption field (finger system)?
- ○ Yes ***4***
- ○ No ***6***
- ○ I don't know ***1***

D. Do you have a garbage disposal?
- ○ Yes, I use it daily ***1***
- ○ Yes, I use it occasionally ***5***
- ○ Yes, but I don't use it
- ○ No ***6***

E. Within the last five years, have you had any of the following problems? (Check all that apply)
- ○ Slow drains ***3***
- ○ Sewage backup in the house
- ○ Bad smells near tank or drain field
- ○ Sewage flowing to ditch
- ○ Frozen septic
- ○ Other
- ○ None ***8***
- ○ I don't know

F. Is your septic system designed to treat sewage or get rid of waste?
- ○ Treat sewage ***1***
- ○ Get rid of waste ***5***
- ○ Both ***3***
- ○ Neither ***1***
- ○ I don't know

Regular Septic System Maintenance

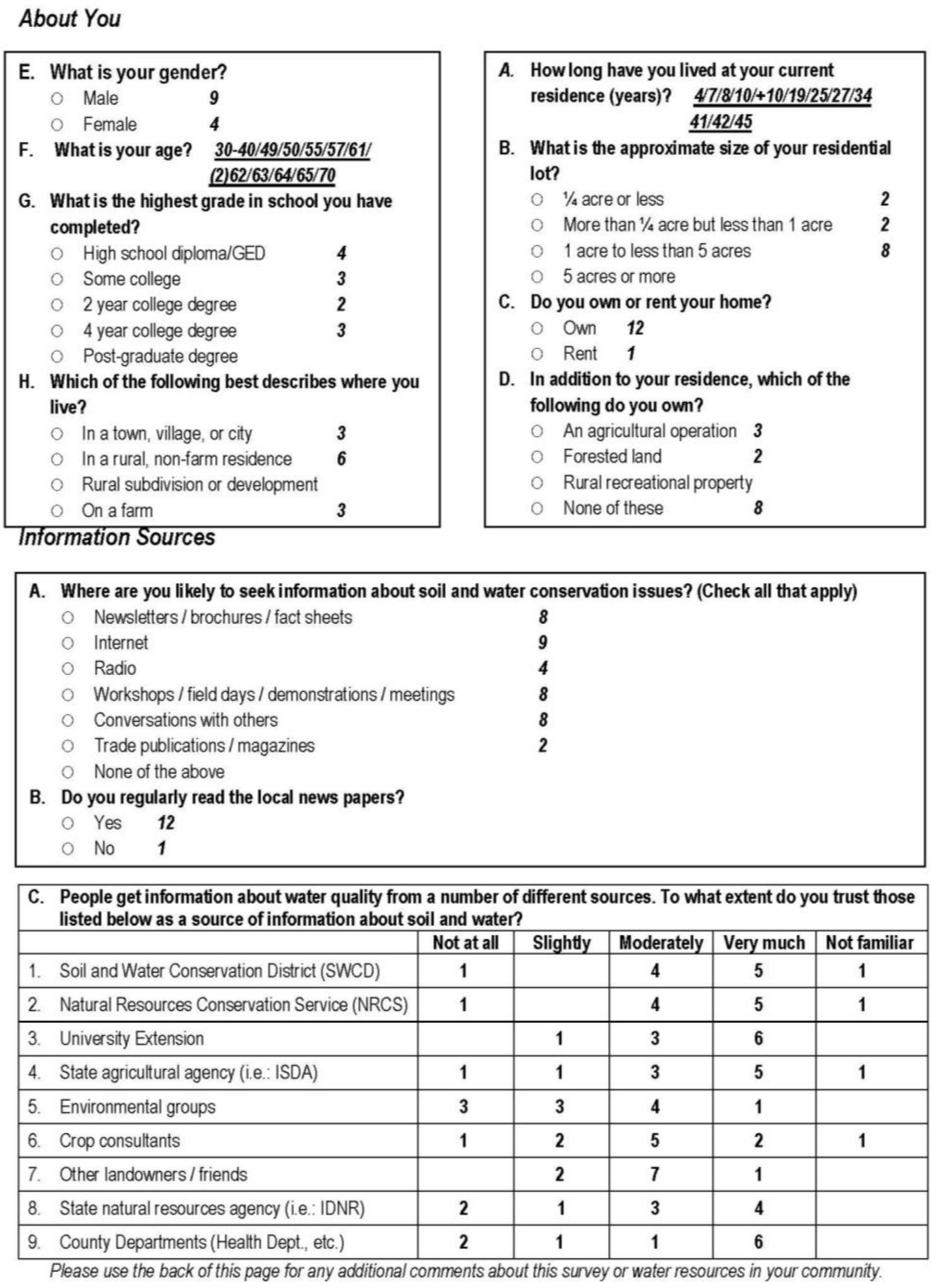
Septic system maintenance includes having your septic system thoroughly cleaned every 3-5 years to remove all the sludge, effluent and scum from the tank.

A. How familiar are you with septic system maintenance?
- ○ Not relevant
- ○ Never heard of it
- ○ Somewhat familiar with it ***9***
- ○ Currently have maintenance performed every 3-5 years ***3***

B. Are you willing to do regular septic system maintenance?
- ○ Yes, already do regular maintenance ***7***
- ○ Yes, I need information on maintenance contractors ***1***
- ○ Maybe ***3***
- ○ No

C. How much do the following factors limit your ability to perform septic system maintenance?

	Not at all	A little	Some	A lot	Don't know
a. Don't know where septic tank is.	8		1	1	
b. Don't know who to contact to do maintenance.	7	2		1	
c. Time required to do maintenance.	5	2	3		
d. Cost to do maintenance.	4	2	1	3	
e. Insufficient proof of water quality benefit.	4	2	3		
f. Desire to keep things the way they are.	3	2	4		



About You

E. What is your gender?
- ○ Male *9*
- ○ Female *4*

F. What is your age? *30-40/49/50/55/57/61/(2)62/63/64/65/70*

G. What is the highest grade in school you have completed?
- ○ High school diploma/GED *4*
- ○ Some college *3*
- ○ 2 year college degree *2*
- ○ 4 year college degree *3*
- ○ Post-graduate degree

H. Which of the following best describes where you live?
- ○ In a town, village, or city *3*
- ○ In a rural, non-farm residence *6*
- ○ Rural subdivision or development
- ○ On a farm *3*

A. **How long have you lived at your current residence (years)?** *4/7/8/10/+10/19/25/27/34 41/42/45*

B. What is the approximate size of your residential lot?
- ○ ¼ acre or less *2*
- ○ More than ¼ acre but less than 1 acre *2*
- ○ 1 acre to less than 5 acres *8*
- ○ 5 acres or more

C. Do you own or rent your home?
- ○ Own *12*
- ○ Rent *1*

D. In addition to your residence, which of the following do you own?
- ○ An agricultural operation *3*
- ○ Forested land *2*
- ○ Rural recreational property
- ○ None of these *8*

Information Sources

A. Where are you likely to seek information about soil and water conservation issues? (Check all that apply)
- ○ Newsletters / brochures / fact sheets *8*
- ○ Internet *9*
- ○ Radio *4*
- ○ Workshops / field days / demonstrations / meetings *8*
- ○ Conversations with others *8*
- ○ Trade publications / magazines *2*
- ○ None of the above

B. Do you regularly read the local news papers?
- ○ Yes *12*
- ○ No *1*

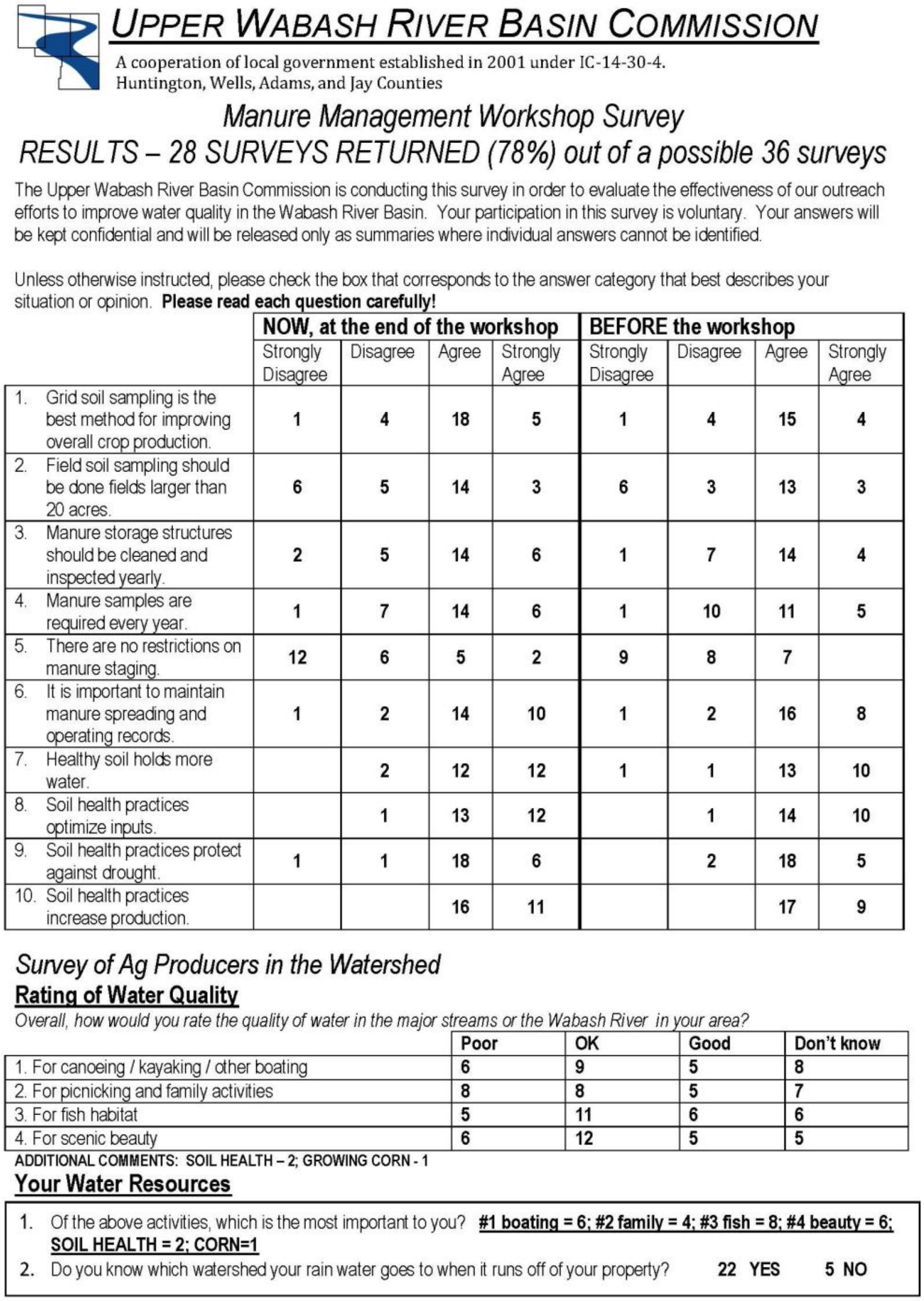
C. People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?

	Not at all	Slightly	Moderately	Very much	Not familiar
1. Soil and Water Conservation District (SWCD)	1		4	5	1
2. Natural Resources Conservation Service (NRCS)	1		4	5	1
3. University Extension		1	3	6	
4. State agricultural agency (i.e.: ISDA)	1	1	3	5	1
5. Environmental groups	3	3	4	1	
6. Crop consultants	1	2	5	2	1
7. Other landowners / friends		2	7	1	
8. State natural resources agency (i.e.: IDNR)	2	1	3	4	
9. County Departments (Health Dept., etc.)	2	1	1	6	

Please use the back of this page for any additional comments about this survey or water resources in your community.

2) Manure Management Workshop – December 11, 2013

The Manure Management Workshop survey was distributed to 36 participants with 28 surveys returned for a 78% completion rate. This survey focused on the value, storage, and application of manure, applicator rules, and the importance of a comprehensive nutrient management plan as well as other best management practices to consider when using manure. The before and after survey questions generated a 27% change in agreement. The SIDMA indicator mean value for awareness of pollution types was 1.55; and the awareness of sources of pollution mean value was 1.59 on a scale of 1-2. The SIDMA willingness to take action mean value was 1.81.



UPPER WABASH RIVER BASIN COMMISSION

A cooperation of local government established in 2001 under IC-14-30-4.
Huntington, Wells, Adams, and Jay Counties

Manure Management Workshop Survey

RESULTS – 28 SURVEYS RETURNED (78%) out of a possible 36 surveys

The Upper Wabash River Basin Commission is conducting this survey in order to evaluate the effectiveness of our outreach efforts to improve water quality in the Wabash River Basin. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, please check the box that corresponds to the answer category that best describes your situation or opinion. **Please read each question carefully!**

	NOW, at the end of the workshop				**BEFORE the workshop**			
	Strongly Disagree	Disagree	Agree	Strongly Agree	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Grid soil sampling is the best method for improving overall crop production.	1	4	18	5	1	4	15	4
2. Field soil sampling should be done fields larger than 20 acres.	6	5	14	3	6	3	13	3
3. Manure storage structures should be cleaned and inspected yearly.	2	5	14	6	1	7	14	4
4. Manure samples are required every year.	1	7	14	6	1	10	11	5
5. There are no restrictions on manure staging.	12	6	5	2	9	8	7	
6. It is important to maintain manure spreading and operating records.	1	2	14	10	1	2	16	8
7. Healthy soil holds more water.		2	12	12	1	1	13	10
8. Soil health practices optimize inputs.		1	13	12		1	14	10
9. Soil health practices protect against drought.	1	1	18	6		2	18	5
10. Soil health practices increase production.			16	11			17	9

Survey of Ag Producers in the Watershed

Rating of Water Quality

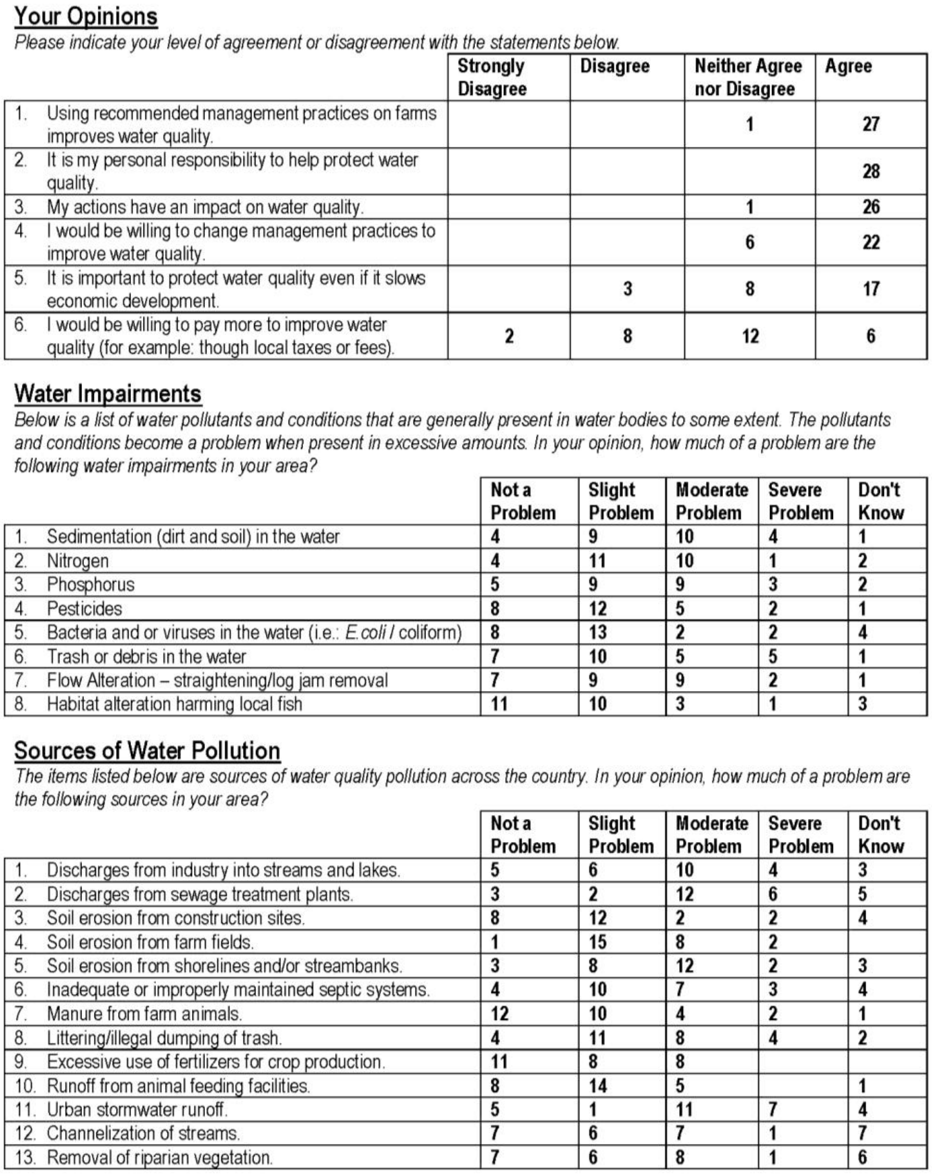
Overall, how would you rate the quality of water in the major streams or the Wabash River in your area?

	Poor	OK	Good	Don't know
1. For canoeing / kayaking / other boating	6	9	5	8
2. For picnicking and family activities	8	8	5	7
3. For fish habitat	5	11	6	6
4. For scenic beauty	6	12	5	5

ADDITIONAL COMMENTS: SOIL HEALTH – 2; GROWING CORN - 1

Your Water Resources

1. Of the above activities, which is the most important to you? **#1 boating = 6; #2 family = 4; #3 fish = 8; #4 beauty = 6; SOIL HEALTH = 2; CORN=1**
2. Do you know which watershed your rain water goes to when it runs off of your property? **22 YES 5 NO**



Your Opinions

Please indicate your level of agreement or disagreement with the statements below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree
1. Using recommended management practices on farms improves water quality.			1	27
2. It is my personal responsibility to help protect water quality.				28
3. My actions have an impact on water quality.			1	26
4. I would be willing to change management practices to improve water quality.			6	22
5. It is important to protect water quality even if it slows economic development.		3	8	17
6. I would be willing to pay more to improve water quality (for example: though local taxes or fees).	2	8	12	6

Water Impairments

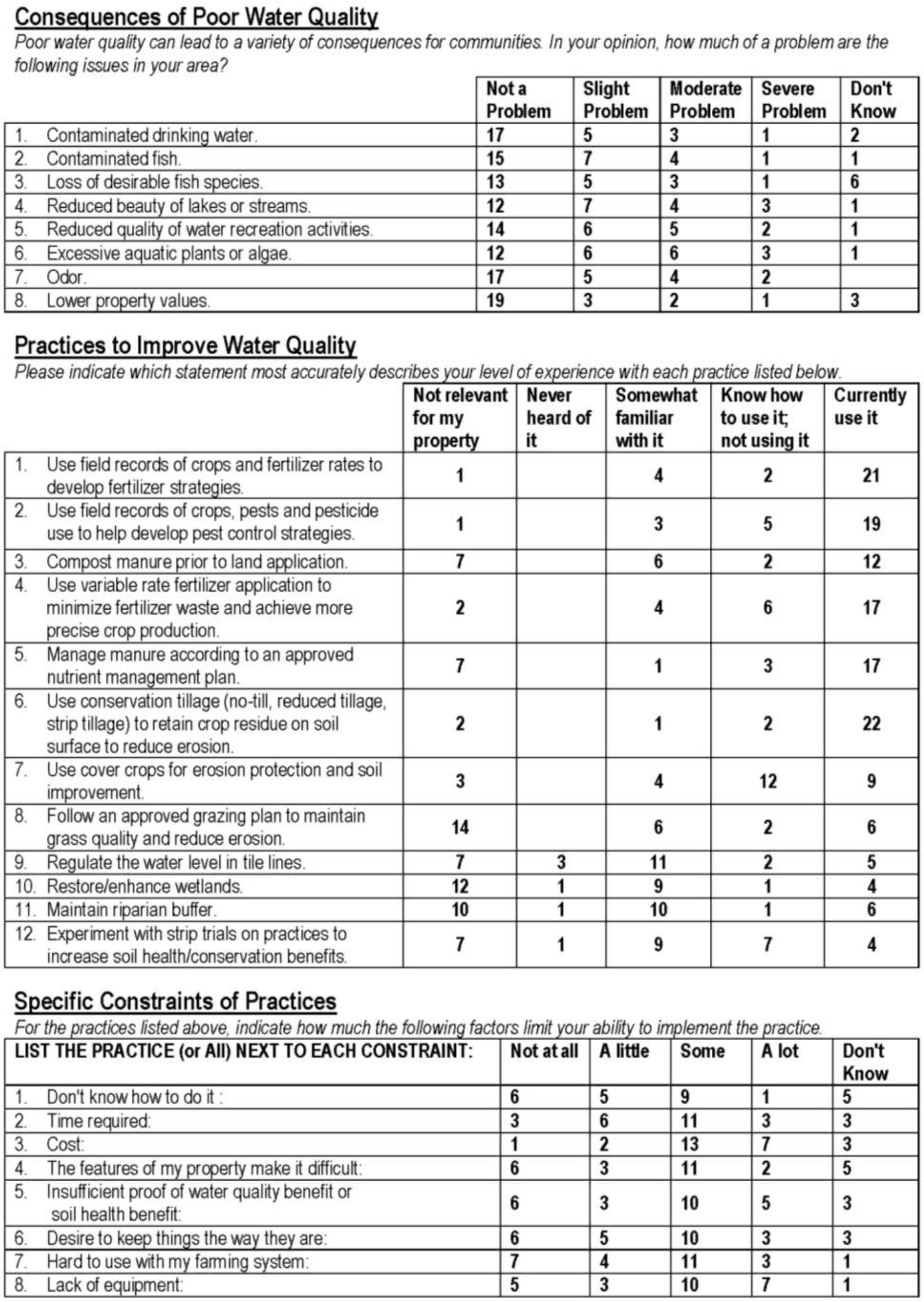
Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Sedimentation (dirt and soil) in the water	4	9	10	4	1
2. Nitrogen	4	11	10	1	2
3. Phosphorus	5	9	9	3	2
4. Pesticides	8	12	5	2	1
5. Bacteria and or viruses in the water (i.e.: *E.coli* / coliform)	8	13	2	2	4
6. Trash or debris in the water	7	10	5	5	1
7. Flow Alteration – straightening/log jam removal	7	9	9	2	1
8. Habitat alteration harming local fish	11	10	3	1	3

Sources of Water Pollution

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Discharges from industry into streams and lakes.	5	6	10	4	3
2. Discharges from sewage treatment plants.	3	2	12	6	5
3. Soil erosion from construction sites.	8	12	2	2	4
4. Soil erosion from farm fields.	1	15	8	2	
5. Soil erosion from shorelines and/or streambanks.	3	8	12	2	3
6. Inadequate or improperly maintained septic systems.	4	10	7	3	4
7. Manure from farm animals.	12	10	4	2	1
8. Littering/illegal dumping of trash.	4	11	8	4	2
9. Excessive use of fertilizers for crop production.	11	8	8		
10. Runoff from animal feeding facilities.	8	14	5		1
11. Urban stormwater runoff.	5	1	11	7	4
12. Channelization of streams.	7	6	7	1	7
13. Removal of riparian vegetation.	7	6	8	1	6



Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Contaminated drinking water.	17	5	3	1	2
2. Contaminated fish.	15	7	4	1	1
3. Loss of desirable fish species.	13	5	3	1	6
4. Reduced beauty of lakes or streams.	12	7	4	3	1
5. Reduced quality of water recreation activities.	14	6	5	2	1
6. Excessive aquatic plants or algae.	12	6	6	3	1
7. Odor.	17	5	4	2	
8. Lower property values.	19	3	2	1	3

Practices to Improve Water Quality

Please indicate which statement most accurately describes your level of experience with each practice listed below.

	Not relevant for my property	Never heard of it	Somewhat familiar with it	Know how to use it; not using it	Currently use it
1. Use field records of crops and fertilizer rates to develop fertilizer strategies.	1		4	2	21
2. Use field records of crops, pests and pesticide use to help develop pest control strategies.	1		3	5	19
3. Compost manure prior to land application.	7		6	2	12
4. Use variable rate fertilizer application to minimize fertilizer waste and achieve more precise crop production.	2		4	6	17
5. Manage manure according to an approved nutrient management plan.	7		1	3	17
6. Use conservation tillage (no-till, reduced tillage, strip tillage) to retain crop residue on soil surface to reduce erosion.	2		1	2	22
7. Use cover crops for erosion protection and soil improvement.	3		4	12	9
8. Follow an approved grazing plan to maintain grass quality and reduce erosion.	14		6	2	6
9. Regulate the water level in tile lines.	7	3	11	2	5
10. Restore/enhance wetlands.	12	1	9	1	4
11. Maintain riparian buffer.	10	1	10	1	6
12. Experiment with strip trials on practices to increase soil health/conservation benefits.	7	1	9	7	4

Specific Constraints of Practices

For the practices listed above, indicate how much the following factors limit your ability to implement the practice.

LIST THE PRACTICE (or All) NEXT TO EACH CONSTRAINT:	Not at all	A little	Some	A lot	Don't Know
1. Don't know how to do it :	6	5	9	1	5
2. Time required:	3	6	11	3	3
3. Cost:	1	2	13	7	3
4. The features of my property make it difficult:	6	3	11	2	5
5. Insufficient proof of water quality benefit or soil health benefit:	6	3	10	5	3
6. Desire to keep things the way they are:	6	5	10	3	3
7. Hard to use with my farming system:	7	4	11	3	1
8. Lack of equipment:	5	3	10	7	1

	Yes	Maybe	No
Are you willing to try any of the practices? (If yes or maybe, list practices) **Cover Crops = 5** **No-till = 1**	**13**	**11**	**2**

Making Decisions for my Property

In general, how much does each issue limit your ability to change your agricultural management practices?

	Not at all	A little	Some	A lot	Don't Know
1. Personal out-of-pocket expense	**3**	**5**	**11**	**10**	
2. Lack of government funds for cost share	**7**	**8**	**8**	**3**	**2**
3. Not having access to the equipment that I need	**6**	**4**	**13**	**3**	**2**
4. Lack of available information about a practice	**8**	**6**	**9**	**2**	**2**
5. No one else I know is implementing the practice	**8**	**5**	**9**	**4**	**2**
6. Concerns about reduced yields	**6**	**4**	**7**	**11**	
7. Approval of my neighbors	**15**	**5**	**3**	**5**	
8. Don't want to participate in government programs or the requirements or restrictions by participating in government programs.	**11**	**5**	**2**	**7**	**3**
9. Environmental damage caused by practice	**8**	**7**	**7**	**3**	**3**
10. I do not own the property	**17**	**3**	**3**	**4**	**1**
11. Not being able to see a demonstration of the practice before I decide	**9**	**6**	**6**	**5**	**2**

About Your Farm Operation

1. Please select the option that best describes who generally makes management decisions for your operation.
   - **13 Me alone or with my spouse**
   - **13 Me with my family partners (siblings, parents, children)**
   - **2 Me with the landowner**
   - ○ Me with my tenant
   - **1 Me and my business partners**
   - ○ Someone else makes the decision for the operation
   - ○ Other

2. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

<u>100 – 6300 ac - SEE ATTACHED INFORMATION</u>

3. How many years have you been farming? (Please enter years).

<u>5-50 yrs - SEE ATTACHED INFORMATION</u>

4. How many livestock are a part of your farming operation? If none, please enter a zero.

<u>0 – 120,000 animals - SEE ATTACHED INFORMATION</u>

5. Does the property you manage touch a stream, river, lake, or wetland?

20 Yes 7 No

6. Five years from now, which statement will best describe your farm operation?
   - **4 It will be about the same as it is today**
   - **12 It will be larger**
   - **1 It will be smaller**
   - **10 I don't know**

7. Do you have a nutrient management plan for your farm operation?
   - **23 Yes**
   - **4 No**

8. Who developed your current nutrient management plan?
   - **2 My Conservation District , Extension, or NRCS office**
   - **17 A private-sector agronomist or crop consultant**
   - **5 I created my own plan**
   - **1 I don't know**
   - ○ Other

About You

1. What is your gender?
   24 Male
   ○ Female

2. What is your age? **24 – 74 yrs – SEE ATTACHED INFORMATION**

3. What is the highest grade in school you have completed?
   11 High school diploma/GED
   3 Some college
   9 2 year college degree
   4 4 year college degree
   Post-graduate degree

Information Sources

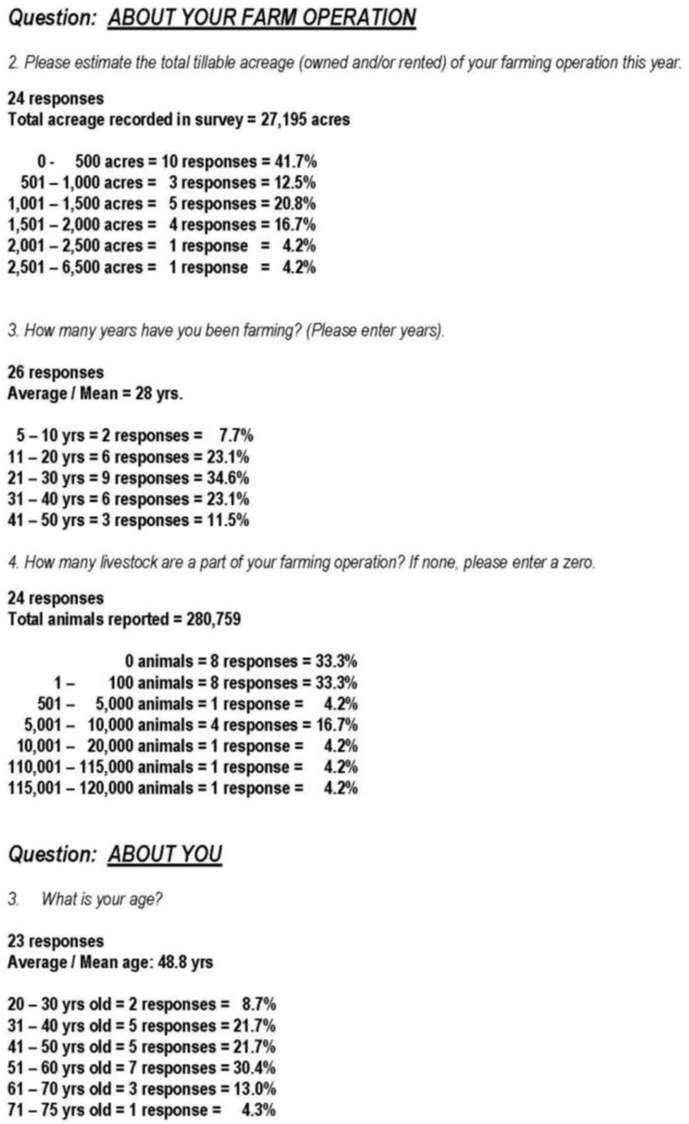
1. Where are you likely to seek information about soil and water conservation issues? (Check all that apply)
19 Newsletters / brochures / fact sheets
8 Internet
3 Radio
19 Workshops / field days / demonstrations / meetings
6 Conversations with others
9 Trade publications / magazines
1 None of the above

2. Do you regularly read the local news papers?
19 Yes
8 No

3. People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?

	Not at all	Slightly	Moderately	Very much	Not familiar
a. Soil and Water Conservation District (SWCD)		3	8	16	
b. Natural Resources Conservation Service (NRCS)	1	1	8	17	
c. University Extension	1	4	9	13	
d. State agricultural agency (i.e.: ISDA)	2	2	13	9	
e. Environmental groups	12	9	5	1	
f. Crop consultants	3	3	12	10	
g. Other landowners / friends	1	5	16	5	
h. State natural resources agency (i.e.: IDNR)	3	6	11	7	
i. County Departments (Health Dept., etc.)	6	5	8	7	1

Additional Comments about this survey or water resources in your community:



Question: ABOUT YOUR FARM OPERATION

2. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

24 responses
Total acreage recorded in survey = 27,195 acres

0 - 500 acres = 10 responses = 41.7%
501 – 1,000 acres = 3 responses = 12.5%
1,001 – 1,500 acres = 5 responses = 20.8%
1,501 – 2,000 acres = 4 responses = 16.7%
2,001 – 2,500 acres = 1 response = 4.2%
2,501 – 6,500 acres = 1 response = 4.2%

3. How many years have you been farming? (Please enter years).

26 responses
Average / Mean = 28 yrs.

5 – 10 yrs = 2 responses = 7.7%
11 – 20 yrs = 6 responses = 23.1%
21 – 30 yrs = 9 responses = 34.6%
31 – 40 yrs = 6 responses = 23.1%
41 – 50 yrs = 3 responses = 11.5%

4. How many livestock are a part of your farming operation? If none, please enter a zero.

24 responses
Total animals reported = 280,759

0 animals = 8 responses = 33.3%
1 – 100 animals = 8 responses = 33.3%
501 – 5,000 animals = 1 response = 4.2%
5,001 – 10,000 animals = 4 responses = 16.7%
10,001 – 20,000 animals = 1 response = 4.2%
110,001 – 115,000 animals = 1 response = 4.2%
115,001 – 120,000 animals = 1 response = 4.2%

Question: ABOUT YOU

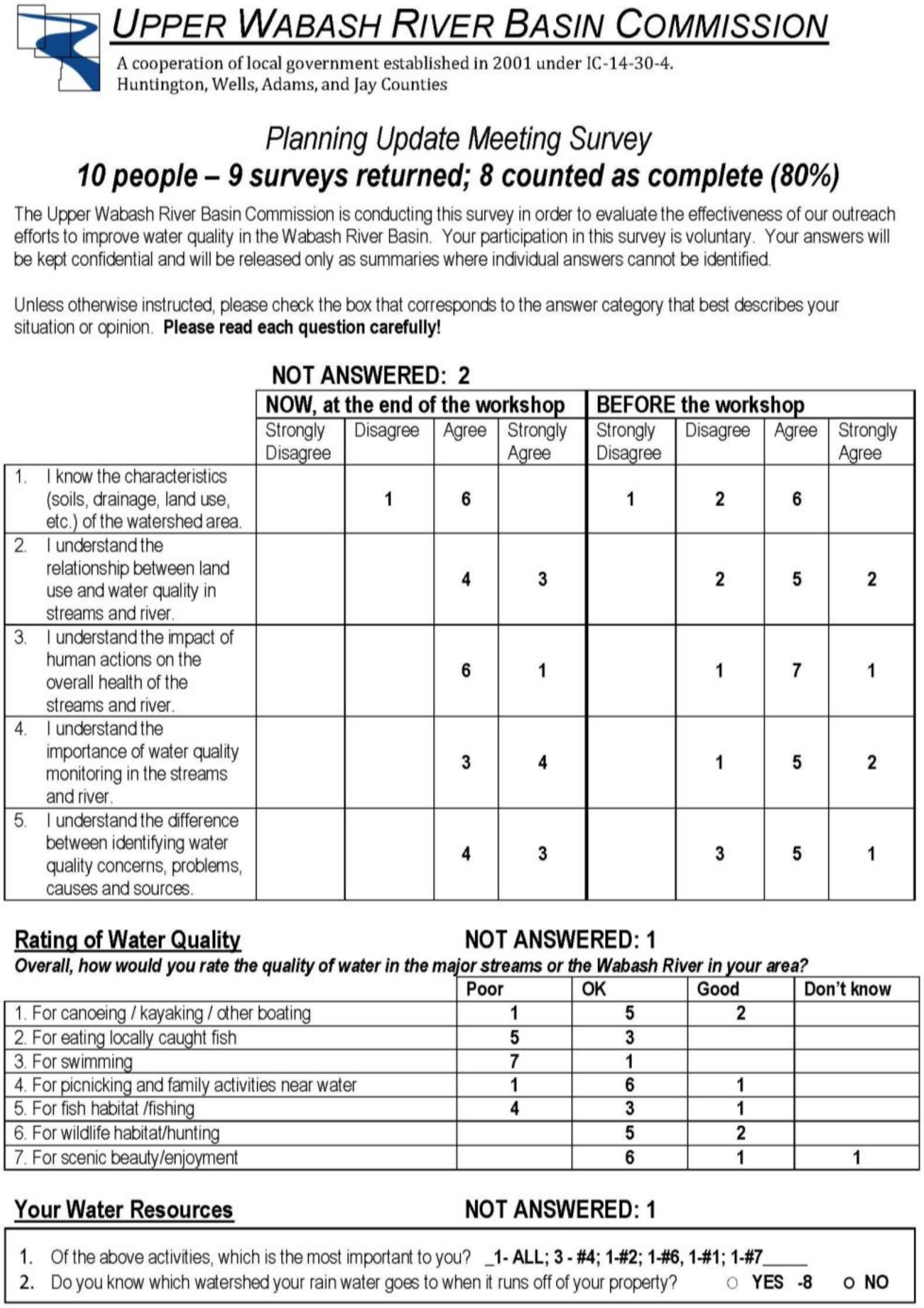
3. What is your age?

23 responses
Average / Mean age: 48.8 yrs

20 – 30 yrs old = 2 responses = 8.7%
31 – 40 yrs old = 5 responses = 21.7%
41 – 50 yrs old = 5 responses = 21.7%
51 – 60 yrs old = 7 responses = 30.4%
61 – 70 yrs old = 3 responses = 13.0%
71 – 75 yrs old = 1 response = 4.3%

3) Planning Update Meeting – March 19, 2014

The Planning Update Meeting survey was distributed to 10 participants. Nine surveys were returned, but only 8 counted in the scoring for a completion rate of 80%. The before and after survey questions highlighted watershed characteristics, relationship between land use and water quality, and human actions on the overall health of the streams and river; and resulted in a 45% increase in the strongly agree category. The SIDMA awareness mean value for types of pollution was 1.85; and awareness of sources of pollution was 1.69. The willingness to take action mean value was 1.94; which was the highest of all the survey results.



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Huntington, Wells, Adams, and Jay Counties

Planning Update Meeting Survey

10 people – 9 surveys returned; 8 counted as complete (80%)

The Upper Wabash River Basin Commission is conducting this survey in order to evaluate the effectiveness of our outreach efforts to improve water quality in the Wabash River Basin. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, please check the box that corresponds to the answer category that best describes your situation or opinion. **Please read each question carefully!**

NOT ANSWERED: 2

	NOW, at the end of the workshop				BEFORE the workshop			
	Strongly Disagree	Disagree	Agree	Strongly Agree	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I know the characteristics (soils, drainage, land use, etc.) of the watershed area.		1	6		1	2	6	
2. I understand the relationship between land use and water quality in streams and river.			4	3		2	5	2
3. I understand the impact of human actions on the overall health of the streams and river.			6	1		1	7	1
4. I understand the importance of water quality monitoring in the streams and river.			3	4		1	5	2
5. I understand the difference between identifying water quality concerns, problems, causes and sources.			4	3		3	5	1

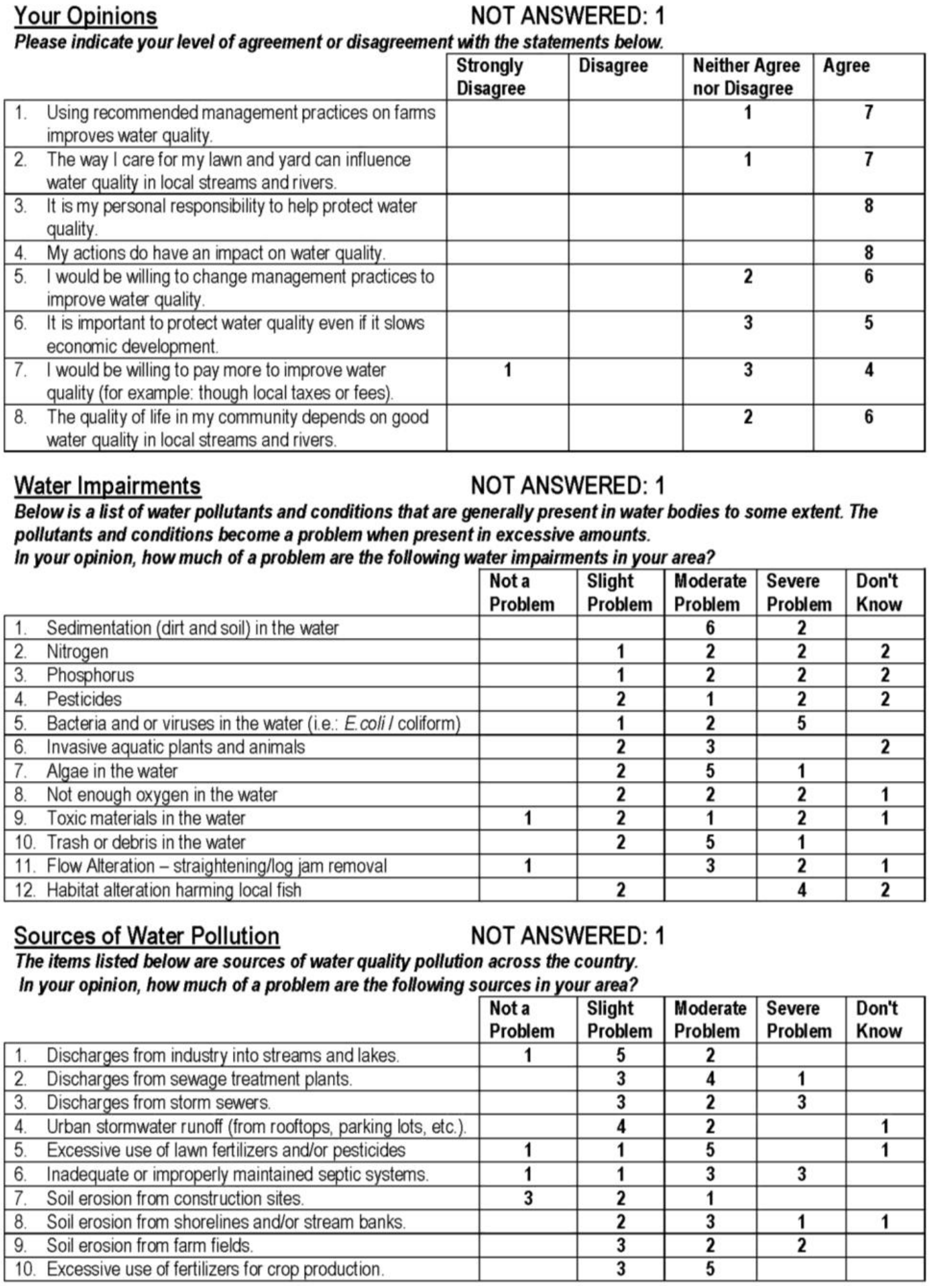
Rating of Water Quality **NOT ANSWERED: 1**

Overall, how would you rate the quality of water in the major streams or the Wabash River in your area?

	Poor	OK	Good	Don't know
1. For canoeing / kayaking / other boating	1	5	2	
2. For eating locally caught fish	5	3		
3. For swimming	7	1		
4. For picnicking and family activities near water	1	6	1	
5. For fish habitat /fishing	4	3	1	
6. For wildlife habitat/hunting		5	2	
7. For scenic beauty/enjoyment		6	1	1

Your Water Resources **NOT ANSWERED: 1**

1. Of the above activities, which is the most important to you? **_1- ALL; 3 - #4; 1-#2; 1-#6, 1-#1; 1-#7_____**
2. Do you know which watershed your rain water goes to when it runs off of your property? ○ **YES -8** ○ **NO**



Your Opinions

NOT ANSWERED: 1

Please indicate your level of agreement or disagreement with the statements below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree
1. Using recommended management practices on farms improves water quality.			1	7
2. The way I care for my lawn and yard can influence water quality in local streams and rivers.			1	7
3. It is my personal responsibility to help protect water quality.				8
4. My actions do have an impact on water quality.				8
5. I would be willing to change management practices to improve water quality.			2	6
6. It is important to protect water quality even if it slows economic development.			3	5
7. I would be willing to pay more to improve water quality (for example: though local taxes or fees).	1		3	4
8. The quality of life in my community depends on good water quality in local streams and rivers.			2	6

Water Impairments

NOT ANSWERED: 1

Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts.
In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Sedimentation (dirt and soil) in the water			6	2	
2. Nitrogen		1	2	2	2
3. Phosphorus		1	2	2	2
4. Pesticides		2	1	2	2
5. Bacteria and or viruses in the water (i.e.: *E.coli* / coliform)		1	2	5	
6. Invasive aquatic plants and animals		2	3		2
7. Algae in the water		2	5	1	
8. Not enough oxygen in the water		2	2	2	1
9. Toxic materials in the water	1	2	1	2	1
10. Trash or debris in the water		2	5	1	
11. Flow Alteration – straightening/log jam removal	1		3	2	1
12. Habitat alteration harming local fish		2		4	2

Sources of Water Pollution

NOT ANSWERED: 1

The items listed below are sources of water quality pollution across the country.
In your opinion, how much of a problem are the following sources in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Discharges from industry into streams and lakes.	1	5	2		
2. Discharges from sewage treatment plants.		3	4	1	
3. Discharges from storm sewers.		3	2	3	
4. Urban stormwater runoff (from rooftops, parking lots, etc.).		4	2		1
5. Excessive use of lawn fertilizers and/or pesticides	1	1	5		1
6. Inadequate or improperly maintained septic systems.	1	1	3	3	
7. Soil erosion from construction sites.	3	2	1		
8. Soil erosion from shorelines and/or stream banks.		2	3	1	1
9. Soil erosion from farm fields.		3	2	2	
10. Excessive use of fertilizers for crop production.		3	5		

11. Manure from farm animals.		2	5	1	
12. Runoff from animal feeding facilities.	2	1	4		1
13. Gravel mining (stone quarries)	3	3			2
14. Channelization of streams – flow regulation/modification	1	3	1		2
15. Removal of riparian vegetation.	1	2	3		2
16. Littering/illegal dumping of trash.		2	6		
17. Natural sources.	2	1	1	1	2

Consequences of Poor Water Quality

NOT ANSWERED: 1

Poor water quality can lead to a variety of consequences for communities.
In your opinion, how much of a problem are the following issues in your area?

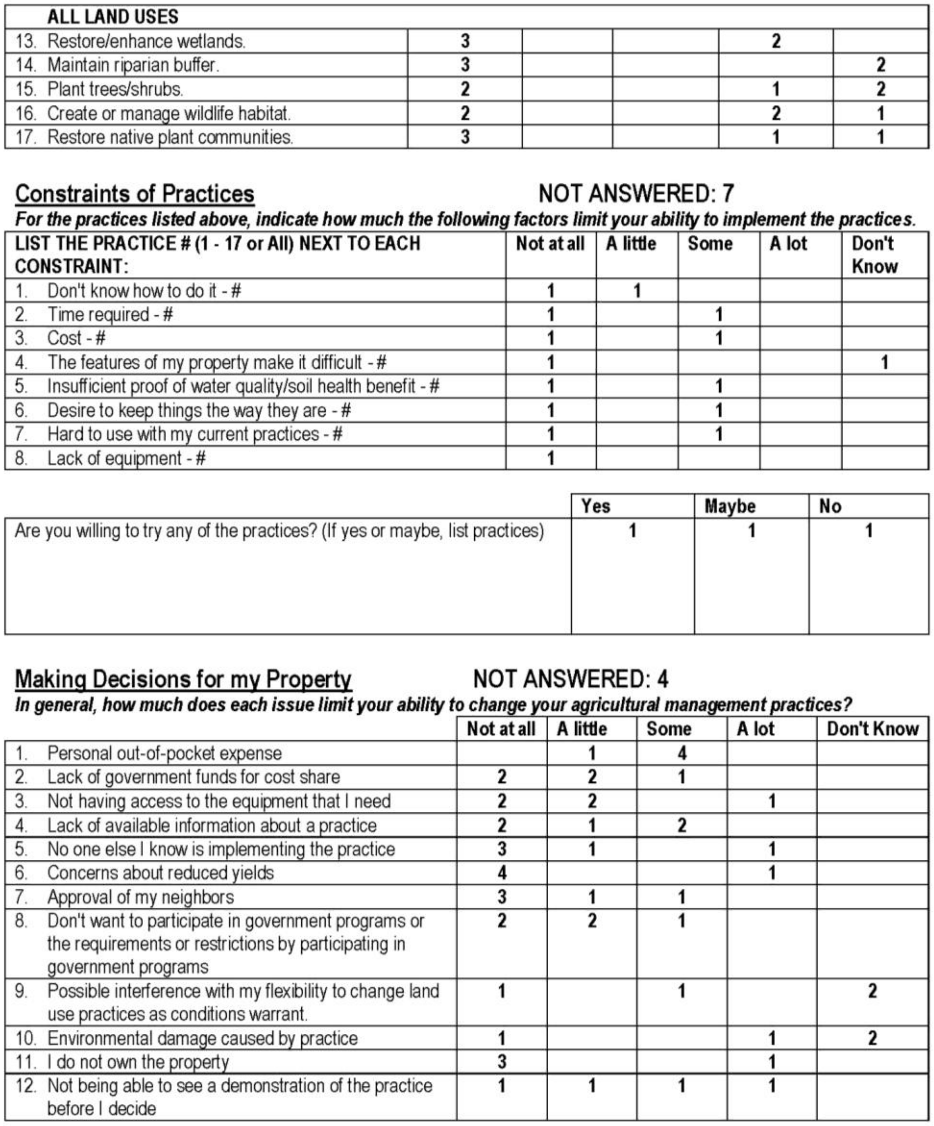
	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Contaminated drinking water.	5		2		1
2. Increase in water/sewage rates.	2	3	1	2	
3. Contaminated fish.	1	1	4		2
4. Loss of desirable fish species/fish kills.	2	2	1	2	1
5. Reduced beauty of lakes or streams.	1	2	4	1	
6. Reduced quality of water recreation activities.		2	5	1	
7. Excessive aquatic plants or algae.		2	3	2	1
8. Odor.	3	2	2		1
9. Lower property values.	3	1	2	1	1

Practices to Improve Water Quality

NOT ANSWERED: 2, AG & ALL USES NOT ANSWERED: 4

Please indicate which statement most accurately describes your level of experience with each practice listed.

	Not relevant for my property	Never heard of it	Somewhat familiar with it	Know how to use it; not using it	Currently use it
RESIDENTIAL /URBAN					
1. Apply fertilizers, pesticides and herbicides at manufacturer's guidelines for your lawn and garden.	2		2		3
2. Manage runoff from roofs, parking lots, etc.	1		2		4
3. Use rain barrels, create a rain garden.	1	2	1	2	2
4. Maintenance on home septic system.	4				3
5. Properly dispose of residential waste (chemicals, batteries, oil, pet waste, etc.)				1	6
AGRICULTURAL / RURAL					
6. Follow a comprehensive nutrient management plan for fertilizer and manure applications.	2		2		1
7. Use field records of crops, pests and pesticide use to help develop pest control strategies.	2		2		1
8. Use variable rate fertilizer application.	2	1	1	2	
9. Use conservation tillage (no-till, reduced tillage, strip tillage) to retain crop residue on soil surface to reduce erosion.	3		1		1
10. Use cover crops for erosion protection and soil improvement.	3		1		1
11. Follow an approved grazing plan to maintain grass quality and reduce erosion.	3		1		1
12. Experiment with strip trials on practices to increase soil health/conservation benefits.	3		1	1	



ALL LAND USES					
13. Restore/enhance wetlands.	3			2	
14. Maintain riparian buffer.	3				2
15. Plant trees/shrubs.	2			1	2
16. Create or manage wildlife habitat.	2			2	1
17. Restore native plant communities.	3			1	1

Constraints of Practices NOT ANSWERED: 7

For the practices listed above, indicate how much the following factors limit your ability to implement the practices.

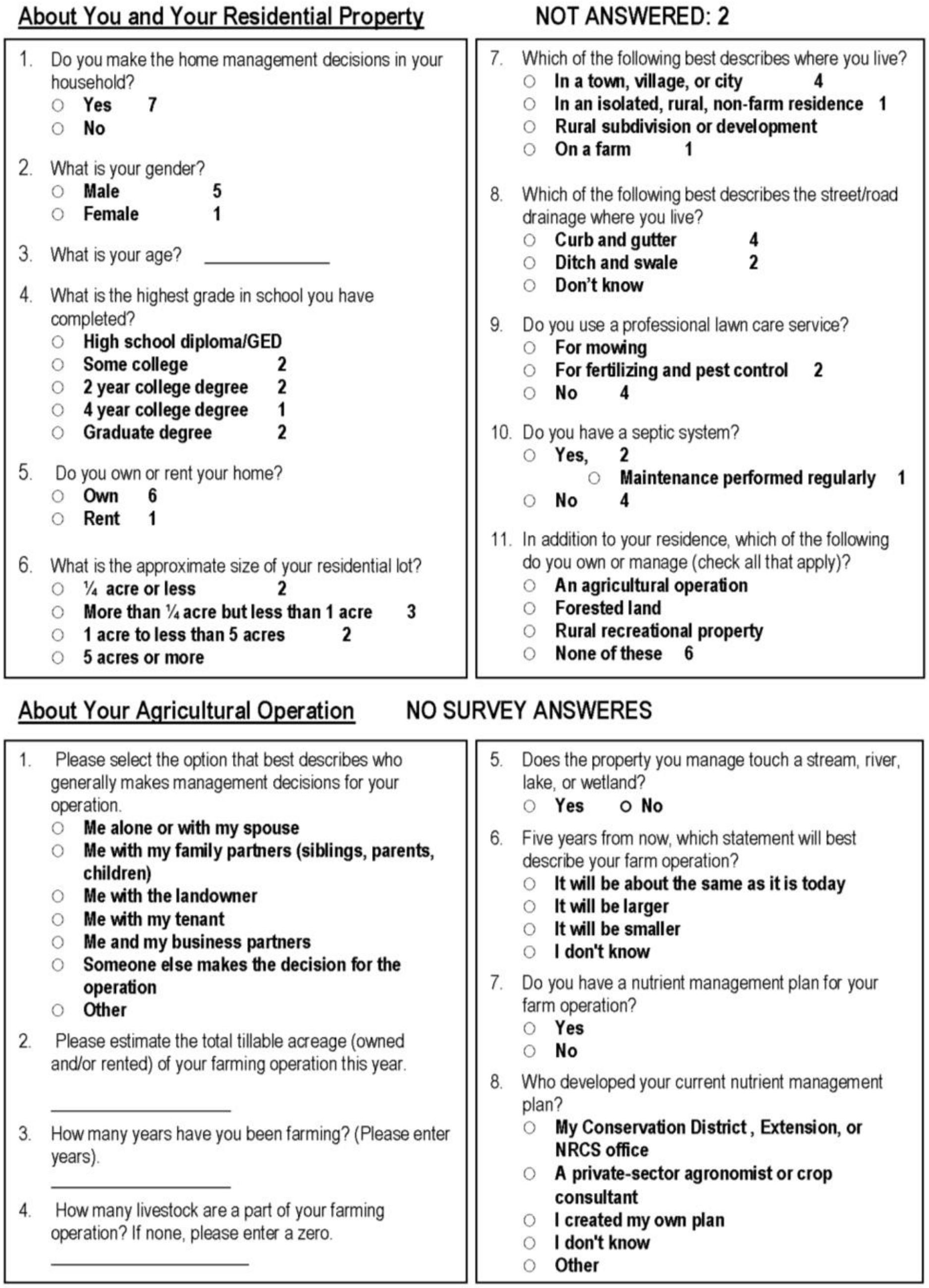
LIST THE PRACTICE # (1 - 17 or All) NEXT TO EACH CONSTRAINT:	Not at all	A little	Some	A lot	Don't Know
1. Don't know how to do it - #	1	1			
2. Time required - #	1		1		
3. Cost - #	1		1		
4. The features of my property make it difficult - #	1				1
5. Insufficient proof of water quality/soil health benefit - #	1		1		
6. Desire to keep things the way they are - #	1		1		
7. Hard to use with my current practices - #	1		1		
8. Lack of equipment - #	1				

	Yes	Maybe	No
Are you willing to try any of the practices? (If yes or maybe, list practices)	1	1	1

Making Decisions for my Property NOT ANSWERED: 4

In general, how much does each issue limit your ability to change your agricultural management practices?

	Not at all	A little	Some	A lot	Don't Know
1. Personal out-of-pocket expense		1	4		
2. Lack of government funds for cost share	2	2	1		
3. Not having access to the equipment that I need	2	2		1	
4. Lack of available information about a practice	2	1	2		
5. No one else I know is implementing the practice	3	1		1	
6. Concerns about reduced yields	4			1	
7. Approval of my neighbors	3	1	1		
8. Don't want to participate in government programs or the requirements or restrictions by participating in government programs	2	2	1		
9. Possible interference with my flexibility to change land use practices as conditions warrant.	1		1		2
10. Environmental damage caused by practice	1			1	2
11. I do not own the property	3			1	
12. Not being able to see a demonstration of the practice before I decide	1	1	1	1	



About You and Your Residential Property

NOT ANSWERED: 2

1. Do you make the home management decisions in your household?
   - ○ **Yes** 7
   - ○ **No**
2. What is your gender?
   - ○ **Male** 5
   - ○ **Female** 1
3. What is your age? ______________
4. What is the highest grade in school you have completed?
   - ○ **High school diploma/GED**
   - ○ **Some college** 2
   - ○ **2 year college degree** 2
   - ○ **4 year college degree** 1
   - ○ **Graduate degree** 2
5. Do you own or rent your home?
   - ○ **Own** 6
   - ○ **Rent** 1
6. What is the approximate size of your residential lot?
   - ○ **¼ acre or less** 2
   - ○ **More than ¼ acre but less than 1 acre** 3
   - ○ **1 acre to less than 5 acres** 2
   - ○ **5 acres or more**
7. Which of the following best describes where you live?
   - ○ **In a town, village, or city** 4
   - ○ **In an isolated, rural, non-farm residence** 1
   - ○ **Rural subdivision or development**
   - ○ **On a farm** 1
8. Which of the following best describes the street/road drainage where you live?
   - ○ **Curb and gutter** 4
   - ○ **Ditch and swale** 2
   - ○ **Don't know**
9. Do you use a professional lawn care service?
   - ○ **For mowing**
   - ○ **For fertilizing and pest control** 2
   - ○ **No** 4
10. Do you have a septic system?
    - ○ **Yes,** 2
      - ○ **Maintenance performed regularly** 1
    - ○ **No** 4
11. In addition to your residence, which of the following do you own or manage (check all that apply)?
    - ○ **An agricultural operation**
    - ○ **Forested land**
    - ○ **Rural recreational property**
    - ○ **None of these** 6

About Your Agricultural Operation

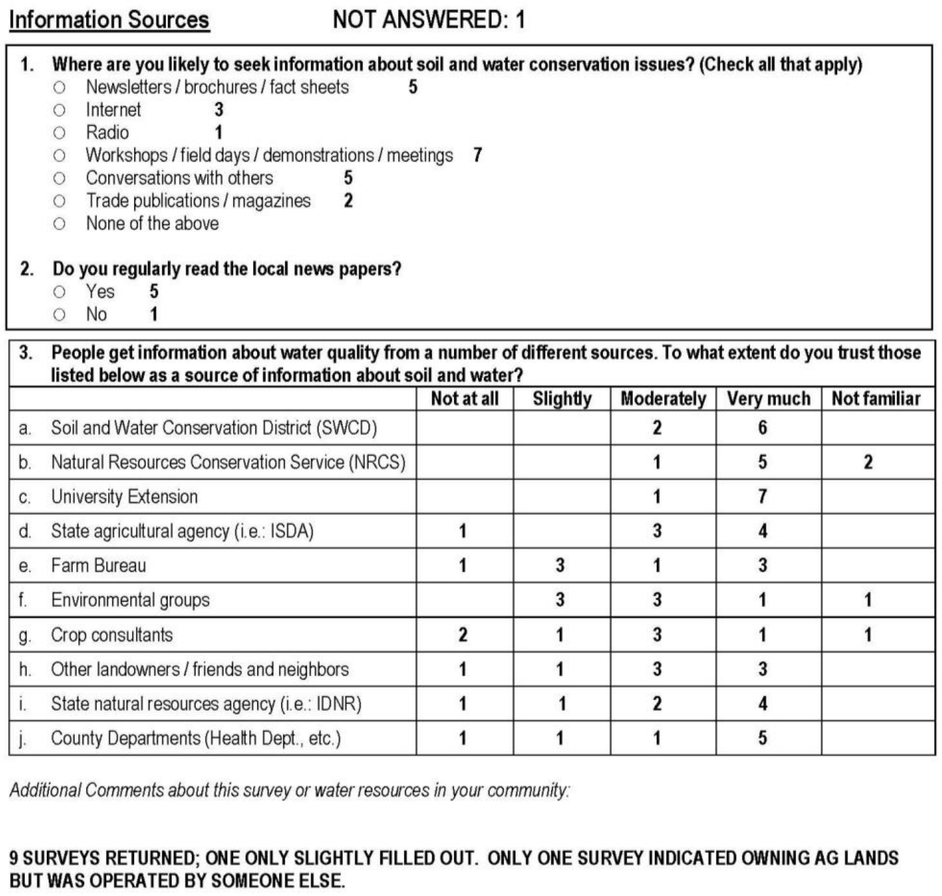
NO SURVEY ANSWERES

1. Please select the option that best describes who generally makes management decisions for your operation.
   - ○ **Me alone or with my spouse**
   - ○ **Me with my family partners (siblings, parents, children)**
   - ○ **Me with the landowner**
   - ○ **Me with my tenant**
   - ○ **Me and my business partners**
   - ○ **Someone else makes the decision for the operation**
   - ○ **Other**
2. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

   ____
3. How many years have you been farming? (Please enter years).

   ____
4. How many livestock are a part of your farming operation? If none, please enter a zero.

   ____
5. Does the property you manage touch a stream, river, lake, or wetland?
   - ○ **Yes** ○ **No**
6. Five years from now, which statement will best describe your farm operation?
   - ○ **It will be about the same as it is today**
   - ○ **It will be larger**
   - ○ **It will be smaller**
   - ○ **I don't know**
7. Do you have a nutrient management plan for your farm operation?
   - ○ **Yes**
   - ○ **No**
8. Who developed your current nutrient management plan?
   - ○ **My Conservation District , Extension, or NRCS office**
   - ○ **A private-sector agronomist or crop consultant**
   - ○ **I created my own plan**
   - ○ **I don't know**
   - ○ **Other**



Information Sources **NOT ANSWERED: 1**

1. **Where are you likely to seek information about soil and water conservation issues? (Check all that apply)**
   - ○ Newsletters / brochures / fact sheets **5**
   - ○ Internet **3**
   - ○ Radio **1**
   - ○ Workshops / field days / demonstrations / meetings **7**
   - ○ Conversations with others **5**
   - ○ Trade publications / magazines **2**
   - ○ None of the above

2. **Do you regularly read the local news papers?**
   - ○ Yes **5**
   - ○ No **1**

3. **People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?**

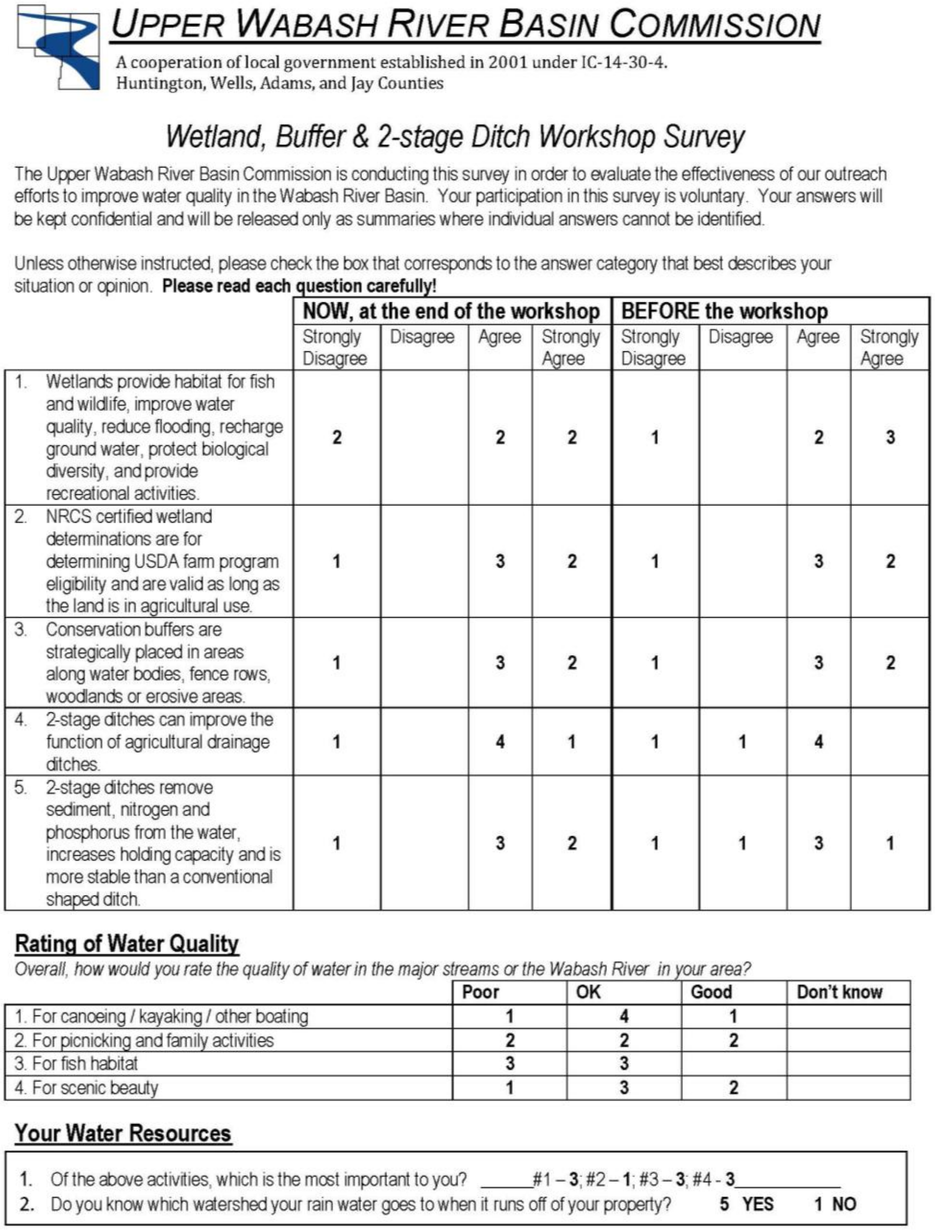
	Not at all	Slightly	Moderately	Very much	Not familiar
a. Soil and Water Conservation District (SWCD)			2	6	
b. Natural Resources Conservation Service (NRCS)			1	5	2
c. University Extension			1	7	
d. State agricultural agency (i.e.: ISDA)	1		3	4	
e. Farm Bureau	1	3	1	3	
f. Environmental groups		3	3	1	1
g. Crop consultants	2	1	3	1	1
h. Other landowners / friends and neighbors	1	1	3	3	
i. State natural resources agency (i.e.: IDNR)	1	1	2	4	
j. County Departments (Health Dept., etc.)	1	1	1	5	

Additional Comments about this survey or water resources in your community:

9 SURVEYS RETURNED; ONE ONLY SLIGHTLY FILLED OUT. ONLY ONE SURVEY INDICATED OWNING AG LANDS BUT WAS OPERATED BY SOMEONE ELSE.

4) Wetland, Buffer and 2-Stage Ditch Field Day – June 26, 2014

The Wetland, Buffer and 2-Stage Ditch Field Day survey was distributed to 13 participants, and had the lowest rate of return with only 6 surveys being completed (46%); however, that may be due to the low attendance rate from the general public. The before and after survey questions resulted in only a difference of 11%; or in other words, one participant's answer. The SIDMA awareness of types of pollution generated a mean factor of 1.95; and awareness of sources was 1.79. The willingness to take action indicator mean value was 1.43; the lowest value of all the surveys.



UPPER WABASH RIVER BASIN COMMISSION

A cooperation of local government established in 2001 under IC-14-30-4.
Huntington, Wells, Adams, and Jay Counties

Wetland, Buffer & 2-stage Ditch Workshop Survey

The Upper Wabash River Basin Commission is conducting this survey in order to evaluate the effectiveness of our outreach efforts to improve water quality in the Wabash River Basin. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, please check the box that corresponds to the answer category that best describes your situation or opinion. **Please read each question carefully!**

	NOW, at the end of the workshop				**BEFORE the workshop**			
	Strongly Disagree	Disagree	Agree	Strongly Agree	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Wetlands provide habitat for fish and wildlife, improve water quality, reduce flooding, recharge ground water, protect biological diversity, and provide recreational activities.	**2**		**2**	**2**	**1**		**2**	**3**
2. NRCS certified wetland determinations are for determining USDA farm program eligibility and are valid as long as the land is in agricultural use.	**1**		**3**	**2**	**1**		**3**	**2**
3. Conservation buffers are strategically placed in areas along water bodies, fence rows, woodlands or erosive areas.	**1**		**3**	**2**	**1**		**3**	**2**
4. 2-stage ditches can improve the function of agricultural drainage ditches.	**1**		**4**	**1**	**1**	**1**	**4**	
5. 2-stage ditches remove sediment, nitrogen and phosphorus from the water, increases holding capacity and is more stable than a conventional shaped ditch.	**1**		**3**	**2**	**1**	**1**	**3**	**1**

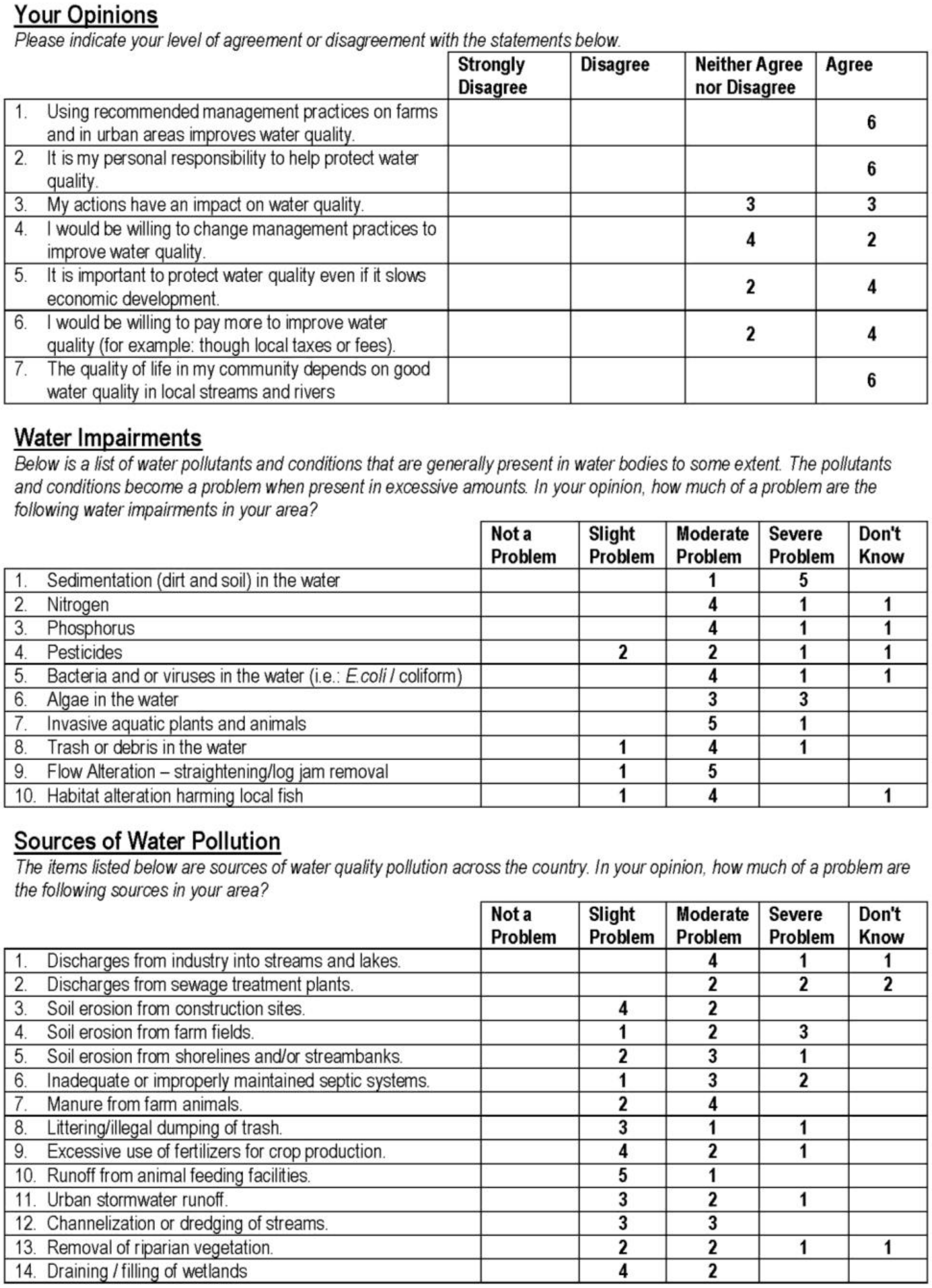
Rating of Water Quality

Overall, how would you rate the quality of water in the major streams or the Wabash River in your area?

	Poor	OK	Good	Don't know
1. For canoeing / kayaking / other boating	**1**	**4**	**1**	
2. For picnicking and family activities	**2**	**2**	**2**	
3. For fish habitat	**3**	**3**		
4. For scenic beauty	**1**	**3**	**2**	

Your Water Resources

1. Of the above activities, which is the most important to you? ______#1 – **3**; #2 – **1**; #3 – **3**; #4 - **3**___________
2. Do you know which watershed your rain water goes to when it runs off of your property? **5 YES** **1 NO**



Your Opinions

Please indicate your level of agreement or disagreement with the statements below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree
1. Using recommended management practices on farms and in urban areas improves water quality.				6
2. It is my personal responsibility to help protect water quality.				6
3. My actions have an impact on water quality.			3	3
4. I would be willing to change management practices to improve water quality.			4	2
5. It is important to protect water quality even if it slows economic development.			2	4
6. I would be willing to pay more to improve water quality (for example: though local taxes or fees).			2	4
7. The quality of life in my community depends on good water quality in local streams and rivers				6

Water Impairments

Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Sedimentation (dirt and soil) in the water			1	5	
2. Nitrogen			4	1	1
3. Phosphorus			4	1	1
4. Pesticides		2	2	1	1
5. Bacteria and or viruses in the water (i.e.: *E.coli* / coliform)			4	1	1
6. Algae in the water			3	3	
7. Invasive aquatic plants and animals			5	1	
8. Trash or debris in the water		1	4	1	
9. Flow Alteration – straightening/log jam removal		1	5		
10. Habitat alteration harming local fish		1	4		1

Sources of Water Pollution

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Discharges from industry into streams and lakes.			4	1	1
2. Discharges from sewage treatment plants.			2	2	2
3. Soil erosion from construction sites.		4	2		
4. Soil erosion from farm fields.		1	2	3	
5. Soil erosion from shorelines and/or streambanks.		2	3	1	
6. Inadequate or improperly maintained septic systems.		1	3	2	
7. Manure from farm animals.		2	4		
8. Littering/illegal dumping of trash.		3	1	1	
9. Excessive use of fertilizers for crop production.		4	2	1	
10. Runoff from animal feeding facilities.		5	1		
11. Urban stormwater runoff.		3	2	1	
12. Channelization or dredging of streams.		3	3		
13. Removal of riparian vegetation.		2	2	1	1
14. Draining / filling of wetlands		4	2		

Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Contaminated drinking water.	**2**	**2**	**1**	**1**	
2. Contaminated fish.		**3**		**1**	**2**
3. Loss of desirable fish species.		**2**	**2**	**1**	**1**
4. Reduced beauty of lakes or streams.		**1**	**2**	**3**	
5. Reduced quality of water recreation activities.		**3**	**1**	**2**	
6. Excessive aquatic plants or algae.		**2**	**2**	**2**	
7. Odor.	**1**	**3**	**2**		
8. Lower property values.	**2**	**2**	**2**		

Practices to Improve Water Quality

Please indicate which statement most accurately describes your level of experience with each practice listed below.

	Not relevant for my property	Never heard of it	Somewhat familiar with it	Know how to use it; not using it	Currently use it
1. Use conservation tillage (no-till, reduced tillage, strip tillage) to retain crop residue on soil surface to reduce erosion.	**4**				**1**
2. Follow a comprehensive nutrient management plan that includes soil testing, manure nutrient values, legumes in rotation, etc.	**4**		**1**		
3. Use field records of crops, pests and pesticide use to help develop pest control strategies.	**4**			**1**	
4. Use variable rate application technology for more precise crop production.	**4**			**1**	
5. Use cover crops on cropland or establish permanent vegetation on retired agricultural land to reduce soil erosion and improve soil health.	**4**			**1**	
6. Use filter strips and field borders to reduce the amount of sediments and nutrients entering a stream or river.	**4**				**1**
7. Maintain herbaceous and forested riparian buffer areas.	**4**				
8. Establish vegetation to stabilize and protect stream banks.	**4**				**1**
9. Create wetlands or restore native plant communities to enhance wetlands.	**4**		**1**		
10. Construct 2-stage ditches to stabilize ditch channels, reduce sediment movement, and increase nutrient removal from the stream.	**4**			**1**	

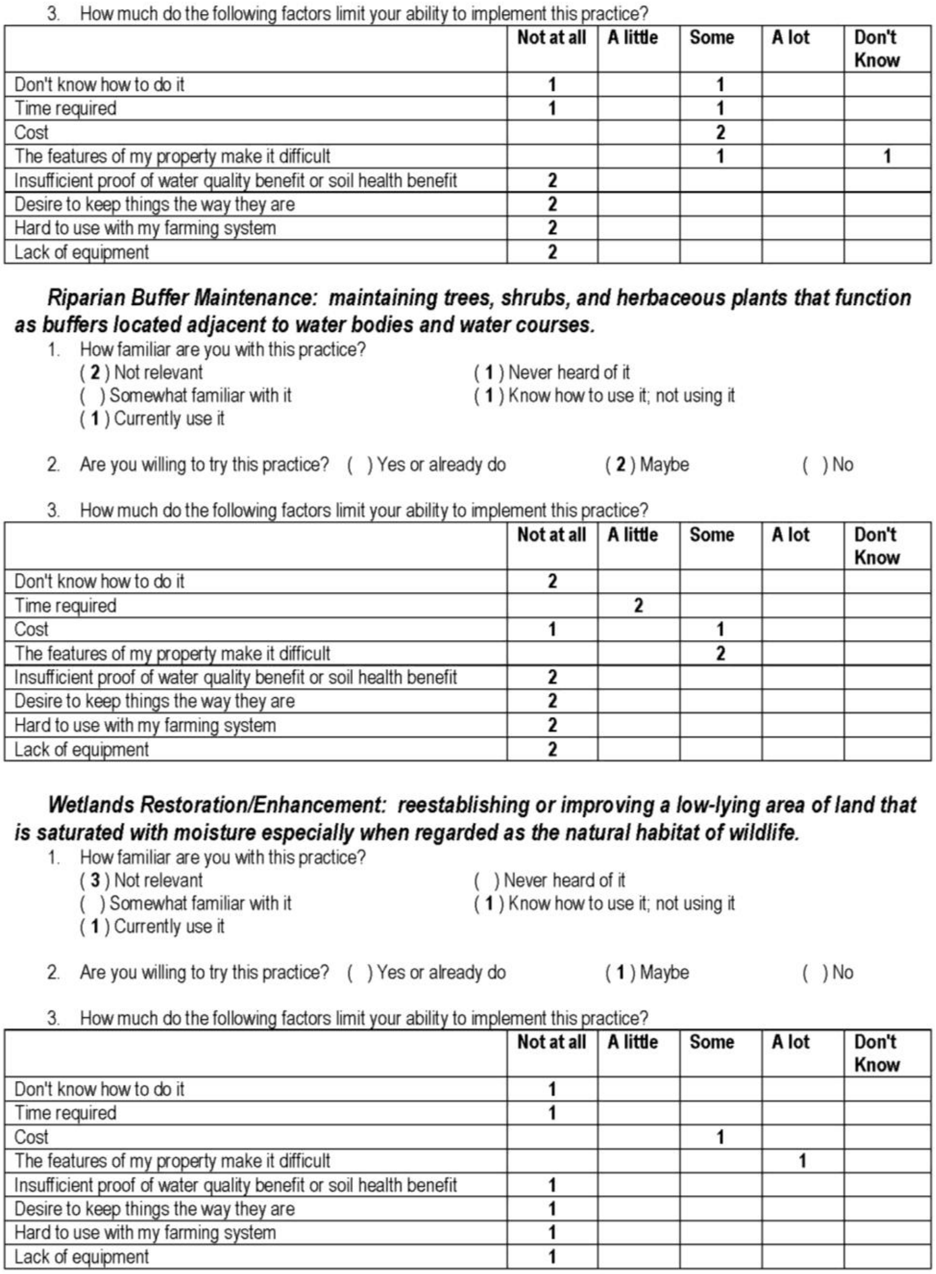
Specific Constraints of Practices

For the practices listed indicate how much the following factors limit your ability to implement the practice.

Riparian Vegetation: establishing and maintaining vegetative cover in riparian areas.

1. How familiar are you with this practice?
   (**2**) Not relevant
   ( ) Never heard of it
   (**1**) Somewhat familiar with it
   (**1**) Know how to use it; not using it
   (**1**) Currently use it

2. Are you willing to try this practice? ( ) Yes or already do (**2**) Maybe ( ) No



3. How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't Know
Don't know how to do it	**1**		**1**		
Time required	**1**		**1**		
Cost			**2**		
The features of my property make it difficult			**1**		**1**
Insufficient proof of water quality benefit or soil health benefit	**2**				
Desire to keep things the way they are	**2**				
Hard to use with my farming system	**2**				
Lack of equipment	**2**				

Riparian Buffer Maintenance: maintaining trees, shrubs, and herbaceous plants that function as buffers located adjacent to water bodies and water courses.

1. How familiar are you with this practice?
(**2**) Not relevant (**1**) Never heard of it
( ) Somewhat familiar with it (**1**) Know how to use it; not using it
(**1**) Currently use it

2. Are you willing to try this practice? ( ) Yes or already do (**2**) Maybe ( ) No

3. How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't Know
Don't know how to do it	**2**				
Time required		**2**			
Cost	**1**		**1**		
The features of my property make it difficult			**2**		
Insufficient proof of water quality benefit or soil health benefit	**2**				
Desire to keep things the way they are	**2**				
Hard to use with my farming system	**2**				
Lack of equipment	**2**				

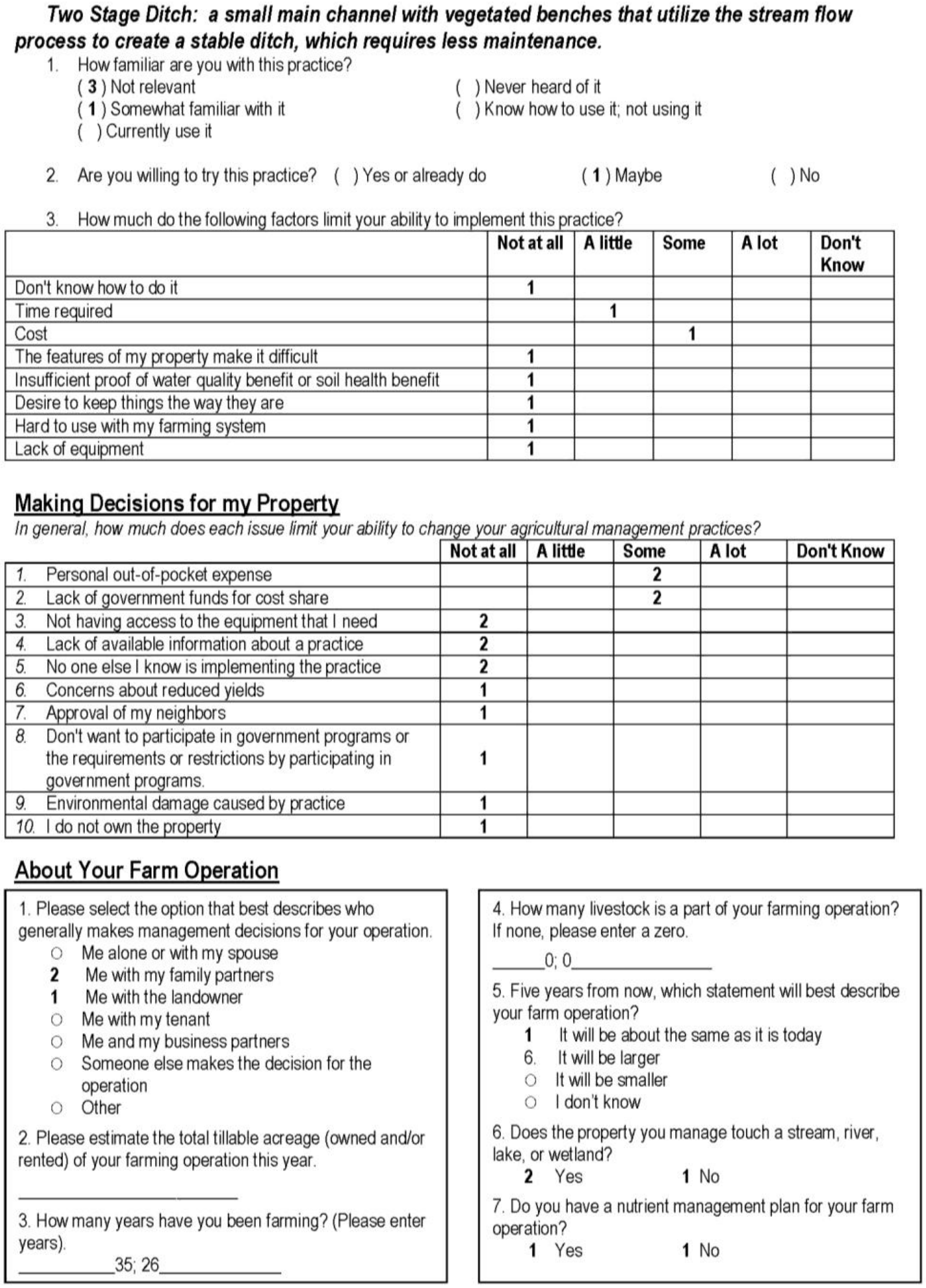
Wetlands Restoration/Enhancement: reestablishing or improving a low-lying area of land that is saturated with moisture especially when regarded as the natural habitat of wildlife.

1. How familiar are you with this practice?
(**3**) Not relevant ( ) Never heard of it
( ) Somewhat familiar with it (**1**) Know how to use it; not using it
(**1**) Currently use it

2. Are you willing to try this practice? ( ) Yes or already do (**1**) Maybe ( ) No

3. How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't Know
Don't know how to do it	**1**				
Time required	**1**				
Cost			**1**		
The features of my property make it difficult				**1**	
Insufficient proof of water quality benefit or soil health benefit	**1**				
Desire to keep things the way they are	**1**				
Hard to use with my farming system	**1**				
Lack of equipment	**1**				



Two Stage Ditch: a small main channel with vegetated benches that utilize the stream flow process to create a stable ditch, which requires less maintenance.

1. How familiar are you with this practice?
   (**3**) Not relevant
   (**1**) Somewhat familiar with it
   ( ) Currently use it
   ( ) Never heard of it
   ( ) Know how to use it; not using it

2. Are you willing to try this practice? ( ) Yes or already do (**1**) Maybe ( ) No

3. How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't Know
Don't know how to do it	1				
Time required		1			
Cost			1		
The features of my property make it difficult	1				
Insufficient proof of water quality benefit or soil health benefit	1				
Desire to keep things the way they are	1				
Hard to use with my farming system	1				
Lack of equipment	1				

Making Decisions for my Property

In general, how much does each issue limit your ability to change your agricultural management practices?

	Not at all	A little	Some	A lot	Don't Know
1. Personal out-of-pocket expense			2		
2. Lack of government funds for cost share			2		
3. Not having access to the equipment that I need	2				
4. Lack of available information about a practice	2				
5. No one else I know is implementing the practice	2				
6. Concerns about reduced yields	1				
7. Approval of my neighbors	1				
8. Don't want to participate in government programs or the requirements or restrictions by participating in government programs.	1				
9. Environmental damage caused by practice	1				
10. I do not own the property	1				

About Your Farm Operation

1. Please select the option that best describes who generally makes management decisions for your operation.
   ○ Me alone or with my spouse
   2 Me with my family partners
   1 Me with the landowner
   ○ Me with my tenant
   ○ Me and my business partners
   ○ Someone else makes the decision for the operation
   ○ Other

2. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

____

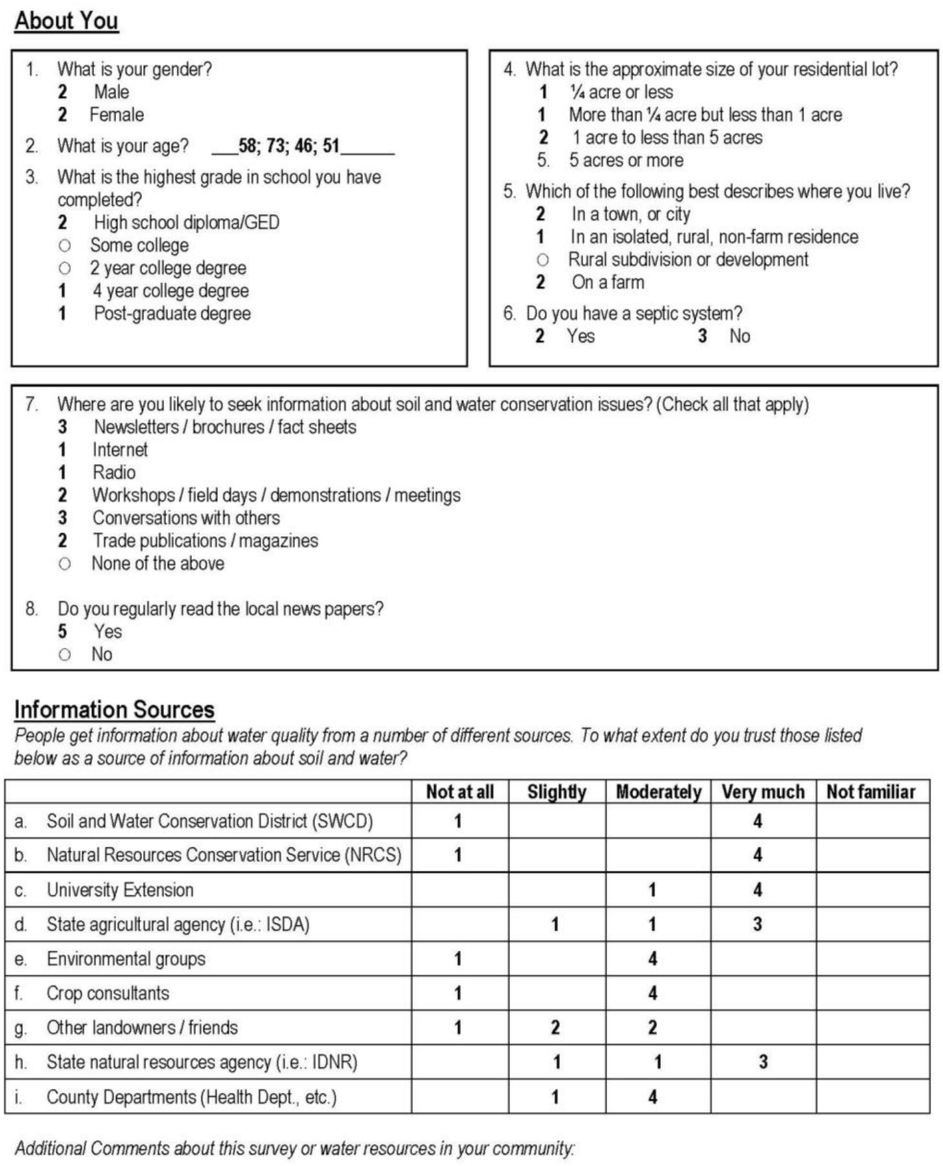
3. How many years have you been farming? (Please enter years).
___________35; 26______________

4. How many livestock is a part of your farming operation? If none, please enter a zero.
______0; 0________________

5. Five years from now, which statement will best describe your farm operation?
   1 It will be about the same as it is today
   6. It will be larger
   ○ It will be smaller
   ○ I don't know

6. Does the property you manage touch a stream, river, lake, or wetland?
   2 Yes **1** No

7. Do you have a nutrient management plan for your farm operation?
   1 Yes **1** No



About You

1. What is your gender?
   - **2** Male
   - **2** Female
2. What is your age? ___**58; 73; 46; 51**______
3. What is the highest grade in school you have completed?
   - **2** High school diploma/GED
   - ○ Some college
   - ○ 2 year college degree
   - **1** 4 year college degree
   - **1** Post-graduate degree

4. What is the approximate size of your residential lot?
   - **1** ¼ acre or less
   - **1** More than ¼ acre but less than 1 acre
   - **2** 1 acre to less than 5 acres
   - 5. 5 acres or more
5. Which of the following best describes where you live?
   - **2** In a town, or city
   - **1** In an isolated, rural, non-farm residence
   - ○ Rural subdivision or development
   - **2** On a farm
6. Do you have a septic system?
   2 Yes **3** No

7. Where are you likely to seek information about soil and water conservation issues? (Check all that apply)
   - **3** Newsletters / brochures / fact sheets
   - **1** Internet
   - **1** Radio
   - **2** Workshops / field days / demonstrations / meetings
   - **3** Conversations with others
   - **2** Trade publications / magazines
   - ○ None of the above
8. Do you regularly read the local news papers?
   - **5** Yes
   - ○ No

Information Sources

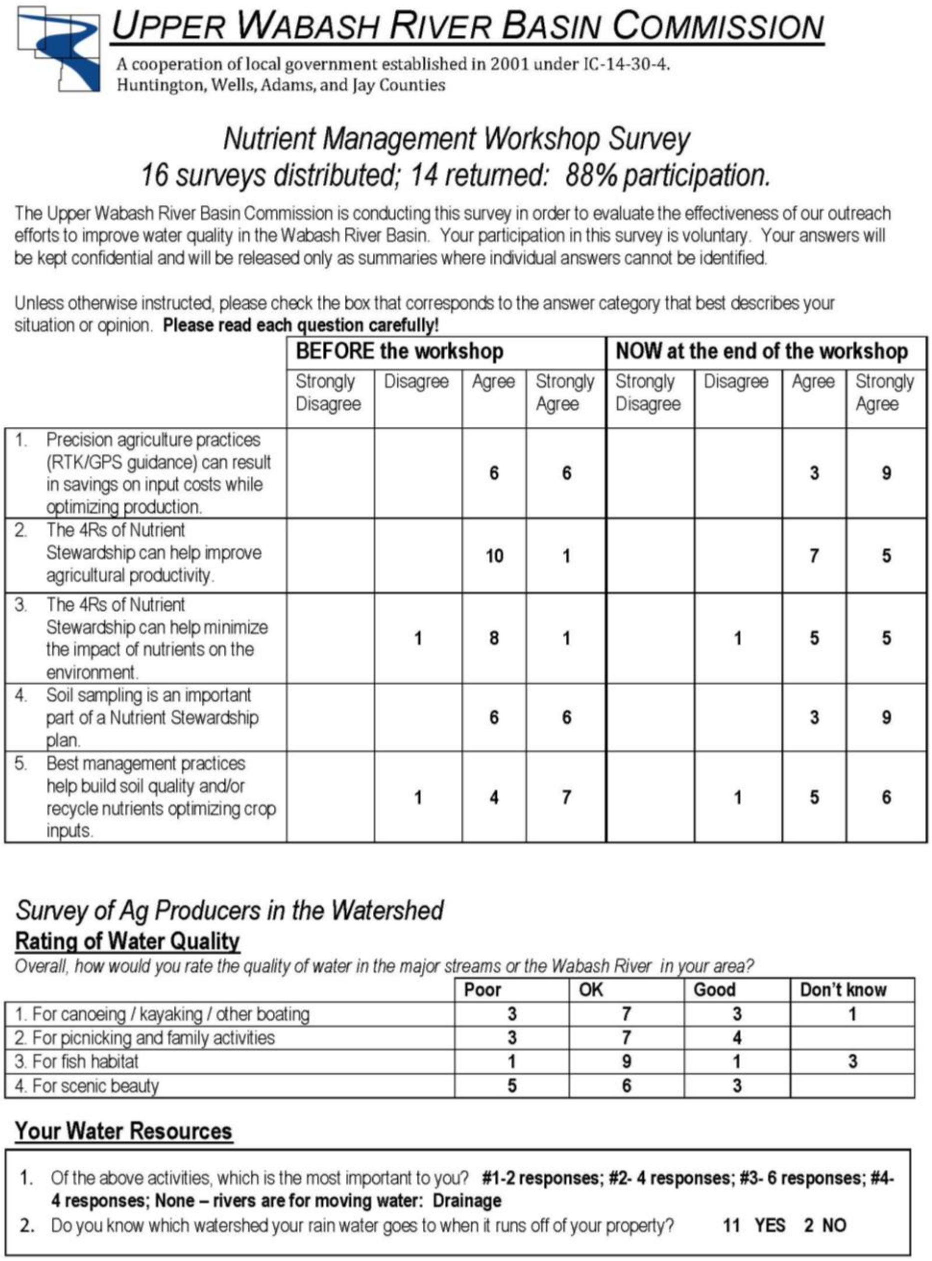
People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?

	Not at all	Slightly	Moderately	Very much	Not familiar
a. Soil and Water Conservation District (SWCD)	**1**			**4**	
b. Natural Resources Conservation Service (NRCS)	**1**			**4**	
c. University Extension			**1**	**4**	
d. State agricultural agency (i.e.: ISDA)		**1**	**1**	**3**	
e. Environmental groups	**1**		**4**		
f. Crop consultants	**1**		**4**		
g. Other landowners / friends	**1**	**2**	**2**		
h. State natural resources agency (i.e.: IDNR)		**1**	**1**	**3**	
i. County Departments (Health Dept., etc.)		**1**	**4**		

Additional Comments about this survey or water resources in your community:

5) Nutrient Field Day – January 7, 2015

The final survey for the project was the Nutrient Management Workshop survey. It was distributed to 16 participants, with a return of 14 surveys for a completion rate of 88%. The survey before and after questions generated an increase of 38% in the strongly agree answers to indicate an increase in knowledge of the subject matter. The SIDMA awareness of pollutant types mean value was 1.78; and the awareness of pollution sources mean value was 1.72. The willingness to take action mean value was 1.88, indicating a more positive attitude.



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Huntington, Wells, Adams, and Jay Counties

Nutrient Management Workshop Survey
16 surveys distributed; 14 returned: 88% participation.

The Upper Wabash River Basin Commission is conducting this survey in order to evaluate the effectiveness of our outreach efforts to improve water quality in the Wabash River Basin. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, please check the box that corresponds to the answer category that best describes your situation or opinion. **Please read each question carefully!**

	BEFORE the workshop				**NOW at the end of the workshop**			
	Strongly Disagree	Disagree	Agree	Strongly Agree	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Precision agriculture practices (RTK/GPS guidance) can result in savings on input costs while optimizing production.			**6**	**6**			**3**	**9**
2. The 4Rs of Nutrient Stewardship can help improve agricultural productivity.			**10**	**1**			**7**	**5**
3. The 4Rs of Nutrient Stewardship can help minimize the impact of nutrients on the environment.		**1**	**8**	**1**		**1**	**5**	**5**
4. Soil sampling is an important part of a Nutrient Stewardship plan.			**6**	**6**			**3**	**9**
5. Best management practices help build soil quality and/or recycle nutrients optimizing crop inputs.		**1**	**4**	**7**		**1**	**5**	**6**

Survey of Ag Producers in the Watershed

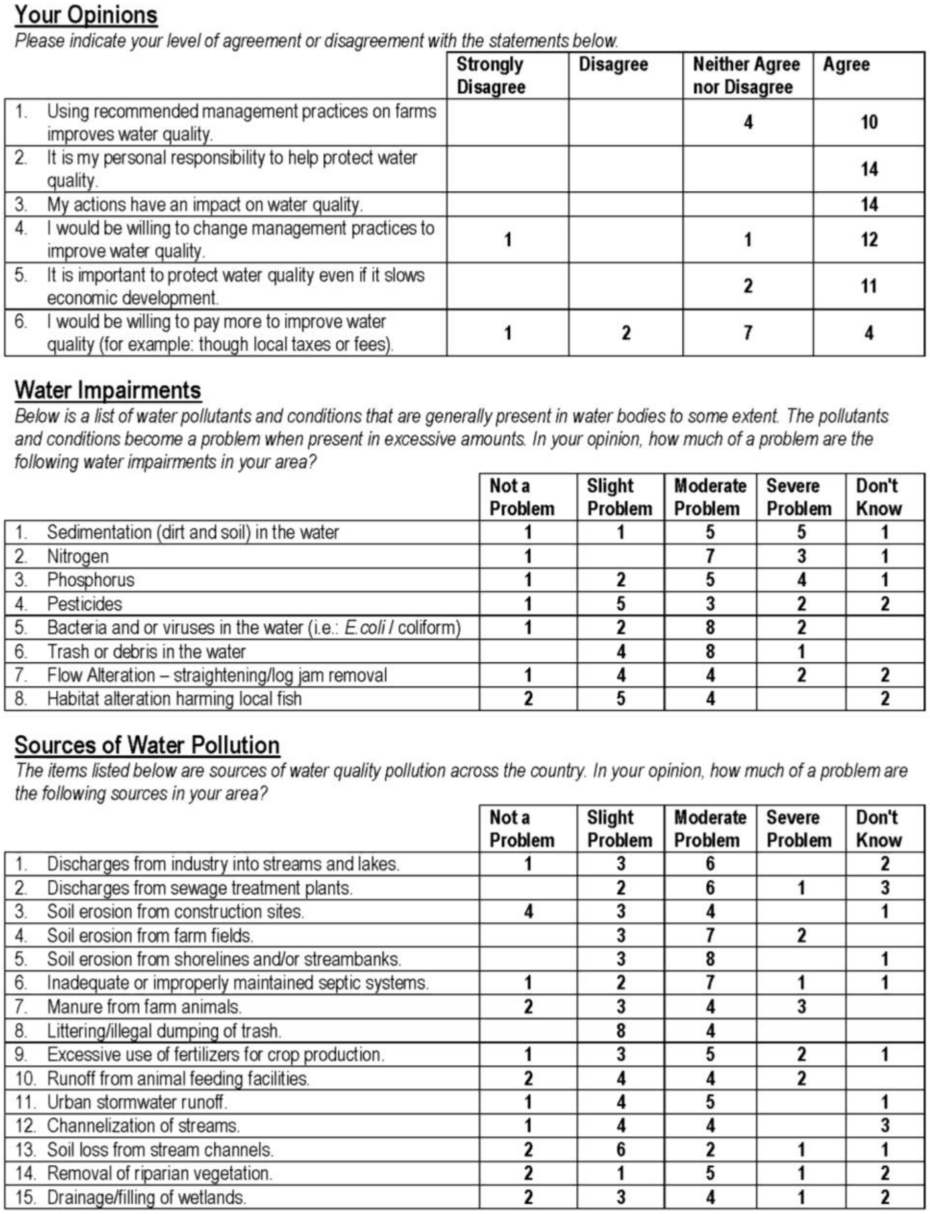
Rating of Water Quality

Overall, how would you rate the quality of water in the major streams or the Wabash River in your area?

	Poor	**OK**	**Good**	**Don't know**
1. For canoeing / kayaking / other boating	**3**	**7**	**3**	**1**
2. For picnicking and family activities	**3**	**7**	**4**	
3. For fish habitat	**1**	**9**	**1**	**3**
4. For scenic beauty	**5**	**6**	**3**	

Your Water Resources

1. Of the above activities, which is the most important to you? **#1-2 responses; #2- 4 responses; #3- 6 responses; #4- 4 responses; None – rivers are for moving water: Drainage**
2. Do you know which watershed your rain water goes to when it runs off of your property? **11 YES 2 NO**



Your Opinions

Please indicate your level of agreement or disagreement with the statements below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree
1. Using recommended management practices on farms improves water quality.			4	10
2. It is my personal responsibility to help protect water quality.				14
3. My actions have an impact on water quality.				14
4. I would be willing to change management practices to improve water quality.	1		1	12
5. It is important to protect water quality even if it slows economic development.			2	11
6. I would be willing to pay more to improve water quality (for example: though local taxes or fees).	1	2	7	4

Water Impairments

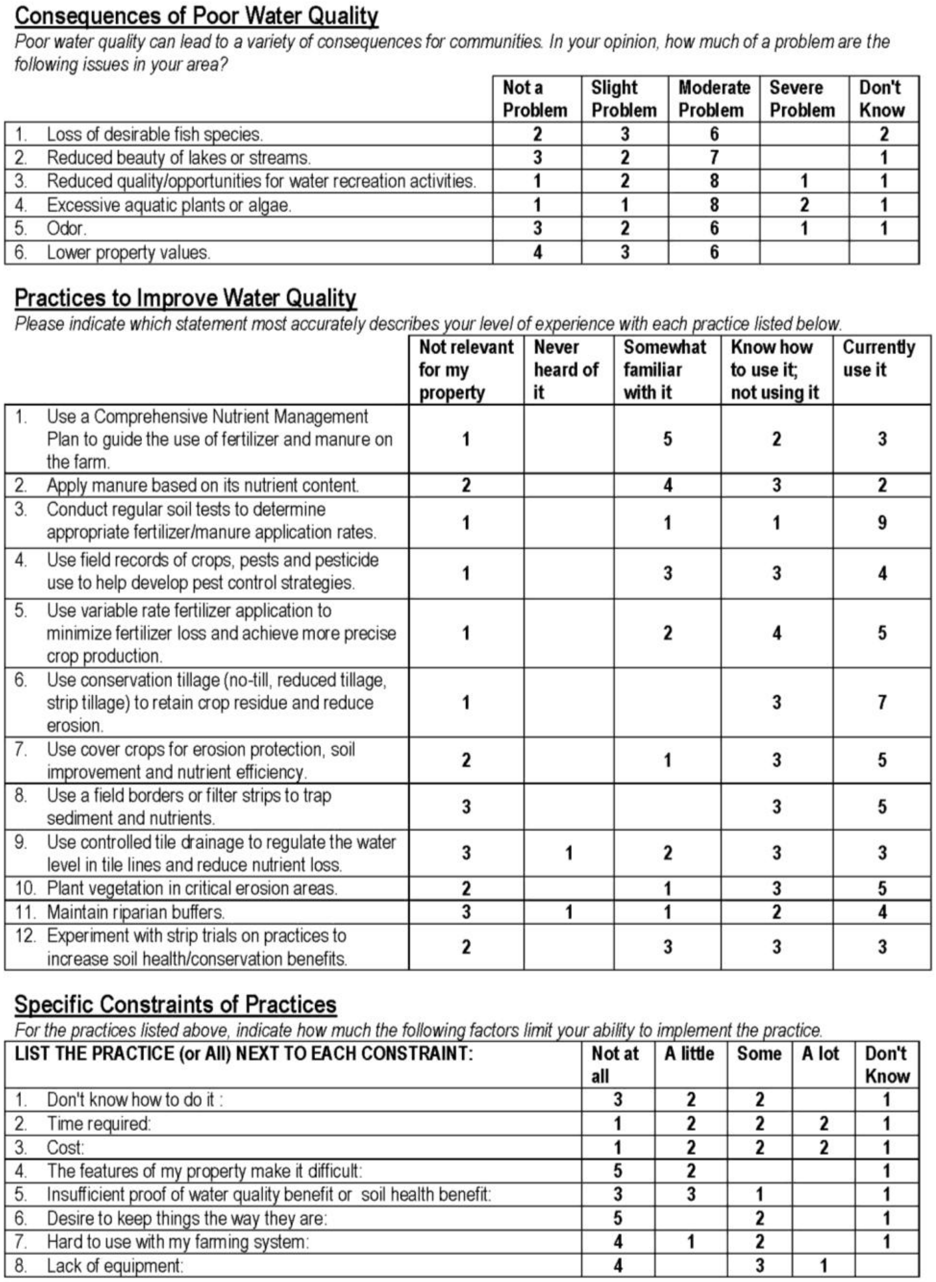
Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Sedimentation (dirt and soil) in the water	1	1	5	5	1
2. Nitrogen	1		7	3	1
3. Phosphorus	1	2	5	4	1
4. Pesticides	1	5	3	2	2
5. Bacteria and or viruses in the water (i.e.: *E.coli* / coliform)	1	2	8	2	
6. Trash or debris in the water		4	8	1	
7. Flow Alteration – straightening/log jam removal	1	4	4	2	2
8. Habitat alteration harming local fish	2	5	4		2

Sources of Water Pollution

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Discharges from industry into streams and lakes.	1	3	6		2
2. Discharges from sewage treatment plants.		2	6	1	3
3. Soil erosion from construction sites.	4	3	4		1
4. Soil erosion from farm fields.		3	7	2	
5. Soil erosion from shorelines and/or streambanks.		3	8		1
6. Inadequate or improperly maintained septic systems.	1	2	7	1	1
7. Manure from farm animals.	2	3	4	3	
8. Littering/illegal dumping of trash.		8	4		
9. Excessive use of fertilizers for crop production.	1	3	5	2	1
10. Runoff from animal feeding facilities.	2	4	4	2	
11. Urban stormwater runoff.	1	4	5		1
12. Channelization of streams.	1	4	4		3
13. Soil loss from stream channels.	2	6	2	1	1
14. Removal of riparian vegetation.	2	1	5	1	2
15. Drainage/filling of wetlands.	2	3	4	1	2



Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
1. Loss of desirable fish species.	2	3	6		2
2. Reduced beauty of lakes or streams.	3	2	7		1
3. Reduced quality/opportunities for water recreation activities.	1	2	8	1	1
4. Excessive aquatic plants or algae.	1	1	8	2	1
5. Odor.	3	2	6	1	1
6. Lower property values.	4	3	6		

Practices to Improve Water Quality

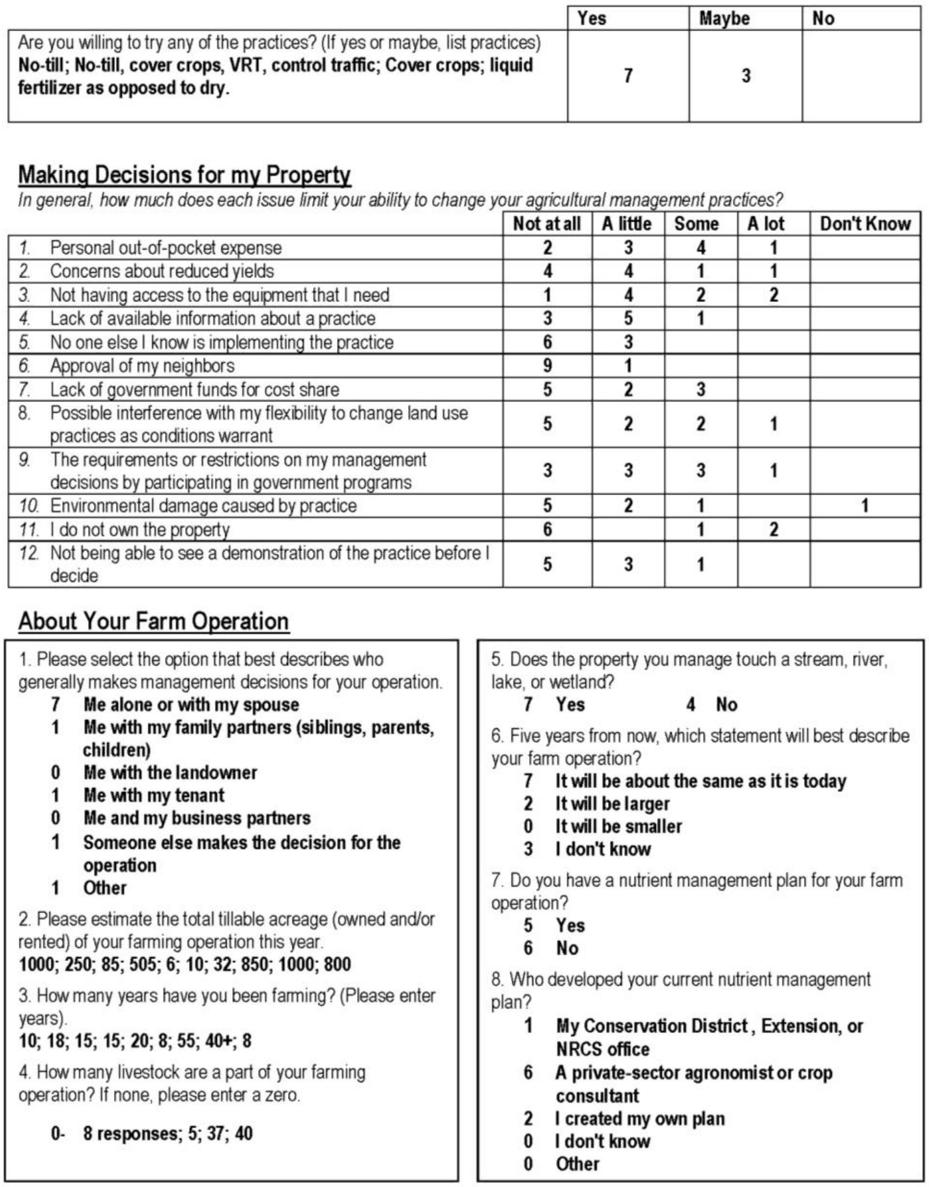
Please indicate which statement most accurately describes your level of experience with each practice listed below.

	Not relevant for my property	Never heard of it	Somewhat familiar with it	Know how to use it; not using it	Currently use it
1. Use a Comprehensive Nutrient Management Plan to guide the use of fertilizer and manure on the farm.	1		5	2	3
2. Apply manure based on its nutrient content.	2		4	3	2
3. Conduct regular soil tests to determine appropriate fertilizer/manure application rates.	1		1	1	9
4. Use field records of crops, pests and pesticide use to help develop pest control strategies.	1		3	3	4
5. Use variable rate fertilizer application to minimize fertilizer loss and achieve more precise crop production.	1		2	4	5
6. Use conservation tillage (no-till, reduced tillage, strip tillage) to retain crop residue and reduce erosion.	1			3	7
7. Use cover crops for erosion protection, soil improvement and nutrient efficiency.	2		1	3	5
8. Use a field borders or filter strips to trap sediment and nutrients.	3			3	5
9. Use controlled tile drainage to regulate the water level in tile lines and reduce nutrient loss.	3	1	2	3	3
10. Plant vegetation in critical erosion areas.	2		1	3	5
11. Maintain riparian buffers.	3	1	1	2	4
12. Experiment with strip trials on practices to increase soil health/conservation benefits.	2		3	3	3

Specific Constraints of Practices

For the practices listed above, indicate how much the following factors limit your ability to implement the practice.

LIST THE PRACTICE (or All) NEXT TO EACH CONSTRAINT:	Not at all	A little	Some	A lot	Don't Know
1. Don't know how to do it :	3	2	2		1
2. Time required:	1	2	2	2	1
3. Cost:	1	2	2	2	1
4. The features of my property make it difficult:	5	2			1
5. Insufficient proof of water quality benefit or soil health benefit:	3	3	1		1
6. Desire to keep things the way they are:	5		2		1
7. Hard to use with my farming system:	4	1	2		1
8. Lack of equipment:	4		3	1	



	Yes	Maybe	No
Are you willing to try any of the practices? (If yes or maybe, list practices) **No-till; No-till, cover crops, VRT, control traffic; Cover crops; liquid fertilizer as opposed to dry.**	7	3	

Making Decisions for my Property

In general, how much does each issue limit your ability to change your agricultural management practices?

	Not at all	A little	Some	A lot	Don't Know
1. Personal out-of-pocket expense	2	3	4	1	
2. Concerns about reduced yields	4	4	1	1	
3. Not having access to the equipment that I need	1	4	2	2	
4. Lack of available information about a practice	3	5	1		
5. No one else I know is implementing the practice	6	3			
6. Approval of my neighbors	9	1			
7. Lack of government funds for cost share	5	2	3		
8. Possible interference with my flexibility to change land use practices as conditions warrant	5	2	2	1	
9. The requirements or restrictions on my management decisions by participating in government programs	3	3	3	1	
10. Environmental damage caused by practice	5	2	1		1
11. I do not own the property	6		1	2	
12. Not being able to see a demonstration of the practice before I decide	5	3	1		

About Your Farm Operation

1. Please select the option that best describes who generally makes management decisions for your operation.

- **7 Me alone or with my spouse**
- **1 Me with my family partners (siblings, parents, children)**
- **0 Me with the landowner**
- **1 Me with my tenant**
- **0 Me and my business partners**
- **1 Someone else makes the decision for the operation**
- **1 Other**

2. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

1000; 250; 85; 505; 6; 10; 32; 850; 1000; 800

3. How many years have you been farming? (Please enter years).

10; 18; 15; 15; 20; 8; 55; 40+; 8

4. How many livestock are a part of your farming operation? If none, please enter a zero.

0- 8 responses; 5; 37; 40

5. Does the property you manage touch a stream, river, lake, or wetland?

7 Yes 4 No

6. Five years from now, which statement will best describe your farm operation?

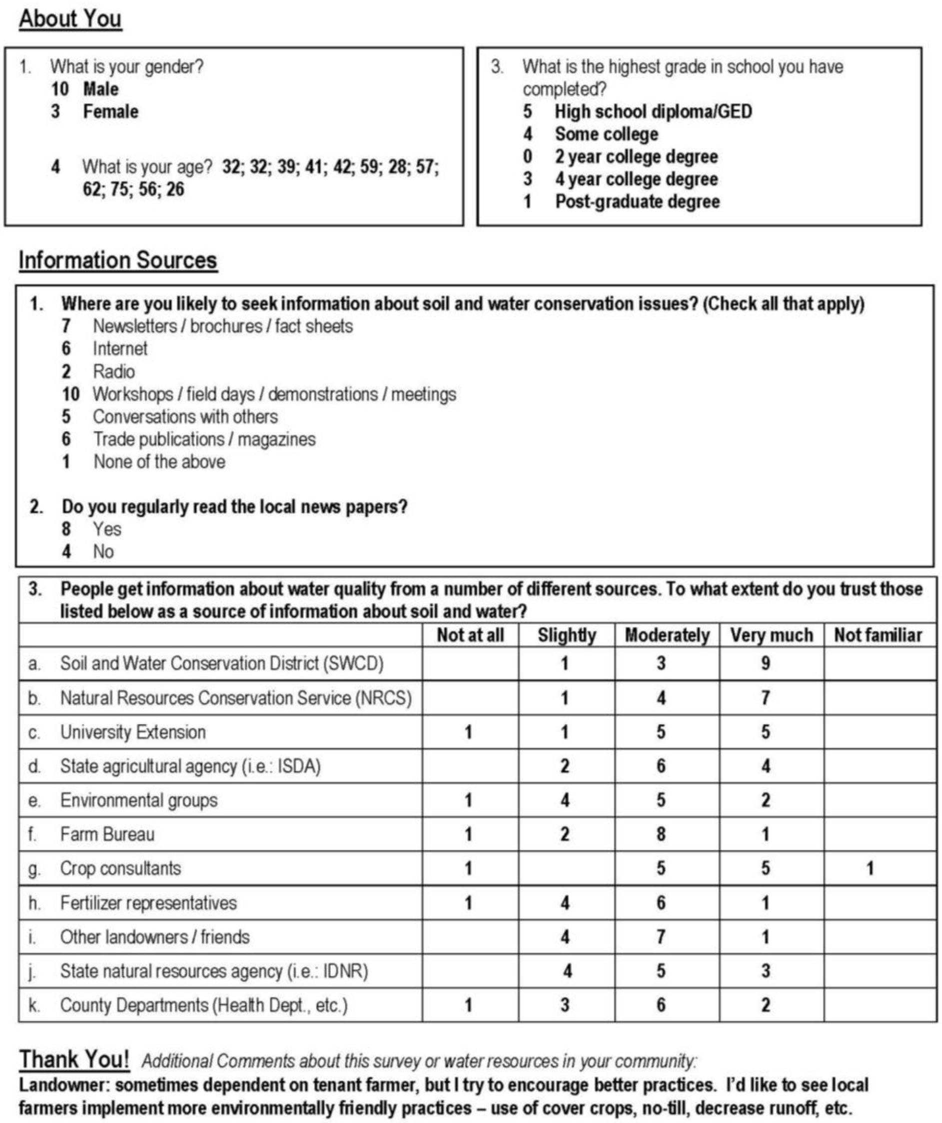
- **7 It will be about the same as it is today**
- **2 It will be larger**
- **0 It will be smaller**
- **3 I don't know**

7. Do you have a nutrient management plan for your farm operation?

- **5 Yes**
- **6 No**

8. Who developed your current nutrient management plan?

- **1 My Conservation District , Extension, or NRCS office**
- **6 A private-sector agronomist or crop consultant**
- **2 I created my own plan**
- **0 I don't know**
- **0 Other**



About You

1. What is your gender?
   10 Male
   3 Female

   4 What is your age? **32; 32; 39; 41; 42; 59; 28; 57; 62; 75; 56; 26**

3. What is the highest grade in school you have completed?
   5 High school diploma/GED
   4 Some college
   0 2 year college degree
   3 4 year college degree
   1 Post-graduate degree

Information Sources

1. Where are you likely to seek information about soil and water conservation issues? (Check all that apply)
- **7** Newsletters / brochures / fact sheets
- **6** Internet
- **2** Radio
- **10** Workshops / field days / demonstrations / meetings
- **5** Conversations with others
- **6** Trade publications / magazines
- **1** None of the above

2. Do you regularly read the local news papers?
- **8** Yes
- **4** No

3. People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?

	Not at all	Slightly	Moderately	Very much	Not familiar
a. Soil and Water Conservation District (SWCD)		1	3	9	
b. Natural Resources Conservation Service (NRCS)		1	4	7	
c. University Extension	1	1	5	5	
d. State agricultural agency (i.e.: ISDA)		2	6	4	
e. Environmental groups	1	4	5	2	
f. Farm Bureau	1	2	8	1	
g. Crop consultants	1		5	5	1
h. Fertilizer representatives	1	4	6	1	
i. Other landowners / friends		4	7	1	
j. State natural resources agency (i.e.: IDNR)		4	5	3	
k. County Departments (Health Dept., etc.)	1	3	6	2	

Thank You! *Additional Comments about this survey or water resources in your community:*

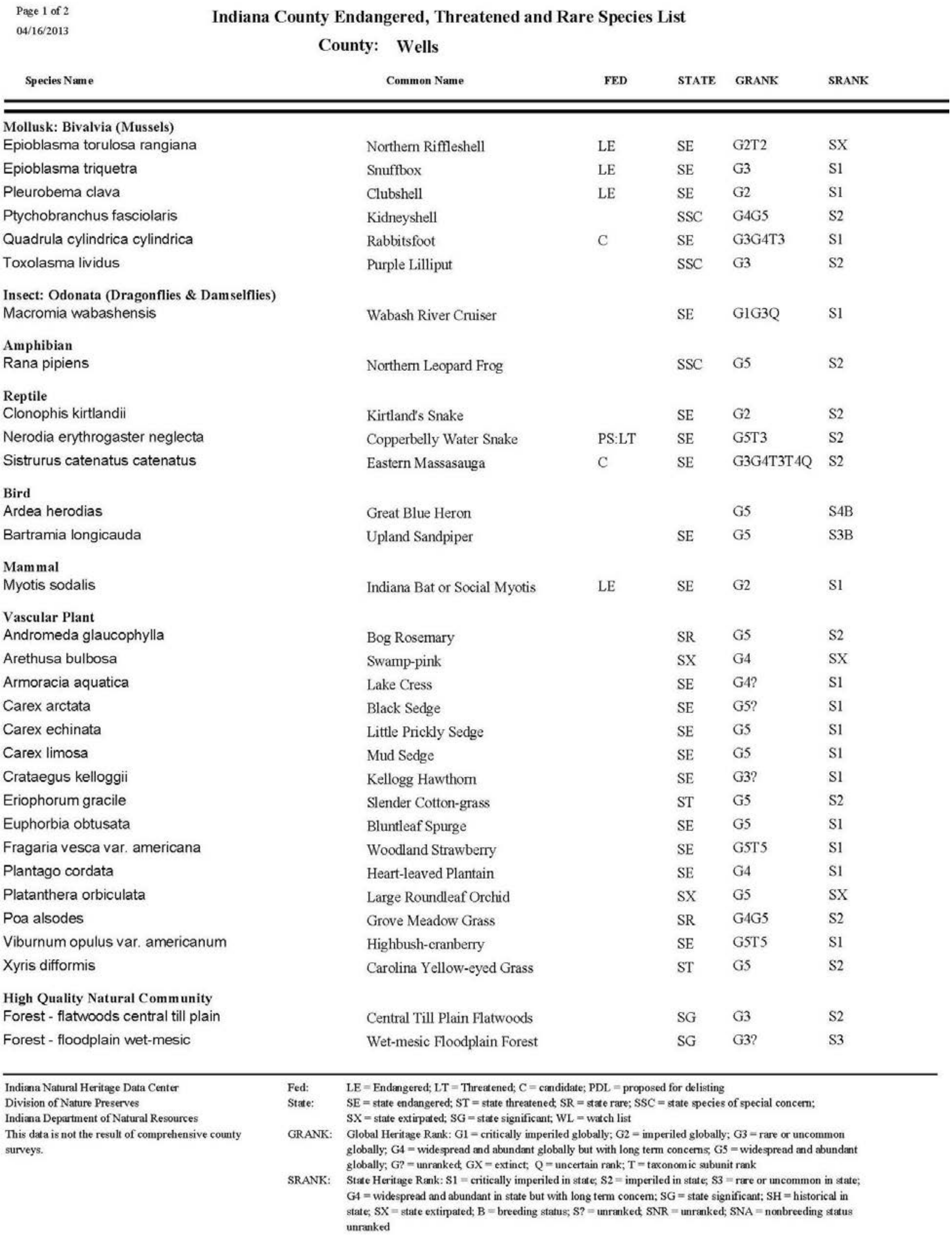
Landowner: sometimes dependent on tenant farmer, but I try to encourage better practices. I'd like to see local farmers implement more environmentally friendly practices – use of cover crops, no-till, decrease runoff, etc.

Appendix D – Other Reports

Table 2-10: Existing Reports for Upper Wabash River Basin

Year	Title	Website Link
1999	Upper Wabash River Basin Fourteen Digit Hydrologic Unit Mileages	www.in.gov/idem/files/wqsurvey_Report.pdf
2000	Upper Wabash River Basin Sampling Site & Stream Standard Violations	www.in.gov/idem/files/wqsurvey_finalreport99305b.pdf
2001	An Assessment of Pesticides in the Upper Wabash River Basin	www.in.gov/idem/files/wqsurvey_024finalrept.pdf
2002	Watershed Restoration Action Strategy for the Upper Wabash Watershed	www.in.gov/idem/nps/files/wras_wabash-upper_part1.pdf
2006	Wabash River TMDL	www.in.gov/idem/nps/2841.htm
2009	Rapid Watershed Assessment Upper Wabash Watershed	http://www.in.gov/isda/files/Upper_Wabash_RWA.pdf
2012	2012 303(d) Revised List of Impaired Waters	www.in.gov/idem/nps/2647.htm
1999 - present	Rock Creek Conservancy District Water Quality Monitoring Reports	www.rockcreekcd.org

Appendix E – Endangered, Threatened and Rare Species Lists by County



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Indiana County Endangered, Threatened and Rare Species List

County: Wells

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	G2T2	SX
Epioblasma triquetra	Snuffbox	LE	SE	G3	S1
Pleurobema clava	Clubshell	LE	SE	G2	S1
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula cylindrica cylindrica	Rabbitsfoot	C	SE	G3G4T3	S1
Toxolasma lividus	Purple Lilliput		SSC	G3	S2
Insect: Odonata (Dragonflies & Damselflies)					
Macromia wabashensis	Wabash River Cruiser		SE	G1G3Q	S1
Amphibian					
Rana pipiens	Northern Leopard Frog		SSC	G5	S2
Reptile					
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Nerodia erythrogaster neglecta	Copperbelly Water Snake	PS:LT	SE	G5T3	S2
Sistrurus catenatus catenatus	Eastern Massasauga	C	SE	G3G4T3T4Q	S2
Bird					
Ardea herodias	Great Blue Heron			G5	S4B
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Mammal					
Myotis sodalis	Indiana Bat or Social Myotis	LE	SE	G2	S1
Vascular Plant					
Andromeda glaucophylla	Bog Rosemary		SR	G5	S2
Arethusa bulbosa	Swamp-pink		SX	G4	SX
Armoracia aquatica	Lake Cress		SE	G4?	S1
Carex arctata	Black Sedge		SE	G5?	S1
Carex echinata	Little Prickly Sedge		SE	G5	S1
Carex limosa	Mud Sedge		SE	G5	S1
Crataegus kelloggii	Kellogg Hawthorn		SE	G3?	S1
Eriophorum gracile	Slender Cotton-grass		ST	G5	S2
Euphorbia obtusata	Bluntleaf Spurge		SE	G5	S1
Fragaria vesca var. americana	Woodland Strawberry		SE	G5T5	S1
Plantago cordata	Heart-leaved Plantain		SE	G4	S1
Platanthera orbiculata	Large Roundleaf Orchid		SX	G5	SX
Poa alsodes	Grove Meadow Grass		SR	G4G5	S2
Viburnum opulus var. americanum	Highbush-cranberry		SE	G5T5	S1
Xyris difformis	Carolina Yellow-eyed Grass		ST	G5	S2
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	G3?	S3

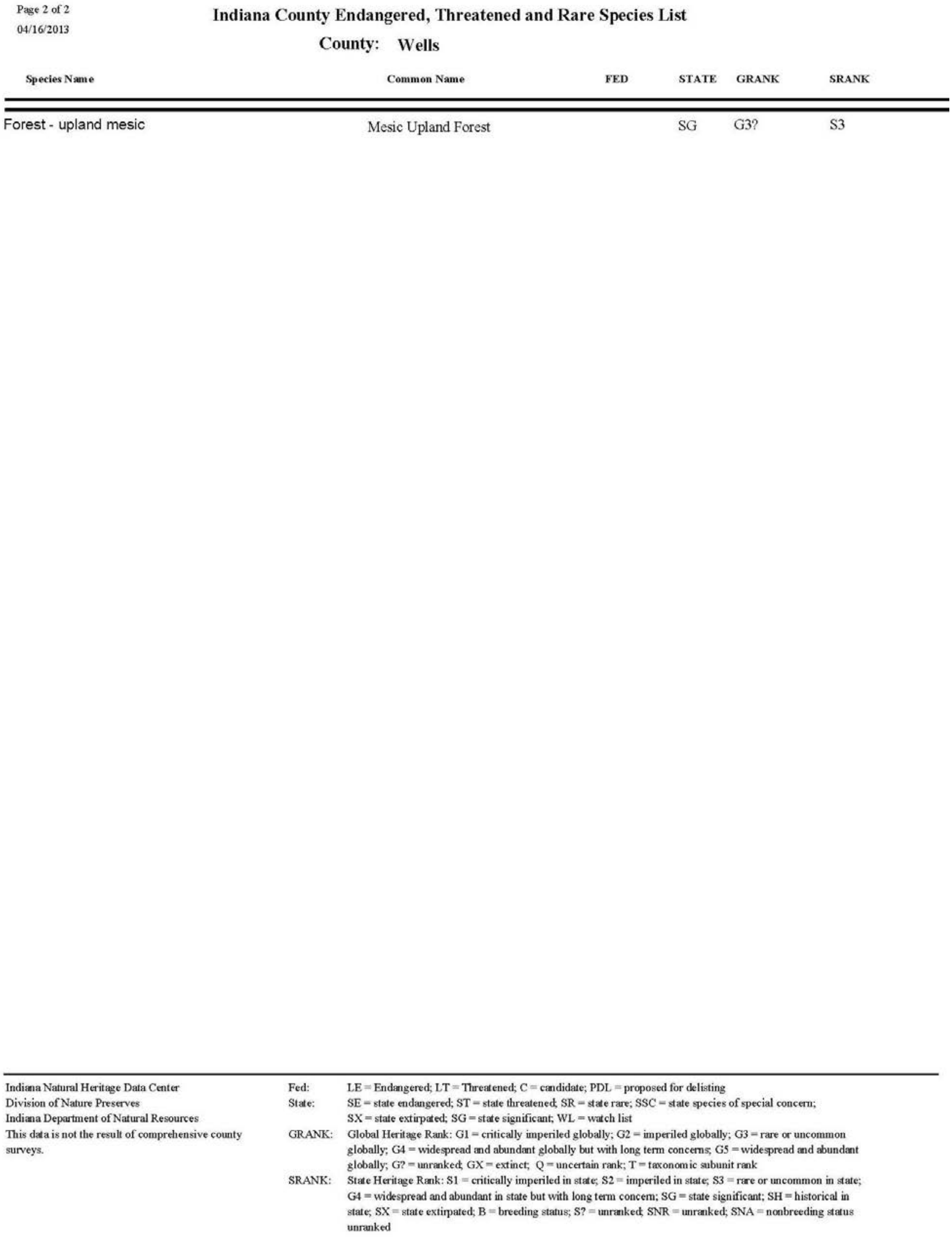
Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
This data is not the result of comprehensive county surveys.

Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list

GRANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank

SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked



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Indiana County Endangered, Threatened and Rare Species List

County: Wells

Species Name	Common Name	FED	STATE	GRANK	SRANK
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3

Indiana Natural Heritage Data Center
Division of Nature Preserves
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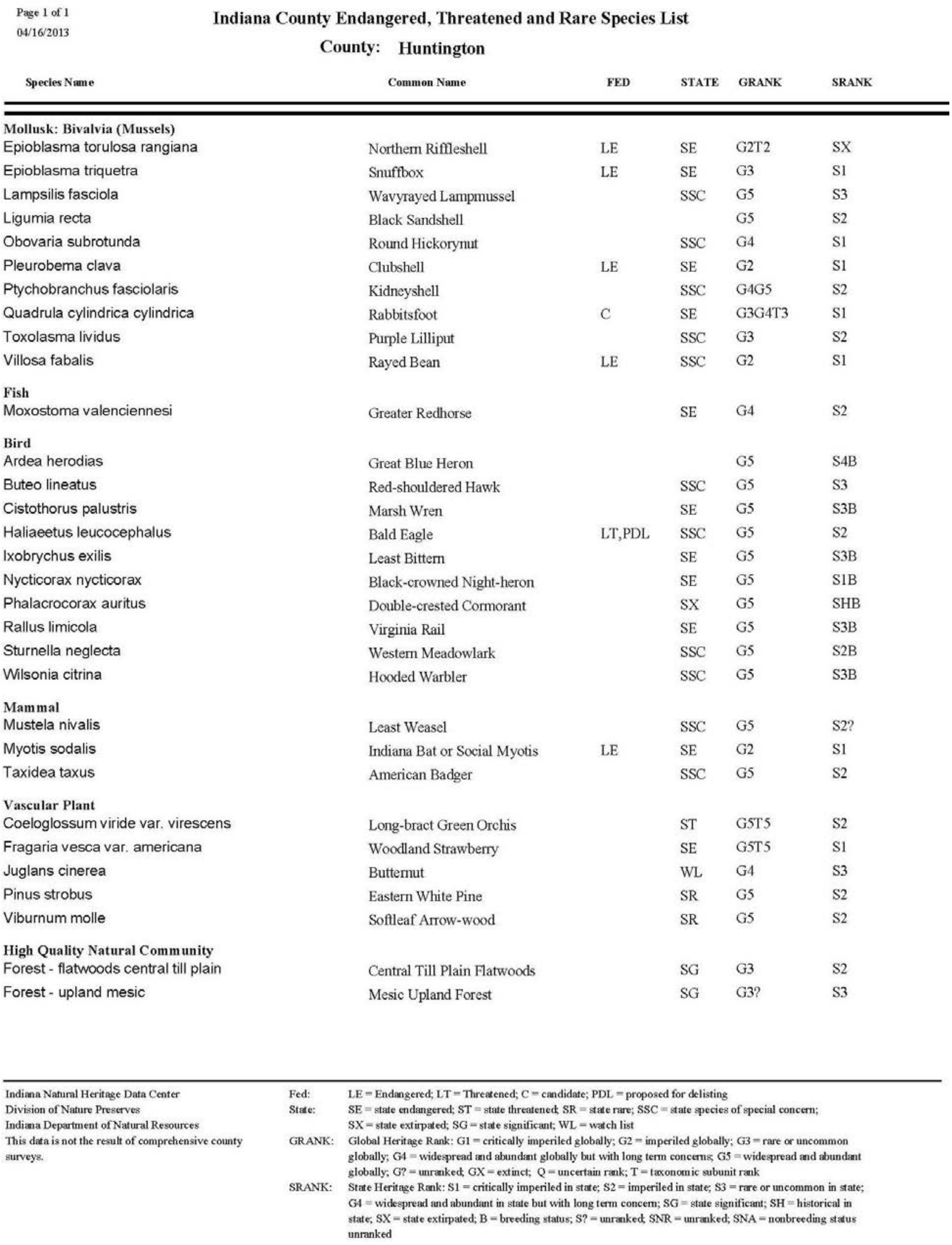

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Indiana County Endangered, Threatened and Rare Species List

County: Huntington

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	G2T2	SX
Epioblasma triquetra	Snuffbox	LE	SE	G3	S1
Lampsilis fasciola	Wavyrayed Lampmussel		SSC	G5	S3
Ligumia recta	Black Sandshell			G5	S2
Obovaria subrotunda	Round Hickorynut		SSC	G4	S1
Pleurobema clava	Clubshell	LE	SE	G2	S1
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula cylindrica cylindrica	Rabbitsfoot	C	SE	G3G4T3	S1
Toxolasma lividus	Purple Lilliput		SSC	G3	S2
Villosa fabalis	Rayed Bean	LE	SSC	G2	S1
Fish					
Moxostoma valenciennesi	Greater Redhorse		SE	G4	S2
Bird					
Ardea herodias	Great Blue Heron			G5	S4B
Buteo lineatus	Red-shouldered Hawk		SSC	G5	S3
Cistothorus palustris	Marsh Wren		SE	G5	S3B
Haliaeetus leucocephalus	Bald Eagle	LT,PDL	SSC	G5	S2
Ixobrychus exilis	Least Bittern		SE	G5	S3B
Nycticorax nycticorax	Black-crowned Night-heron		SE	G5	S1B
Phalacrocorax auritus	Double-crested Cormorant		SX	G5	SHB
Rallus limicola	Virginia Rail		SE	G5	S3B
Sturnella neglecta	Western Meadowlark		SSC	G5	S2B
Wilsonia citrina	Hooded Warbler		SSC	G5	S3B
Mammal					
Mustela nivalis	Least Weasel		SSC	G5	S2?
Myotis sodalis	Indiana Bat or Social Myotis	LE	SE	G2	S1
Taxidea taxus	American Badger		SSC	G5	S2
Vascular Plant					
Coeloglossum viride var. virescens	Long-bract Green Orchis		ST	G5T5	S2
Fragaria vesca var. americana	Woodland Strawberry		SE	G5T5	S1
Juglans cinerea	Butternut		WL	G4	S3
Pinus strobus	Eastern White Pine		SR	G5	S2
Viburnum molle	Softleaf Arrow-wood		SR	G5	S2
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3

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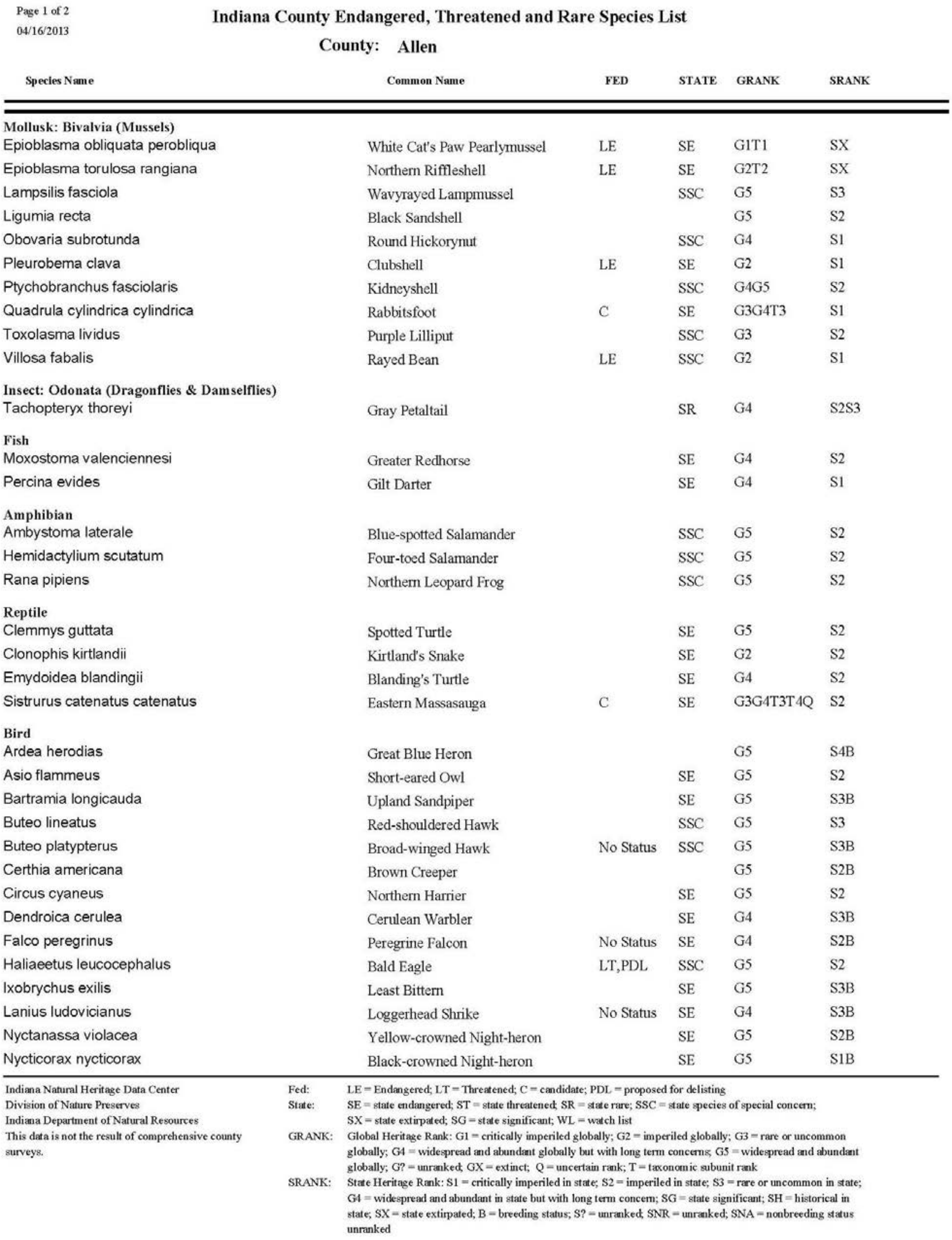

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Indiana County Endangered, Threatened and Rare Species List

County: Allen

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Epioblasma obliquata perobliqua	White Cat's Paw Pearlymussel	LE	SE	G1T1	SX
Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	G2T2	SX
Lampsilis fasciola	Wavyrayed Lampmussel		SSC	G5	S3
Ligumia recta	Black Sandshell			G5	S2
Obovaria subrotunda	Round Hickorynut		SSC	G4	S1
Pleurobema clava	Clubshell	LE	SE	G2	S1
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula cylindrica cylindrica	Rabbitsfoot	C	SE	G3G4T3	S1
Toxolasma lividus	Purple Lilliput		SSC	G3	S2
Villosa fabalis	Rayed Bean	LE	SSC	G2	S1
Insect: Odonata (Dragonflies & Damselflies)					
Tachopteryx thoreyi	Gray Petaltail		SR	G4	S2S3
Fish					
Moxostoma valenciennesi	Greater Redhorse		SE	G4	S2
Percina evides	Gilt Darter		SE	G4	S1
Amphibian					
Ambystoma laterale	Blue-spotted Salamander		SSC	G5	S2
Hemidactylium scutatum	Four-toed Salamander		SSC	G5	S2
Rana pipiens	Northern Leopard Frog		SSC	G5	S2
Reptile					
Clemmys guttata	Spotted Turtle		SE	G5	S2
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Emydoidea blandingii	Blanding's Turtle		SE	G4	S2
Sistrurus catenatus catenatus	Eastern Massasauga	C	SE	G3G4T3T4Q	S2
Bird					
Ardea herodias	Great Blue Heron			G5	S4B
Asio flammeus	Short-eared Owl		SE	G5	S2
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Buteo lineatus	Red-shouldered Hawk		SSC	G5	S3
Buteo platypterus	Broad-winged Hawk	No Status	SSC	G5	S3B
Certhia americana	Brown Creeper			G5	S2B
Circus cyaneus	Northern Harrier		SE	G5	S2
Dendroica cerulea	Cerulean Warbler		SE	G4	S3B
Falco peregrinus	Peregrine Falcon	No Status	SE	G4	S2B
Haliaeetus leucocephalus	Bald Eagle	LT,PDL	SSC	G5	S2
Ixobrychus exilis	Least Bittern		SE	G5	S3B
Lanius ludovicianus	Loggerhead Shrike	No Status	SE	G4	S3B
Nyctanassa violacea	Yellow-crowned Night-heron		SE	G5	S2B
Nycticorax nycticorax	Black-crowned Night-heron		SE	G5	S1B

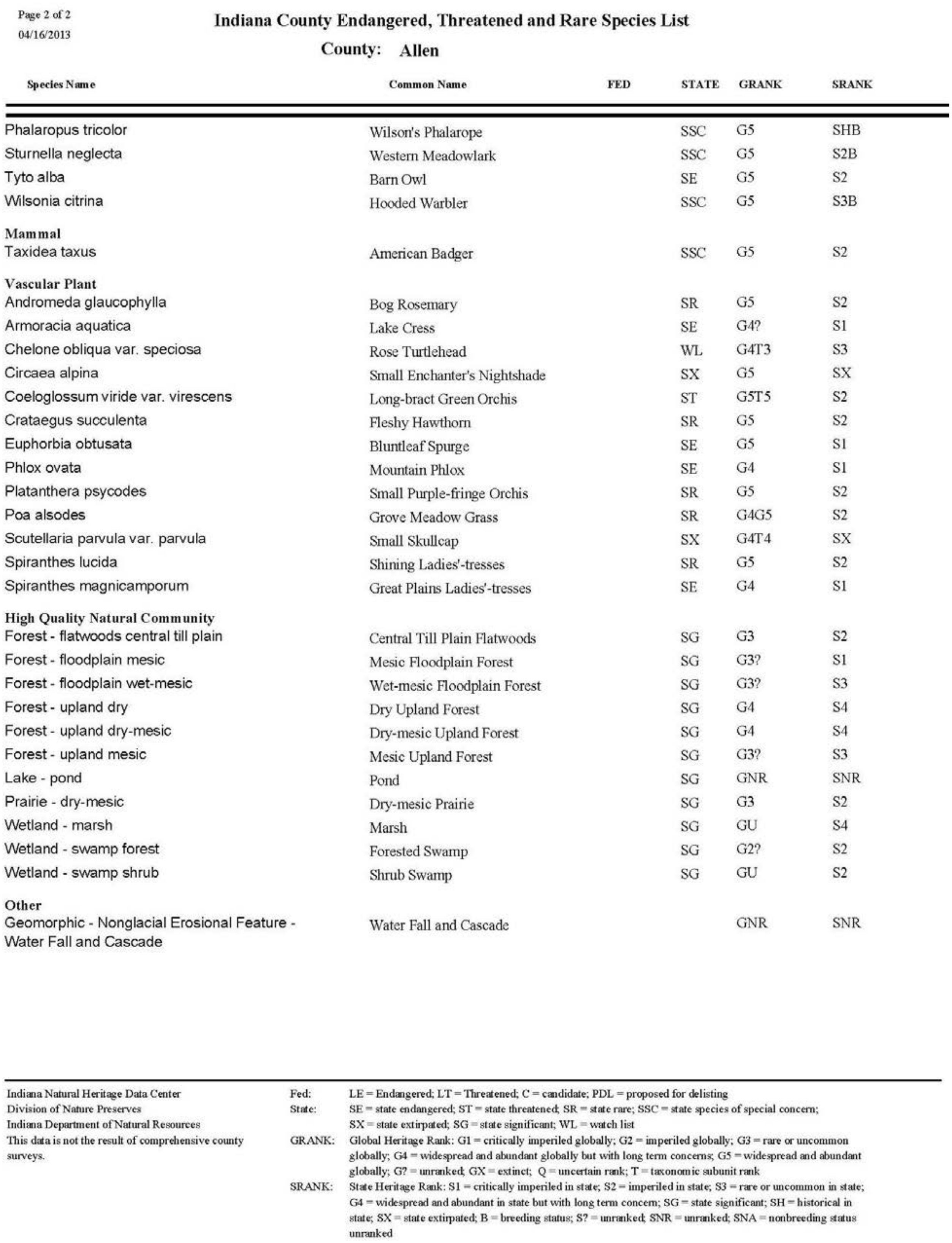
Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
This data is not the result of comprehensive county surveys.

Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list

GRANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank

SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked



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04/16/2013

Indiana County Endangered, Threatened and Rare Species List

County: Allen

Species Name	Common Name	FED	STATE	GRANK	SRANK
Phalaropus tricolor	Wilson's Phalarope		SSC	G5	SHB
Sturnella neglecta	Western Meadowlark		SSC	G5	S2B
Tyto alba	Barn Owl		SE	G5	S2
Wilsonia citrina	Hooded Warbler		SSC	G5	S3B
Mammal					
Taxidea taxus	American Badger		SSC	G5	S2
Vascular Plant					
Andromeda glaucophylla	Bog Rosemary		SR	G5	S2
Armoracia aquatica	Lake Cress		SE	G4?	S1
Chelone obliqua var. speciosa	Rose Turtlehead		WL	G4T3	S3
Circaea alpina	Small Enchanter's Nightshade		SX	G5	SX
Coeloglossum viride var. virescens	Long-bract Green Orchis		ST	G5T5	S2
Crataegus succulenta	Fleshy Hawthorn		SR	G5	S2
Euphorbia obtusata	Bluntleaf Spurge		SE	G5	S1
Phlox ovata	Mountain Phlox		SE	G4	S1
Platanthera psycodes	Small Purple-fringe Orchis		SR	G5	S2
Poa alsodes	Grove Meadow Grass		SR	G4G5	S2
Scutellaria parvula var. parvula	Small Skullcap		SX	G4T4	SX
Spiranthes lucida	Shining Ladies'-tresses		SR	G5	S2
Spiranthes magnicamporum	Great Plains Ladies'-tresses		SE	G4	S1
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Forest - floodplain mesic	Mesic Floodplain Forest		SG	G3?	S1
Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	G3?	S3
Forest - upland dry	Dry Upland Forest		SG	G4	S4
Forest - upland dry-mesic	Dry-mesic Upland Forest		SG	G4	S4
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3
Lake - pond	Pond		SG	GNR	SNR
Prairie - dry-mesic	Dry-mesic Prairie		SG	G3	S2
Wetland - marsh	Marsh		SG	GU	S4
Wetland - swamp forest	Forested Swamp		SG	G2?	S2
Wetland - swamp shrub	Shrub Swamp		SG	GU	S2
Other					
Geomorphic - Nonglacial Erosional Feature - Water Fall and Cascade	Water Fall and Cascade			GNR	SNR

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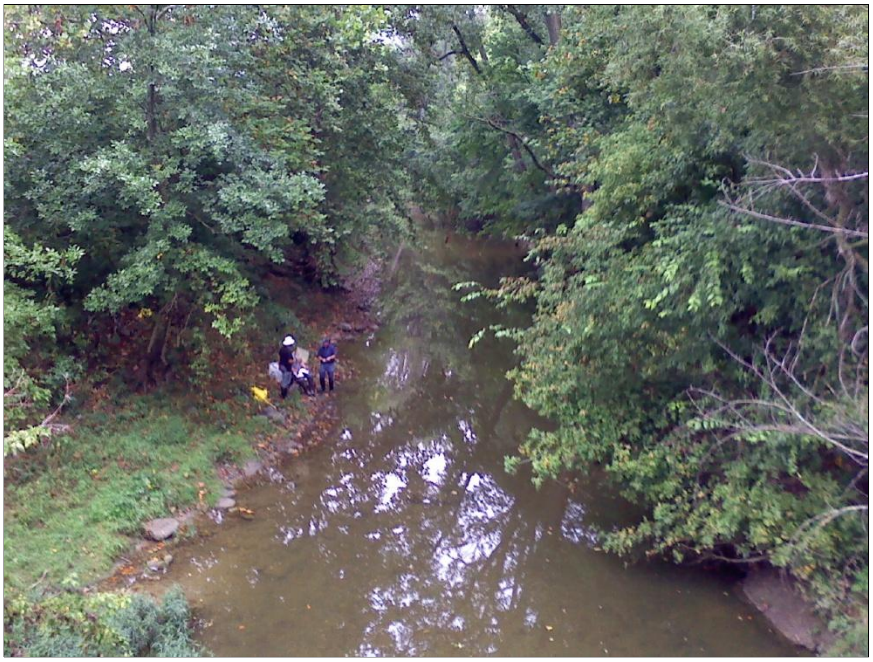
SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

Appendix F – Water Quality Monitoring Site Photos

Site 1: Eight Mile Creek

Mayne Road
Huntington County
Pleasant Run Ditch
subwatershed
HUC: 051201010904

Latitude
40.951829944
Longitude
-85.349130621



Site 2: Eight Mile Creek

CR 100 E and CR 1000 N
Wells County
Moser Lake subwatershed
HUC: 051201010902

Hoosier Riverwatch site

Latitude
40.887734117
Longitude
-85.203991178

Site 3: Eight Mile Creek

CR 800 N,
west of CR 450 E
Wells County
Moser Lake subwatershed
HUC: 051201010902

Latitude
40.859139506
Longitude
-85.13947349

Site 4: Eight Mile Creek

CR 500 N,
east of SR 301
Wells County
Maple Creek subwatershed
HUC: 051201010901

Latitude
40.815413464
Longitude
-85.081277937

Site 5: Wabash River

CR 450 E at White Bridge
Wells County
Johns Creek subwatershed
HUC: 051201010801

Latitude
40.728426157
Longitude
-85.136889182

Site 6: Wabash River

CR 100 N at Gerber Bridge
Wells County
Dowty Ditch subwatershed
HUC: 051201010802

Latitude
40.757136019
Longitude
-85.184775917

Site 7: Wabash River

Rose Road,
north of CR 300 N
Wells County
Dowty Ditch subwatershed
HUC: 051201010802

Hoosier Riverwatch site

Latitude
40.788304126
Longitude
-85.203673923

Site 8: Wabash River

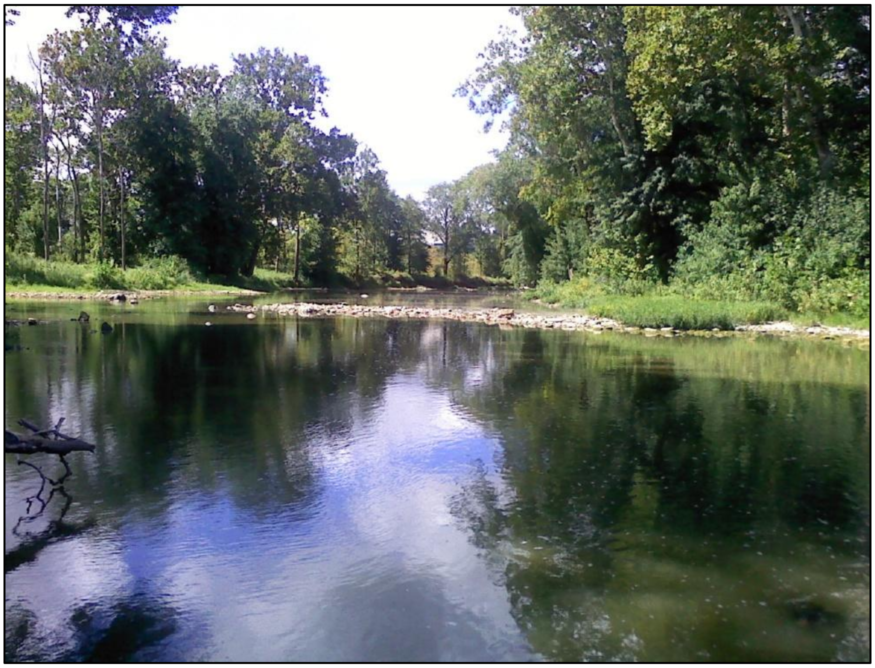
CR 500 W,
South of SR 116
IDNR F&W area
Wells County
Griffin Ditch subwatershed
HUC: 051201010804

Latitude
40.820563138
Longitude
-85.318016745

Site 9: Wabash River

IDNR F&W area,
north of CR 100 S
at dead end of road
Huntington County
Griffin Ditch subwatershed
HUC: 051201010804

Latitude
40.816460699
Longitude
-85.361119341



Site 10: Rock Creek

IDNR F&W area,
east of CR 100 S
at dead end of road
Huntington County
Elkenberry Ditch
subwatershed
HUC: 051201010704

Latitude
40.814927481
Longitude
-85.363609102

Site 11: Elkenberry Ditch

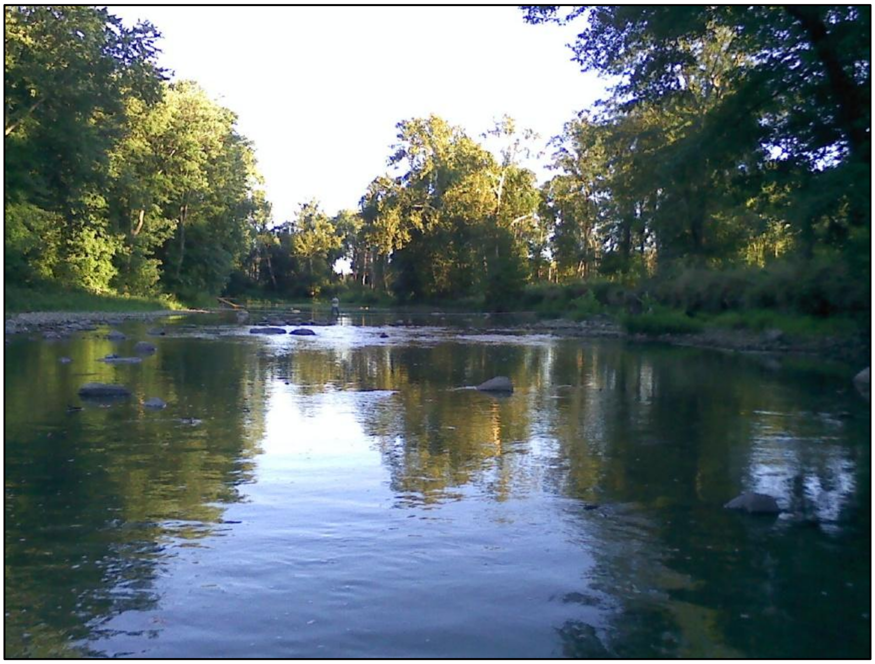
IDNR F&W area,
at dead end of
Division Road
Huntington County
Elkenberry Ditch
subwatershed
HUC: 051201010704

Latitude
40.807323921
Longitude
-85.366133898

Site 12: Wabash River

IDNR F&W area,
Division Road, east of
I-69 Bridges
Huntington County
Downstream from
Griffin Ditch subwatershed
HUC: 0512010100804
(Loon Creek subwatershed
HUC: 0512010111301)

Latitude
40.818272028
Longitude
-85.363796521



Site 13: Rock Creek

CR 200 N,
east of CR 500 W
Wells County
Elkenberry Ditch
subwatershed
HUC: 051201010704

Hoosier Riverwatch site

Latitude
40.7709157
Longitude
-85.308936127

Site 14: Rock Creek

CR 300 W,
north of CR 200 S
Wells County
Stites Ditch subwatershed
HUC: 051201010703

Latitude
40.714427708
Longitude
-85.279366951

Site 15: Rock Creek

CR 400 S,
east of CR 200 W
Wells County
Stites Ditch subwatershed
HUC: 051201010703

Latitude
40.683498485
Longitude
-85.250091478

Appendix G – Upper Wabash River Phase 2 Project
Water Quality Monitoring Data

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	9/12/2013 9:33	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.11	mg/L
WUW-09-0001	9/12/2013 9:33	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	60.5	%
WUW-09-0001	9/12/2013 9:33	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.93	units
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.12	°C
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	8.7	NTU
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	1.5	cfs
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0	mg/L
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.8	mg/L
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.73	mg/L
WUW-09-0001	9/12/2013 9:33	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.137	ms/cm
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Habitat (| CQHEI | WATER | TOTAL | N/A)	70	CQHEI
WUW-09-0001	9/12/2013 9:33	UWRBC 01	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	12	PTIR
WUW-09-0003	9/12/2013 12:00	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.61	mg/L
WUW-09-0003	9/12/2013 12:00	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	143.4	%
WUW-09-0003	9/12/2013 12:00	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.53	units
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.16	°C
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	10.3	NTU
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	1.23	cfs
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	48.05	mg/L
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.5	mg/L
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	2.39	mg/L
WUW-09-0003	9/12/2013 12:00	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	2.14	ms/cm
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Habitat (| CQHEI | WATER | TOTAL | N/A)	60	CQHEI

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0003	9/12/2013 12:00	UWRBC 02	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	19	PTIR
WUW-09-0004	9/12/2013 14:00	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.93	mg/L
WUW-09-0004	9/12/2013 14:00	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	126.2	%
WUW-09-0004	9/12/2013 14:00	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.46	units
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.03	°C
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	41.6	NTU
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	0.07	cfs
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0	mg/L
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.3	mg/L
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.35	mg/L
WUW-09-0004	9/12/2013 14:00	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	433	cfu/100mL
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.201	ms/cm
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Habitat (| CQHEI | WATER | TOTAL | N/A)	32	CQHEI
WUW-09-0004	9/12/2013 14:00	UWRBC 03	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	8	PTIR
WUW-09-0002	9/12/2013 15:30	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.21	mg/L
WUW-09-0002	9/12/2013 15:30	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	112.4	%
WUW-09-0002	9/12/2013 15:30	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8	units
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.64	°C
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	47.2	NTU
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	0	cfs
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.04	mg/L
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.8	mg/L
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.48	mg/L
WUW-09-0002	9/12/2013 15:30	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.296	ms/cm
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Habitat (| CQHEI | WATER | TOTAL | N/A)	25	CQHEI
WUW-09-0002	9/12/2013 15:30	UWRBC 04	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	11	PTIR

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0001	9/12/2013 18:45	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.97	mg/L
WUW-08-0001	9/12/2013 18:45	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	99.8	%
WUW-08-0001	9/12/2013 18:45	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.44	units
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.12	°C
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	99.9	NTU
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	19.08	cfs
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.14	mg/L
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.073	mg/L
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	12.1	mg/L
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.07	mg/L
WUW-08-0001	9/12/2013 18:45	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.151	ms/cm
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Habitat (| CQHEI | WATER | TOTAL | N/A)	76.5	CQHEI
WUW-08-0001	9/12/2013 18:45	UWRBC 05	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	18	PTIR
WUW-08-0005	9/13/2013 9:55	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.16	mg/L
WUW-08-0005	9/13/2013 9:55	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	71.3	%
WUW-08-0005	9/13/2013 9:55	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.34	units
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.02	°C
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	57.8	NTU
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	19.24	cfs
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	8.58	mg/L
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.017	mg/L
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6	mg/L
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.4	mg/L
WUW-08-0005	9/13/2013 9:55	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	900	cfu/100mL
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.058	ms/cm
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Habitat (| CQHEI | WATER | TOTAL | N/A)	47	CQHEI
WUW-08-0005	9/13/2013 9:55	UWRBC 06	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	4	PTIR
WUW-08-0002	9/13/2013 11:35	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.34	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	9/13/2013 11:35	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.7	%
WUW-08-0002	9/13/2013 11:35	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.33	units
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.54	°C
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	78.8	NTU
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	21.22	cfs
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	12.58	mg/L
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.5	mg/L
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.34	mg/L
WUW-08-0002	9/13/2013 11:35	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	367	cfu/100mL
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.085	ms/cm
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Habitat (| CQHEI | WATER | TOTAL | N/A)	67	CQHEI
WUW-08-0002	9/13/2013 11:35	UWRBC 07	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	18	PTIR
WUW-07-0012	9/13/2013 15:35	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.48	mg/L
WUW-07-0012	9/13/2013 15:35	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	155.7	%
WUW-07-0012	9/13/2013 15:35	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.68	units
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.95	°C
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	1.9	NTU
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	4.18	cfs
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.69	mg/L
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.5	mg/L
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L
WUW-07-0012	9/13/2013 15:35	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.605	ms/cm
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Habitat (| CQHEI | WATER | TOTAL | N/A)	70	CQHEI
WUW-07-0012	9/13/2013 15:35	UWRBC 10	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	27	PTIR
WUW-07-0009	9/13/2013 17:42	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.22	mg/L
WUW-07-0009	9/13/2013 17:42	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	151.2	%

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0009	9/13/2013 17:42	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.83	units
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.47	°C
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	24.8	NTU
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	0	cfs
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.46	mg/L
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.4	mg/L
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.2	mg/L
WUW-07-0009	9/13/2013 17:42	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.55	ms/cm
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Habitat (| CQHEI | WATER | TOTAL | N/A)	59	CQHEI
WUW-07-0009	9/13/2013 17:42	UWRBC 11	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	10	PTIR
WUW-13-0003	9/13/2013 18:48	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.91	mg/L
WUW-13-0003	9/13/2013 18:48	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	117.6	%
WUW-13-0003	9/13/2013 18:48	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.52	units
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.28	°C
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	35.3	NTU
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	18.23	cfs
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	2.29	mg/L
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.01	mg/L
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.2	mg/L
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.26	mg/L
WUW-13-0003	9/13/2013 18:48	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.854	ms/cm
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Habitat (| CQHEI | WATER | TOTAL | N/A)	83	CQHEI
WUW-13-0003	9/13/2013 18:48	UWRBC 12	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	21	PTIR
WUW-07-0013	9/15/2013 8:46	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.54	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	78.7	%
WUW-07-0013	9/15/2013 8:46	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.23	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	15.94	°C
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	4.6	NTU
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	3.2	cfs
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.46	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.6	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.721	ms/cm
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Habitat (| CQHEI | WATER | TOTAL | N/A)	65	CQHEI
WUW-07-0013	9/15/2013 8:46	UWRBC 13	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	16	PTIR
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.54	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	78.7	%
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.23	units
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	15.94	°C
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	4.6	NTU
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.46	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.6	mg/L
WUW-07-0013	9/15/2013 8:46	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0011	9/15/2013 11:00	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.39	mg/L
WUW-07-0011	9/15/2013 11:00	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	76.2	%
WUW-07-0011	9/15/2013 11:00	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.18	units
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	15.41	°C
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	9.2	NTU
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	0.93	cfs
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.46	mg/L
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.3	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.16	mg/L
WUW-07-0011	9/15/2013 11:00	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.71	ms/cm
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Habitat (| CQHEI | WATER | TOTAL | N/A)	60	CQHEI
WUW-07-0011	9/15/2013 11:00	UWRBC 15	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	23	PTIR
WUW-09-0001	10/3/2013 11:49	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.79	mg/L
WUW-09-0001	10/3/2013 11:49	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	62.6	%
WUW-09-0001	10/3/2013 11:49	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.75	units
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	18.03	°C
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	2.3	NTU
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	1.13	cfs
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	2.29	mg/L
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.5	mg/L
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.16	mg/L
WUW-09-0001	10/3/2013 11:49	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	467	cfu/100mL
WUW-09-0001	10/3/2013 11:49	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.091	ms/cm
WUW-09-0003	10/3/2013 13:33	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	15.34	mg/L
WUW-09-0003	10/3/2013 13:33	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	179.1	%
WUW-09-0003	10/3/2013 13:33	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.81	units
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.63	°C
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	2.6	NTU
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	0.51	cfs
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	70.93	mg/L
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.211	mg/L
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	13.3	mg/L
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	2.13	mg/L
WUW-09-0003	10/3/2013 13:33	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-09-0003	10/3/2013 13:33	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	2.17	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0004	10/3/2013 14:57	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.33	mg/L
WUW-09-0004	10/3/2013 14:57	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	99.5	%
WUW-09-0004	10/3/2013 14:57	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.89	units
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.93	°C
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	34.7	NTU
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	0.71	cfs
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.14	mg/L
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.046	mg/L
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1	mg/L
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-09-0004	10/3/2013 14:57	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	467	cfu/100mL
WUW-09-0004	10/3/2013 14:57	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.107	ms/cm
WUW-09-0002	10/3/2013 16:30	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.52	mg/L
WUW-09-0002	10/3/2013 16:30	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	71.5	%
WUW-09-0002	10/3/2013 16:30	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.57	units
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	18.61	°C
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	17.4	NTU
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	0	cfs
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	2.86	mg/L
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.063	mg/L
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.9	mg/L
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.11	mg/L
WUW-09-0002	10/3/2013 16:30	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-09-0002	10/3/2013 16:30	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.381	ms/cm
WUW-08-0001	10/3/2013 17:13	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.23	mg/L
WUW-08-0001	10/3/2013 17:13	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	104.6	%
WUW-08-0001	10/3/2013 17:13	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.35	units
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.33	°C
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72.4	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	14.44	cfs
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	5.15	mg/L
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.043	mg/L
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.6	mg/L
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.18	mg/L
WUW-08-0001	10/3/2013 17:13	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-08-0001	10/3/2013 17:13	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.001	ms/cm
WUW-08-0005	10/4/2013 12:48	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.33	mg/L
WUW-08-0005	10/4/2013 12:48	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	96.5	%
WUW-08-0005	10/4/2013 12:48	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.36	units
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.46	°C
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	50.3	NTU
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	13.37	cfs
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	8.77	mg/L
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.05	mg/L
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3	mg/L
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.25	mg/L
WUW-08-0005	10/4/2013 12:48	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-08-0005	10/4/2013 12:48	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.015	ms/cm
WUW-08-0002	10/5/2013 13:35	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.91	mg/L
WUW-08-0002	10/5/2013 13:35	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	92.6	%
WUW-08-0002	10/5/2013 13:35	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.31	units
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.96	°C
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	35.4	NTU
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	17.84	cfs
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	7.25	mg/L
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.056	mg/L
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.8	mg/L
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.22	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	10/5/2013 13:35	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-08-0002	10/5/2013 13:35	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.004	ms/cm
WUW-08-0003	10/6/2013 12:32	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.93	mg/L
WUW-08-0003	10/6/2013 12:32	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	67.6	%
WUW-08-0003	10/6/2013 12:32	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.1	units
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.67	°C
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	67.3	NTU
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Flow (| USGS | WATER | TOTAL | N/A)	67.47	cfs
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.76	mg/L
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.2	mg/L
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.1	mg/L
WUW-08-0003	10/6/2013 12:32	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	533	cfu/100mL
WUW-08-0003	10/6/2013 12:32	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.918	ms/cm
WUW-08-0004	10/5/2013 18:10	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.2	mg/L
WUW-08-0004	10/5/2013 18:10	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	83.9	%
WUW-08-0004	10/5/2013 18:10	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.3	units
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.81	°C
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	66.5	NTU
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	25.45	cfs
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.81	mg/L
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.066	mg/L
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.1	mg/L
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.37	mg/L
WUW-08-0004	10/5/2013 18:10	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1800	cfu/100mL
WUW-08-0004	10/5/2013 18:10	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.703	ms/cm
WUW-07-0012	10/5/2013 19:00	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.56	mg/L
WUW-07-0012	10/5/2013 19:00	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	75.2	%
WUW-07-0012	10/5/2013 19:00	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.95	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.09	°C
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	87.8	NTU
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	13.49	cfs
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.81	mg/L
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.6	mg/L
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.55	mg/L
WUW-07-0012	10/5/2013 19:00	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	2100	cfu/100mL
WUW-07-0012	10/5/2013 19:00	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.348	ms/cm
WUW-07-0009	10/5/2013 15:30	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.63	mg/L
WUW-07-0009	10/5/2013 15:30	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.7	%
WUW-07-0009	10/5/2013 15:30	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.72	units
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.13	°C
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	184	NTU
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	9.57	cfs
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.81	mg/L
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.043	mg/L
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2	mg/L
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.49	mg/L
WUW-07-0009	10/5/2013 15:30	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	2833	cfu/100mL
WUW-07-0009	10/5/2013 15:30	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.255	ms/cm
WUW-13-0003	10/5/2013 16:39	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.8	mg/L
WUW-13-0003	10/5/2013 16:39	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	91	%
WUW-13-0003	10/5/2013 16:39	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.35	units
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.86	°C
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	82.7	NTU
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	50.79	cfs
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	6.48	mg/L
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.4	mg/L
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.42	mg/L
WUW-13-0003	10/5/2013 16:39	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1867	cfu/100mL
WUW-13-0003	10/5/2013 16:39	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.631	ms/cm
WUW-07-0013	10/6/2013 9:11	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.26	mg/L
WUW-07-0013	10/6/2013 9:11	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	59.4	%
WUW-07-0013	10/6/2013 9:11	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.95	units
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.2	°C
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	5.9	NTU
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	4.42	cfs
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.14	mg/L
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.1	mg/L
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	10/6/2013 9:11	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	2333	cfu/100mL
WUW-07-0013	10/6/2013 9:11	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.679	ms/cm
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.41	mg/L
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	60.4	%
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.95	units
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.19	°C
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	5.5	NTU
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.14	mg/L
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.9	mg/L
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	467	cfu/100mL
WUW-07-0013	10/6/2013 9:45	UWRBC 13D-1	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.689	ms/cm
WUW-07-0013	10/6/2013 10:15	UWRBC 13D-2	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.22	mg/L
WUW-07-0013	10/6/2013 10:15	UWRBC 13D-2	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	58.9	%

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	10/6/2013 10:15	UWRBC 13D-2	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.95	units
WUW-07-0013	10/6/2013 10:15	UWRBC 13D-2	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.2	°C
WUW-07-0013	10/6/2013 10:15	UWRBC 13D-2	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	5.4	NTU
WUW-07-0013	10/6/2013 10:15	UWRBC 13D-2	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.689	ms/cm
WUW-07-0011	10/6/2013 11:11	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	3.29	mg/L
WUW-07-0011	10/6/2013 11:11	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	36.7	%
WUW-07-0011	10/6/2013 11:11	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.79	units
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	19.58	°C
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	5.5	NTU
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	0.75	cfs
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.38	mg/L
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	0.4	mg/L
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.18	mg/L
WUW-07-0011	10/6/2013 11:11	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1033	cfu/100mL
WUW-07-0011	10/6/2013 11:11	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.723	ms/cm
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	12	mg/L
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	123.71	%
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	8.5	units
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17	°C
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Flow (| USGS | WATER | TOTAL | N/A)	13.67	cfs
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	18	mg/L
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	5.5	mg/L
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Habitat (| CQHEI | WATER | TOTAL | N/A)	49	CQHEI
WUW-09-0003	10/12/2013 14:30	UWRBC 02HRW	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	17	PTIR
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	9	mg/L
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	91	%

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	9	units
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	16	°C
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Flow (| USGS | WATER | TOTAL | N/A)	143.78	cfs
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	8.8	mg/L
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	0.7	mg/L
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Habitat (| CQHEI | WATER | TOTAL | N/A)	78	CQHEI
WUW-08-0002	10/12/2013 11:36	UWRBC 07HRW	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	32	PTIR
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	9	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	88	%
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	8.5	units
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	14.5	°C
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Flow (| USGS | WATER | TOTAL | N/A)	9.66	cfs
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	2.2	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	0.15	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Habitat (| CQHEI | WATER | TOTAL | N/A)	52	CQHEI
WUW-07-0013	10/12/2013 8:26	UWRBC 13HRW	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	21	PTIR
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	9.5	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	93	%
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	8.5	units
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	2.2	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	0.15	mg/L
WUW-07-0013	10/12/2013 8:26	UWRBC 13DHRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-09-0001	11/2/2013 17:50	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.53	mg/L
WUW-09-0001	11/2/2013 17:50	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	79.6	%

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	11/2/2013 17:50	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.78	units
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.37	°C
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	36.9	NTU
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	24.55	cfs
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	12.58	mg/L
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.149	mg/L
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.3	mg/L
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.35	mg/L
WUW-09-0001	11/2/2013 17:50	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1367	cfu/100mL
WUW-09-0001	11/2/2013 17:50	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.687	ms/cm
WUW-09-0003	11/2/2013 13:20	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.71	mg/L
WUW-09-0003	11/2/2013 13:20	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	82.5	%
WUW-09-0003	11/2/2013 13:20	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.72	units
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	11	°C
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	46.5	NTU
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	11.59	cfs
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	75.5	mg/L
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.208	mg/L
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	12.1	mg/L
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.34	mg/L
WUW-09-0003	11/2/2013 13:20	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1633	cfu/100mL
WUW-09-0003	11/2/2013 13:20	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.73	ms/cm
WUW-09-0004	11/2/2013 11:50	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.58	mg/L
WUW-09-0004	11/2/2013 11:50	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	70.5	%
WUW-09-0004	11/2/2013 11:50	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.62	units
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.3	°C
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	65.3	NTU
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	6.6	cfs
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	35.46	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.208	mg/L
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.7	mg/L
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.55	mg/L
WUW-09-0004	11/2/2013 11:50	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-09-0004	11/2/2013 11:50	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.649	ms/cm
WUW-09-0002	11/2/2013 10:50	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.7	mg/L
WUW-09-0002	11/2/2013 10:50	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	52.8	%
WUW-09-0002	11/2/2013 10:50	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.42	units
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.1	°C
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	109	NTU
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	1.31	cfs
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	21.16	mg/L
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.578	mg/L
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.8	mg/L
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.32	mg/L
WUW-09-0002	11/2/2013 10:50	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	3800	cfu/100mL
WUW-09-0002	11/2/2013 10:50	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.604	ms/cm
WUW-08-0001	11/1/2013 12:30	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.84	mg/L
WUW-08-0001	11/1/2013 12:30	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.9	%
WUW-08-0001	11/1/2013 12:30	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.97	units
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	11.26	°C
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72.5	NTU
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	90.38	cfs
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	5.72	mg/L
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.8	mg/L
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.38	mg/L
WUW-08-0001	11/1/2013 12:30	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1767	cfu/100mL
WUW-08-0001	11/1/2013 12:30	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.43	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0005	11/1/2013 14:29	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.99	mg/L
WUW-08-0005	11/1/2013 14:29	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	67.5	%
WUW-08-0005	11/1/2013 14:29	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.75	units
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	11.84	°C
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	193	NTU
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	124	cfs
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	9.91	mg/L
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.185	mg/L
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.8	mg/L
WUW-08-0005	11/1/2013 14:29	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	2200	cfu/100mL
WUW-08-0005	11/1/2013 14:29	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.867	ms/cm
WUW-08-0002	11/1/2013 17:00	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.87	mg/L
WUW-08-0002	11/1/2013 17:00	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	66.7	%
WUW-08-0002	11/1/2013 17:00	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.71	units
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	12.09	°C
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	125	NTU
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	147	cfs
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	8.01	mg/L
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.149	mg/L
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.7	mg/L
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.44	mg/L
WUW-08-0002	11/1/2013 17:00	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	2033	cfu/100mL
WUW-08-0002	11/1/2013 17:00	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.792	ms/cm
WUW-08-0003	11/1/2013 18:10	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	5.39	mg/L
WUW-08-0003	11/1/2013 18:10	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	52.6	%
WUW-08-0003	11/1/2013 18:10	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.57	units
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	12.31	°C
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	112	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Flow (| USGS | WATER | TOTAL | N/A)	287.88	cfs
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	12.2	mg/L
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.178	mg/L
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.5	mg/L
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.39	mg/L
WUW-08-0003	11/1/2013 18:10	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	2333	cfu/100mL
WUW-08-0003	11/1/2013 18:10	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.805	ms/cm
WUW-08-0004	11/3/2013 8:17	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.83	mg/L
WUW-08-0004	11/3/2013 8:17	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	82.3	%
WUW-08-0004	11/3/2013 8:17	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.89	units
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.32	°C
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	73.5	NTU
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	197.8	cfs
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	13.35	mg/L
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.122	mg/L
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.1	mg/L
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.4	mg/L
WUW-08-0004	11/3/2013 8:17	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	933	cfu/100mL
WUW-08-0004	11/3/2013 8:17	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.035	ms/cm
WUW-07-0012	11/3/2013 11:00	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.68	mg/L
WUW-07-0012	11/3/2013 11:00	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	89.5	%
WUW-07-0012	11/3/2013 11:00	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.89	units
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	9.99	°C
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	56.6	NTU
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	33.7	cfs
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	24.6	mg/L
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.201	mg/L
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.3	mg/L
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.3	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0012	11/3/2013 11:00	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1300	cfu/100mL
WUW-07-0012	11/3/2013 11:00	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.482	ms/cm
WUW-07-0009	11/3/2013 13:00	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.47	mg/L
WUW-07-0009	11/3/2013 13:00	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	97.2	%
WUW-07-0009	11/3/2013 13:00	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.97	units
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.17	°C
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	14.3	NTU
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	2.49	cfs
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.43	mg/L
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.132	mg/L
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.2	mg/L
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.04	mg/L
WUW-07-0009	11/3/2013 13:00	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-07-0009	11/3/2013 13:00	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.611	ms/cm
WUW-13-0003	11/3/2013 14:14	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.46	mg/L
WUW-13-0003	11/3/2013 14:14	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	89.6	%
WUW-13-0003	11/3/2013 14:14	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.96	units
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	11.03	°C
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	64	NTU
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	216.4	cfs
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	11.06	mg/L
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.9	mg/L
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.27	mg/L
WUW-13-0003	11/3/2013 14:14	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	633	cfu/100mL
WUW-13-0003	11/3/2013 14:14	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.817	ms/cm
WUW-07-0013	11/3/2013 16:09	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.73	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	81.9	%
WUW-07-0013	11/3/2013 16:09	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.79	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.63	°C
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	36.6	NTU
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	19.71	cfs
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	16.59	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.172	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.3	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0013	11/3/2013 16:09	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.514	ms/cm
WUW-07-0013	11/3/2013 16:09	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.73	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.178	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.4	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	11/3/2013 16:09	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-07-0011	11/3/2013 17:08	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.06	mg/L
WUW-07-0011	11/3/2013 17:08	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.8	%
WUW-07-0011	11/3/2013 17:08	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.7	units
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.18	°C
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	26	NTU
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	7.06	cfs
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.155	mg/L
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.4	mg/L
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.27	mg/L
WUW-07-0011	11/3/2013 17:08	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-07-0011	11/3/2013 17:08	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.536	ms/cm
WUW-09-0001	11/22/2013 10:00	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.01	mg/L
WUW-09-0001	11/22/2013 10:00	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	77.7	%
WUW-09-0001	11/22/2013 10:00	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.93	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.07	°C
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	19.9	NTU
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	19.54	cfs
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	7.92	mg/L
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.003	mg/L
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.9	mg/L
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-09-0001	11/22/2013 10:00	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	267	cfu/100mL
WUW-09-0001	11/22/2013 10:00	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.851	ms/cm
WUW-09-0003	11/22/2013 11:44	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.72	mg/L
WUW-09-0003	11/22/2013 11:44	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	78.6	%
WUW-09-0003	11/22/2013 11:44	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.75	units
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.87	°C
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	51.6	NTU
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	11.61	cfs
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	30.36	mg/L
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.145	mg/L
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.4	mg/L
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.26	mg/L
WUW-09-0003	11/22/2013 11:44	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1533	cfu/100mL
WUW-09-0003	11/22/2013 11:44	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.849	ms/cm
WUW-09-0004	11/22/2013 12:52	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.71	mg/L
WUW-09-0004	11/22/2013 12:52	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	68.6	%
WUW-09-0004	11/22/2013 12:52	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.76	units
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.33	°C
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72	NTU
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	7.28	cfs
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	27.72	mg/L
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.221	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9	mg/L
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.24	mg/L
WUW-09-0004	11/22/2013 12:52	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1833	cfu/100mL
WUW-09-0004	11/22/2013 12:52	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.753	ms/cm
WUW-09-0002	11/22/2013 14:05	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.89	mg/L
WUW-09-0002	11/22/2013 14:05	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	69.8	%
WUW-09-0002	11/22/2013 14:05	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.7	units
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.15	°C
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	70	NTU
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	1.54	cfs
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.208	mg/L
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.2	mg/L
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.12	mg/L
WUW-09-0002	11/22/2013 14:05	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1800	cfu/100mL
WUW-09-0002	11/22/2013 14:05	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.727	ms/cm
WUW-08-0001	11/21/2013 15:55	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.41	mg/L
WUW-08-0001	11/21/2013 15:55	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	71.7	%
WUW-08-0001	11/21/2013 15:55	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.79	units
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.68	°C
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	207	NTU
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	104.4	cfs
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	46.2	mg/L
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	1.304	mg/L
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.5	mg/L
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.32	mg/L
WUW-08-0001	11/21/2013 15:55	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1433	cfu/100mL
WUW-08-0001	11/21/2013 15:55	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.642	ms/cm
WUW-08-0005	11/22/2013 15:25	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.44	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0005	11/22/2013 15:25	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74	%
WUW-08-0005	11/22/2013 15:25	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.86	units
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.79	°C
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	133	NTU
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	105.7	cfs
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	38.28	mg/L
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.32	mg/L
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.8	mg/L
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.43	mg/L
WUW-08-0005	11/22/2013 15:25	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1400	cfu/100mL
WUW-08-0005	11/22/2013 15:25	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.673	ms/cm
WUW-08-0002	11/22/2013 16:55	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.53	mg/L
WUW-08-0002	11/22/2013 16:55	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.4	%
WUW-08-0002	11/22/2013 16:55	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.86	units
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.57	°C
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	131	NTU
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	115.2	cfs
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	40.92	mg/L
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.327	mg/L
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.9	mg/L
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.4	mg/L
WUW-08-0002	11/22/2013 16:55	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	733	cfu/100mL
WUW-08-0002	11/22/2013 16:55	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.658	ms/cm
WUW-08-0003	11/23/2013 10:20	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.79	mg/L
WUW-08-0003	11/23/2013 10:20	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	64.3	%
WUW-08-0003	11/23/2013 10:20	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.83	units
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	5.4	°C
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	110	NTU
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Flow (| USGS | WATER | TOTAL | N/A)	314.87	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	33	mg/L
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.317	mg/L
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.2	mg/L
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.18	mg/L
WUW-08-0003	11/23/2013 10:20	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	267	cfu/100mL
WUW-08-0003	11/23/2013 10:20	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.663	ms/cm
WUW-08-0004	11/21/2013 13:02	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.34	mg/L
WUW-08-0004	11/21/2013 13:02	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	80.6	%
WUW-08-0004	11/21/2013 13:02	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.88	units
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.12	°C
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	169	NTU
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	192.8	cfs
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	36.46	mg/L
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.366	mg/L
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.3	mg/L
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.21	mg/L
WUW-08-0004	11/21/2013 13:02	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	733	cfu/100mL
WUW-08-0004	11/21/2013 13:02	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.673	ms/cm
WUW-07-0012	11/21/2013 14:20	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.27	mg/L
WUW-07-0012	11/21/2013 14:20	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	96.1	%
WUW-07-0012	11/21/2013 14:20	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.25	units
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.67	°C
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	56.6	NTU
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	18.94	cfs
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.079	mg/L
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.4	mg/L
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.25	mg/L
WUW-07-0012	11/21/2013 14:20	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	867	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0012	11/21/2013 14:20	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.541	ms/cm
WUW-07-0009	11/21/2013 11:56	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.11	mg/L
WUW-07-0009	11/21/2013 11:56	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	102.5	%
WUW-07-0009	11/21/2013 11:56	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.23	units
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.33	°C
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	7	NTU
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	2.36	cfs
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	11.88	mg/L
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.013	mg/L
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.8	mg/L
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.01	mg/L
WUW-07-0009	11/21/2013 11:56	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-07-0009	11/21/2013 11:56	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.685	ms/cm
WUW-13-0003	11/21/2013 10:00	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.09	mg/L
WUW-13-0003	11/21/2013 10:00	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	86.1	%
WUW-13-0003	11/21/2013 10:00	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.98	units
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.66	°C
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	124	NTU
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	236.2	cfs
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	30.36	mg/L
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.076	mg/L
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.9	mg/L
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.25	mg/L
WUW-13-0003	11/21/2013 10:00	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	667	cfu/100mL
WUW-13-0003	11/21/2013 10:00	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.614	ms/cm
WUW-07-0013	11/23/2013 11:43	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.34	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	84.8	%
WUW-07-0013	11/23/2013 11:43	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.06	units
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	5.12	°C

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	32.7	NTU
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	36.26	cfs
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	19.8	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.092	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.6	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-07-0013	11/23/2013 11:43	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.628	ms/cm
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-1	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-1	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.092	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-1	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.3	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-1	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-1	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-2	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-2	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.092	mg/L
WUW-07-0013	11/23/2013 11:43	UWRBC 13D-2	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.2	mg/L
WUW-07-0010	11/23/2013 13:30	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.65	mg/L
WUW-07-0010	11/23/2013 13:30	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	79.4	%
WUW-07-0010	11/23/2013 13:30	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.96	units
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	5.27	°C
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	30.7	NTU
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	22.59	cfs
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	21.12	mg/L
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.79	mg/L
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.2	mg/L
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.22	mg/L
WUW-07-0010	11/23/2013 13:30	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	267	cfu/100mL
WUW-07-0010	11/23/2013 13:30	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.638	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0011	11/23/2013 15:00	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.01	mg/L
WUW-07-0011	11/23/2013 15:00	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	90.3	%
WUW-07-0011	11/23/2013 15:00	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.08	units
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	5.14	°C
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	23.8	NTU
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	12.56	cfs
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	21.12	mg/L
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.079	mg/L
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.7	mg/L
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.25	mg/L
WUW-07-0011	11/23/2013 15:00	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL
WUW-07-0011	11/23/2013 15:00	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.629	ms/cm
WUW-09-0001	3/15/2014 11:36	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.67	mg/L
WUW-09-0001	3/15/2014 11:36	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	71.6	%
WUW-09-0001	3/15/2014 11:36	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.65	units
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	1.82	°C
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	301	NTU
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	275.6	cfs
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	11.88	mg/L
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.116	mg/L
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.9	mg/L
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.47	mg/L
WUW-09-0001	3/15/2014 11:36	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-09-0001	3/15/2014 11:36	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.25	ms/cm
WUW-09-0003	3/15/2014 12:19	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.56	mg/L
WUW-09-0003	3/15/2014 12:19	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.1	%
WUW-09-0003	3/15/2014 12:19	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.33	units
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	2.49	°C
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	200	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	97.3	cfs
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	15.84	mg/L
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.089	mg/L
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.4	mg/L
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.44	mg/L
WUW-09-0003	3/15/2014 12:19	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	466	cfu/100mL
WUW-09-0003	3/15/2014 12:19	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.276	ms/cm
WUW-09-0004	3/15/2014 12:51	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.31	mg/L
WUW-09-0004	3/15/2014 12:51	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	70.8	%
WUW-09-0004	3/15/2014 12:51	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.32	units
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	2.85	°C
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	165	NTU
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	57.94	cfs
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.106	mg/L
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.7	mg/L
WUW-09-0004	3/15/2014 12:51	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.45	mg/L
WUW-09-0004	3/15/2014 12:51	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-09-0002	3/15/2014 13:20	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.23	mg/L
WUW-09-0002	3/15/2014 13:20	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.4	%
WUW-09-0002	3/15/2014 13:20	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.17	units
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4	°C
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	170	NTU
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	12.9	cfs
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.079	mg/L
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.9	mg/L
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.4	mg/L
WUW-09-0002	3/15/2014 13:20	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0002	3/15/2014 13:20	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.308	ms/cm
WUW-08-0001	3/15/2014 16:00	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.02	mg/L
WUW-08-0001	3/15/2014 16:00	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.4	%
WUW-08-0001	3/15/2014 16:00	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.45	units
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.85	°C
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	32.1	NTU
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	2339.8	cfs
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	25.08	mg/L
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.155	mg/L
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	12.2	mg/L
WUW-08-0001	3/15/2014 16:00	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.65	mg/L
WUW-08-0001	3/15/2014 16:00	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-08-0005	3/15/2014 16:33	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.48	mg/L
WUW-08-0005	3/15/2014 16:33	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	75.9	%
WUW-08-0005	3/15/2014 16:33	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.59	units
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.84	°C
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	303	NTU
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	2529.2	cfs
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	22.44	mg/L
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.093	mg/L
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.4	mg/L
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.57	mg/L
WUW-08-0005	3/15/2014 16:33	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-08-0005	3/15/2014 16:33	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.358	ms/cm
WUW-08-0002	3/15/2014 17:03	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.45	mg/L
WUW-08-0002	3/15/2014 17:03	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	75.5	%
WUW-08-0002	3/15/2014 17:03	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.66	units
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.7	°C
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	294	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	2435.2	cfs
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	22.44	mg/L
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.145	mg/L
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.9	mg/L
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.5	mg/L
WUW-08-0002	3/15/2014 17:03	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-08-0002	3/15/2014 17:03	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.354	ms/cm
WUW-08-0003	3/15/2014 17:42	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.46	mg/L
WUW-08-0003	3/15/2014 17:42	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.7	%
WUW-08-0003	3/15/2014 17:42	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.53	units
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.26	°C
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	265	NTU
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.152	mg/L
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.9	mg/L
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.53	mg/L
WUW-08-0003	3/15/2014 17:42	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-08-0003	3/15/2014 17:42	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.352	ms/cm
WUW-08-0004	3/15/2014 18:16	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.43	mg/L
WUW-08-0004	3/15/2014 18:16	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.3	%
WUW-08-0004	3/15/2014 18:16	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.55	units
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.13	°C
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	226	NTU
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	2975	cfs
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.089	mg/L
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.2	mg/L
WUW-08-0004	3/15/2014 18:16	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.5	mg/L
WUW-08-0004	3/15/2014 18:16	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0012	3/15/2014 19:47	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.73	mg/L
WUW-07-0012	3/15/2014 19:47	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	77	%
WUW-07-0012	3/15/2014 19:47	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.32	units
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.34	°C
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	110	NTU
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	341.3	cfs
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.5	mg/L
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.39	mg/L
WUW-07-0012	3/15/2014 19:47	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0012	3/15/2014 19:47	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.277	ms/cm
WUW-07-0009	3/15/2014 19:31	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.12	mg/L
WUW-07-0009	3/15/2014 19:31	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	73.9	%
WUW-07-0009	3/15/2014 19:31	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.36	units
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	5.26	°C
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	115	NTU
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	24	cfs
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	14.52	mg/L
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.6	mg/L
WUW-07-0009	3/15/2014 19:31	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.35	mg/L
WUW-07-0009	3/15/2014 19:31	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-13-0003	3/15/2014 18:57	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.75	mg/L
WUW-13-0003	3/15/2014 18:57	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	76.9	%
WUW-13-0003	3/15/2014 18:57	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.45	units
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.22	°C
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	151	NTU
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	3486.2	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.073	mg/L
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9	mg/L
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.46	mg/L
WUW-13-0003	3/15/2014 18:57	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-13-0003	3/15/2014 18:57	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.307	ms/cm
WUW-07-0013	3/15/2014 20:17	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.72	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	77.6	%
WUW-07-0013	3/15/2014 20:17	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.52	units
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.69	°C
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	116	NTU
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	260.7	cfs
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	10.56	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.056	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.1	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.32	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0013	3/15/2014 20:17	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.281	ms/cm
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.72	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	77.6	%
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.52	units
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.69	°C
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	116	NTU
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	10.56	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-1	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.32	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-2	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-2	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.046	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-2	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.4	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-2	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.36	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-3	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-07-0013	3/15/2014 20:17	UWRBC 13D-3	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.33	mg/L
WUW-07-0011	3/15/2014 20:54	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.31	mg/L
WUW-07-0011	3/15/2014 20:54	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	70.8	%
WUW-07-0011	3/15/2014 20:54	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.22	units
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	2.85	°C
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	165	NTU
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	81.7	cfs
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.48	mg/L
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.1	mg/L
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.36	mg/L
WUW-07-0011	3/15/2014 20:54	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0011	3/15/2014 20:54	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.273	ms/cm
WUW-09-0001	4/5/2014 8:54	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.76	mg/L
WUW-09-0001	4/5/2014 8:54	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	68.6	%
WUW-09-0001	4/5/2014 8:54	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.54	units
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	3.92	°C
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	436	NTU
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	530	cfs
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	25.08	mg/L
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.007	mg/L
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	14.6	mg/L
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.7	mg/L
WUW-09-0001	4/5/2014 8:54	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-09-0001	4/5/2014 8:54	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.348	ms/cm
WUW-09-0003	4/5/2014 9:49	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.39	mg/L
WUW-09-0003	4/5/2014 9:49	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	73.1	%

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0003	4/5/2014 9:49	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.49	units
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	3.69	°C
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	404	NTU
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	187.2	cfs
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.04	mg/L
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0	mg/L
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	13.9	mg/L
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.64	mg/L
WUW-09-0003	4/5/2014 9:49	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-09-0003	4/5/2014 9:49	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.352	ms/cm
WUW-09-0004	4/5/2014 10:25	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.08	mg/L
WUW-09-0004	4/5/2014 10:25	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	70.8	%
WUW-09-0004	4/5/2014 10:25	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.56	units
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	2.77	°C
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	366	NTU
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	111.4	cfs
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	33	mg/L
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.003	mg/L
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	14.6	mg/L
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.71	mg/L
WUW-09-0004	4/5/2014 10:25	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	267	cfu/100mL
WUW-09-0004	4/5/2014 10:25	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.34	ms/cm
WUW-09-0002	4/5/2014 10:50	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.06	mg/L
WUW-09-0002	4/5/2014 10:50	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	71.7	%
WUW-09-0002	4/5/2014 10:50	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.37	units
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	4.27	°C
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	306	NTU
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	24.8	cfs
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	42.24	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	14.2	mg/L
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.54	mg/L
WUW-09-0002	4/5/2014 10:50	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	967	cfu/100mL
WUW-09-0002	4/5/2014 10:50	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.384	ms/cm
WUW-08-0001	4/5/2014 11:27	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.04	mg/L
WUW-08-0001	4/5/2014 11:27	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	73.8	%
WUW-08-0001	4/5/2014 11:27	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.69	units
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	5.54	°C
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	1161	NTU
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	4500	cfs
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	30.36	mg/L
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.04	mg/L
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	16.8	mg/L
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.25	mg/L
WUW-08-0001	4/5/2014 11:27	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1600	cfu/100mL
WUW-08-0001	4/5/2014 11:27	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.273	ms/cm
WUW-08-0005	4/5/2014 14:35	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.74	mg/L
WUW-08-0005	4/5/2014 14:35	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.9	%
WUW-08-0005	4/5/2014 14:35	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.78	units
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.35	°C
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	1141	NTU
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	4864.4	cfs
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.04	mg/L
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	22.7	mg/L
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.25	mg/L
WUW-08-0005	4/5/2014 14:35	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL
WUW-08-0005	4/5/2014 14:35	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.274	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	4/5/2014 15:05	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.79	mg/L
WUW-08-0002	4/5/2014 15:05	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	73.3	%
WUW-08-0002	4/5/2014 15:05	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.87	units
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.37	°C
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	1116	NTU
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	4683.4	cfs
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	31.68	mg/L
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	23.6	mg/L
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.21	mg/L
WUW-08-0002	4/5/2014 15:05	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-08-0002	4/5/2014 15:05	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.277	ms/cm
WUW-08-0003	4/5/2014 15:40	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.52	mg/L
WUW-08-0003	4/5/2014 15:40	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	78.9	%
WUW-08-0003	4/5/2014 15:40	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.71	units
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.14	°C
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	1111	NTU
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	30.36	mg/L
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.099	mg/L
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	17.2	mg/L
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.16	mg/L
WUW-08-0003	4/5/2014 15:40	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	500	cfu/100mL
WUW-08-0003	4/5/2014 15:40	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.276	ms/cm
WUW-08-0004	4/5/2014 16:22	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.1	mg/L
WUW-08-0004	4/5/2014 16:22	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	76	%
WUW-08-0004	4/5/2014 16:22	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.72	units
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.44	°C
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	1062	NTU
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	5721.5	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	27.72	mg/L
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.013	mg/L
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	16.4	mg/L
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.11	mg/L
WUW-08-0004	4/5/2014 16:22	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1400	cfu/100mL
WUW-08-0004	4/5/2014 16:22	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.273	ms/cm
WUW-07-0012	4/5/2014 17:53	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.32	mg/L
WUW-07-0012	4/5/2014 17:53	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	70.4	%
WUW-07-0012	4/5/2014 17:53	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.6	units
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	6.97	°C
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	302	NTU
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	656.4	cfs
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	26.4	mg/L
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	17.9	mg/L
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.58	mg/L
WUW-07-0012	4/5/2014 17:53	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-07-0012	4/5/2014 17:53	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.387	ms/cm
WUW-07-0009	4/5/2014 17:25	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.21	mg/L
WUW-07-0009	4/5/2014 17:25	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	81.4	%
WUW-07-0009	4/5/2014 17:25	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.65	units
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.7	°C
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	247	NTU
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	46.2	cfs
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.04	mg/L
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	12.9	mg/L
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.49	mg/L
WUW-07-0009	4/5/2014 17:25	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0009	4/5/2014 17:25	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.38	ms/cm
WUW-07-0013	4/5/2014 18:38	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.3	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	79.2	%
WUW-07-0013	4/5/2014 18:38	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.58	units
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.19	°C
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	287	NTU
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	501.4	cfs
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	26.4	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.019	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.5	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.57	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	433	cfu/100mL
WUW-07-0013	4/5/2014 18:38	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.307	ms/cm
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.3	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	79.2	%
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.58	units
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.19	°C
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	287	NTU
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	30.36	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.013	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.6	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.57	mg/L
WUW-07-0013	4/5/2014 18:38	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	433	cfu/100mL
WUW-07-0010	4/5/2014 19:17	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.49	mg/L
WUW-07-0010	4/5/2014 19:17	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	73.6	%
WUW-07-0010	4/5/2014 19:17	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.56	units
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.94	°C
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	286	NTU
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	288	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.04	mg/L
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.3	mg/L
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.58	mg/L
WUW-07-0010	4/5/2014 19:17	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	367	cfu/100mL
WUW-07-0010	4/5/2014 19:17	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.31	ms/cm
WUW-07-0011	4/5/2014 19:43	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.76	mg/L
WUW-07-0011	4/5/2014 19:43	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	76.6	%
WUW-07-0011	4/5/2014 19:43	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.56	units
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.3	°C
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	218	NTU
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	157.2	cfs
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.04	mg/L
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.017	mg/L
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.4	mg/L
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.55	mg/L
WUW-07-0011	4/5/2014 19:43	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL
WUW-07-0011	4/5/2014 19:43	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.329	ms/cm
WUW-09-0001	4/26/2014 11:45	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.89	mg/L
WUW-09-0001	4/26/2014 11:45	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	131.5	%
WUW-09-0001	4/26/2014 11:45	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.18	units
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	14.46	°C
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	134.3	NTU
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	22.26	cfs
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	11.21	mg/L
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.1	mg/L
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.03	mg/L
WUW-09-0001	4/26/2014 11:45	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	4/26/2014 11:45	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.736	ms/cm
WUW-09-0003	4/26/2014 10:40	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	14.11	mg/L
WUW-09-0003	4/26/2014 10:40	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	142.9	%
WUW-09-0003	4/26/2014 10:40	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.35	units
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	14.11	°C
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	13.1	NTU
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	7.86	cfs
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	20.02	mg/L
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.7	mg/L
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.14	mg/L
WUW-09-0003	4/26/2014 10:40	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-09-0003	4/26/2014 10:40	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.77	ms/cm
WUW-09-0004	4/26/2014 10:00	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.86	mg/L
WUW-09-0004	4/26/2014 10:00	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	85.1	%
WUW-09-0004	4/26/2014 10:00	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.88	units
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	11.76	°C
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	23.4	NTU
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	4.68	cfs
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	23.45	mg/L
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.8	mg/L
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-09-0004	4/26/2014 10:00	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-09-0004	4/26/2014 10:00	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.651	ms/cm
WUW-09-0002	4/26/2014 9:03	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.78	mg/L
WUW-09-0002	4/26/2014 9:03	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	73.4	%
WUW-09-0002	4/26/2014 9:03	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.73	units
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	10.44	°C

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	21.4	NTU
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	1.04	cfs
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	46.9	mg/L
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.017	mg/L
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.9	mg/L
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.15	mg/L
WUW-09-0002	4/26/2014 9:03	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL
WUW-09-0002	4/26/2014 9:03	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.76	ms/cm
WUW-08-0001	4/25/2014 14:25	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.51	mg/L
WUW-08-0001	4/25/2014 14:25	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	116.6	%
WUW-08-0001	4/25/2014 14:25	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.34	units
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	14.14	°C
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	46.2	NTU
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	189	cfs
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.13	mg/L
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.5	mg/L
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.12	mg/L
WUW-08-0001	4/25/2014 14:25	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-08-0001	4/25/2014 14:25	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.704	ms/cm
WUW-08-0005	4/25/2014 15:35	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.2	mg/L
WUW-08-0005	4/25/2014 15:35	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	135.8	%
WUW-08-0005	4/25/2014 15:35	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.51	units
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	14.86	°C
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	41.3	NTU
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	204.3	cfs
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	20.59	mg/L
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.04	mg/L
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.5	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.12	mg/L
WUW-08-0005	4/25/2014 15:35	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-08-0005	4/25/2014 15:35	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.713	ms/cm
WUW-08-0002	4/25/2014 17:23	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.73	mg/L
WUW-08-0002	4/25/2014 17:23	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	142.3	%
WUW-08-0002	4/25/2014 17:23	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.58	units
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	15.19	°C
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	41.9	NTU
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	196.7	cfs
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-08-0002	4/25/2014 17:23	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-08-0002	4/25/2014 17:23	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.722	ms/cm
WUW-08-0003	4/25/2014 19:15	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	15.09	mg/L
WUW-08-0003	4/25/2014 19:15	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	156.4	%
WUW-08-0003	4/25/2014 19:15	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.72	units
WUW-08-0003	4/25/2014 19:15	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	15.19	°C
WUW-08-0003	4/25/2014 19:15	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	53.3	NTU
WUW-08-0003	4/25/2014 19:15	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	19.83	mg/L
WUW-08-0003	4/25/2014 19:15	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-08-0003	4/25/2014 19:15	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.7	mg/L
WUW-08-0003	4/25/2014 19:15	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.07	mg/L
WUW-08-0003	4/25/2014 19:15	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-08-0004	4/26/2014 16:55	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13	mg/L
WUW-08-0004	4/26/2014 16:55	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	138.9	%
WUW-08-0004	4/26/2014 16:55	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.72	units
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	16.64	°C

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	52.2	NTU
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	240.3	cfs
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	20.21	mg/L
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.1	mg/L
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.1	mg/L
WUW-08-0004	4/26/2014 16:55	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-08-0004	4/26/2014 16:55	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.705	ms/cm
WUW-07-0012	4/26/2014 17:54	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.45	mg/L
WUW-07-0012	4/26/2014 17:54	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	128.7	%
WUW-07-0012	4/26/2014 17:54	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.34	units
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	19.11	°C
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	5.2	NTU
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	27.97	cfs
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	11.44	mg/L
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.1	mg/L
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0012	4/26/2014 17:54	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-07-0012	4/26/2014 17:54	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.569	ms/cm
WUW-07-0009	4/26/2014 14:33	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	14.35	mg/L
WUW-07-0009	4/26/2014 14:33	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	157.7	%
WUW-07-0009	4/26/2014 14:33	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.61	units
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17.96	°C
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	6	NTU
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	1.94	cfs
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.74	mg/L
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	13.35	mg/L
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.8	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.04	mg/L
WUW-07-0009	4/26/2014 14:33	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0009	4/26/2014 14:33	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.54	ms/cm
WUW-13-0003	4/26/2014 15:20	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.25	mg/L
WUW-13-0003	4/26/2014 15:20	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	142.8	%
WUW-13-0003	4/26/2014 15:20	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.7	units
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17.03	°C
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	55.1	NTU
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	281.6	cfs
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	15.44	mg/L
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.2	mg/L
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.03	mg/L
WUW-13-0003	4/26/2014 15:20	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-13-0003	4/26/2014 15:20	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.694	ms/cm
WUW-07-0013	4/26/2014 18:30	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	15.56	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	172.1	%
WUW-07-0013	4/26/2014 18:30	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.31	units
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17.72	°C
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	17.9	NTU
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	21.06	cfs
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	10.3	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.043	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.5	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.03	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	15.56	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	172.1	%
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.31	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17.72	°C
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	17.9	NTU
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	10.3	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.5	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0013	4/26/2014 18:30	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	233	cfu/100mL
WUW-07-0011	4/26/2014 19:15	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	15.67	mg/L
WUW-07-0011	4/26/2014 19:15	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	169.2	%
WUW-07-0011	4/26/2014 19:15	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.25	units
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17.31	°C
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	39.5	NTU
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	6.6	cfs
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	8.01	mg/L
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.1	mg/L
WUW-07-0011	4/26/2014 19:15	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.03	mg/L
WUW-07-0011	4/26/2014 19:15	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-09-0001	6/15/2014 17:20	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.47	mg/L
WUW-09-0001	6/15/2014 17:20	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	101.5	%
WUW-09-0001	6/15/2014 17:20	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.14	units
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.54	°C
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	7.6	NTU
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	18.91	cfs
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	25.17	mg/L
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.083	mg/L
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.6	mg/L
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.15	mg/L
WUW-09-0001	6/15/2014 17:20	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	6/15/2014 17:20	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.698	ms/cm
WUW-09-0003	6/15/2014 18:30	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.81	mg/L
WUW-09-0003	6/15/2014 18:30	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	124.1	%
WUW-09-0003	6/15/2014 18:30	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.15	units
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.76	°C
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	11	NTU
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	10.93	cfs
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	50.34	mg/L
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.083	mg/L
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.3	mg/L
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.26	mg/L
WUW-09-0003	6/15/2014 18:30	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-09-0003	6/15/2014 18:30	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.774	ms/cm
WUW-09-0004	6/15/2014 19:19	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.3	mg/L
WUW-09-0004	6/15/2014 19:19	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	116.2	%
WUW-09-0004	6/15/2014 19:19	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.06	units
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.8	°C
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	25	NTU
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	8.21	cfs
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	33.18	mg/L
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.248	mg/L
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.2	mg/L
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L
WUW-09-0004	6/15/2014 19:19	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-09-0004	6/15/2014 19:19	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.681	ms/cm
WUW-09-0002	6/15/2014 20:00	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.89	mg/L
WUW-09-0002	6/15/2014 20:00	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	108.7	%
WUW-09-0002	6/15/2014 20:00	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8	units
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.72	°C

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	11.2	NTU
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	1.253	cfs
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	29.74	mg/L
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.271	mg/L
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.2	mg/L
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.06	mg/L
WUW-09-0002	6/15/2014 20:00	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	666	cfu/100mL
WUW-09-0002	6/15/2014 20:00	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.66	ms/cm
WUW-08-0001	6/13/2014 13:10	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.64	mg/L
WUW-08-0001	6/13/2014 13:10	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	90.3	%
WUW-08-0001	6/13/2014 13:10	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.96	units
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	21.02	°C
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	85.2	NTU
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	232.3	cfs
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	59.49	mg/L
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.429	mg/L
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	14.4	mg/L
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.28	mg/L
WUW-08-0001	6/13/2014 13:10	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-08-0001	6/13/2014 13:10	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.721	ms/cm
WUW-08-0005	6/13/2014 15:10	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.54	mg/L
WUW-08-0005	6/13/2014 15:10	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	102.4	%
WUW-08-0005	6/13/2014 15:10	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.11	units
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.66	°C
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	75.5	NTU
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	231.5	cfs
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	60.47	mg/L
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.422	mg/L
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	16.5	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.27	mg/L
WUW-08-0005	6/13/2014 15:10	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-08-0005	6/13/2014 15:10	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.715	ms/cm
WUW-08-0002	6/13/2014 17:20	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.91	mg/L
WUW-08-0002	6/13/2014 17:20	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	106.1	%
WUW-08-0002	6/13/2014 17:20	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.15	units
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.29	°C
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72.2	NTU
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	273.7	cfs
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	62.92	mg/L
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.413	mg/L
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	15.8	mg/L
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.27	mg/L
WUW-08-0002	6/13/2014 17:20	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-08-0002	6/13/2014 17:20	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.7	ms/cm
WUW-08-0003	6/13/2014 18:56	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.12	mg/L
WUW-08-0003	6/13/2014 18:56	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	96.5	%
WUW-08-0003	6/13/2014 18:56	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.03	units
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.21	°C
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	76.9	NTU
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	43.47	mg/L
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.581	mg/L
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.9	mg/L
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.19	mg/L
WUW-08-0003	6/13/2014 18:56	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	266	cfu/100mL
WUW-08-0003	6/13/2014 18:56	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.685	ms/cm
WUW-08-0004	6/14/2014 7:10	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.77	mg/L
WUW-08-0004	6/14/2014 7:10	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	88	%
WUW-08-0004	6/14/2014 7:10	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.11	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	19.78	°C
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	109	NTU
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	251.7	cfs
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	41.18	mg/L
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.403	mg/L
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	11.1	mg/L
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.22	mg/L
WUW-08-0004	6/14/2014 7:10	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-08-0004	6/14/2014 7:10	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.686	ms/cm
WUW-07-0012	6/14/2014 8:20	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.75	mg/L
WUW-07-0012	6/14/2014 8:20	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	84.6	%
WUW-07-0012	6/14/2014 8:20	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.07	units
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	11.44	°C
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	43.6	NTU
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	66.64	cfs
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	56.06	mg/L
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.515	mg/L
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	13.7	mg/L
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.11	mg/L
WUW-07-0012	6/14/2014 8:20	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-07-0012	6/14/2014 8:20	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.598	ms/cm
WUW-07-0009	6/14/2014 10:30	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.97	mg/L
WUW-07-0009	6/14/2014 10:30	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	96.9	%
WUW-07-0009	6/14/2014 10:30	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.26	units
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	17.43	°C
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	16.7	NTU
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	3.6	cfs
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	40.04	mg/L
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.083	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.4	mg/L
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0009	6/14/2014 10:30	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-07-0009	6/14/2014 10:30	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.598	ms/cm
WUW-13-0003	6/14/2014 9:19	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.61	mg/L
WUW-13-0003	6/14/2014 9:19	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	95.6	%
WUW-13-0003	6/14/2014 9:19	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.61	units
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	18.77	°C
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	57.3	NTU
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	308.6	cfs
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	44.62	mg/L
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.502	mg/L
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.2	mg/L
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.16	mg/L
WUW-13-0003	6/14/2014 9:19	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-13-0003	6/14/2014 9:19	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.628	ms/cm
WUW-07-0013	6/15/2014 11:37	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.3	mg/L
WUW-07-0013	6/15/2014 11:37	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	105.1	%
WUW-07-0013	6/15/2014 11:37	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.07	units
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	19.63	°C
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	29.4	NTU
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	33.96	cfs
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	27.46	mg/L
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.178	mg/L
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.3	mg/L
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.06	mg/L
WUW-07-0013	6/15/2014 11:37	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0013	6/15/2014 11:37	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.647	ms/cm
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.29	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	105.1	%
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.07	units
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	19.72	°C
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	28.1	NTU
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	30.89	mg/L
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.185	mg/L
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.2	mg/L
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0013	6/15/2014 11:57	UWRBC 13D	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.648	ms/cm
WUW-07-0010	6/15/2014 13:15	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.53	mg/L
WUW-07-0010	6/15/2014 13:15	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	86.2	%
WUW-07-0010	6/15/2014 13:15	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.81	units
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20.27	°C
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	25.1	NTU
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	19	cfs
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	40.04	mg/L
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.231	mg/L
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.4	mg/L
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0010	6/15/2014 13:15	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-07-0010	6/15/2014 13:15	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.683	ms/cm
WUW-07-0011	6/15/2014 14:27	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.36	mg/L
WUW-07-0011	6/15/2014 14:27	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	95	%
WUW-07-0011	6/15/2014 14:27	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.92	units
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	19.89	°C
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	11.8	NTU
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	12.41	cfs
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	37.75	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.046	mg/L
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.8	mg/L
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.06	mg/L
WUW-07-0011	6/15/2014 14:27	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0011	6/15/2014 14:27	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.653	ms/cm
WUW-09-0001	7/13/2014 10:30	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.28	mg/L
WUW-09-0001	7/13/2014 10:30	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	111.3	%
WUW-09-0001	7/13/2014 10:30	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.2	units
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.64	°C
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	4.5	NTU
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	3.39	cfs
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	5.28	mg/L
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4	mg/L
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.15	mg/L
WUW-09-0001	7/13/2014 10:30	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	233	cfu/100mL
WUW-09-0001	7/13/2014 10:30	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.845	ms/cm
WUW-09-0003	7/13/2014 12:14	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.1	mg/L
WUW-09-0003	7/13/2014 12:14	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	166.6	%
WUW-09-0003	7/13/2014 12:14	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.49	units
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.72	°C
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	9.1	NTU
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	1.22	cfs
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	21.12	mg/L
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.204	mg/L
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.3	mg/L
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.78	mg/L
WUW-09-0003	7/13/2014 12:14	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-09-0003	7/13/2014 12:14	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.144	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0004	7/13/2014 13:26	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.52	mg/L
WUW-09-0004	7/13/2014 13:26	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	122.9	%
WUW-09-0004	7/13/2014 13:26	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.11	units
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.64	°C
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	13.2	NTU
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	0.68	cfs
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	9.24	mg/L
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.106	mg/L
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.1	mg/L
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.12	mg/L
WUW-09-0004	7/13/2014 13:26	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	533	cfu/100mL
WUW-09-0004	7/13/2014 13:26	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.688	ms/cm
WUW-09-0002	7/13/2014 14:28	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.72	mg/L
WUW-09-0002	7/13/2014 14:28	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	162.5	%
WUW-09-0002	7/13/2014 14:28	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.27	units
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.13	°C
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	19.5	NTU
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	0.17	cfs
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	7.92	mg/L
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.139	mg/L
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.9	mg/L
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.16	mg/L
WUW-09-0002	7/13/2014 14:28	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-09-0002	7/13/2014 14:28	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.741	ms/cm
WUW-08-0001	7/11/2014 13:38	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.05	mg/L
WUW-08-0001	7/11/2014 13:38	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	112.1	%
WUW-08-0001	7/11/2014 13:38	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.23	units
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.39	°C
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	90.2	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	138.4	cfs
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	26.4	mg/L
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.171	mg/L
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9	mg/L
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.43	mg/L
WUW-08-0001	7/11/2014 13:38	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	533	cfu/100mL
WUW-08-0001	7/11/2014 13:38	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.636	ms/cm
WUW-08-0005	7/11/2014 14:45	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.53	mg/L
WUW-08-0005	7/11/2014 14:45	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	120.6	%
WUW-08-0005	7/11/2014 14:45	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.35	units
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.53	°C
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	85.1	NTU
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	149.1	cfs
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	22.44	mg/L
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.132	mg/L
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.7	mg/L
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.42	mg/L
WUW-08-0005	7/11/2014 14:45	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-08-0005	7/11/2014 14:45	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.637	ms/cm
WUW-08-0002	7/11/2014 16:26	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.08	mg/L
WUW-08-0002	7/11/2014 16:26	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	139.7	%
WUW-08-0002	7/11/2014 16:26	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.47	units
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.35	°C
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	83.7	NTU
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	133.1	cfs
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	26.4	mg/L
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.119	mg/L
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.8	mg/L
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.44	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	7/11/2014 16:26	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-08-0002	7/11/2014 16:26	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.624	ms/cm
WUW-08-0003	7/11/2014 18:30	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.96	mg/L
WUW-08-0003	7/11/2014 18:30	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	112.5	%
WUW-08-0003	7/11/2014 18:30	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.27	units
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.19	°C
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	120	NTU
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	23.76	mg/L
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.149	mg/L
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.7	mg/L
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.42	mg/L
WUW-08-0003	7/11/2014 18:30	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	467	cfu/100mL
WUW-08-0003	7/11/2014 18:30	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.525	ms/cm
WUW-08-0004	7/12/2014 10:56	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.46	mg/L
WUW-08-0004	7/12/2014 10:56	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	105.7	%
WUW-08-0004	7/12/2014 10:56	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.2	units
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.88	°C
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	113	NTU
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	138.2	cfs
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	19.56	mg/L
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.145	mg/L
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.9	mg/L
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.43	mg/L
WUW-08-0004	7/12/2014 10:56	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-08-0004	7/12/2014 10:56	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.341	ms/cm
WUW-07-0012	7/12/2014 12:09	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.35	mg/L
WUW-07-0012	7/12/2014 12:09	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	130.1	%
WUW-07-0012	7/12/2014 12:09	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.33	units
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.03	°C

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	3.1	NTU
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	12.27	cfs
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	6.81	mg/L
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.8	mg/L
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0012	7/12/2014 12:09	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-07-0012	7/12/2014 12:09	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.585	ms/cm
WUW-07-0009	7/12/2014 14:15	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.9	mg/L
WUW-07-0009	7/12/2014 14:15	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	131.8	%
WUW-07-0009	7/12/2014 14:15	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.45	units
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.15	°C
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	4.7	NTU
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	0.41	cfs
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	6.69	mg/L
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.4	mg/L
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.06	mg/L
WUW-07-0009	7/12/2014 14:15	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	633	cfu/100mL
WUW-07-0009	7/12/2014 14:15	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.605	ms/cm
WUW-13-0003	7/12/2014 13:11	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.44	mg/L
WUW-13-0003	7/12/2014 13:11	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	119.7	%
WUW-13-0003	7/12/2014 13:11	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.37	units
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.65	°C
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	74.5	NTU
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	149.5	cfs
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	13.04	mg/L
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.099	mg/L
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.8	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.26	mg/L
WUW-13-0003	7/12/2014 13:11	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	333	cfu/100mL
WUW-13-0003	7/12/2014 13:11	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.55	ms/cm
WUW-07-0013	7/12/2014 15:42	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.31	mg/L
WUW-07-0013	7/12/2014 15:42	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	152.1	%
WUW-07-0013	7/12/2014 15:42	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.21	units
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.05	°C
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	7.1	NTU
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	9.65	cfs
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.98	mg/L
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.04	mg/L
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.8	mg/L
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	7/12/2014 15:42	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-07-0013	7/12/2014 15:42	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.608	ms/cm
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.31	mg/L
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	152.1	%
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.21	units
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.05	°C
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	7.1	NTU
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	4.06	mg/L
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.8	mg/L
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.05	mg/L
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0013	7/12/2014 15:52	UWRBC 13D	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.608	ms/cm
WUW-07-0010	7/12/2014 16:30	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.67	mg/L
WUW-07-0010	7/12/2014 16:30	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	157.8	%
WUW-07-0010	7/12/2014 16:30	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.06	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.67	°C
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	23	NTU
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	1.3	cfs
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.2	mg/L
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.2	mg/L
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0010	7/12/2014 16:30	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-07-0010	7/12/2014 16:30	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.662	ms/cm
WUW-07-0011	7/12/2014 17:25	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.96	mg/L
WUW-07-0011	7/12/2014 17:25	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	160.8	%
WUW-07-0011	7/12/2014 17:25	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.16	units
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.5	°C
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	82.9	NTU
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	2.94	cfs
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.49	mg/L
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.9	mg/L
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.07	mg/L
WUW-07-0011	7/12/2014 17:25	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-07-0011	7/12/2014 17:25	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.639	ms/cm
WUW-09-0001	8/5/2014 18:18	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.81	mg/L
WUW-09-0001	8/5/2014 18:18	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	82.2	%
WUW-09-0001	8/5/2014 18:18	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.82	units
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.53	°C
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	53	NTU
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	2.44	cfs
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	2.86	mg/L
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.056	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3	mg/L
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.21	mg/L
WUW-09-0001	8/5/2014 18:18	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1033	cfu/100mL
WUW-09-0001	8/5/2014 18:18	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.817	ms/cm
WUW-09-0003	8/5/2014 19:26	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.42	mg/L
WUW-09-0003	8/5/2014 19:26	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	160	%
WUW-09-0003	8/5/2014 19:26	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.55	units
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.92	°C
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	13.3	NTU
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	1.05	cfs
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	39.69	mg/L
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.132	mg/L
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.5	mg/L
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	1.14	mg/L
WUW-09-0003	8/5/2014 19:26	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	600	cfu/100mL
WUW-09-0003	8/5/2014 19:26	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.319	ms/cm
WUW-09-0004	8/5/2014 19:58	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.74	mg/L
WUW-09-0004	8/5/2014 19:58	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	79.9	%
WUW-09-0004	8/5/2014 19:58	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.26	units
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.6	°C
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	28	NTU
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	0.31	cfs
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.34	mg/L
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.1	mg/L
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.12	mg/L
WUW-09-0004	8/5/2014 19:58	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-09-0004	8/5/2014 19:58	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.781	ms/cm
WUW-09-0002	8/5/2014 20:27	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.94	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0002	8/5/2014 20:27	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	98.7	%
WUW-09-0002	8/5/2014 20:27	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.73	units
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.06	°C
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	102	NTU
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	-0.14	cfs
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.61	mg/L
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.099	mg/L
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.4	mg/L
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.27	mg/L
WUW-09-0002	8/5/2014 20:27	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	467	cfu/100mL
WUW-09-0002	8/5/2014 20:27	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.84	ms/cm
WUW-08-0001	8/4/2014 18:49	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.85	mg/L
WUW-08-0001	8/4/2014 18:49	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	150.3	%
WUW-08-0001	8/4/2014 18:49	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.78	units
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.14	°C
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	107	NTU
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	51.44	cfs
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.15	mg/L
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.5	mg/L
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.57	mg/L
WUW-08-0001	8/4/2014 18:49	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-08-0001	8/4/2014 18:49	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1	ms/cm
WUW-08-0005	8/4/2014 19:30	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.76	mg/L
WUW-08-0005	8/4/2014 19:30	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	148	%
WUW-08-0005	8/4/2014 19:30	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.8	units
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.7	°C
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	99.3	NTU
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	58.75	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.19	mg/L
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.3	mg/L
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.54	mg/L
WUW-08-0005	8/4/2014 19:30	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	200	cfu/100mL
WUW-08-0005	8/4/2014 19:30	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.987	ms/cm
WUW-08-0002	8/5/2014 9:30	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.21	mg/L
WUW-08-0002	8/5/2014 9:30	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	86.6	%
WUW-08-0002	8/5/2014 9:30	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.52	units
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.16	°C
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	108	NTU
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	66.85	cfs
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.11	mg/L
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.55	mg/L
WUW-08-0002	8/5/2014 9:30	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-08-0002	8/5/2014 9:30	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.023	ms/cm
WUW-08-0003	8/5/2014 10:48	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.59	mg/L
WUW-08-0003	8/5/2014 10:48	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	129.3	%
WUW-08-0003	8/5/2014 10:48	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.86	units
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.08	°C
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	91.8	NTU
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.11	mg/L
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.007	mg/L
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.7	mg/L
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.52	mg/L
WUW-08-0003	8/5/2014 10:48	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-08-0003	8/5/2014 10:48	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.882	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0004	8/5/2014 11:25	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.06	mg/L
WUW-08-0004	8/5/2014 11:25	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	97.9	%
WUW-08-0004	8/5/2014 11:25	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.56	units
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.79	°C
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	95.7	NTU
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	62.48	cfs
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.11	mg/L
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.01	mg/L
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.1	mg/L
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.47	mg/L
WUW-08-0004	8/5/2014 11:25	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-08-0004	8/5/2014 11:25	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.912	ms/cm
WUW-07-0012	8/5/2014 12:38	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.2	mg/L
WUW-07-0012	8/5/2014 12:38	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	110.2	%
WUW-07-0012	8/5/2014 12:38	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.16	units
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.13	°C
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	6.2	NTU
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	5.14	cfs
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.57	mg/L
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.8	mg/L
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.1	mg/L
WUW-07-0012	8/5/2014 12:38	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-07-0012	8/5/2014 12:38	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.621	ms/cm
WUW-07-0009	8/5/2014 14:14	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.93	mg/L
WUW-07-0009	8/5/2014 14:14	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	129.7	%
WUW-07-0009	8/5/2014 14:14	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.44	units
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.6	°C
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	12.7	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	0.19	cfs
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.23	mg/L
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.6	mg/L
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.12	mg/L
WUW-07-0009	8/5/2014 14:14	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-07-0009	8/5/2014 14:14	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.596	ms/cm
WUW-13-0003	8/5/2014 14:53	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.89	mg/L
WUW-13-0003	8/5/2014 14:53	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	122.5	%
WUW-13-0003	8/5/2014 14:53	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.61	units
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.8	°C
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	76	NTU
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	65.48	cfs
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.06	mg/L
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.066	mg/L
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.7	mg/L
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.38	mg/L
WUW-13-0003	8/5/2014 14:53	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-13-0003	8/5/2014 14:53	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.848	ms/cm
WUW-07-0013	8/5/2014 15:57	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.15	mg/L
WUW-07-0013	8/5/2014 15:57	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	142	%
WUW-07-0013	8/5/2014 15:57	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.12	units
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.44	°C
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	9.3	NTU
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	3.83	cfs
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.17	mg/L
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	8/5/2014 15:57	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0013	8/5/2014 15:57	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.695	ms/cm
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.15	mg/L
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	142	%
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.12	units
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.44	°C
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	9.3	NTU
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.17	mg/L
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.028	mg/L
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-07-0013	8/5/2014 16:07	UWRBC 13D	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.695	ms/cm
WUW-07-0010	8/5/2014 16:31	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.91	mg/L
WUW-07-0010	8/5/2014 16:31	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	83.3	%
WUW-07-0010	8/5/2014 16:31	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.71	units
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.81	°C
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	12.7	NTU
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	2	cfs
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.06	mg/L
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.5	mg/L
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.07	mg/L
WUW-07-0010	8/5/2014 16:31	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0010	8/5/2014 16:31	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.769	ms/cm
WUW-07-0011	8/5/2014 17:00	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.26	mg/L
WUW-07-0011	8/5/2014 17:00	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	99.9	%
WUW-07-0011	8/5/2014 17:00	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.97	units
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.62	°C

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	17.9	NTU
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	0.88	cfs
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.17	mg/L
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.6	mg/L
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.11	mg/L
WUW-07-0011	8/5/2014 17:00	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	167	cfu/100mL
WUW-07-0011	8/5/2014 17:00	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.745	ms/cm
WUW-09-0001	8/31/2014 9:42	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.12	mg/L
WUW-09-0001	8/31/2014 9:42	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	83.7	%
WUW-09-0001	8/31/2014 9:42	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.92	units
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.14	°C
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	6.9	NTU
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	5.19	cfs
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.09	mg/L
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.8	mg/L
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.16	mg/L
WUW-09-0001	8/31/2014 9:42	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	467	cfu/100mL
WUW-09-0001	8/31/2014 9:42	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.763	ms/cm
WUW-09-0003	8/31/2014 10:56	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.05	mg/L
WUW-09-0003	8/31/2014 10:56	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	96.2	%
WUW-09-0003	8/31/2014 10:56	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.9	units
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.89	°C
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	6.2	NTU
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	1.74	cfs
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	20.02	mg/L
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.7	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-09-0003	8/31/2014 10:56	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-09-0003	8/31/2014 10:56	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.161	ms/cm
WUW-09-0004	8/31/2014 12:10	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.43	mg/L
WUW-09-0004	8/31/2014 12:10	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	102	%
WUW-09-0004	8/31/2014 12:10	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.05	units
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.61	°C
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	12.4	NTU
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	0.38	cfs
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.49	mg/L
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.9	mg/L
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.14	mg/L
WUW-09-0004	8/31/2014 12:10	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	767	cfu/100mL
WUW-09-0004	8/31/2014 12:10	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.775	ms/cm
WUW-09-0002	8/31/2014 12:56	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	4.98	mg/L
WUW-09-0002	8/31/2014 12:56	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	60.4	%
WUW-09-0002	8/31/2014 12:56	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.61	units
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.72	°C
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	19.5	NTU
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	-0.1	cfs
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	2.29	mg/L
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.7	mg/L
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.24	mg/L
WUW-09-0002	8/31/2014 12:56	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	833	cfu/100mL
WUW-09-0002	8/31/2014 12:56	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.026	ms/cm
WUW-08-0001	8/28/2014 14:43	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.49	mg/L
WUW-08-0001	8/28/2014 14:43	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	132.1	%

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0001	8/28/2014 14:43	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.2	units
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.82	°C
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	149	NTU
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	116.4	cfs
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.49	mg/L
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.8	mg/L
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.7	mg/L
WUW-08-0001	8/28/2014 14:43	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	567	cfu/100mL
WUW-08-0001	8/28/2014 14:43	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.678	ms/cm
WUW-08-0005	8/28/2014 15:47	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.51	mg/L
WUW-08-0005	8/28/2014 15:47	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	144.1	%
WUW-08-0005	8/28/2014 15:47	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.52	units
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.5	°C
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	125	NTU
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	132.78	cfs
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	4.35	mg/L
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.043	mg/L
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.1	mg/L
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.57	mg/L
WUW-08-0005	8/28/2014 15:47	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	400	cfu/100mL
WUW-08-0005	8/28/2014 15:47	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.7	ms/cm
WUW-08-0002	8/28/2014 16:23	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.45	mg/L
WUW-08-0002	8/28/2014 16:23	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	168.8	%
WUW-08-0002	8/28/2014 16:23	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.66	units
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.59	°C
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	114	NTU
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	123.1	cfs
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	4.46	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.5	mg/L
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.52	mg/L
WUW-08-0002	8/28/2014 16:23	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	367	cfu/100mL
WUW-08-0002	8/28/2014 16:23	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.668	ms/cm
WUW-08-0003	8/28/2014 17:29	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.16	mg/L
WUW-08-0003	8/28/2014 17:29	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	168.6	%
WUW-08-0003	8/28/2014 17:29	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.6	units
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.78	°C
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	89.2	NTU
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	9.61	mg/L
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.116	mg/L
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.9	mg/L
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.39	mg/L
WUW-08-0003	8/28/2014 17:29	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-08-0003	8/28/2014 17:29	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.637	ms/cm
WUW-08-0004	8/29/2014 14:25	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.52	mg/L
WUW-08-0004	8/29/2014 14:25	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	133.4	%
WUW-08-0004	8/29/2014 14:25	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.56	units
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	26.21	°C
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72.9	NTU
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	108.7	cfs
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	10.75	mg/L
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.135	mg/L
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.2	mg/L
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.38	mg/L
WUW-08-0004	8/29/2014 14:25	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-08-0004	8/29/2014 14:25	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.631	ms/cm
WUW-07-0012	8/29/2014 15:26	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.59	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0012	8/29/2014 15:26	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	144.2	%
WUW-07-0012	8/29/2014 15:26	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.47	units
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.06	°C
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	4.1	NTU
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	8.67	cfs
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	2.17	mg/L
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	3.3	mg/L
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L
WUW-07-0012	8/29/2014 15:26	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-07-0012	8/29/2014 15:26	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.5	ms/cm
WUW-07-0009	8/29/2014 16:32	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.62	mg/L
WUW-07-0009	8/29/2014 16:32	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	168.5	%
WUW-07-0009	8/29/2014 16:32	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.58	units
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.91	°C
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	20.6	NTU
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	0.49	cfs
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.76	mg/L
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.017	mg/L
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.5	mg/L
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.13	mg/L
WUW-07-0009	8/29/2014 16:32	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	267	cfu/100mL
WUW-07-0009	8/29/2014 16:32	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.55	ms/cm
WUW-13-0003	8/30/2014 9:32	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.27	mg/L
WUW-13-0003	8/30/2014 9:32	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	99.3	%
WUW-13-0003	8/30/2014 9:32	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.21	units
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.28	°C
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	41.7	NTU
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	79.25	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	3.43	mg/L
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.3	mg/L
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.26	mg/L
WUW-13-0003	8/30/2014 9:32	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	100	cfu/100mL
WUW-13-0003	8/30/2014 9:32	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.614	ms/cm
WUW-07-0013	8/30/2014 10:45	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.5	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	114.4	%
WUW-07-0013	8/30/2014 10:45	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.12	units
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.4	°C
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	7.7	NTU
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	5.72	cfs
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.76	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.7	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.1	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-07-0013	8/30/2014 10:45	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.641	ms/cm
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	9.5	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	114.4	%
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.12	units
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.4	°C
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	7.7	NTU
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	0.76	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	1.6	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.1	mg/L
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-07-0013	8/30/2014 10:45	UWRBC 13D	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.641	ms/cm

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0010	8/30/2014 11:20	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	6.15	mg/L
WUW-07-0010	8/30/2014 11:20	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.4	%
WUW-07-0010	8/30/2014 11:20	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.67	units
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	22.28	°C
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	37.9	NTU
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	3.03	cfs
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.14	mg/L
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.043	mg/L
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2	mg/L
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.2	mg/L
WUW-07-0010	8/30/2014 11:20	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL
WUW-07-0010	8/30/2014 11:20	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.714	ms/cm
WUW-07-0011	8/30/2014 11:46	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	7.51	mg/L
WUW-07-0011	8/30/2014 11:46	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	90.2	%
WUW-07-0011	8/30/2014 11:46	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.92	units
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	23.27	°C
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	10.1	NTU
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	1.38	cfs
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	1.07	mg/L
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	2.3	mg/L
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.19	mg/L
WUW-07-0011	8/30/2014 11:46	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	133	cfu/100mL
WUW-07-0011	8/30/2014 11:46	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.72	ms/cm
WUW-09-0001	9/6/2014 14:39	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.15	mg/L
WUW-09-0001	9/6/2014 14:39	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	136.8	%
WUW-09-0001	9/6/2014 14:39	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.23	units
WUW-09-0001	9/6/2014 14:39	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	24.37	°C
WUW-09-0001	9/6/2014 14:39	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	6.3	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	9/6/2014 14:39	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	8.76	cfs
WUW-09-0001	9/6/2014 14:39	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.862	ms/cm
WUW-09-0001	9/6/2014 14:39	UWRBC 01	Habitat (| CQHEI | WATER | TOTAL | N/A)	48	CQHEI
WUW-09-0001	9/6/2014 14:39	UWRBC 01	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	23	PTIR
WUW-09-0003	9/6/2014 16:00	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	16.34	mg/L
WUW-09-0003	9/6/2014 16:00	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	206.2	%
WUW-09-0003	9/6/2014 16:00	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.68	units
WUW-09-0003	9/6/2014 16:00	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	25.8	°C
WUW-09-0003	9/6/2014 16:00	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	10.1	NTU
WUW-09-0003	9/6/2014 16:00	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	1.258	ms/cm
WUW-09-0003	9/6/2014 16:00	UWRBC 02	Habitat (| CQHEI | WATER | TOTAL | N/A)	51.5	CQHEI
WUW-09-0003	9/6/2014 16:00	UWRBC 02	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	24	PTIR
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	12	mg/L
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	131.87	%
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	8	units
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	20	°C
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Turbidity (E-10617 | TRANSPARENCY TUBE | WATER | TOTAL | N/A)	<15	NTU
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Flow (| USGS | WATER | TOTAL | N/A)	17.52	cfs
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	22	mg/L
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	1	mg/L
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	300	cfu/100mL
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Habitat (| CQHEI | WATER | TOTAL | N/A)	43	CQHEI
WUW-09-0003	9/23/2014 16:45	UWRBC 02HRW	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	27	PTIR
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	12	mg/L
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	125	%
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	8	units
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	18	°C
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Turbidity (E-10617 | TRANSPARENCY TUBE | WATER | TOTAL | N/A)	70	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Flow (| USGS | WATER | TOTAL | N/A)	175.2	cfs
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	22	mg/L
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	1	mg/L
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1700	cfu/100mL
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Habitat (| CQHEI | WATER | TOTAL | N/A)	86.5	CQHEI
WUW-08-0002	9/23/2014 15:30	UWRBC 07HRW	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	21	PTIR
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	12	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	125	%
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	7	units
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	18	°C
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Turbidity (E-10617 | TRANSPARENCY TUBE | WATER | TOTAL | N/A)	35	NTU
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Flow (| USGS | WATER | TOTAL | N/A)	87.37	cfs
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	22	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	0.8	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1200	cfu/100mL
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Habitat (| CQHEI | WATER | TOTAL | N/A)	64.5	CQHEI
WUW-07-0013	9/23/2014 14:10	UWRBC 13HRW	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	25	PTIR
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	DO (E-14539 | CHEMETRICS DO KIT K 7512 | WATER | TOTAL | N/A)	12	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	125	%
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	pH (Field) (E-10139 | WATER WORKS PH STRIPS | WATER | TOTAL | N/A)	7	units
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	18	°C
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	Turbidity (E-10617 | TRANSPARENCY TUBE | WATER | TOTAL | N/A)	35	NTU
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	Flow (| USGS | WATER | TOTAL | N/A)	87.37	cfs
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	Nitrate (14797-55-8 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	22	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	Nitrite (14797-65-0 | WATERWORKS TEST STRIPS #480009 | WATER | TOTAL | N/A)	0	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	Phosphorous, ortho (14265-44-2 | CHEMETRICS KIT K 8510 | WATER | TOTAL | N/A)	0.8	mg/L
WUW-07-0013	9/23/2014 14:10	UWRBC 13D HRW	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1400	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0001	11/11/2014 15:19	UWRBC 01	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.7	mg/L
WUW-09-0001	11/11/2014 15:19	UWRBC 01	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	102.7	%
WUW-09-0001	11/11/2014 15:19	UWRBC 01	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.24	units
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.85	°C
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	2.8	NTU
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Flow (| USGS | WATER | TOTAL | N/A)	15.82	cfs
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	4.69	mg/L
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.4	mg/L
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L
WUW-09-0001	11/11/2014 15:19	UWRBC 01	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1566	cfu/100mL
WUW-09-0001	11/11/2014 15:19	UWRBC 01	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.775	ms/cm
WUW-09-0003	11/11/2014 16:28	UWRBC 02	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.03	mg/L
WUW-09-0003	11/11/2014 16:28	UWRBC 02	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	107.6	%
WUW-09-0003	11/11/2014 16:28	UWRBC 02	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.31	unit
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	9.64	°C
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	3.7	NTU
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Flow (| USGS | WATER | TOTAL | N/A)	6.46	cfs
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	21.74	mg/L
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.4	mg/L
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.28	mg/L
WUW-09-0003	11/11/2014 16:28	UWRBC 02	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1866	cfu/100mL
WUW-09-0003	11/11/2014 16:28	UWRBC 02	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.874	ms/cm
WUW-09-0004	11/16/2014 10:41	UWRBC 03	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	13.11	mg/L
WUW-09-0004	11/16/2014 10:41	UWRBC 03	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	96.6	%
WUW-09-0004	11/16/2014 10:41	UWRBC 03	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.3	units
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	2	°C
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	19	NTU

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Flow (| USGS | WATER | TOTAL | N/A)	1.9	cfs
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	19.45	mg/L
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.023	mg/L
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.9	mg/L
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.09	mg/L
WUW-09-0004	11/16/2014 10:41	UWRBC 03	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.879	ms/cm
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Habitat (| CQHEI | WATER | TOTAL | N/A)	51	CQHEI
WUW-09-0004	11/16/2014 10:41	UWRBC 03	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	22	PTIR
WUW-09-0002	11/16/2014 11:56	UWRBC 04	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.94	mg/L
WUW-09-0002	11/16/2014 11:56	UWRBC 04	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	98	%
WUW-09-0002	11/16/2014 11:56	UWRBC 04	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.28	units
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	3	°C
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	36.6	NTU
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Flow (| USGS | WATER | TOTAL | N/A)	1.05	cfs
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	28.6	mg/L
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8	mg/L
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.22	mg/L
WUW-09-0002	11/16/2014 11:56	UWRBC 04	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	0	cfu/100mL
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.87	ms/cm
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Habitat (| CQHEI | WATER | TOTAL | N/A)	35	CQHEI
WUW-09-0002	11/16/2014 11:56	UWRBC 04	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	19	PTIR
WUW-08-0001	11/1/2014 16:08	UWRBC 05	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.62	mg/L
WUW-08-0001	11/1/2014 16:08	UWRBC 05	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	92	%
WUW-08-0001	11/1/2014 16:08	UWRBC 05	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.2	units
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.36	°C
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	91.6	NTU
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Flow (| USGS | WATER | TOTAL | N/A)	222.9	cfs

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	5.72	mg/L
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.24	mg/L
WUW-08-0001	11/1/2014 16:08	UWRBC 05	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	33	cfu/100mL
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.522	ms/cm
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Habitat (| CQHEI | WATER | TOTAL | N/A)	83	CQHEI
WUW-08-0001	11/1/2014 16:08	UWRBC 05	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	22	PTIR
WUW-08-0005	11/7/2014 11:45	UWRBC 06	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.51	mg/L
WUW-08-0005	11/7/2014 11:45	UWRBC 06	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	72.7	%
WUW-08-0005	11/7/2014 11:45	UWRBC 06	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.77	units
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.8	°C
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	66.3	NTU
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Flow (| USGS | WATER | TOTAL | N/A)	110.5	cfs
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	16.59	mg/L
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	9.3	mg/L
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.45	mg/L
WUW-08-0005	11/7/2014 11:45	UWRBC 06	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	833	cfu/100mL
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.712	ms/cm
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Habitat (| CQHEI | WATER | TOTAL | N/A)	62	CQHEI
WUW-08-0005	11/7/2014 11:45	UWRBC 06	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	11	PTIR
WUW-08-0002	11/7/2014 14:25	UWRBC 07	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.79	mg/L
WUW-08-0002	11/7/2014 14:25	UWRBC 07	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	76.4	%
WUW-08-0002	11/7/2014 14:25	UWRBC 07	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.71	units
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.46	°C
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72.9	NTU
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Flow (| USGS | WATER | TOTAL | N/A)	130.7	cfs
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	20.02	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.033	mg/L
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.8	mg/L
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.38	mg/L
WUW-08-0002	11/7/2014 14:25	UWRBC 07	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	600	cfu/100mL
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.677	ms/cm
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Habitat (| CQHEI | WATER | TOTAL | N/A)	84	CQHEI
WUW-08-0002	11/7/2014 14:25	UWRBC 07	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	29	PTIR
WUW-08-0003	11/7/2014 17:30	UWRBC 08	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	8.62	mg/L
WUW-08-0003	11/7/2014 17:30	UWRBC 08	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	74.2	%
WUW-08-0003	11/7/2014 17:30	UWRBC 08	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.82	units
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.06	°C
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	70.9	NTU
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.036	mg/L
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.55	mg/L
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.41	mg/L
WUW-08-0003	11/7/2014 17:30	UWRBC 08	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	767	cfu/100mL
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.722	ms/cm
WUW-08-0003	11/7/2014 17:30	UWRBC 08	Habitat (| CQHEI | WATER | TOTAL | N/A)	58	CQHEI
WUW-08-0004	11/7/2014 16:50	UWRBC 09	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.41	mg/L
WUW-08-0004	11/7/2014 16:50	UWRBC 09	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	89.6	%
WUW-08-0004	11/7/2014 16:50	UWRBC 09	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.01	units
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.09	°C
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	72.6	NTU
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Flow (| USGS | WATER | TOTAL | N/A)	168.2	cfs
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	17.16	mg/L
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	7.6	mg/L
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.33	mg/L

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-08-0004	11/7/2014 16:50	UWRBC 09	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	67	cfu/100mL
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.723	ms/cm
WUW-08-0004	11/7/2014 16:50	UWRBC 09	Habitat (| CQHEI | WATER | TOTAL | N/A)	87	CQHEI
WUW-08-0004	11/8/2014 11:00	UWRBC 09	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	26	PTIR
WUW-07-0012	11/8/2014 11:38	UWRBC 10	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.33	mg/L
WUW-07-0012	11/8/2014 11:38	UWRBC 10	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	97.2	%
WUW-07-0012	11/8/2014 11:38	UWRBC 10	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.06	units
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	7.94	°C
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	23.7	NTU
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Flow (| USGS | WATER | TOTAL | N/A)	65.6	cfs
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	25.17	mg/L
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	10.4	mg/L
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.21	mg/L
WUW-07-0012	11/8/2014 11:38	UWRBC 10	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1200	cfu/100mL
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.577	ms/cm
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Habitat (| CQHEI | WATER | TOTAL | N/A)	94	CQHEI
WUW-07-0012	11/8/2014 11:38	UWRBC 10	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	36	PTIR
WUW-07-0009	11/8/2014 15:51	UWRBC 11	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	10.58	mg/L
WUW-07-0009	11/8/2014 15:51	UWRBC 11	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	91.2	%
WUW-07-0009	11/8/2014 15:51	UWRBC 11	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.06	units
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.13	°C
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	12.2	NTU
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Flow (| USGS | WATER | TOTAL | N/A)	5.96	cfs
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	18.3	mg/L
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	4.307	mg/L
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	6.8	mg/L
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.06	mg/L
WUW-07-0009	11/8/2014 15:51	UWRBC 11	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1033	cfu/100mL

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.65	ms/cm
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Habitat (| CQHEI | WATER | TOTAL | N/A)	82	CQHEI
WUW-07-0009	11/8/2014 15:51	UWRBC 11	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	22	PTIR
WUW-13-0003	11/8/2014 14:20	UWRBC 12	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.16	mg/L
WUW-13-0003	11/8/2014 14:20	UWRBC 12	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	95.9	%
WUW-13-0003	11/8/2014 14:20	UWRBC 12	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.11	units
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.03	°C
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	21.8	NTU
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Flow (| USGS | WATER | TOTAL | N/A)	209.6	cfs
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	25.17	mg/L
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.03	mg/L
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	8.2	mg/L
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.24	mg/L
WUW-13-0003	11/8/2014 14:20	UWRBC 12	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	800	cfu/100mL
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.59	ms/cm
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Habitat (| CQHEI | WATER | TOTAL | N/A)	96	CQHEI
WUW-13-0003	11/8/2014 14:20	UWRBC 12	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	29	PTIR
WUW-07-0013	11/11/2014 10:15	UWRBC 13	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.1	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	105.5	%
WUW-07-0013	11/11/2014 10:15	UWRBC 13	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.14	units
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.55	°C
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	3.3	NTU
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Flow (| USGS | WATER | TOTAL | N/A)	24.15	cfs
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	16.02	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.025	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.2	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.07	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1766	cfu/100mL
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.674	ms/cm

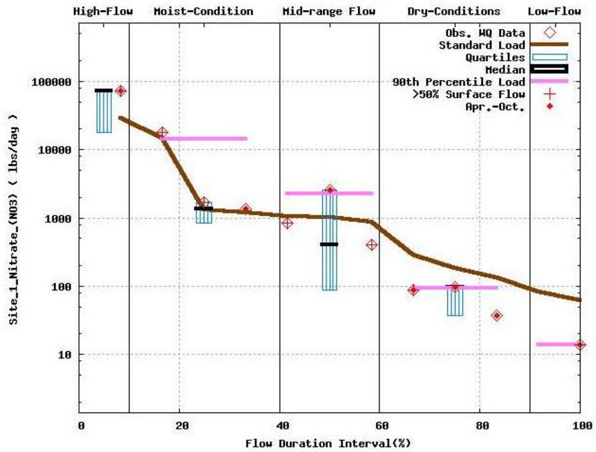
IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Habitat (| CQHEI | WATER | TOTAL | N/A)	62	CQHEI
WUW-07-0013	11/11/2014 10:15	UWRBC 13	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	28	PTIR
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.1	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	105.5	%
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.14	units
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	8.55	°C
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	3.3	NTU
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	16.02	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.025	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.2	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.07	mg/L
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1700	cfu/100mL
WUW-07-0013	11/11/2014 10:15	UWRBC 13D	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.674	ms/cm
WUW-07-0010	11/11/2014 12:07	UWRBC 14	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	11.36	mg/L
WUW-07-0010	11/11/2014 12:07	UWRBC 14	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	101.9	%
WUW-07-0010	11/11/2014 12:07	UWRBC 14	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	7.96	units
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	9.8	°C
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	6.2	NTU
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Flow (| USGS | WATER | TOTAL | N/A)	13.73	cfs
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	15.44	mg/L
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.026	mg/L
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	5.1	mg/L
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.04	mg/L
WUW-07-0010	11/11/2014 12:07	UWRBC 14	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	700	cfu/100mL
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.698	ms/cm
WUW-07-0010	11/11/2014 12:07	UWRBC 14	Habitat (| CQHEI | WATER | TOTAL | N/A)	47	CQHEI
WUW-07-0011	11/11/2014 12:45	UWRBC 15	DO (E-14539 | 360.1 | WATER | TOTAL | N/A)	12.72	mg/L
WUW-07-0011	11/11/2014 12:45	UWRBC 15	% Sat (E-%SAT | SM4500-OG | WATER | TOTAL | N/A)	113.9	%
WUW-07-0011	11/11/2014 12:45	UWRBC 15	pH (Field) (E-10139 | 150.2 | WATER | TOTAL | N/A)	8.06	units

IDEM Site ID	Sample Date/Time	Sample Number	NPS Protocol	Concentration	Unit
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Temperature (Thermocouple) (E-TEMPERATURE | EPA 170.1 | WATER | TOTAL | N/A)	9.72	°C
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Turbidity (Hach) (E-10617 | 180.1 | WATER | TOTAL | N/A)	4	NTU
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Flow (| USGS | WATER | TOTAL | N/A)	7.35	cfs
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Nitrogen, Nitrate (14797-55-8 | SM4500NO3-E | WATER | TOTAL | N/A)	13.16	mg/L
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Nitrogen, Nitrite (14797-65-0 | SM4500NO3-F | WATER | TOTAL | N/A)	0.02	mg/L
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Nitrogen, Nitrate+Nitrite (Hach Method 10071)	4.8	mg/L
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Phosphorus, Total (7723-14-0 | 365.1 | WATER | TOTAL | N/A)	0.08	mg/L
WUW-07-0011	11/11/2014 12:45	UWRBC 15	E. Coli (ECOLI | COLISCAN EASYGEL 35C | WATER | TOTAL | N/A)	1167	cfu/100mL
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Specific Conductance (Field) (E-10184 | 120.1 | WATER | TOTAL | N/A)	0.682	ms/cm
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Habitat (| CQHEI | WATER | TOTAL | N/A)	71	CQHEI
WUW-07-0011	11/11/2014 12:45	UWRBC 15	Pollution Tolerance Index Rating (| PTIR | WATER | TOTAL | N/A)	18	PTIR

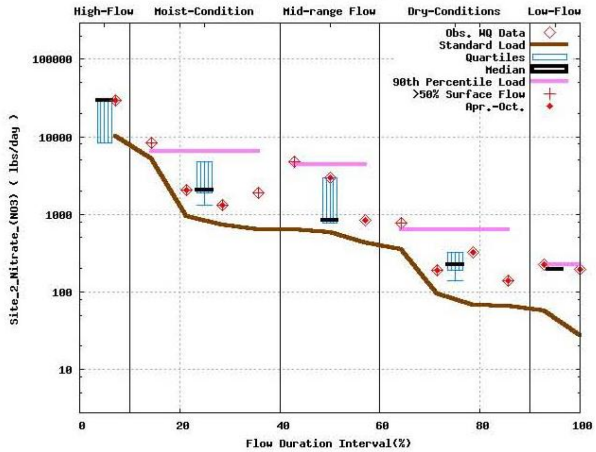
Appendix H – Load Duration Curve and Target Concentration Charts

Nitrate Load Duration Curve Charts

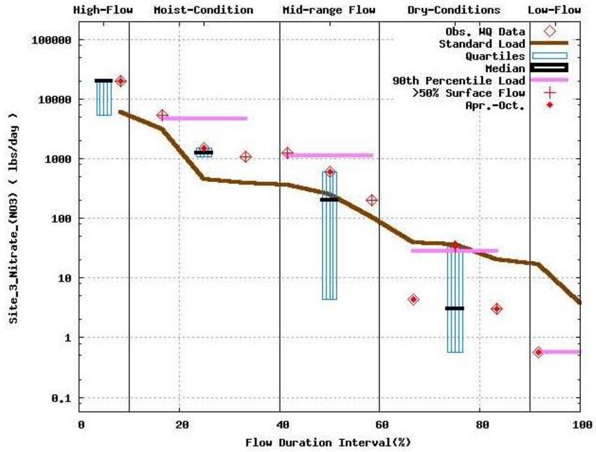
Site 1 Nitrate (NO3)



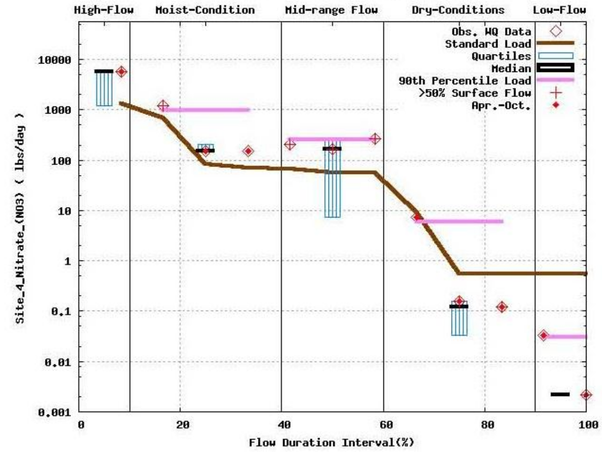
Site 2 Nitrate (NO3)



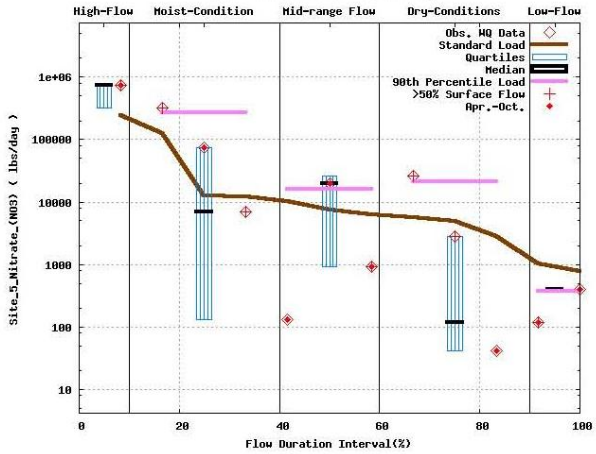
Site 3 Nitrate (NO3)



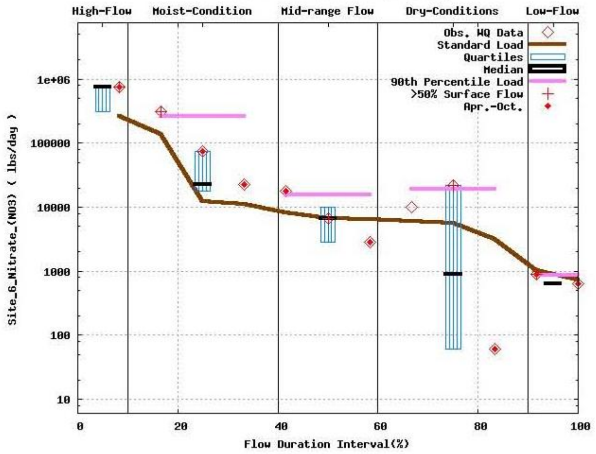
Site 4 Nitrate (NO3)



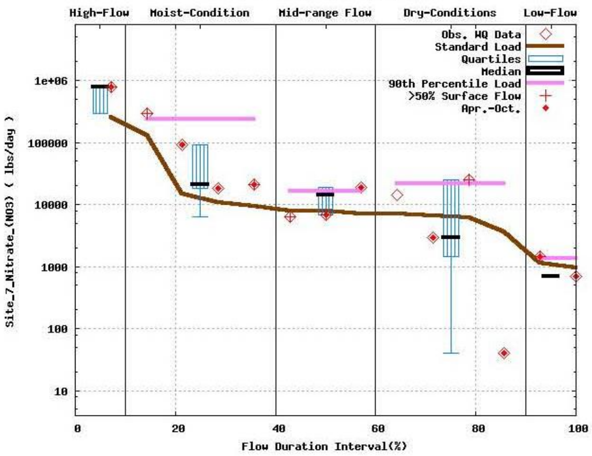
Site 5 Nitrate (NO3)



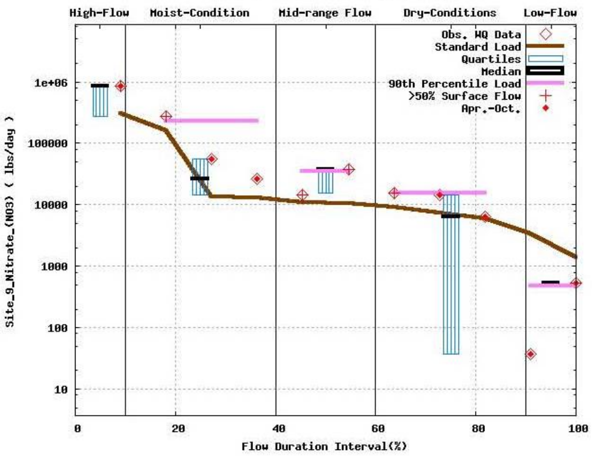
Site 6 Nitrate (NO3)



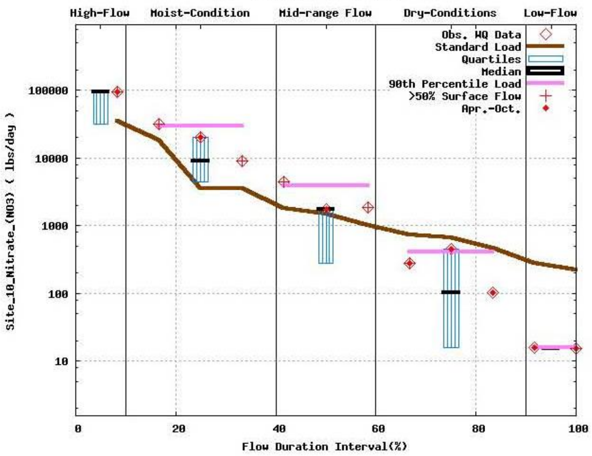
Site 7 Nitrate (NO3)



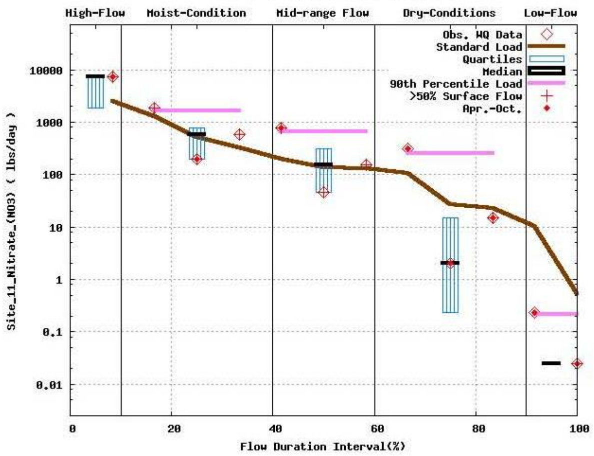
Site 9 Nitrate (NO3)



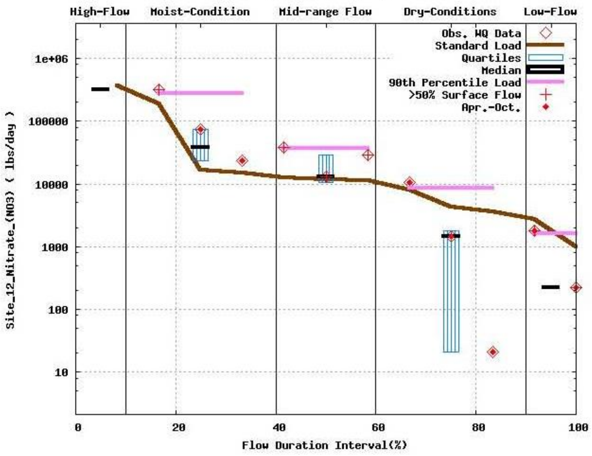
Site 10 Nitrate (NO3)



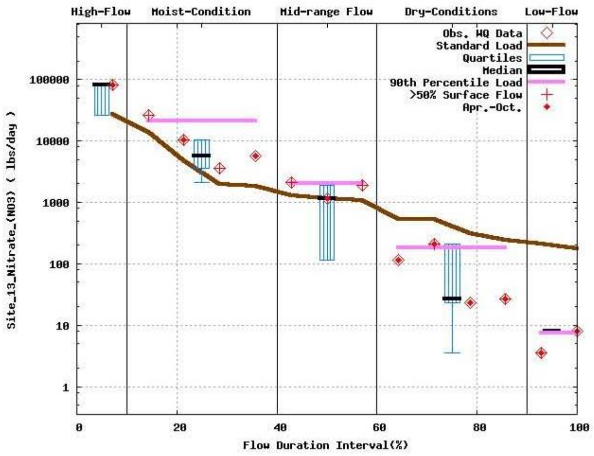
Site 11 Nitrate (NO3)



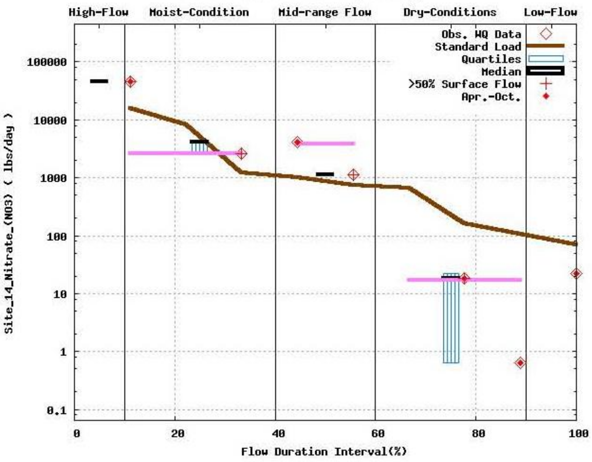
Site 12 Nitrate (NO3)

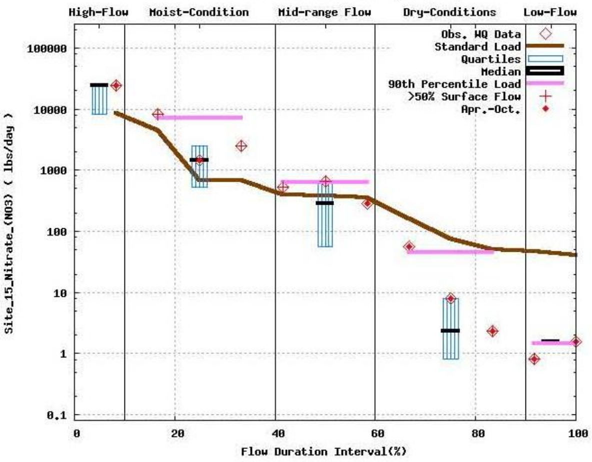


Site 13 Nitrate (NO3)

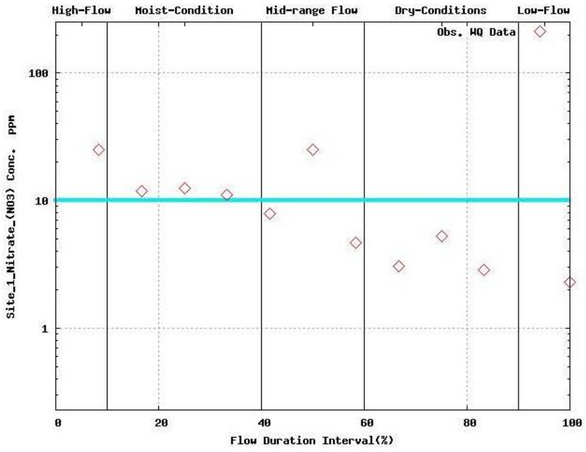


***No charts for Site 8 due to not being able to measure flow.**


Site 14 Nitrate (NO3)


Site 15 Nitrate (NO3)

Nitrate Target Concentration Charts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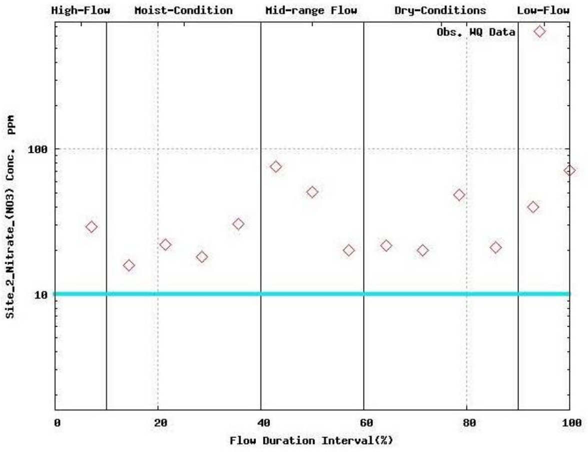
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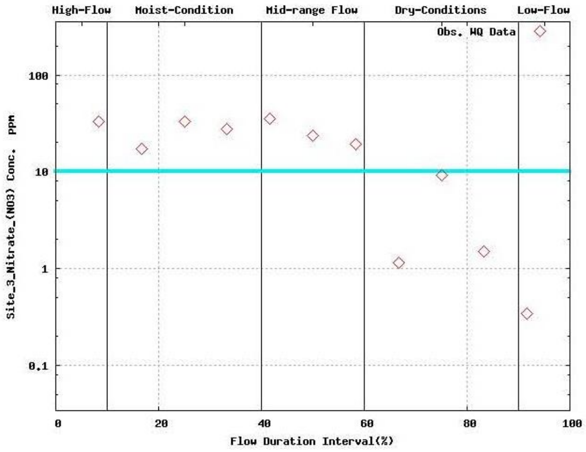
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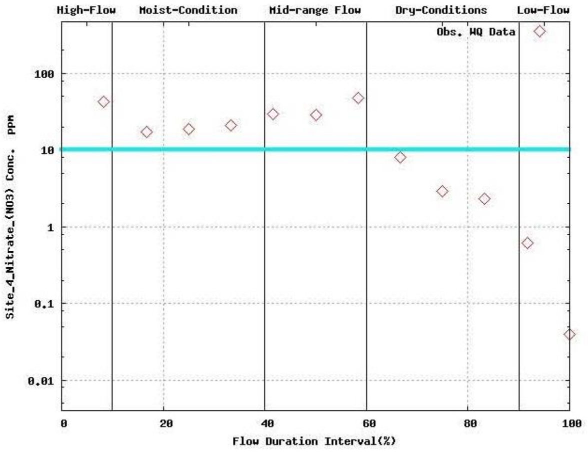
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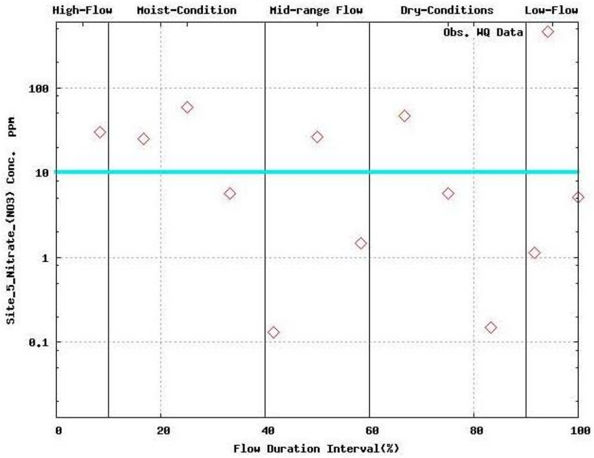
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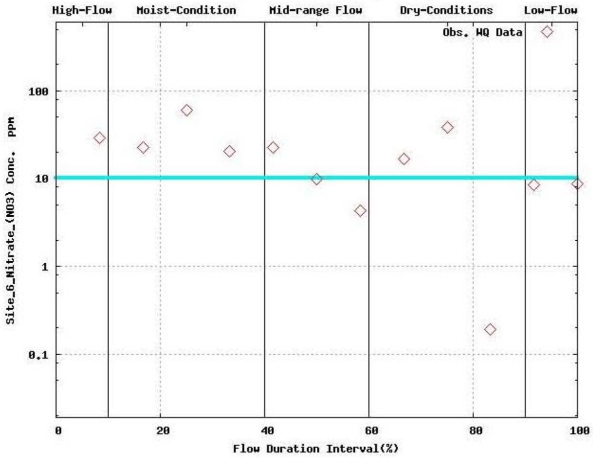
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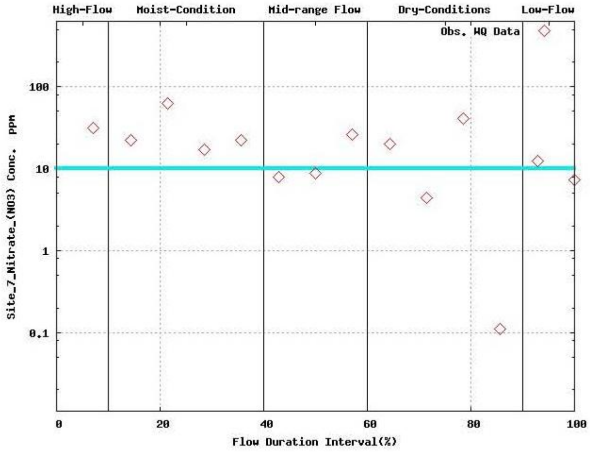
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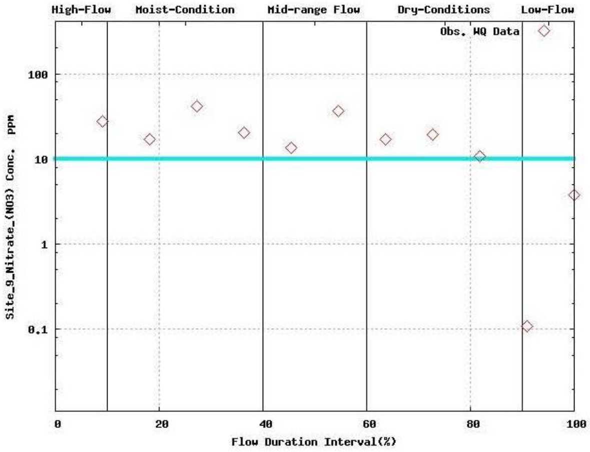
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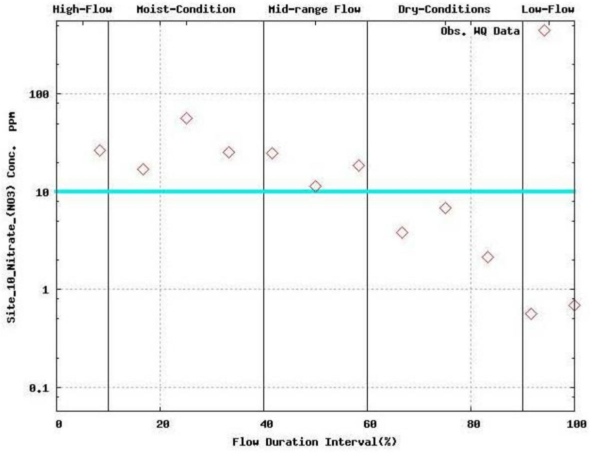
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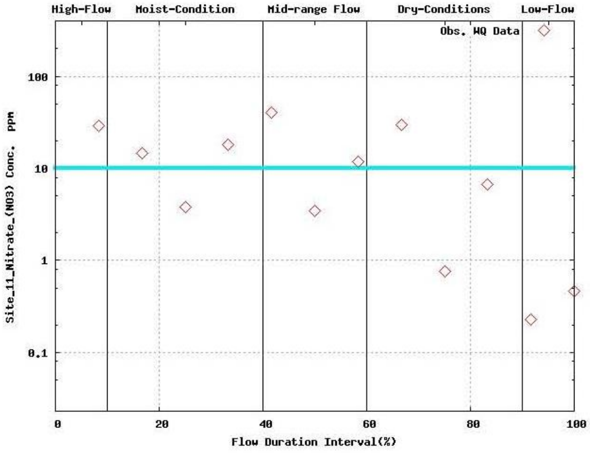
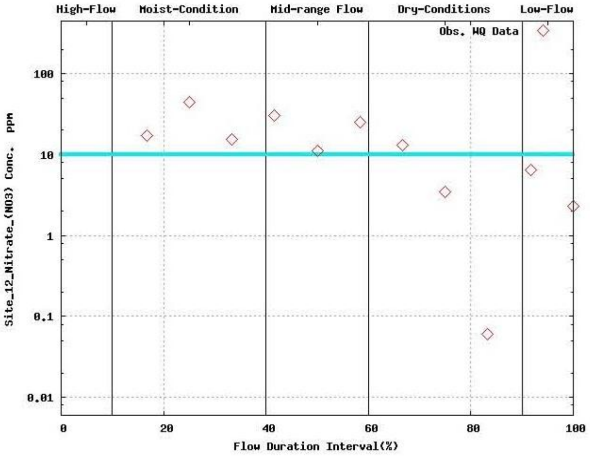
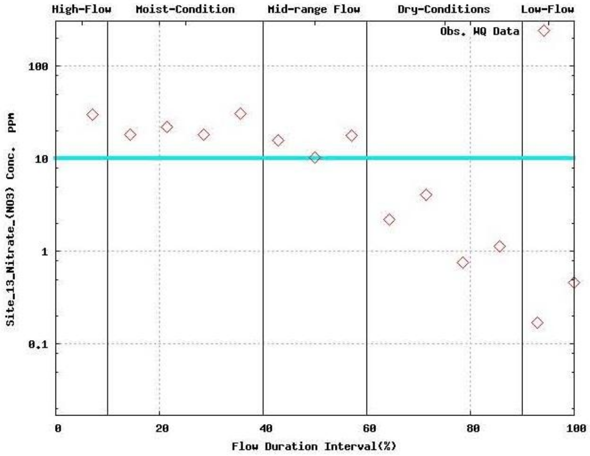

Site 11 Nitrate (NO3)

***No charts for Site 8 due to not being able to measure flow.**

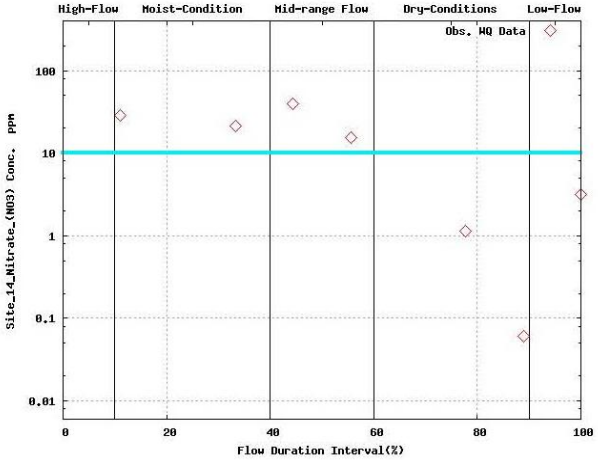
Site 12 Nitrate (NO3)



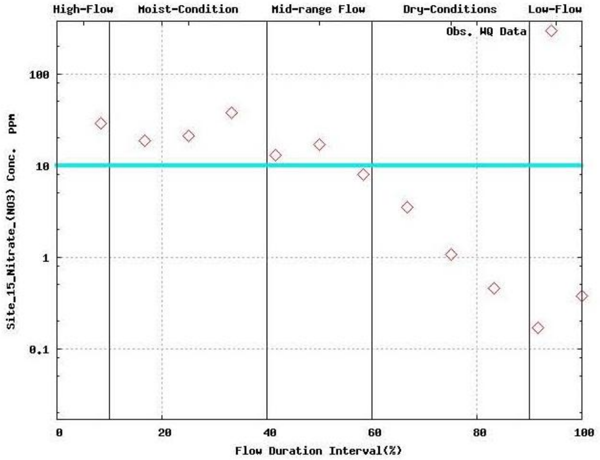
Site 13 Nitrate (NO3)



Site 14 Nitrate (NO3)

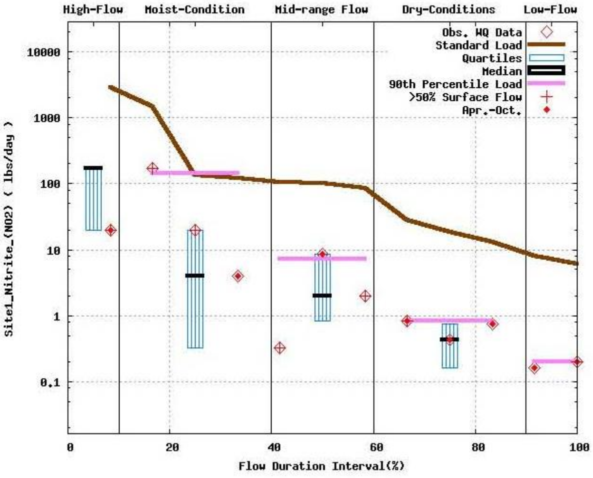


Site 15 Nitrate (NO3)

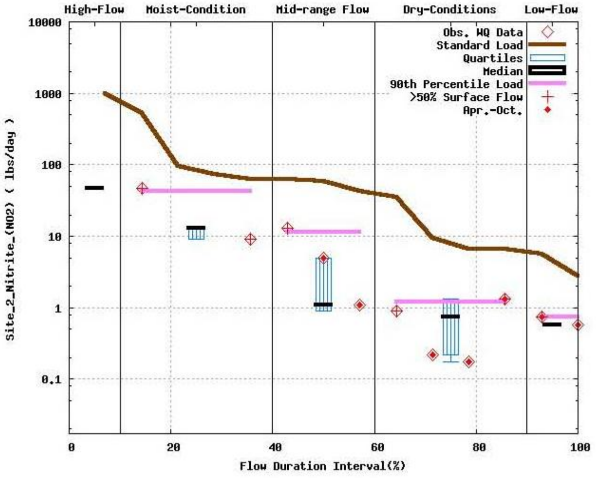


Nitrite Load Duration Curve Charts

Site 1 Nitrite (NO2)



Site 2 Nitrite (NO2)



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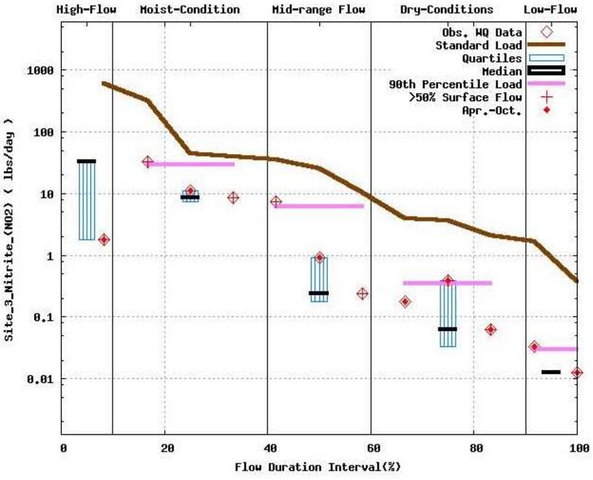
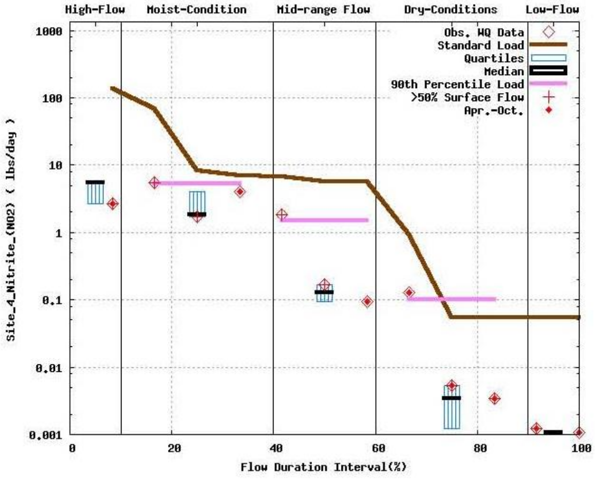
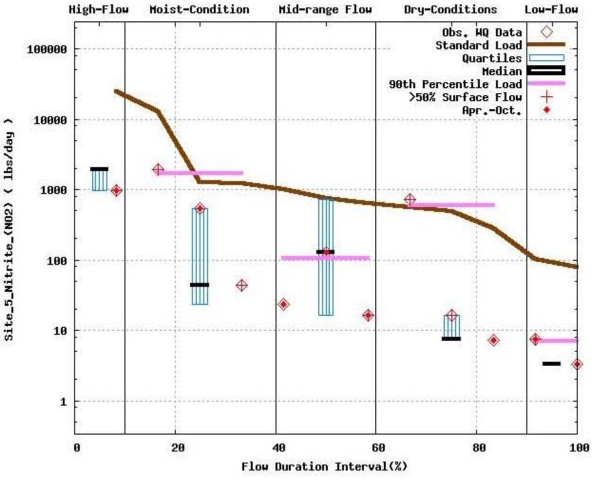


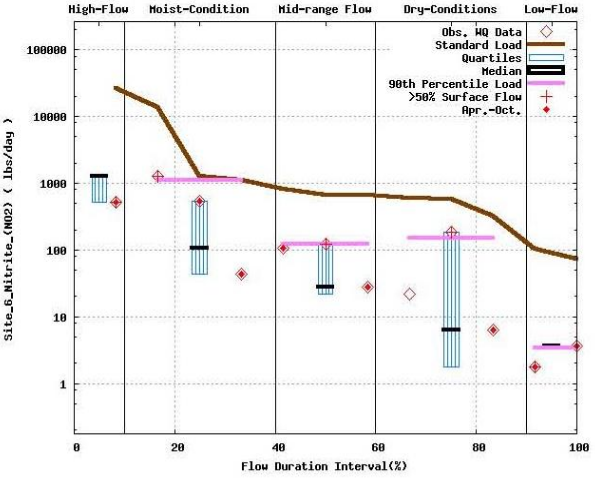
Site 4 Nitrite (NO2)

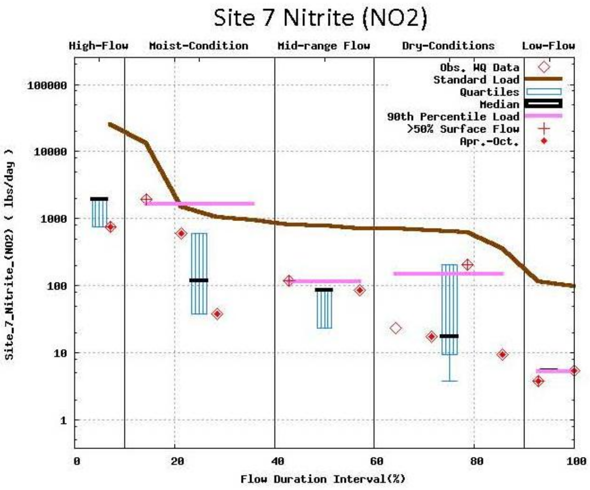


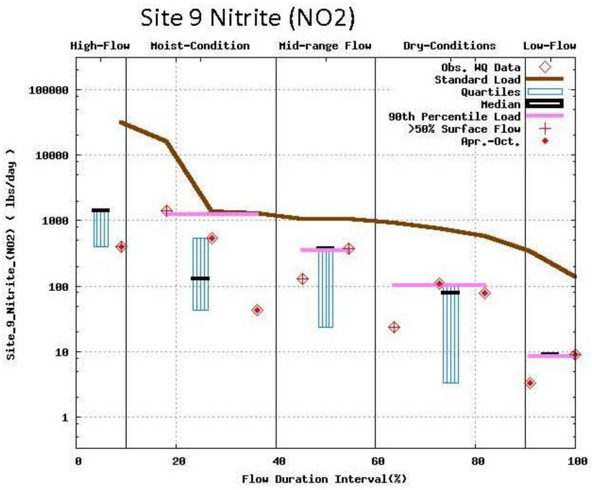
Site 5 Nitrite (NO2)



Site 6 Nitrite (NO2)




Site 7 Nitrite (NO2)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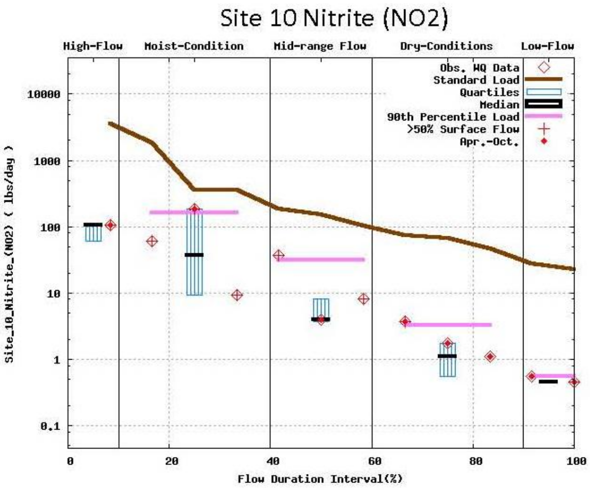
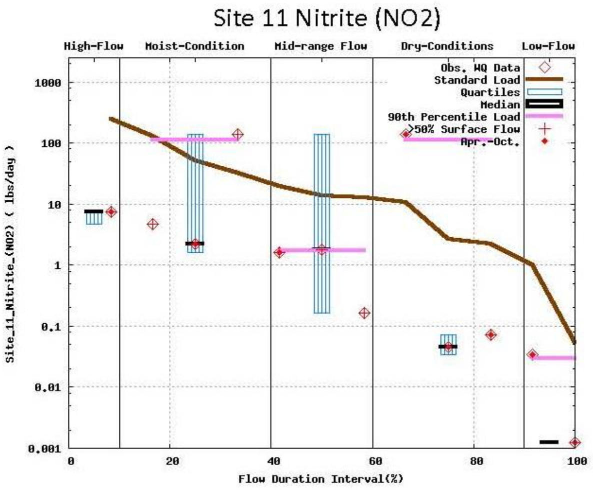
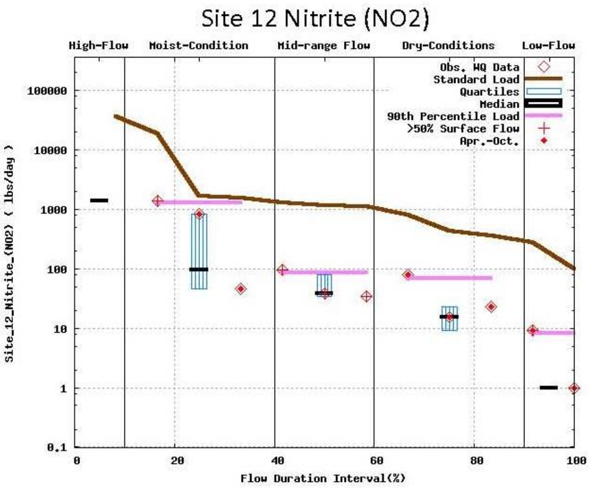

Site 10 Nitrite (NO2)


Site 11 Nitrite (NO2)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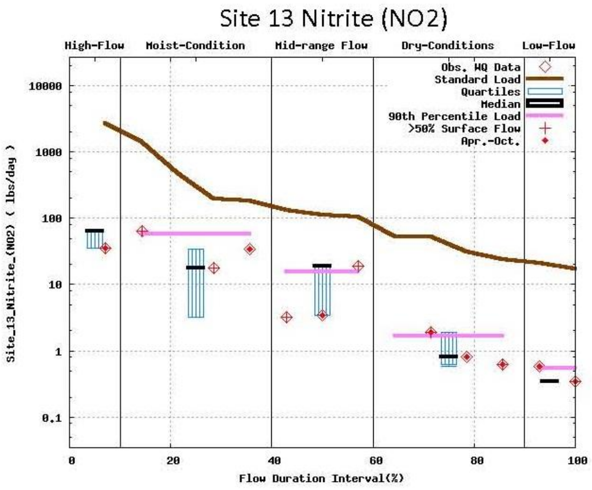
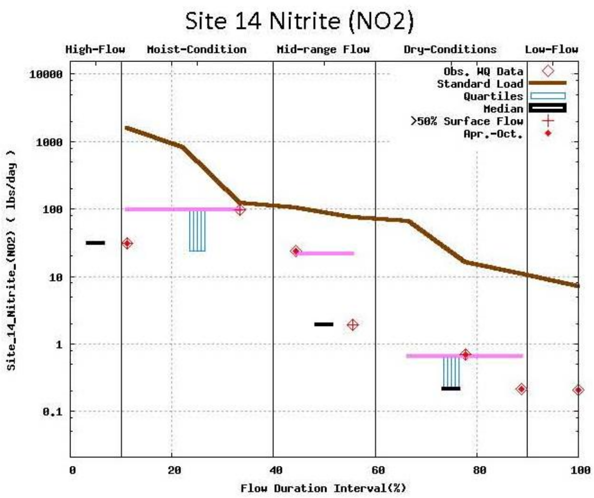
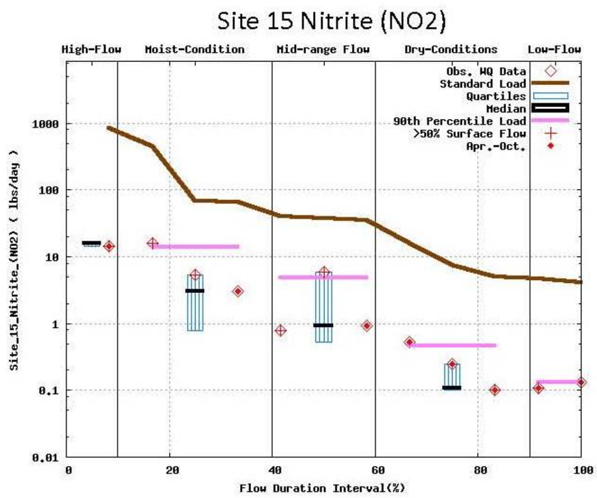
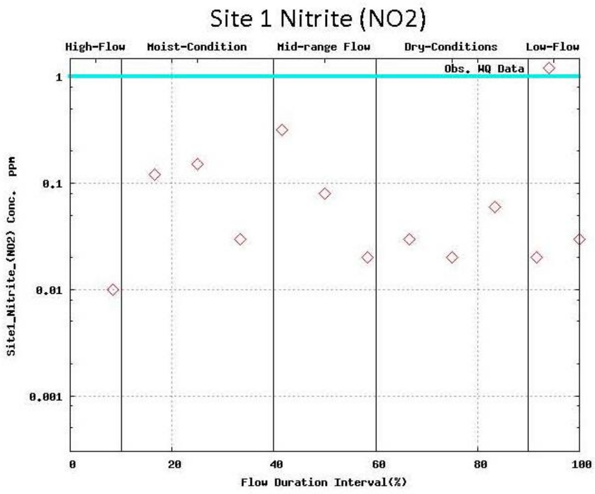

Site 13 Nitrite (NO2)

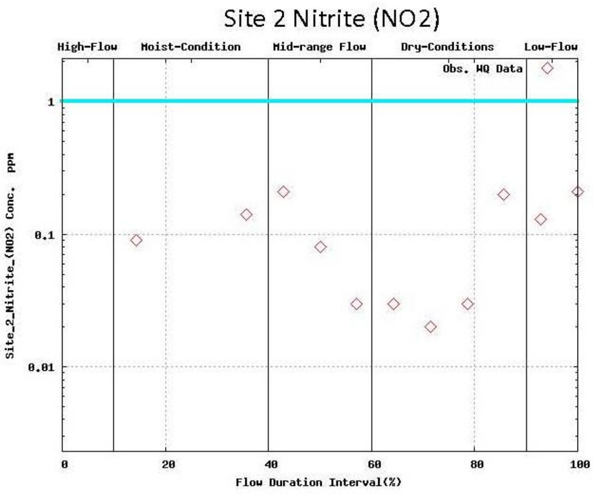
***No charts for Site 8 due to not being able to measure flow.**


Site 14 Nitrite (NO2)


Site 15 Nitrite (NO2)

Nitrite Target Concentration Charts


Site 1 Nitrite (NO2)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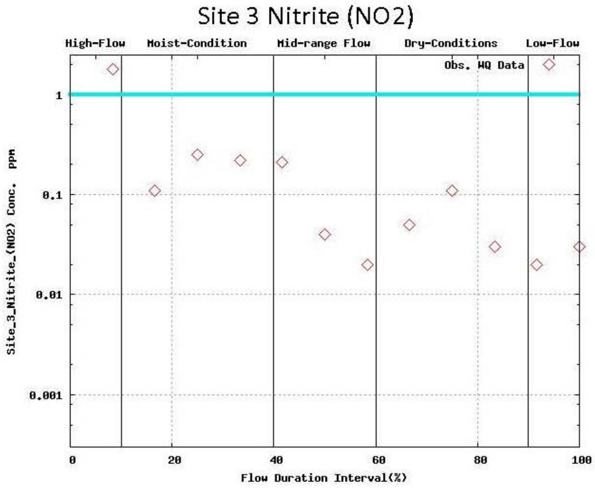
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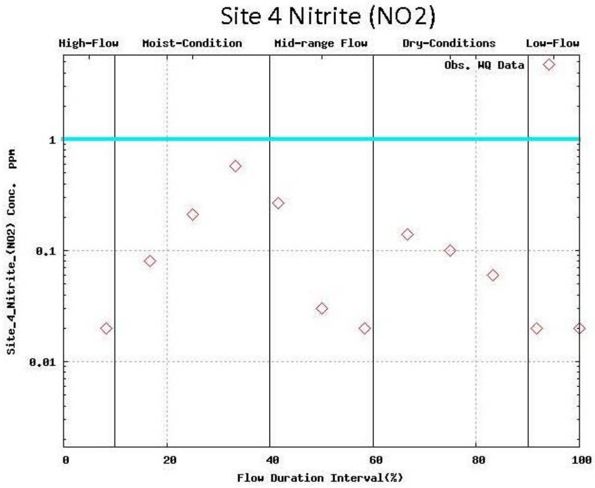
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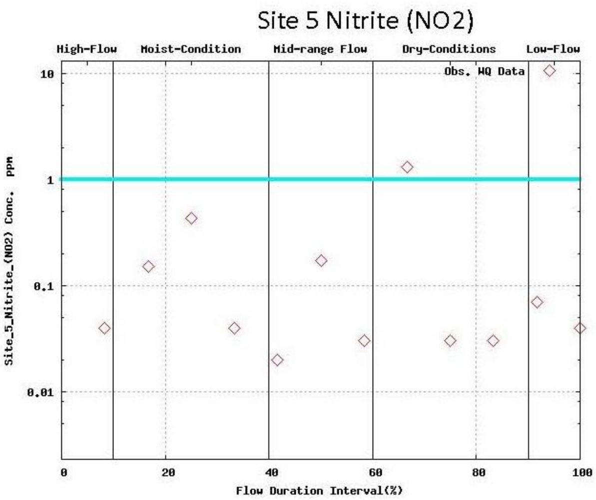
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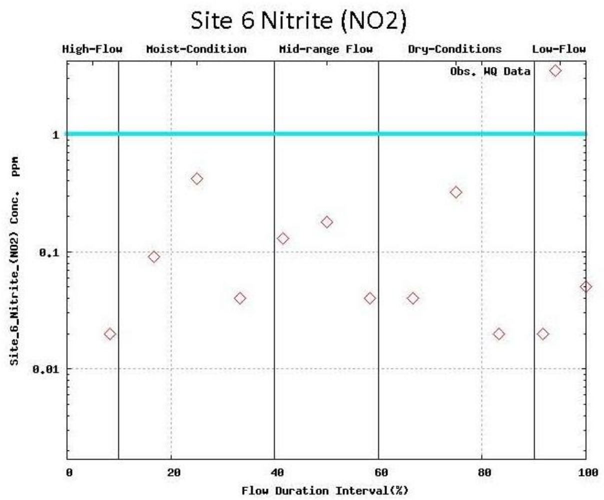
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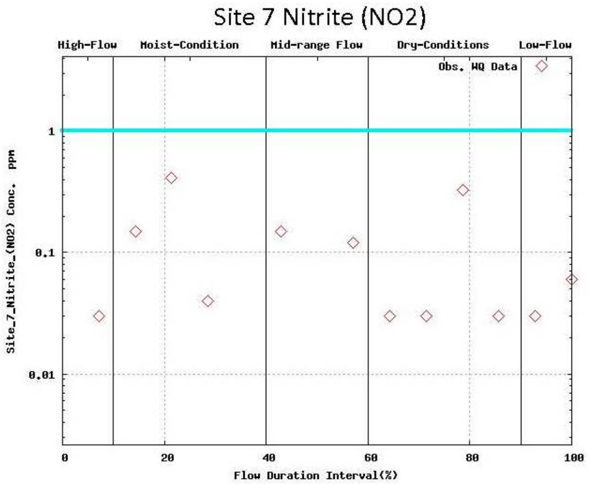
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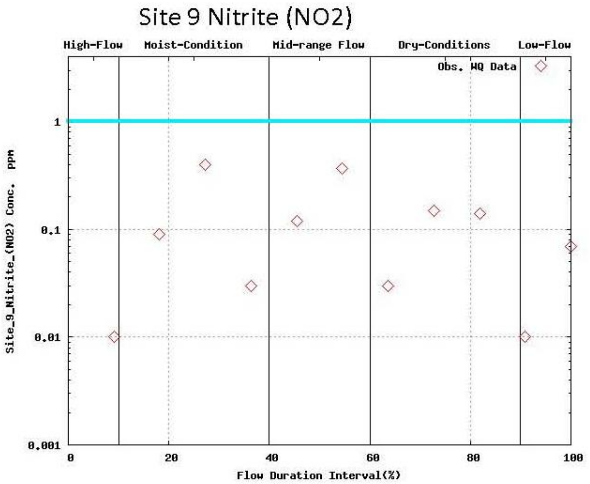
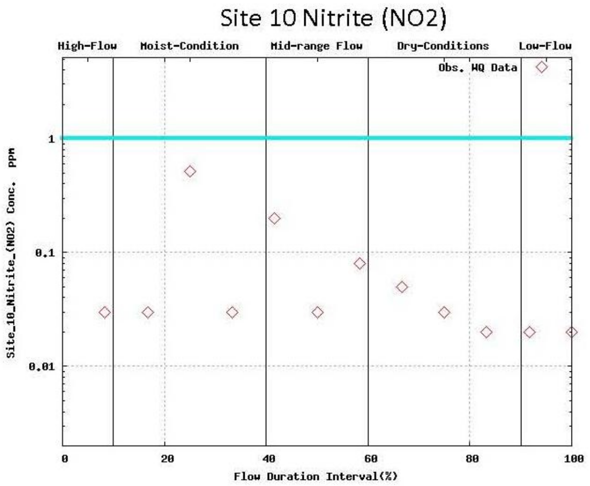

Site 9 Nitrite (NO2)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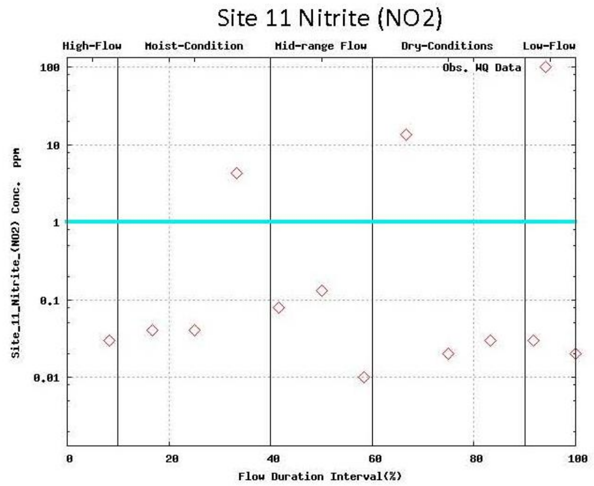
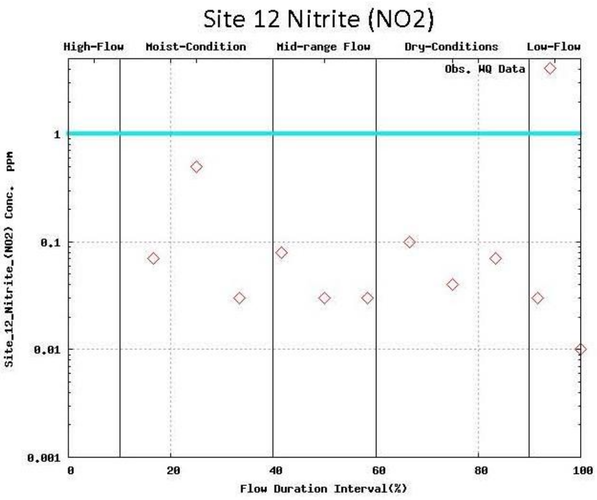
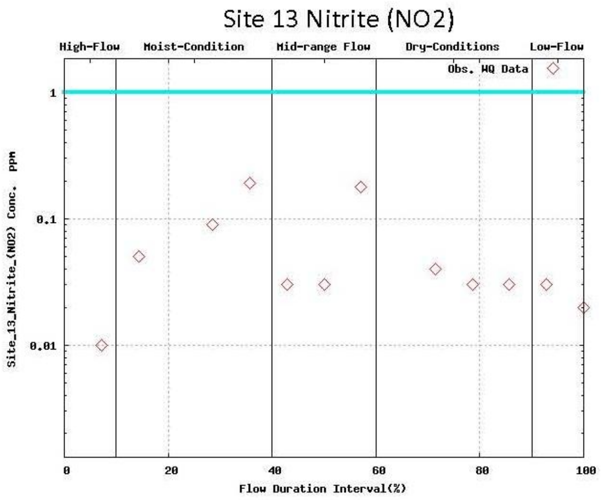

Site 11 Nitrite (NO2)

***No charts for Site 8 due to not being able to measure flow.**


Site 12 Nitrite (NO2)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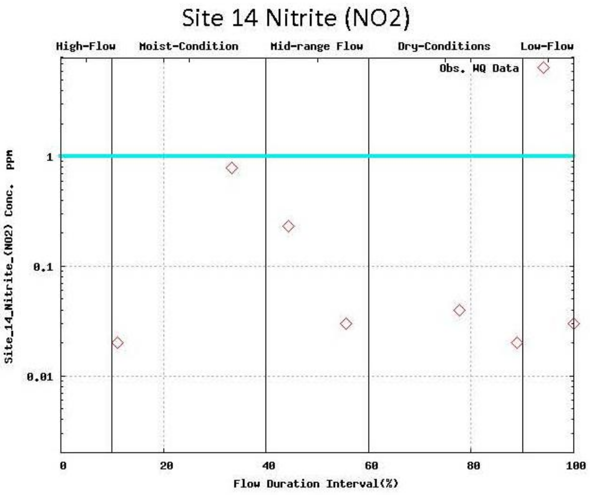
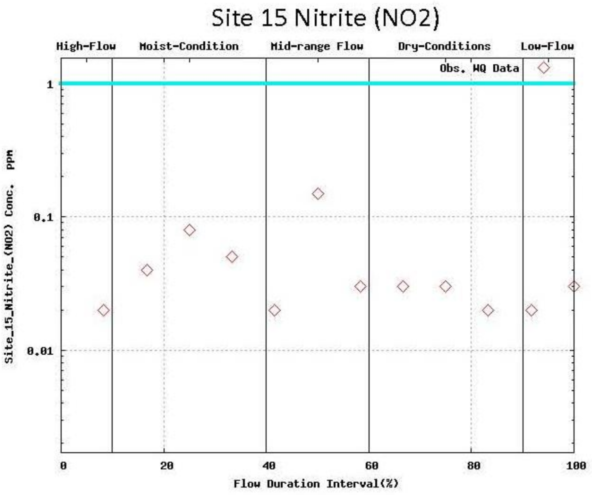
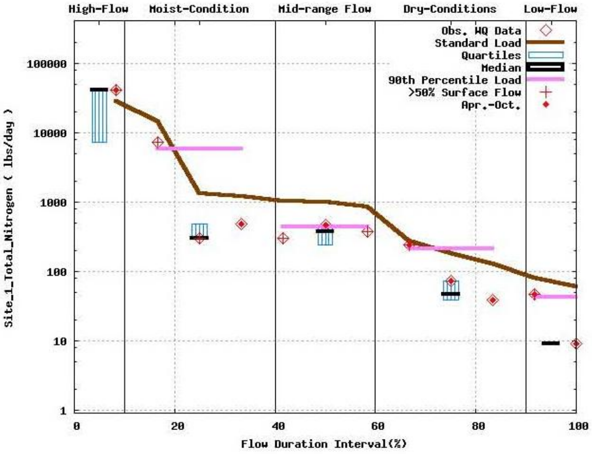
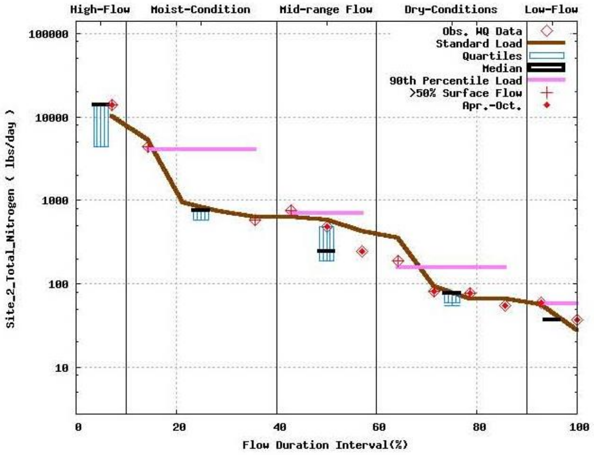
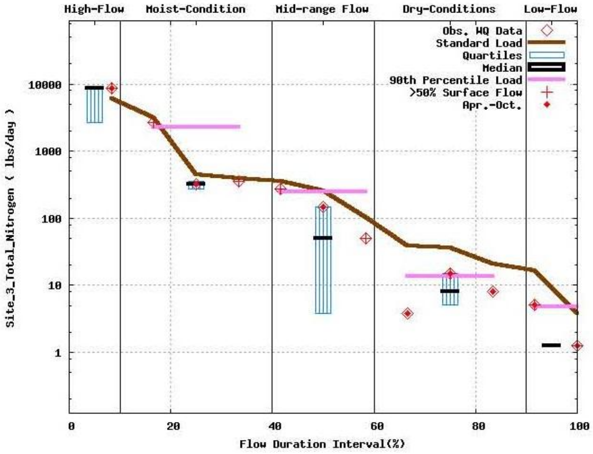

Site 14 Nitrite (NO2)

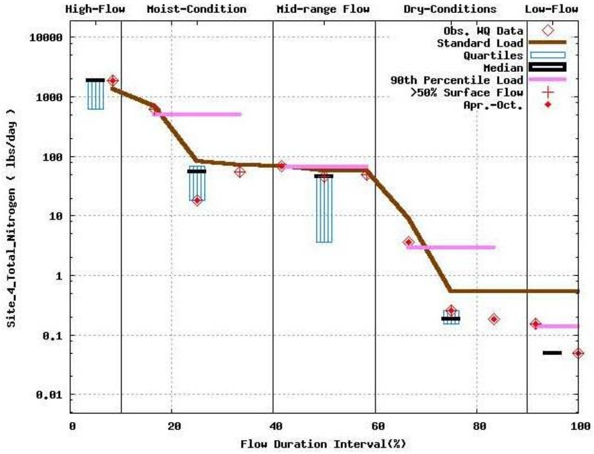

Site 15 Nitrite (NO2)

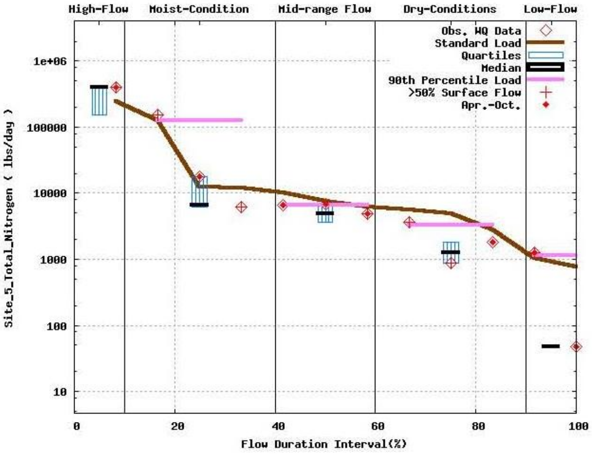
Total Nitrogen Load Duration Curve Charts

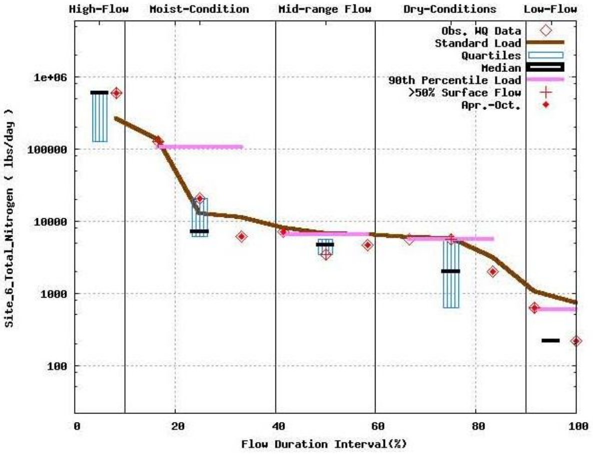

Site 1 Total Nitrogen


Site 2 Total Nitrogen

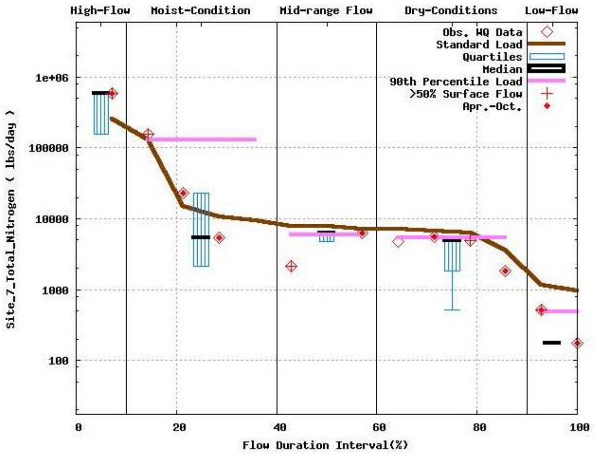

Site 3 Total Nitrogen


Site 4 Total Nitrogen

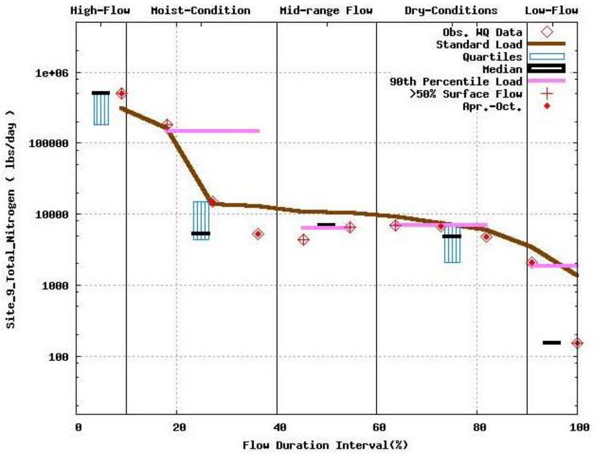

Site 5 Total Nitrogen


Site 6 Total Nitrogen

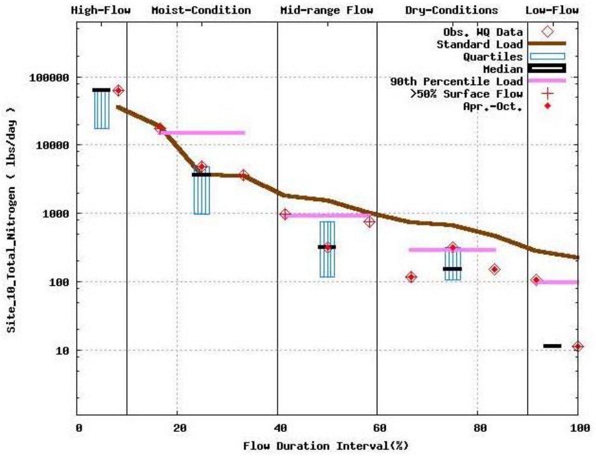
Site 7 Total Nitrogen



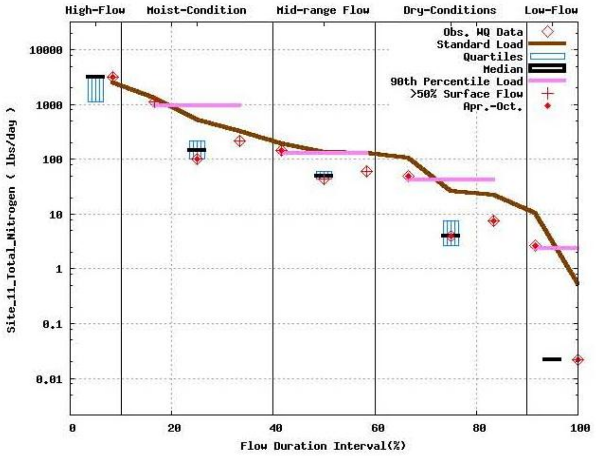
Site 9 Total Nitrogen



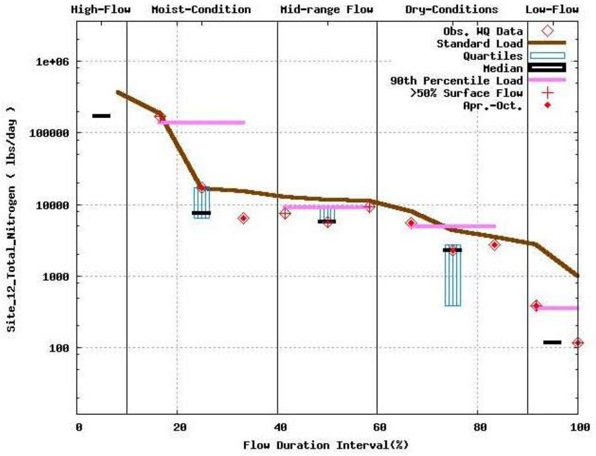
Site 10 Total Nitrogen



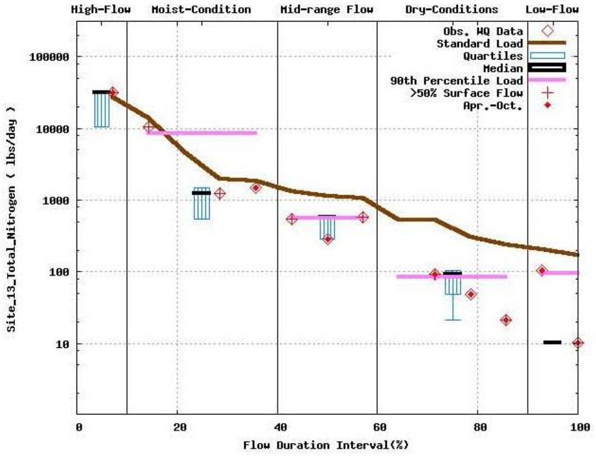
Site 11 Total Nitrogen



Site 12 Total Nitrogen

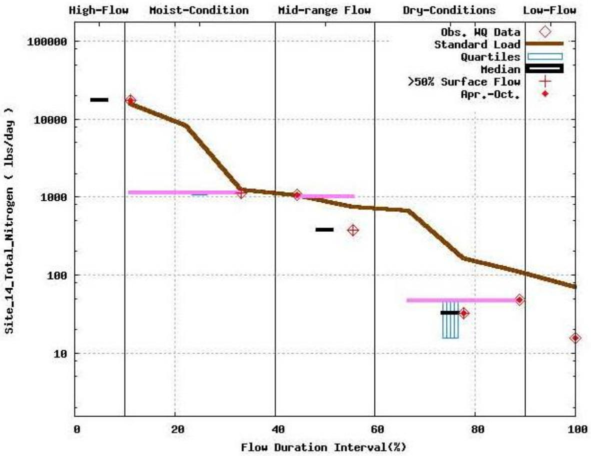


Site 13 Total Nitrogen

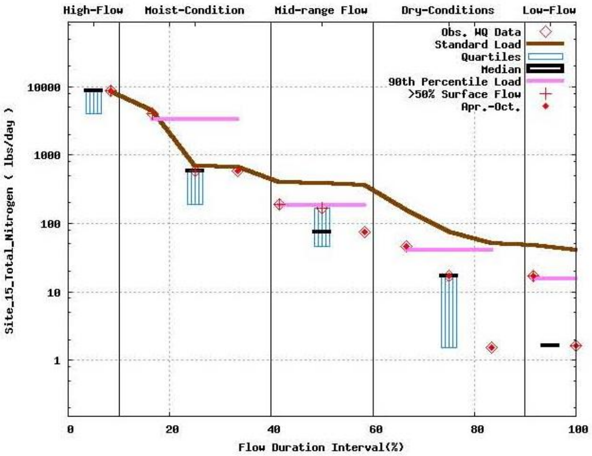


***No charts for Site 8 due to not being able to measure flow.**

Site 14 Total Nitrogen

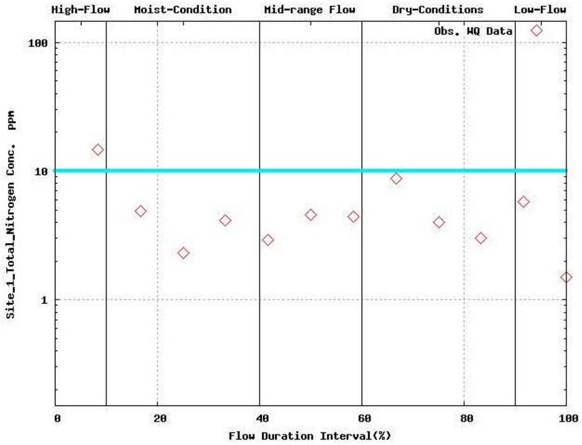


Site 15 Total Nitrogen

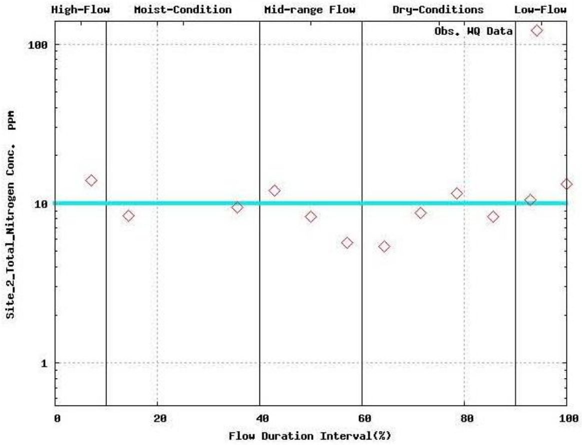


Total Nitrogen Target Concentration Charts

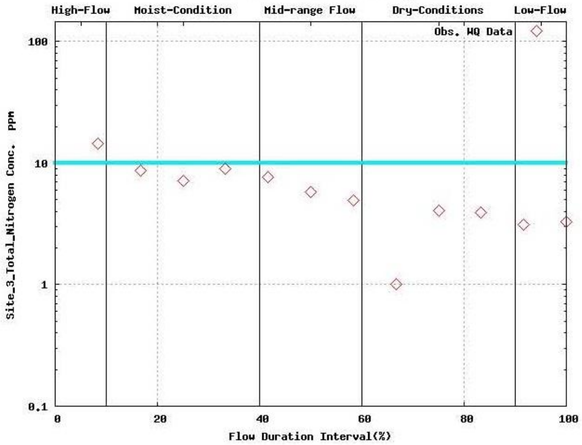
Site 1 Total Nitrogen



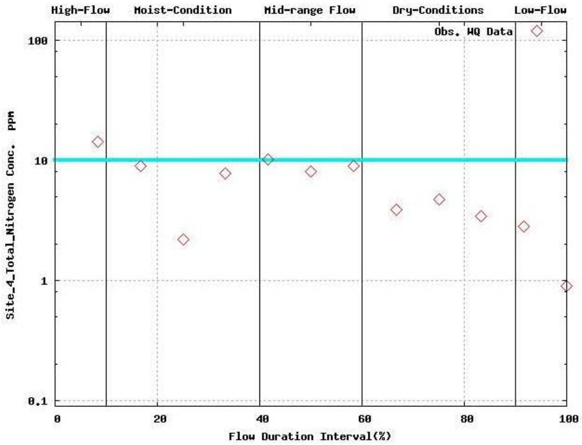
Site 2 Total Nitrogen



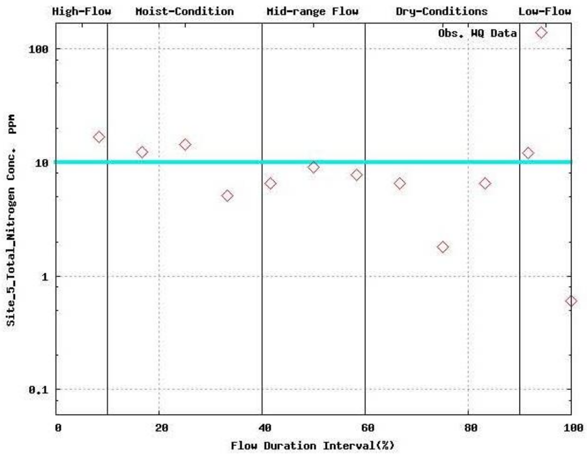
Site 3 Total Nitrogen



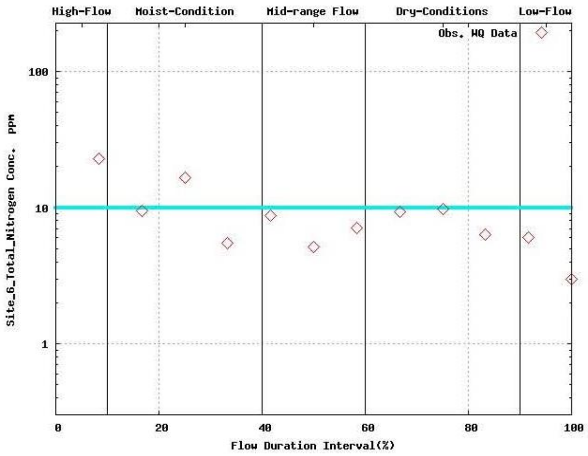
Site 4 Total Nitrogen



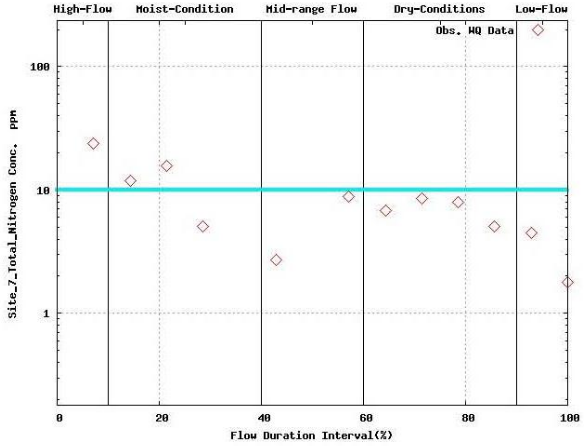
Site 5 Total Nitrogen



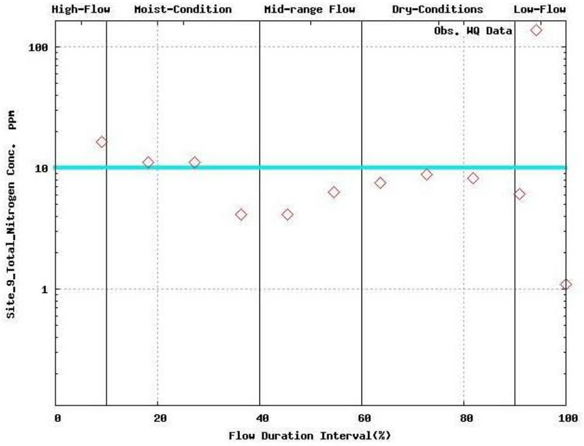
Site 6 Total Nitrogen



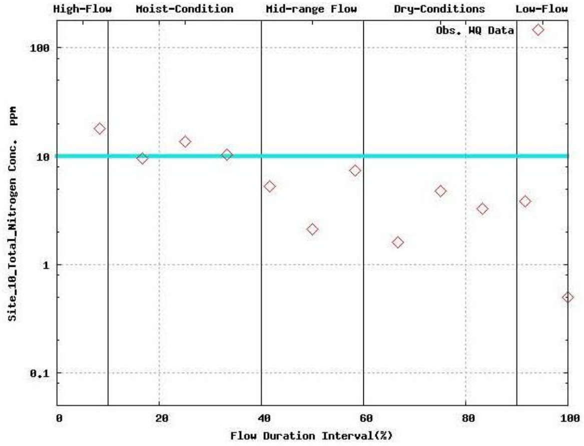
Site 7 Total Nitrogen



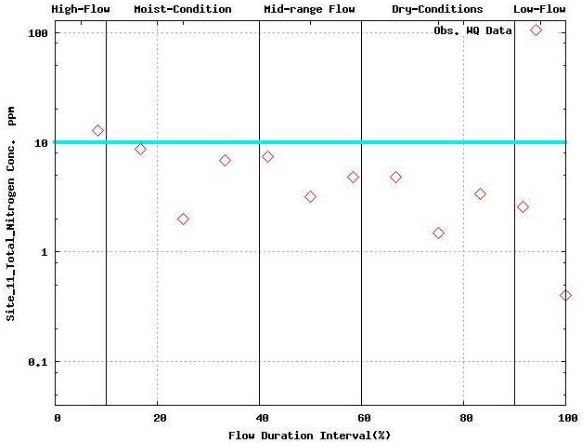
Site 9 Total Nitrogen



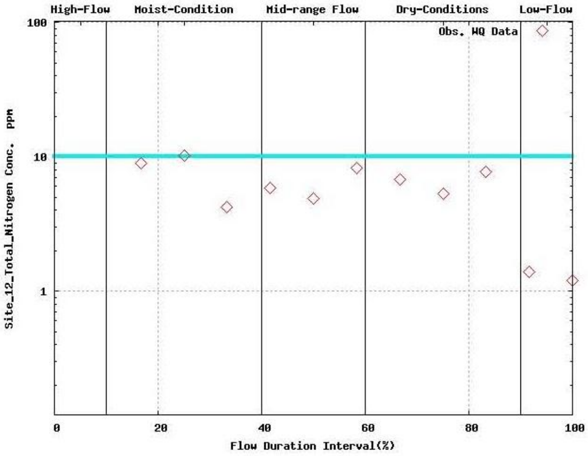
Site 10 Total Nitrogen

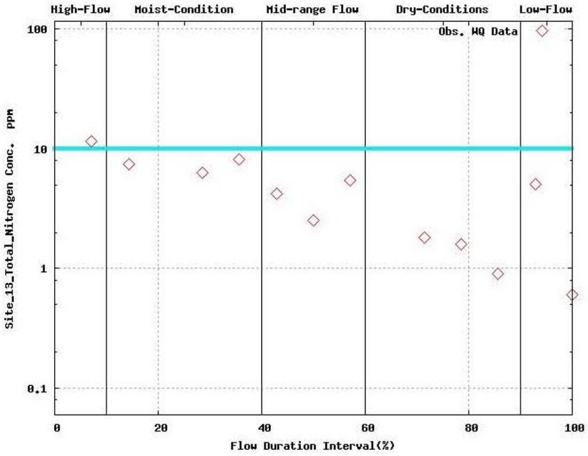


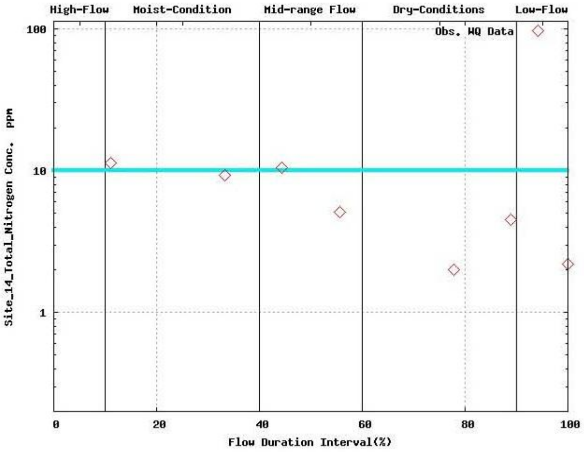
Site 11 Total Nitrogen

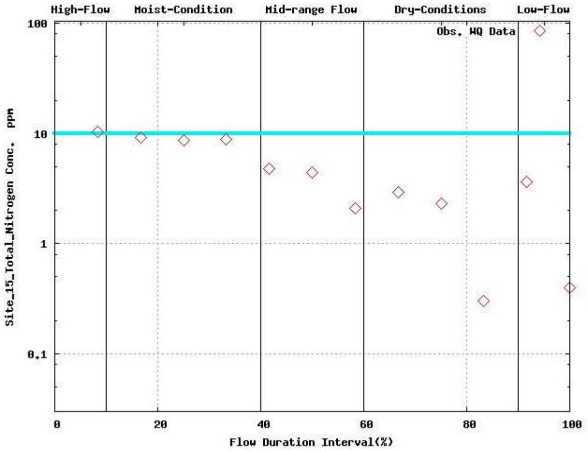


***No charts for Site 8 due to not being able to measure flow.**


Site 12 Total Nitrogen

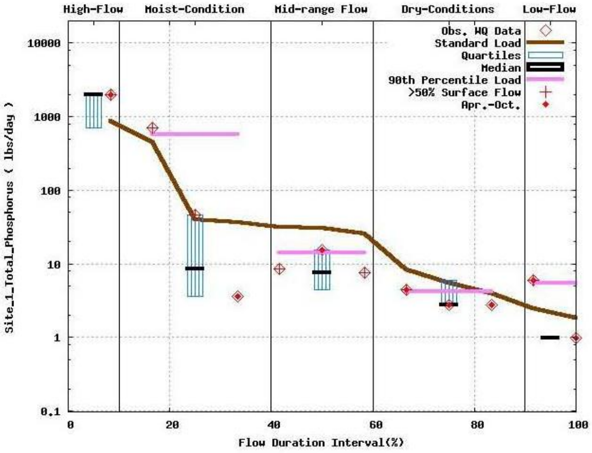

Site 13 Total Nitrogen


Site 14 Total Nitrogen


Site 15 Total Nitrogen

Total Phosphorus Load Duration Curve Charts

Site 1 Total Phosphorus (P)



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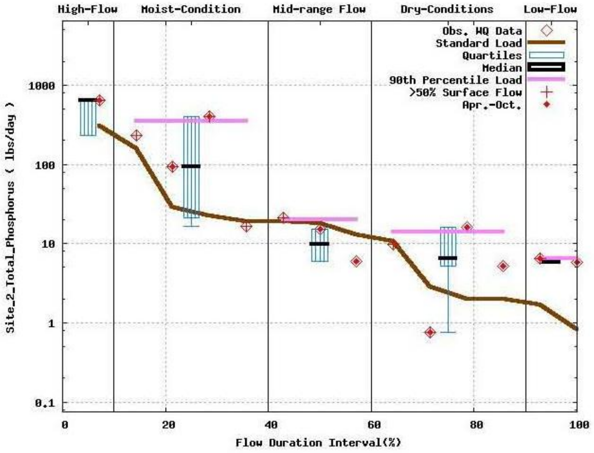

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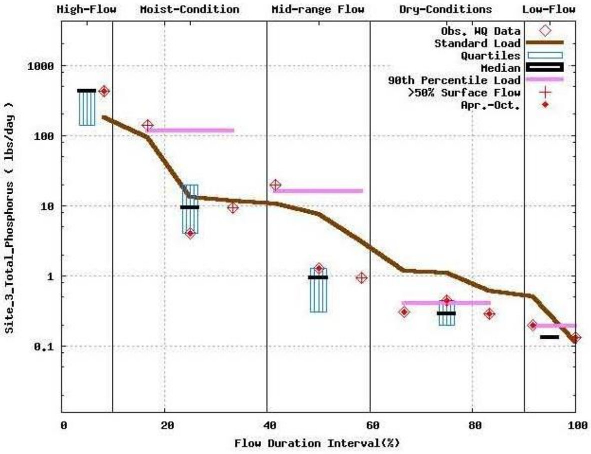

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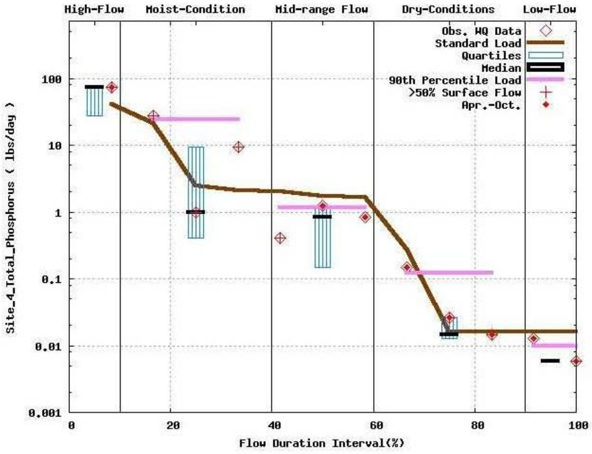

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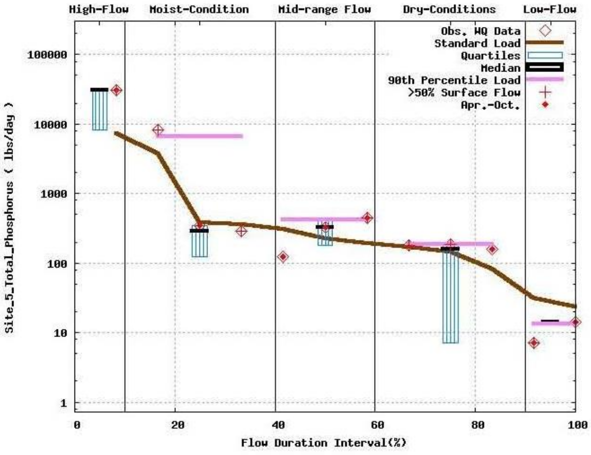

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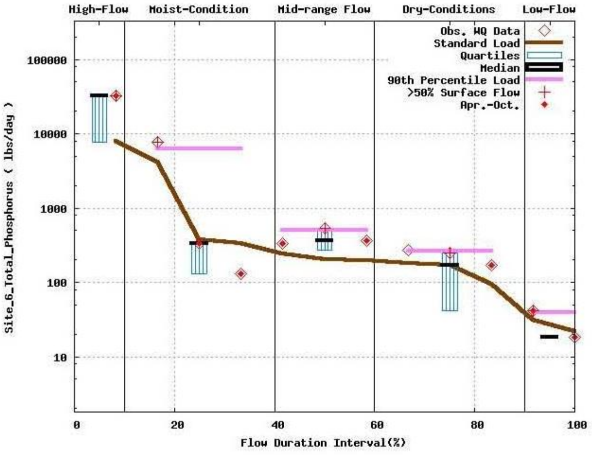

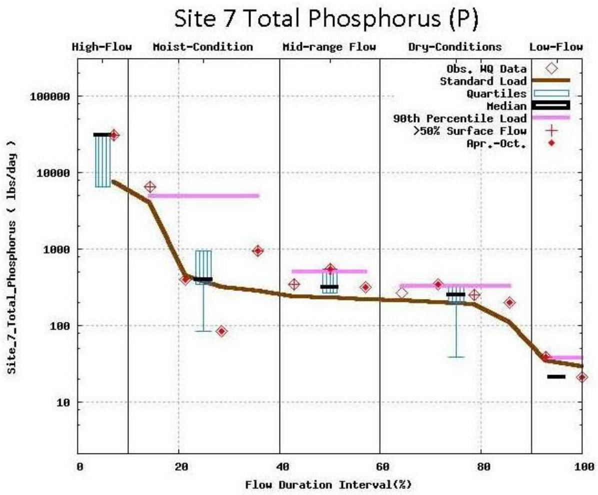

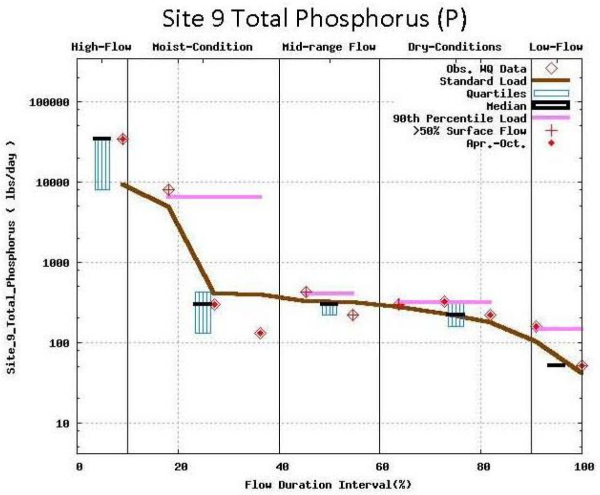

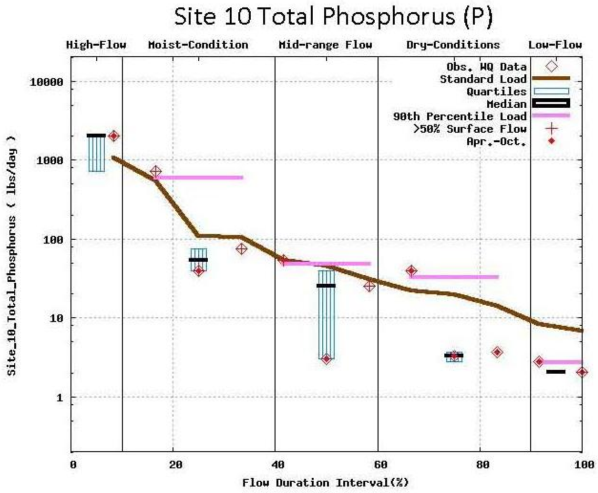

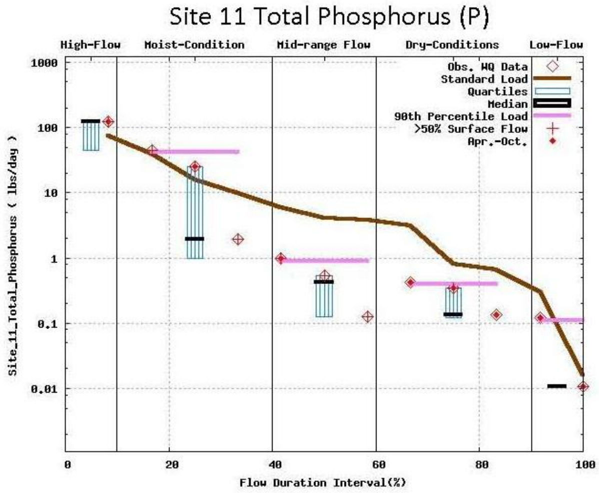

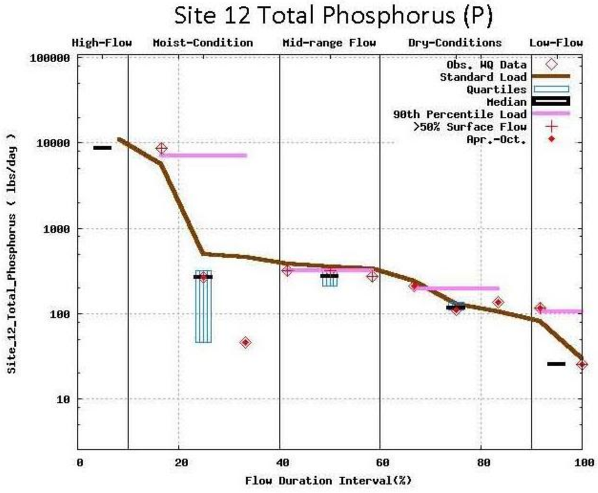

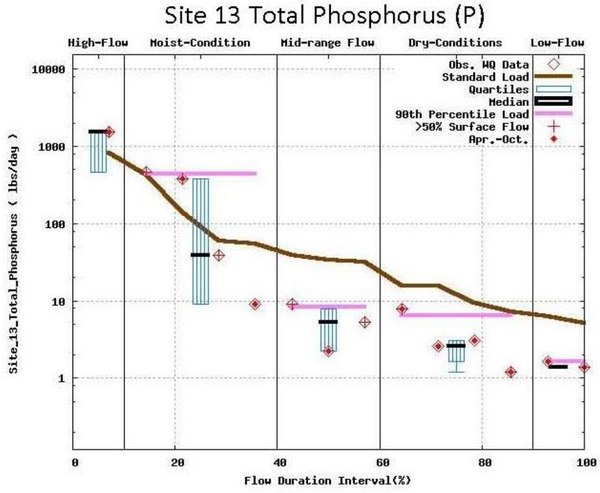

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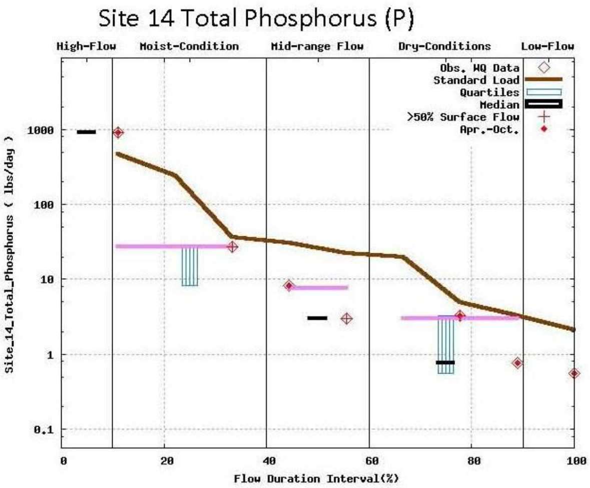
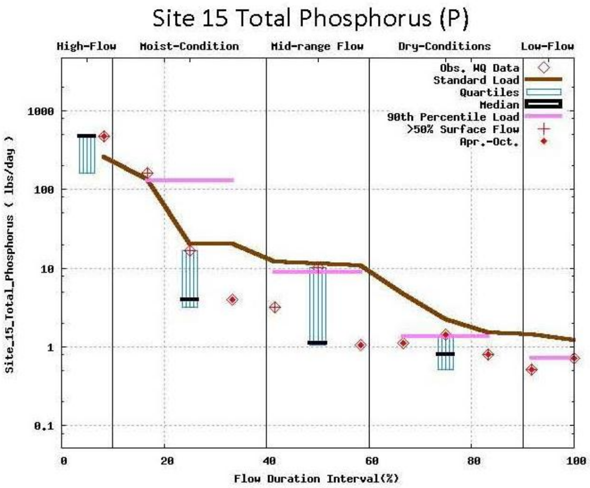
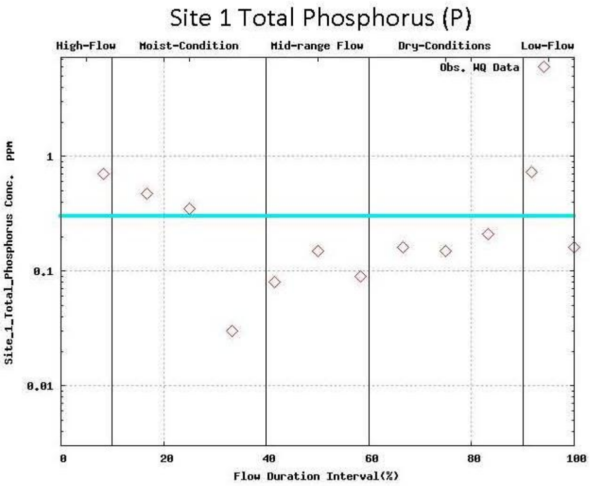
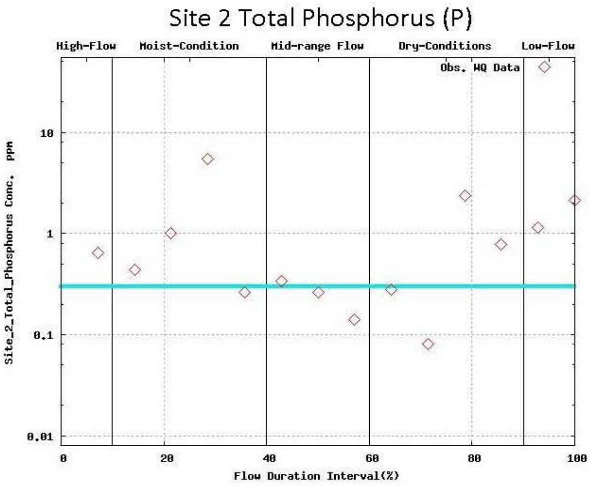
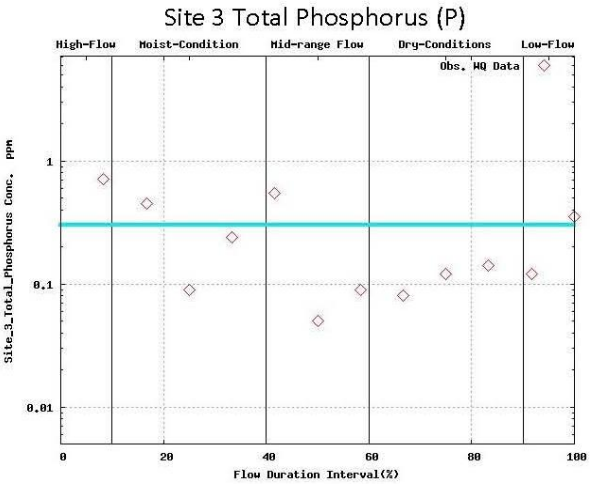


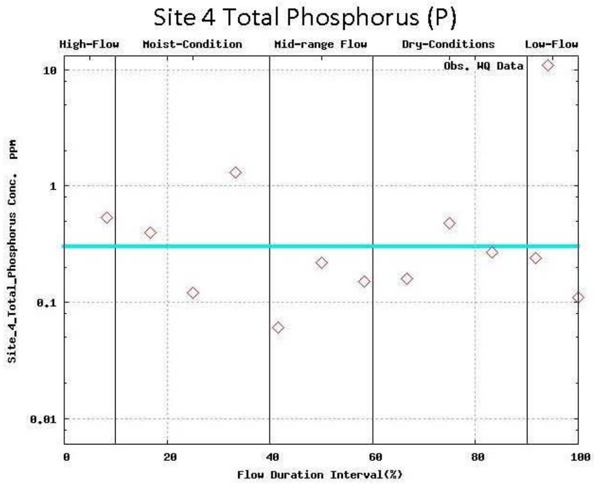


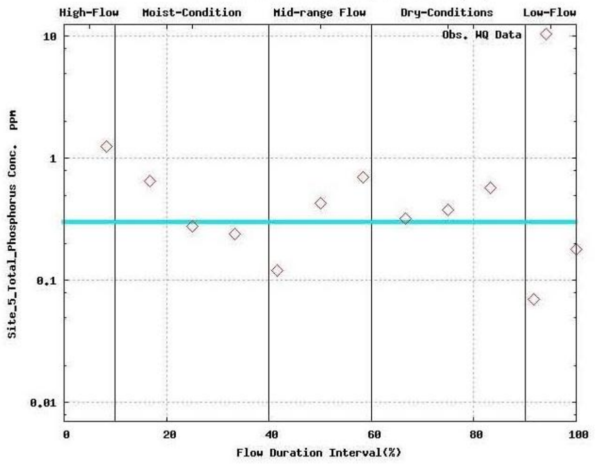
Total Phosphorus Target Concentration Charts



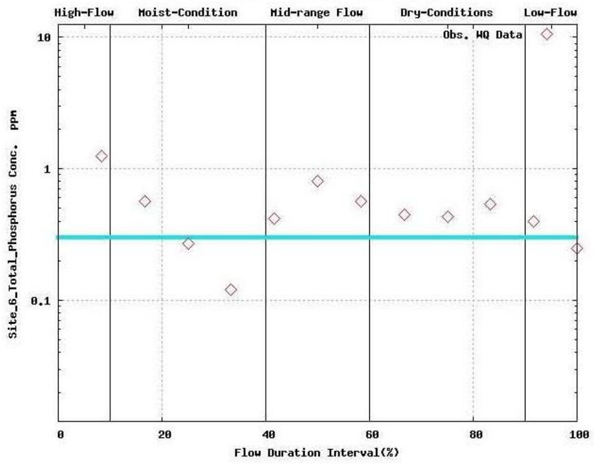








Site 5 Total Phosphorus (P)



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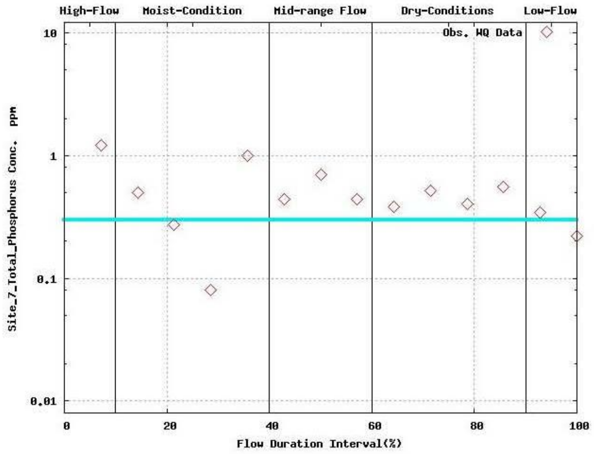

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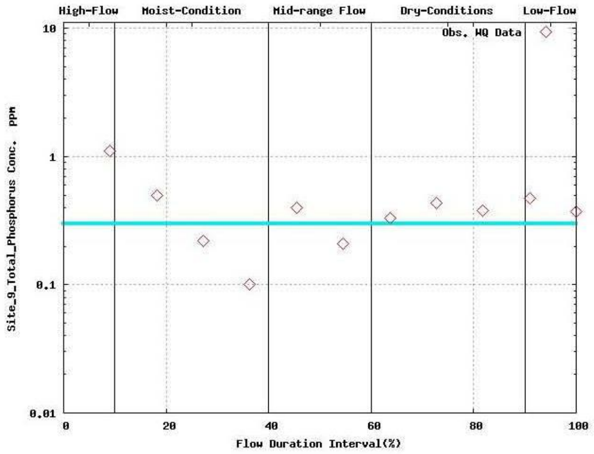

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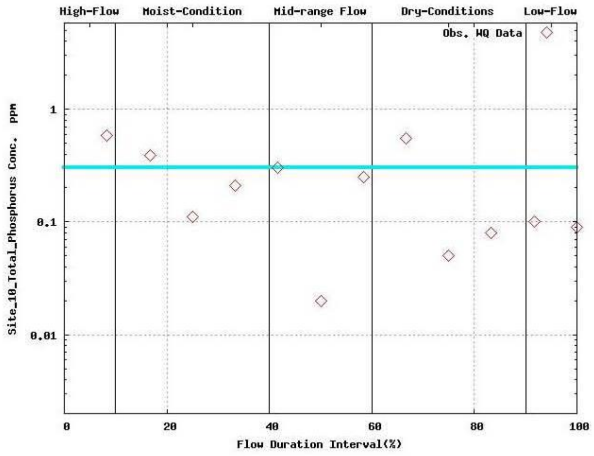

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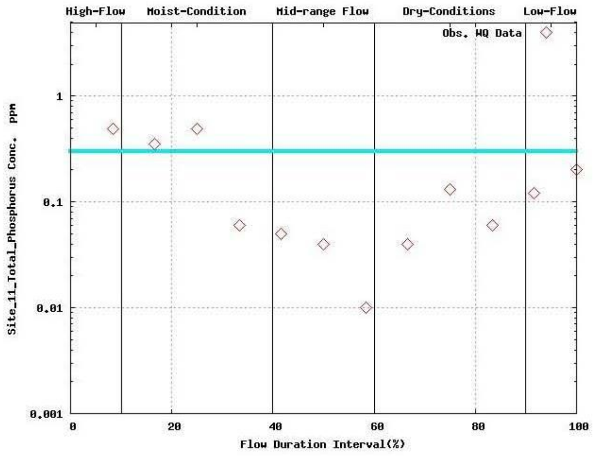

Site 11 Total Phosphorus (P)

***No charts for Site 8 due to not being able to measure flow.**

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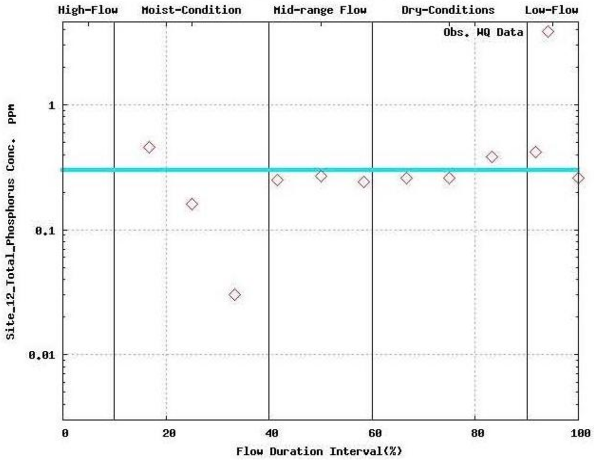

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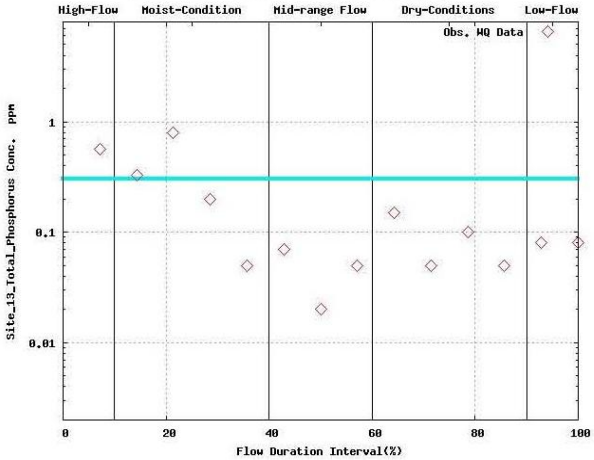

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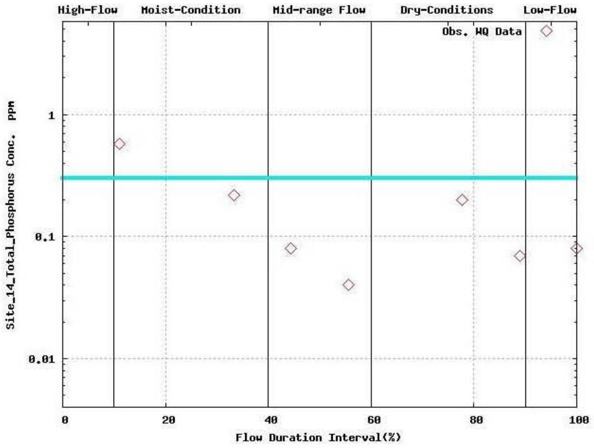

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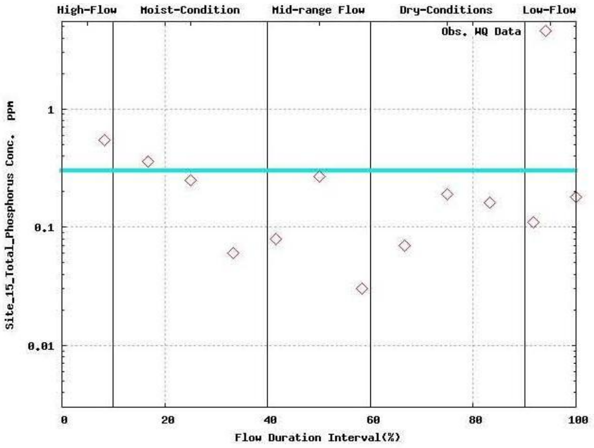
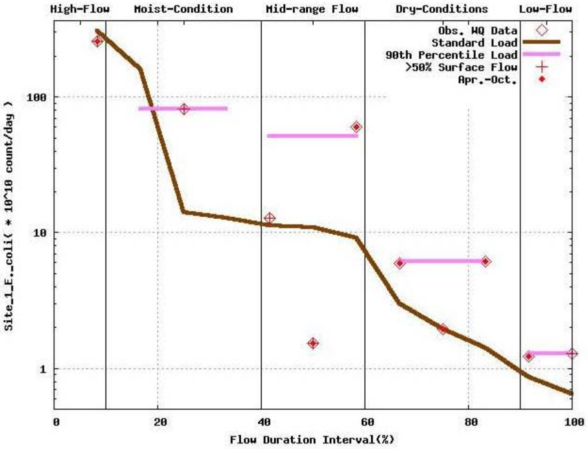


E. Coli **Load Duration Curve Charts**

Site 1 E. coli



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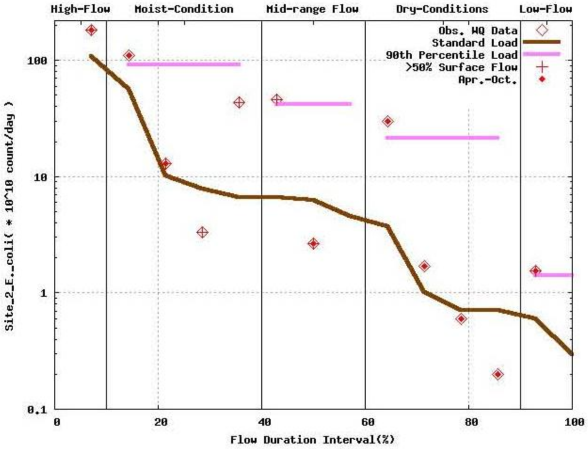
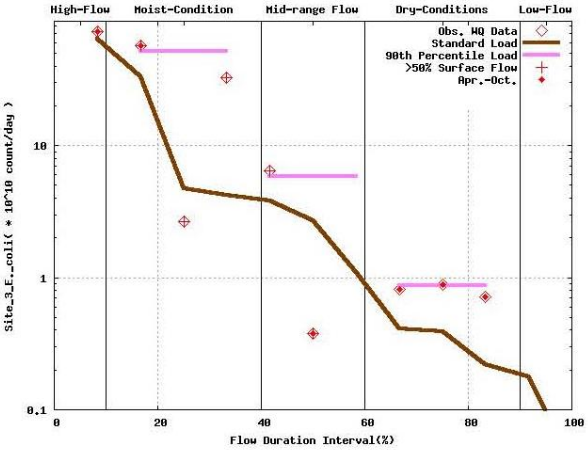


Site 3 E. coli



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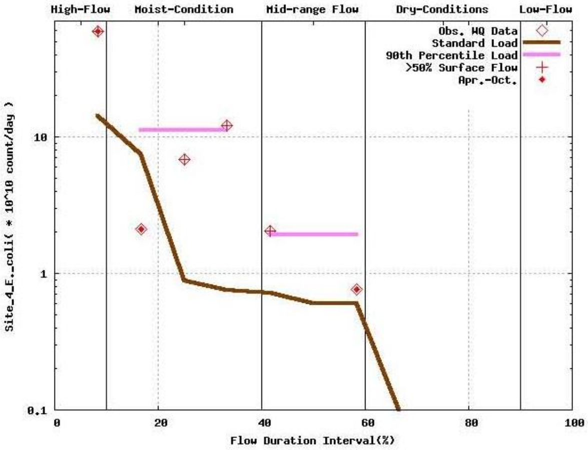
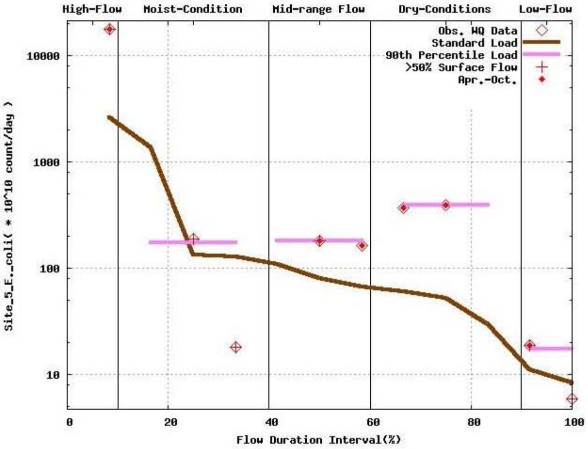
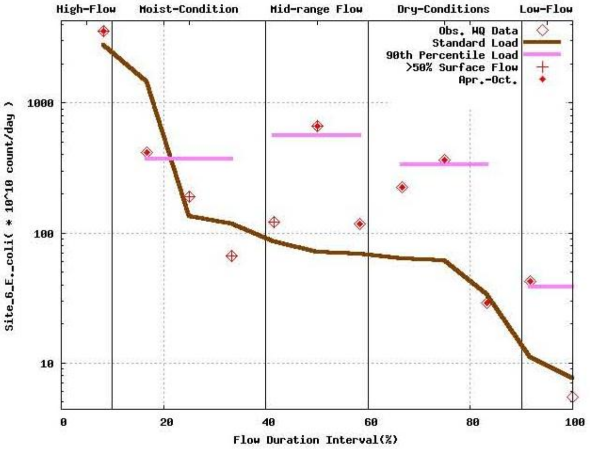


Site 5 E. coli



Site 6 E. coli



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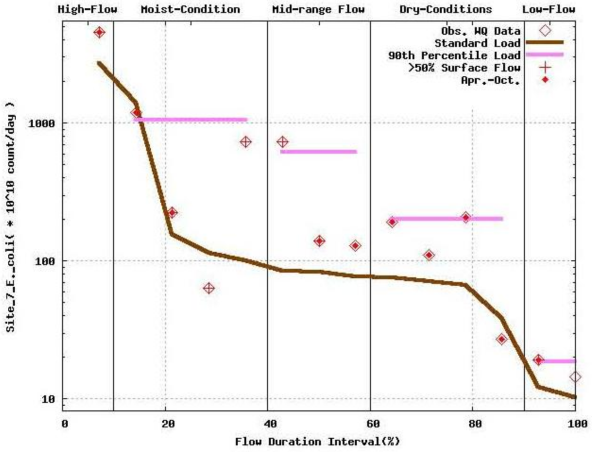
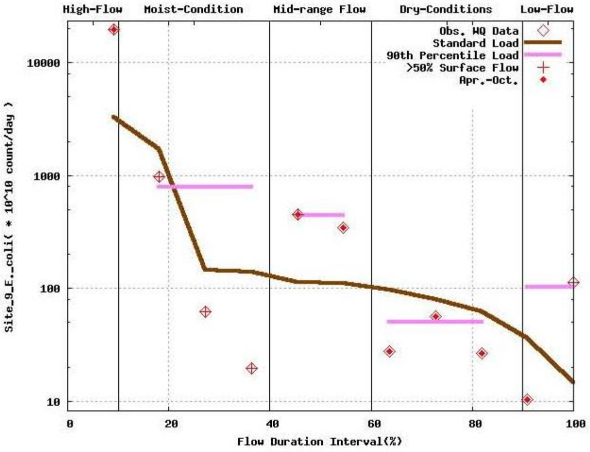


Site 9 E. coli



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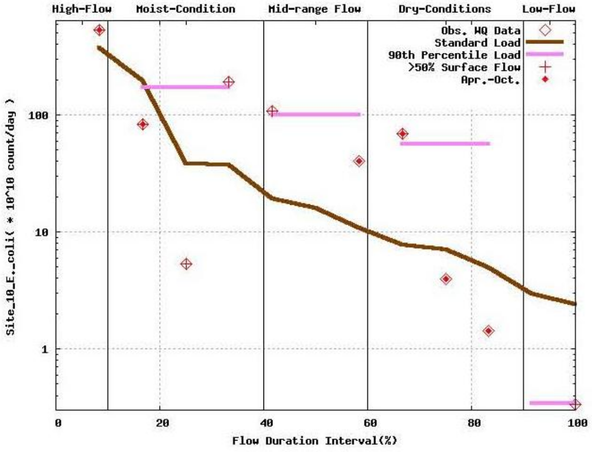

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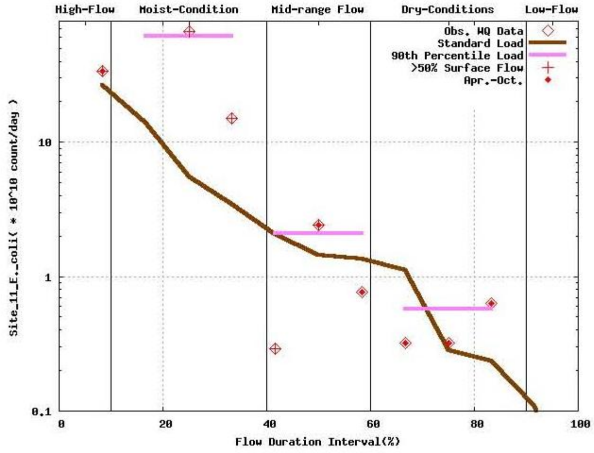

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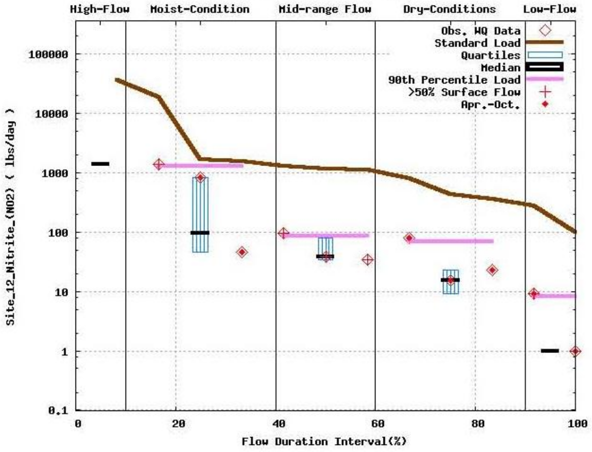

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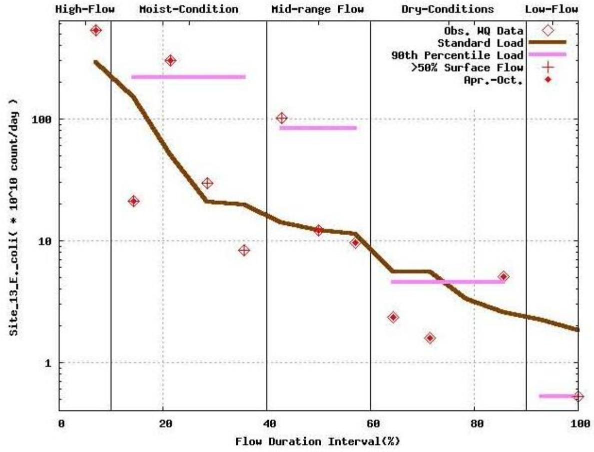
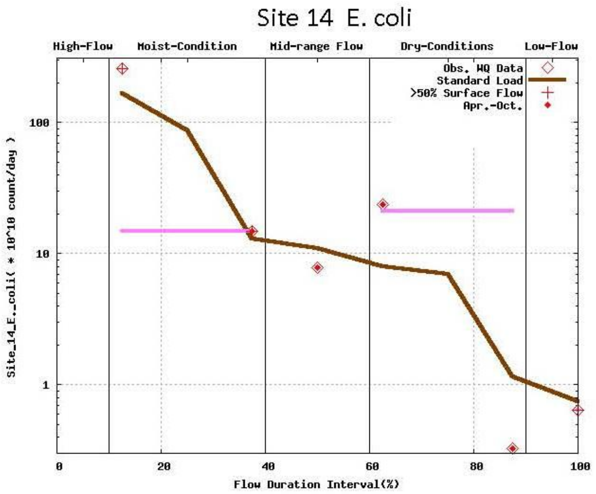


***No charts for Site 8 due to not being able to measure flow.**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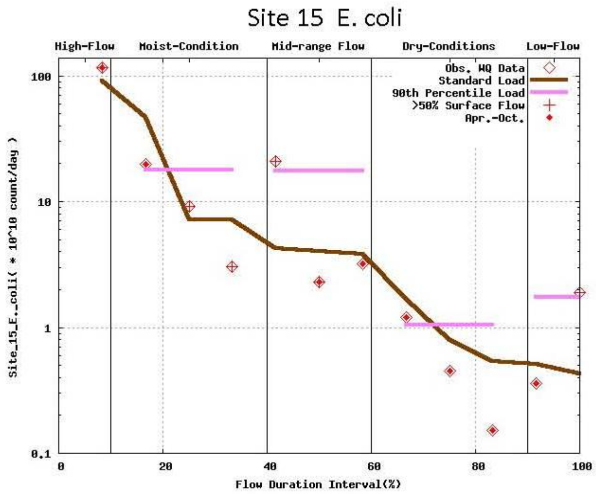
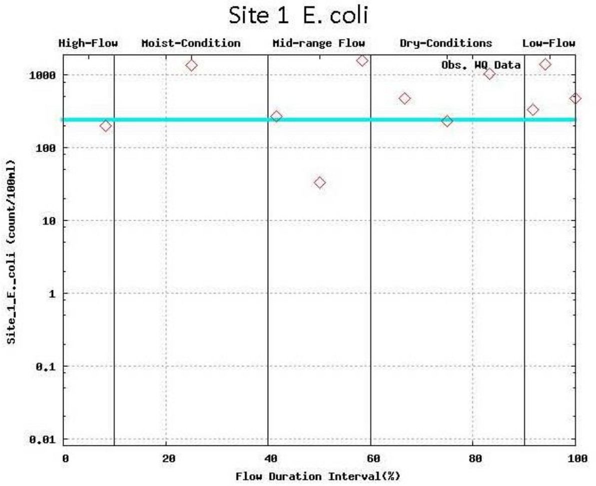
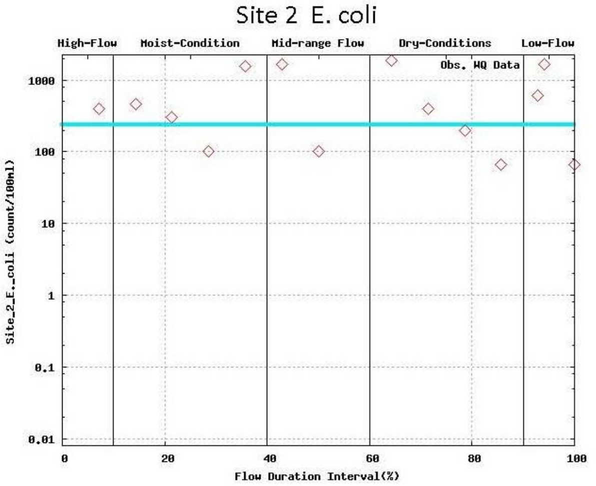

Site 15 E. coli

E. Coli Target Concentration Charts


Site 1 E. coli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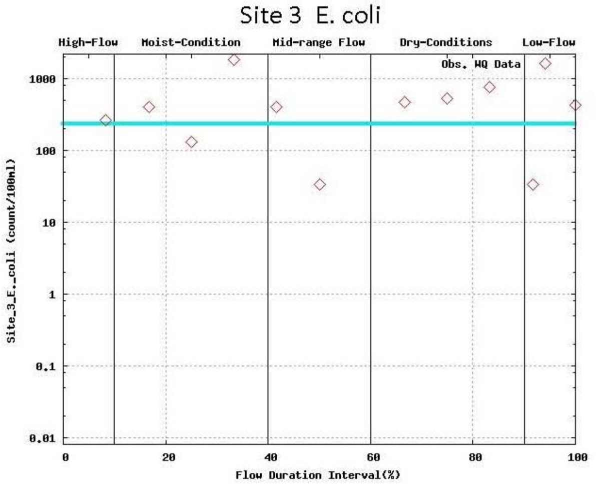
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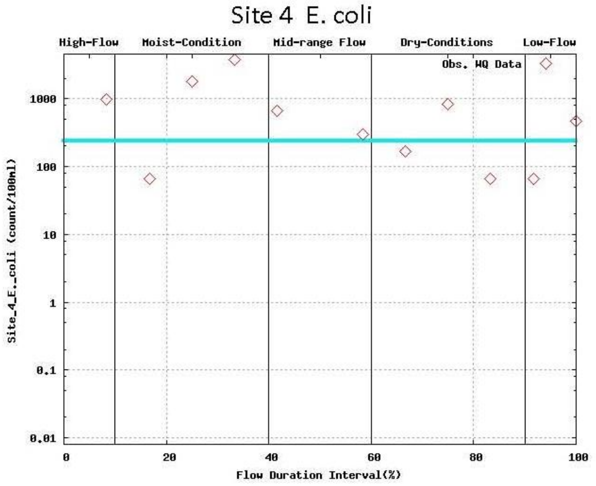
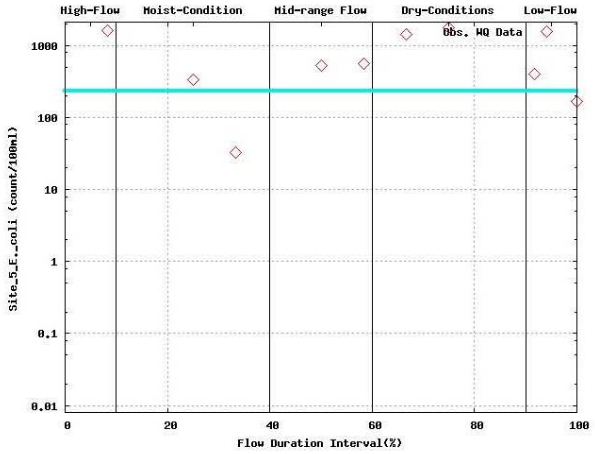

Site 4 E. coli

Site 5 E. coli



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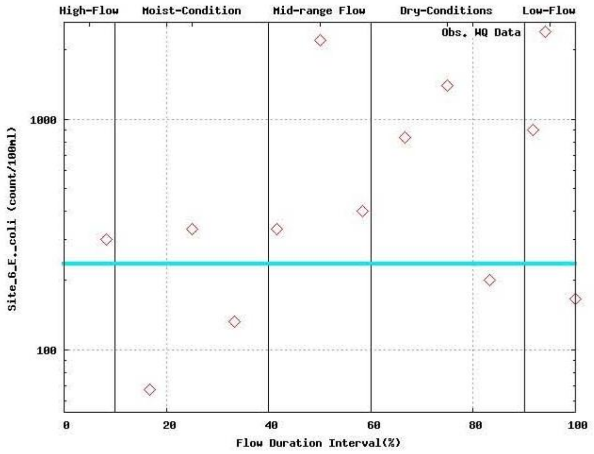

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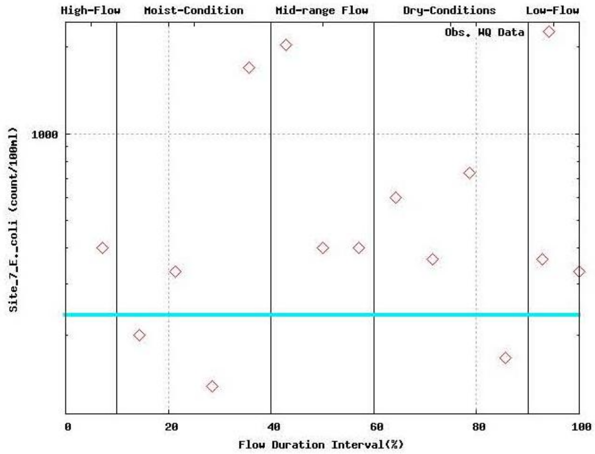

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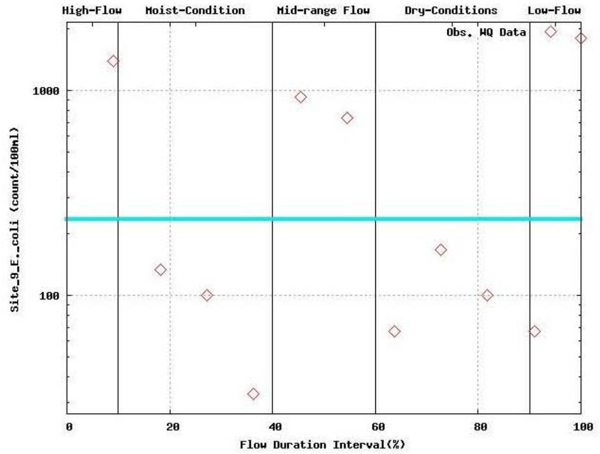
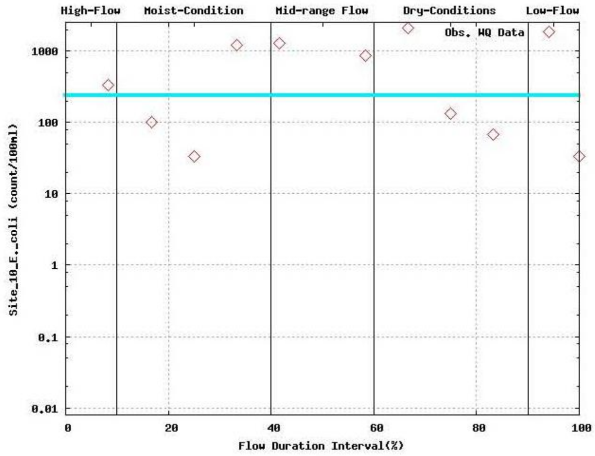
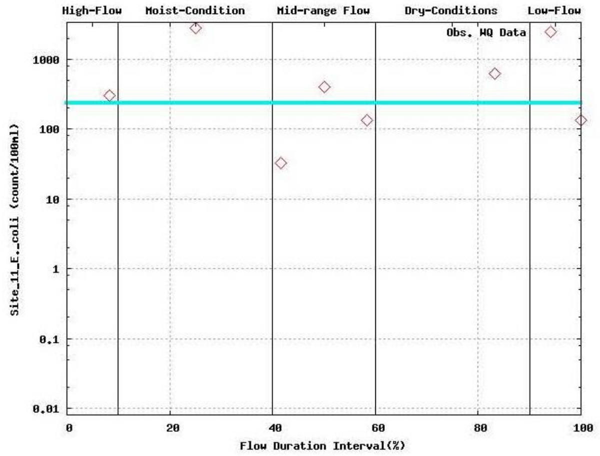


Site 10 E. coli

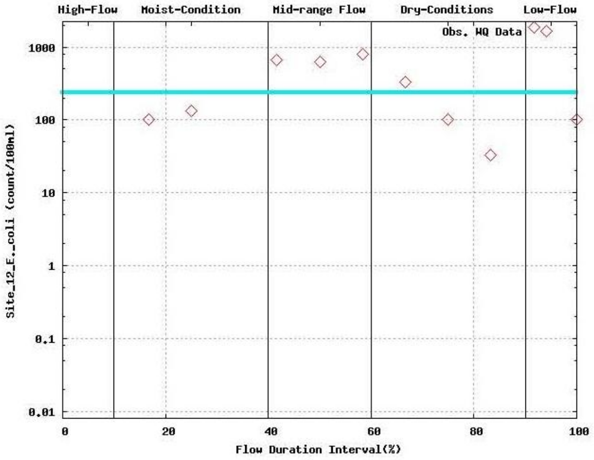


Site 11 E. coli



***No charts for Site 8 due to not being able to measure flow.**

Site 12 E. coli



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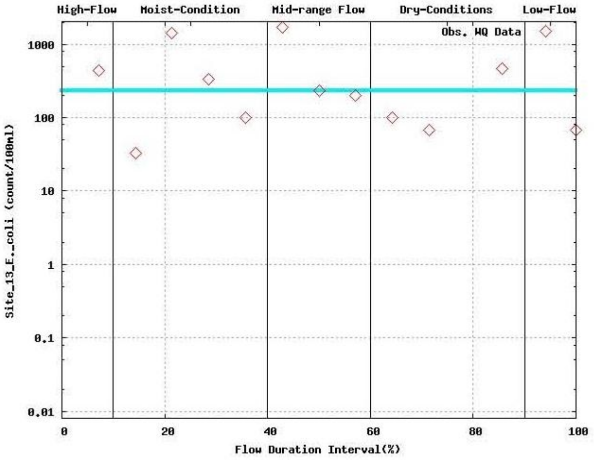

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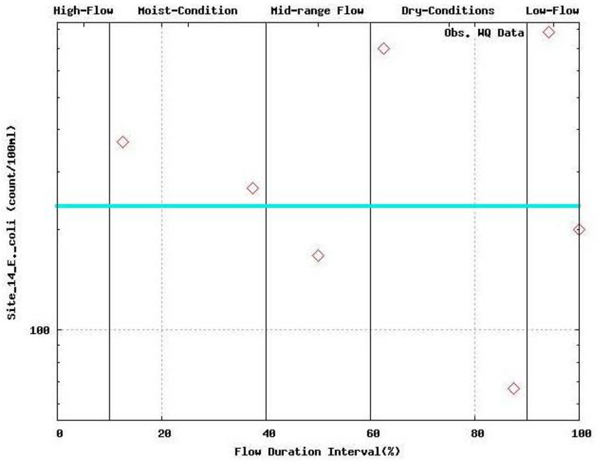

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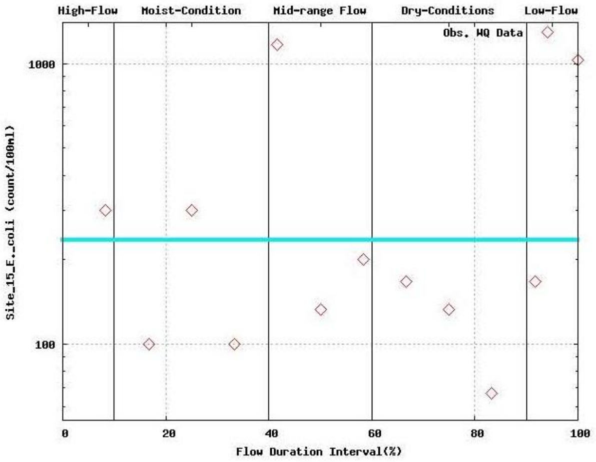

Appendix I – Best Management Practice Descriptions

Agronomy Consultations by a Certified Crop Advisor

Technical assistance provided to land users to address opportunities, concerns, and problems related to the use of natural resources and to help land users make sound natural resource management decisions. This assistance may be in the form of resource assessment, conservation activity plans, practice design, resource monitoring, or follow-up of installed practices. *(NRCS practice codes include Conservation Activity Plans: 102 CNMP, 104 NMP, 110 GMP, 114 IPMP, 130 DWMP, and a variety of on-the-ground best management practices.)*

This assistance can help land users:
- Maintain and improve private lands
- Implement better land management technologies
- Protect and improve water quality and quantity
- Maintain and improve wildlife and fish habitat
- Enhance recreational opportunities on their land
- Maintain and improve the aesthetic character of private land
- Explore opportunities to diversify agricultural operations and
- Develop and apply sustainable agricultural systems

Estimated Cost: $16/acre

Amending Soil Properties with Gypsum Products

The soil chemistry in the surface zone may become stratified over time in some minimum and no-till cropping systems. In most studies, this has not been shown to be a significant yield limitation, however, chemical and physical soil properties that affect water infiltration and runoff can have negative consequences if not monitored and managed accordingly. Using gypsum products to change the physical or chemical properties of soil can be a useful tool to help mitigate some of these negative consequences when combined with a sound conservation cropping system. *(NRCS practice code: 801)*

Primary purposes for Gypsum (calcium sulfate dehydrate – CaSO4)-derived products:
- Improve soil physical/chemical properties to reduce soil erosion and improve infiltration.
- Reduce dissolved phosphorus concentrations in surface runoff and subsurface drainage.
- Reduce the potential for pathogen transport from areas of manure and biosolids application.

Estimated Cost: $35/acre

Bottomland Timber Establishment

Establish woody plants in bottomland areas by planting seedlings or cuttings, direct seeding, or natural regeneration. Species selection is adapted to the soils, climate and site conditions. The selection of planting technique and timing must also be appropriate for the site and soil conditions. Native plant species are used whenever possible. *(NRCS practice code: 612 Tree and Shrub Establishment)*

The benefits of this practice include:
- forest products such as timber, pulpwood, etc.

- wildlife habitat
- long-term erosion control and improvement of water quality
- treating waste
- storing carbon in biomass
- reduce energy use
- develop renewable energy systems
- improving or restoring natural diversity
- enhancing aesthetics

Estimated Cost: $825/acre

Clearing and Snagging

Removal of vegetation along the bank (clearing) and/or selective removal of snags, drifts, or other obstructions (snagging) from natural or improved channels and streams that impedes the proper functioning along a length of the stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. This practice addresses resource concerns such as stream bank soil erosion. *(NRCS practice code: 326)*

Estimated Cost: $16/feet

Conservation Cover

This practice applies to land needing permanent protective cover, and typically involves conversion from a row crop cropping system to permanent vegetative cover. This practice is used to reduce soil erosion and sedimentation, improve water quality, and develop or enhance wildlife habitat. *(NRCS practice code: 327)*

Estimated Cost: $625 to $720/acre

Conservation Tillage - Residue and Tillage Management, Mulch Till and No Till/Strip Till

Mulch Till includes tillage methods where a majority of the soil surface is disturbed by tillage operations such as vertical tillage, chiseling and disking. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops and to tillage for planting perennial crops. It also includes some planting operations, such as hoe drills that disturb a large percentage of the soil surface during the planting operation and cropping systems in which the majority of surface area is disturbed during harvest operations. Also included is the use of a “modified no-till” system (Indiana definition) that uses full width tillage but leaves as much as 85% of the initial residue on the soil surface. *(NRCS practice code: 345)*

This practice is applied as a part of a conservation management system to support one or more of the following purposes:

- Reduce sheet, rill and wind erosion
- Reduce tillage-induced particulate emissions
- Maintain or increase soil quality and organic matter content

- Reduce energy use
- Increase plant-available moisture

No Till/Strip Till only involves an in-row soil tillage operation during the planting operation and a seed row/furrow closing device. There is no full-width tillage performed from the time of harvest or termination of one cash crop to the time of harvest or termination of the next cash crop in the rotation regardless of the depth of the tillage operation. This practice includes planting methods commonly referred to as no-till, quality no till, never-till, zero till, slot plant, zone till, strip till, or direct seed. Approved implements are: no-till and strip-till planters; certain drills and air seeders; strip-type fertilizer and manure injectors and applicators; and similar implements that only disturb strips and slots. *(NRCS practice code: 329)*

All of the benefits shown above for Mulch Till practices can be found using No Till or Strip Till practices in addition to improving soil organic matter content and decreasing carbon dioxide soil losses.

Estimated Costs: $11 to $52/acre

Cover Crops

Planting of non-income crops including grasses, legumes, and forbs for seasonal cover and are terminated by frost, mowing, tillage, crimping, and/or herbicides in preparation for the following crop. *(NRCS practice code: 340)*

The benefits from using cover crops include:
- Reduce erosion from wind and water
- Increase soil organic matter content
- Capture and recycle or redistribute nutrients in the soil profile
- Promote biological nitrogen fixation and reduce energy use
- Increase biodiversity and suppress weeds
- Manage soil moisture
- Minimize and reduce soil compaction

Estimated Costs: average $40/acre

Critical Area Planting

Critical Area Plantings are used to establish permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices. *(NRCS practice code: 342)*

This practice supports the following purposes:
- Stabilize stream and channel banks, pond and other shorelines
- Stabilize areas with existing or expected high rates of soil erosion by wind or water
- Stabilize areas, such as sand dunes and riparian areas

Estimated Costs: $325/acre

Diversion

This practice applies to all land uses where surface runoff water control and/or management are needed and where soils and topography are such that the diversion can be constructed and a suitable outlet is available or can be provided. A diversion channel is generally constructed across the slope with a supporting ridge on the lower side. *(NRCS practice code: 362)*

Purposes of this practice include:

- Break up concentrations of water on long slopes, on undulating land surfaces, and on land that is generally considered too flat or irregular for terracing.
- Divert water away from farmsteads, agricultural waste systems, and other improvements.
- Collect or direct water for storage, water-spreading or water-harvesting systems.
- Protect terrace systems by diverting water from the top terrace where topography, land use, or land ownership prevents terracing the land above.
- Intercept surface and shallow subsurface flow.
- Reduce runoff damages from upland runoff.
- Reduce erosion and runoff on urban or developing areas and at construction or mining sites.
- Divert water away from active gullies or critically eroding areas.

Estimated Costs: $6/feet

Drainage Water Management

This practice is applicable to agricultural lands with surface or subsurface agricultural drainage systems that are adapted to allow management of drainage discharges. Drainage discharges and water levels are managed in a manner that does not cause adverse impacts to other properties or drainage systems. This is accomplished by adjusting the elevation of the drainage outlet and/or installing water control structures. The structure for water control is used to convey water, control the direction or rate of flow, or maintain a desired water surface elevation. *(NRCS practice codes: 554 Drainage Water Management, 587 Structure for Water Control)*

The purpose of this practice is:

- Reduce nutrient, pathogen, and/or pesticide loading from drainage systems into downstream receiving waters.
- Improve productivity, health, and vigor of plants.
- Reduce oxidation of organic matter in soils.
- Reduce wind erosion or particulate matter (dust) emissions.
- Provide seasonal wildlife habitat.

Estimated Costs: $24/acre annual labor; $1,450 to $2,800/structure

Field Borders & Filter Strips

Field borders are a strip of permanent vegetation established at the edge or around the perimeter of a field. This practice is applied around the inside perimeter of fields, and can support or connect other buffer practices within and between fields. *(NRCS practice code: 386)*

This practice may be applied to accomplish one or more of the following:

- Reduce erosion from wind and water

- Protect soil and water quality
- Provide wildlife food and cover and pollinator or other beneficial organism habitat
- Increase carbon storage
- Improve air quality

Filter strips are a strip or area of herbaceous vegetation that is established where environmentally-sensitive areas need to be protected from sediment; other suspended solids and dissolved contaminants in overland flow. Environmentally-sensitive areas include water bodies; water sources, such as wells; and tile inlets. *(NRCS practice code: 393)*

This practice supports the following purposes:
- Reduce suspended solids and associated contaminants in runoff
- Reduce dissolved contaminant loadings in runoff
- Reduce suspended solids and associated contaminants in irrigation tailwater

Estimated Costs: $488 to $678/acre

Grassed Waterway & Grade Stabilization Structures

A grasses waterway is a shaped or graded channel that is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. They are used in areas where added water conveyance capacity and vegetative protection is needed to control erosion resulting from concentrated surface runoff. In urban settings, these are often referred to as swales. *(NRCS practice code: 412)*

A grade stabilization structure is used in areas where the concentration and flow velocity of water requires structures to stabilize the channel grade or to control gully erosion. They are most often used in conjunction with grassed waterways. *(NRCS practice code: 410)*

Grass waterways are used:
- To convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding.
- To reduce gully erosion.
- To protect/improve water quality.

Grade Stabilization Structures are used to:
- Stabilize the grade and control erosion in natural or artificial channels
- Prevent the formation or advance of gullies
- Enhance environmental quality and reduce pollution hazards.

Estimated Costs: Grassed Waterway $3,225 to $4,200/acre
Grade Stabilization Structure $5,000/structure

Greenways and Trails

A trail is a constructed path with a vegetated or earthen surface, or a greenway or walkway is a constructed path with an artificial surface. A trail/walkway is used to facilitate the movement of animals, people, or off-road vehicles. *(NRCS practice code: 575)*

A trail/walkway is used for the following purposes:

- Provide or improve animal access to forage, water, working/handling facilities, or shelter.
- Facilitate improved grazing efficiency and distribution.
- Protect ecologically sensitive, erosive, or potentially erosive sites.
- Provide pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations.
- Provide trails/walkways for recreational activities or access to recreation sites.

Estimated Costs: $1.50 to $5.50/feet

Heavy Use Area Protection

Heavy Use Area Protection is used to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles. *(NRCS practice code: 561)*

Heavy Use Area Protection is used:

- To provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles
- To protect or improve water quality.

Estimated Cost: $1.50/ft^2

Livestock Exclusion

A livestock exclusion system can include access control, access roads, fence, heavy use area protection, livestock pipelines, stream crossings, and watering facilities.

Livestock that have unrestricted access to a stream or wetland have the potential to degrade water quality and biotic integrity. Livestock can deliver nutrients and pathogens directly to a waterbody through defecation, and degrade the stream ecosystem indirectly by trampling and removal of vegetation through grazing of riparian zones. This can increase the potential for bank erosion and compact soils decreasing the areas ability to infiltrate water runoff. Removal of vegetation also limits the ability to filter pollutants in runoff.

Access control is the temporary or permanent exclusion of animals, people, vehicles, and/or equipment from an area. This practice is used for livestock exclusion from a stream, wetland, or woodland. *(NRCS practice code: 472)*

Access roads provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat, and other conservation enterprises while protecting the soil, water, air, fish, wildlife, and other adjacent natural resources. *(NRCS practice code: 560)*

The fence practice provides a means to control movement of animals and people, including vehicles, and is applied on any area where management of animal or human movement is needed. *(NRCS practice code: 382)*

Heavy use area protection is used to provide a stable, non-eroding surface for areas frequently and intensively used by people, animals, or vehicles. *(NRCS practice code: 561)*

A livestock pipeline and appurtenances are used to convey water for livestock or wildlife. *(NRCS practice code: 516)*

Stream crossings provide a stabilized area or structure across a stream to provide a travel way for people, livestock, equipment, or vehicles. The improve water quality by reducing sediment, nutrient, organic and inorganic loading of the stream, reduce stream bank and stream bed erosion, and provide access to another land unit. *(NRCS practice code: 578)*

A watering facility is a permanent or portable device to provide access to drinking water for livestock and/or wildlife to improve animal distribution and meet daily water requirements. *(NRCS practice code: 614)*

Estimated Costs: Access Control \$40/acre
Access Roads \$8/feet
Fence \$2/feet
Heavy Use Area Protection \$1.50/feet^2
Livestock Pipeline \$1 to \$3/feet
Stream Crossing \$1.50/feet^2
Watering Facility \$165 to 1,000 each

Low Impact Development

Low impact development (LID) can be used to manage stormwater runoff by using a site's presettlement hydrology to design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. LID practices can provide numerous benefits.

Green infrastructure includes two broad categories. The first encompasses the natural undisturbed environment such as wetlands, trees, prairies, lakes, rivers, and streams. The second category includes constructed or built green infrastructure.

LID practices include: bioretention (rain gardens), capture reuse (rain barrels), constructed filters, detention basins, infiltration practices, level spreaders, native revegetation, pervious pavement with infiltration, planter boxes, riparian buffer restoration, soil restoration, vegetated filter strips, vegetated roofs, vegetated swales, water quality devices, and other techniques. *(Low Impact Development Manual for Michigan) (NRCS practice codes: 558 Roof Runoff Structure, 570 Stormwater Runoff Control)*

Estimated Costs: Rain Gardens \$100 to \$500 each
Rain Barrels \$100 each
Varies based on practice

Nutrient Management & Pest Management

The overriding objective of nutrient management is to ensure that, as practical as possible, nutrients are applied with the right placement, in the right amount, at the right time, and from the right source to optimize profitability and to minimize nutrient losses to our air and water resources. This practice applies to all lands where plant nutrients and soil amendments are applied. *(NRCS practice code: 590)*

The benefits of this practice are:
- To budget, supply, and conserve nutrients for plant production.
- To minimize agricultural nonpoint source pollution of surface and groundwater resources.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.
- To maintain or improve the physical, chemical, and biological condition of soil.

Integrated pest management is a site-specific combination of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies. *(NRCS practice code: 595)*

The purpose of this practice:
- Prevent or mitigate off-site pesticide risks to water quality from leaching, solution runoff and absorbed runoff losses.
- Prevent or mitigate off-site pesticide risks to soil, water, air, plants, animals and humans from drift and volatization losses.
- Prevent or mitigate on-site pesticide risks to pollinators and other beneficial species through direct contact.
- Prevent or mitigate cultural, mechanical and biological pest suppression risks to soil, water, air, plants, animals and humans.

Estimated Costs: $1,400 to $3,000/plan; $12 to $29/acre application

Open Channel – Two Stage Ditch

Where an existing agricultural drainage ditch will be converted to a two-stage ditch (wider ditch with benches), in which water flows with a free surface. The two-stage design improves ditch stability by allowing the water to have more area to spread out and decreases the velocity of the water. The benefits of a two-stage ditch over the typical agricultural ditch include both improved drainage function and ecological function by reducing water flow and the need for maintenance, saving both labor and money. The transportation of sediment and nutrients is decreased considerably because the design allows the sorting of sediment, with finer silt depositing on the benches and courser material forming the bed. This not only improves the water quality, but also improves the biological conditions of the ditches where this is located. *(NRCS practice code: 582)*

Estimated Costs: $11.50/feet

Precision/Variable Rate Technology – Equipment Modifications

Precision agriculture, also known as “site-specific crop management,” is an information and technology based agricultural management system used to identify, analyze, and manage variability within fields for optimum profitability, sustainability, and environmental protection. Fields often vary in soil types, elevations, soil chemistry, fertility, and productivity. By applying precision agriculture practices, producers are able to specify the farm input needs (including nutrient and pesticide application, tillage, and irrigation) throughout an individual field.

Producers can use new precision tools, techniques, and services to enhance their efforts to save energy and reduce costs. These include yield monitoring, grid soil sampling, variable-rate application of nutrients, remote-sensing applications, soil electrical conductivity (EC) monitoring, and zone soil sampling. In addition to cutting production costs and saving energy, precision agriculture reduces environmental pollution and improves water quality by reducing nutrient runoff.

Other benefits include:
- Improved crop yield;
- Reduced compaction by limiting traffic to specified travel lanes;
- Increased opportunity to operate equipment after dark;
- Labor savings through reduced implement overlap; and
- More accurate farming records

Estimated Costs: $2,000 to $10,000/unit -varies based on precision tool, techniques and services

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing or browsing animals, managed with the intent to maintain or improve water quality and quantity. This practice involves strategically moving livestock across sections of a pasture (paddocks) at set intervals of time so that the vegetation of the pasture can be managed at growth rates best suited to each producer. *(NRCS practice code: 528)* Prescribed grazing generally will require additional livestock practices such as fence, livestock pipeline, watering facilities, etc.

Benefits of prescribed grazing include:
- Improve or maintain desired species composition and vigor of plant communities.
- Improve or maintain quantity and quality of forage for grazing and browsing animals' health and productivity.
- Improve or maintain surface and/or subsurface water quality and quantity.
- Improve or maintain riparian and watershed function.
- Reduce accelerated soil erosion, and maintain or improve soil condition.
- Improve or maintain the quantity and quality of food and/or cover available for wildlife.
- Manage fine fuel loads to achieve desired conditions.

Estimated Costs: average $28/acre - start-up costs include fencing, and water distribution.

Rain Gardens & Rain Barrels

These practices are more applicable to urban settings or farmsteads. They allow stormwater to drain in a proper manner by having it absorbed into the soil, or storing it for future use. *(NRCS practice codes: 558 Roof Runoff Structure, 570 Stormwater Runoff Control)* *Also listed under LID practice.

Estimated Costs:	Rain Gardens $100 to $500 each
	Rain Barrels $100 each

Riparian Forest Buffer & Herbaceous Cover

Riparian forest buffers are applied on areas adjacent to permanent or intermittent streams, lakes, ponds, and wetlands. They are not applied to stabilize stream banks or shorelines. *(NRCS practice code: 391)*

The benefits of a riparian forest buffer include:
- Create shade to lower or maintain water temperatures to improve habitat for aquatic organisms.
- Create or improve riparian habitat and provide a source of detritus and large woody debris.
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow.
- Reduce pesticide drift entering the water body.
- Restore riparian plant communities.
- Increase carbon storage in plant biomass and soils.

Riparian herbaceous cover are areas adjacent to perennial and intermittent watercourses or water bodies where the natural plant community is dominated by herbaceous vegetation that is tolerant of periodic flooding or saturated soils. For seasonal or ephemeral watercourses and water bodies, this zone extends to the center of the channel or basin. The grasses, sedges, rushes, ferns, legumes, and forbs are established or managed as the dominant vegetation in the transitional zone between upland and aquatic habitats. *(NRCS practice code: 390)*

The benefits of riparian herbaceous cover include:
- Provide or improve food and cover for fish, wildlife and livestock,
- Improve and maintain water quality.
- Establish and maintain habitat corridors.
- Increase water storage on floodplains.
- Reduce erosion and improve stability to stream banks and shorelines.
- Increase net carbon storage in the biomass and soil.
- Enhance pollen, nectar, and nesting habitat for pollinators.
- Restore, improve or maintain the desired plant communities.
- Dissipate stream energy and trap sediment.
- Enhance stream bank protection as part of stream bank soil bioengineering practices.

Estimated Costs: $715 to $825/acre

Roof Runoff Structure

Roof runoff structures are used to collect, control and transport precipitation from roofs. This practice applies to areas where roof runoff from precipitation needs to be diverted away from structures or contaminated areas; collected, controlled and transported to a stable outlet; or collected and used for other purposes such as irrigation or animal watering facility. *(NRCS practice code: 558)*

This practice improves water quality, reduces soil erosion, increases infiltration, protects structures, and/or increases water quantity.

Estimated Costs: $7/feet - varies based on structures used

Septic System Care and Maintenance

Septic systems, or on-site waste disposal systems, are the primary means of sanitary treatment throughout rural areas. When septic systems fail, untreated sanitary flows are discharged into open water courses which pollute the water and pose a potential public health risk. Additionally, illicitly connected septic systems can contribute significant amounts of nitrogen and phosphorus to streams and rivers.

Care and maintenance can involve improving or updating parts of the septic system, such as replacing tanks or drainage systems. Annual maintenance of septic systems is also crucial for their operation, particularly the removal of accumulated sludge.

Estimated Costs: vary depending on maintenance, improvements or upgrades implemented

Stormwater Runoff Control

This practice applies to sites where stormwater runoff causes or may cause undesirable downstream flooding, sedimentation or channel degradation and/or degradation of surface or ground water quality if left untreated. This practice may apply both to sites undergoing development as well as remedial work on already developed sites. *(NRCS practice code: 570)*

The benefits of this practice include:
- Reduce onsite erosion.
- Reduce offsite impacts from sedimentation.
- Minimize erosion and sedimentation during and following construction activities.
- Reduce the quantity of stormwater leaving the site to levels that will not adversely affect downstream receiving channels.
- Improve the quality of stormwater leaving the site.

Estimated Costs: $1,500/acre – varies depending on control used (vegetative versus structural)

Soil Sampling

An analysis of a soil sample is used to determine the nutrient content, composition, and other characteristics of the soil. This test can determine the fertility, or the expected growth potential of the soil which indicates nutrient deficiencies, potential toxicities from excessive fertility and inhibitions from the presence of non-essential trace elements. Soil sampling is used to make decisions for nutrient applications, and is required for nutrient management planning.

Estimated Costs: $1/acre

Stream Crossing

This practice is used when a stabilized area or structure is needed to cross an intermittent or perennial watercourse to provide a travel way for people, livestock, equipment or vehicles. Stream crossings are located in areas where the streambed is stable or where grade control can be provided to create a stable condition. *(NRCS practice code: 578)*

The benefits of a stream crossing include:

- Improved water quality by reducing sediment, nutrient, organic, and inorganic loading of the stream.
- Reduction in streambank and streambed erosion.
- Provides crossing for access to another land unit.

Estimated Costs: $1.50 to $2.00/feet^2

Tree and Shrub Establishment

Tree and shrub establishment can be applied on any appropriately prepared site where woody plants can be grown. Establishment can be made by planting seedlings or cuttings, direct seeding, or natural regeneration. *(NRCS practice code: 612)*

The purpose and benefits of tree and shrub establishment include:
- forest products such as timber, pulpwood, etc.
- wildlife habitat
- long-term erosion control and improvement of water quality
- treating waste
- storing carbon in biomass
- reduce energy use
- develop renewable energy systems
- improving or restoring natural diversity
- enhancing aesthetics

Estimated Costs: $825/acre

Underground Outlet (Blind inlet)

An underground outlet is designed to carry water to a suitable outlet from terraces, water and sediment control basins, diversion, waterways, surface drains, or other similar practices or flow concentrations without causing damage by erosion or flooding. This practice applies to areas where disposal of surface water is necessary, or areas where a surface outlet is impractical because of stability problems, topography, climatic conditions, land use or equipment traffic.

Underground outlets can provide a direct conduit to receiving waters for contaminated runoff from crop land. Underground outlets and the accompanying structure or practice should be installed as part of a conservation system that addresses issues such as nutrient and pest management, residue management, blind inlet designs, and filter areas. *(NRCS practice code: 620)*

Estimated Costs: $60/feet - varies based on design.

Waste Utilization

Large volumes of manure are generated by both small, unregulated animal operations and by confined feeding operations. Waste utilization involves using the manure, wastewater, or other organic by-products and biosolids from these livestock operations on the land as a nutrient source. Proper management of animal waste can be accomplished by implementing best manage practices that reduce or eliminate surface application of manure, or technology that increases the application efficiency such as no-till manure injection, variable rate controllers, and Geographic Positioning Systems. The use of nutrient management strategies such as cover crops or crop rotations also improve nutrient cycling and reduce energy inputs.

Benefits of waste utilization practices include a decrease in water quality impacts, optimum nutrient levels for crops, forage, fiber production and forest products, improve or maintain soil structure, and an energy source. Proper manure management can effectively reduce *E. coli* concentrations, nutrient levels and sedimentation. *(NRCS practice code: 590 Nutrient Management)*

Estimated Costs: Waste Application $47/acre
Technology (equipment modifications) $2,000 to $10,000/unit
Nutrient Management Plan or Comprehensive Nutrient Management Plan
$6,000 to $14,500/plan

Water and Sediment Control Basin

A water and sediment control basin is an earthen embankment or combination ridge and channel constructed across a slope of minor watercourses to form a sediment trap and water detention basin with a stable outlet. Water collected in the basin is slowly released through the outlet structure. Water and Sediment Control Basins should be installed as part of a conservation system that includes such practices as grassed waterways, contouring, a conservation cropping system, conservation tillage, nutrient and pest management, crop residue management and filter areas to reduce or mitigate contaminated runoff. *(NRCS practice code: 638)*

This practice may be applied as part of a resource management system for one or more of the following purposes:

- To reduce watercourse and gully erosion
- To trap sediment
- To reduce and manage onsite and downstream runoff

Estimated costs: $2,885/structure

Wetland Creation, Enhancement and Restoration

Wetland creation standards are used to create a wetland on a site location that was historically non-wetland on soils capable of supporting wetland functions. *(NRCS practice code: 658)*

Wetland enhancement is the augmentation of wetland functions beyond the original natural conditions on a former, degraded or naturally functioning wetland site, such as enhancing plant and animal habitats. *(NRCS practice code: 659)*

Wetland restoration is the return of a wetland and its functions, value, habitat, diversity, and capacity to a close approximation of its original condition as it existed prior to disturbance on a former or degraded wetland site. This practice applies only to natural wetland sites with hydric soils which have been subject to degradation of hydrology, vegetation, or soils; and where the natural hydrologic conditions can be approximated by actions such as modifying drainage, restoring stream/floodplain connectivity, removing diversions, dikes and levees, and/or by using a natural or artificial water source to provide conditions similar to the original, natural conditions. *(NRCS practice code: 657)*

Creating, enhancing and restoring wetlands in the watershed could return many of the functions that were lost when these wetlands were drained. The wetland systems store nutrients, sediment, and *E. coli* while also increasing water storage and reducing flooding. Wetlands also provide additional habitat, stormwater mitigation, and recreational opportunities.

Estimated Costs:	Wetland Creation up to $4,500/acre
	Wetland Enhancement and Wetland Restoration $450 to $2,450/acre

Appendix J – Action Register and Schedule

Action Register and Schedule

5-year Nutrient Goals: Reduce nitrate loading by 12% (11,708,813 lbs/yr) and reduce the annual average concentration of nitrate by 17% (3.0 mg/L) by 2020.

Reduce phosphorus loading by 10% (226,619 lbs/yr) and reduce the annual average concentration by 14% (0.05 mg/L) by 2020.

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Develop Nutrient and Pest Management plans and implement on 2,500 acres of cropland.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	Technical Service Providers, NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr*		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Provide cost-share for agronomy consultations and development of nutrient and pest management plans on 500 acres annually. ($15.50/ac)	$38,750		
		Provide cost-share for small farm producers to conduct soil sampling on 500 acres annually. ($1/ac)	$2,500		
		Identify alternate funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Amend Soil Properties with Gypsum Products on 1,000 acres of cropland.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement 500 acres of gypsum applications. ($35/ac)	$35,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase Conservation Tillage - residue and tillage management, mulch till and no till/strip till by 5,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CTIC, CCSI, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement 1,000 acres of conservation tillage. (avg. $20/ac)	$100,000		
		Provide cost-share for equipment modifications. (avg. $4,000 each)	$20,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Implement Precision/ Variable Rate Technology for fertilizer and manure application on 1,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct 1 public meeting program featuring BMPs beginning in 2015.	$10,000/yr*		
		Provide cost-share for equipment modifications. (avg. $7,500 each)	$37,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement cover crops on 2,500 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CCSI, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct 1 field day featuring BMPs beginning in 2015.	E&O program		
		Promote Soil Health with partners.	E&O program		
		Using all funding sources, implement cover crops on 500 acres annually. (avg. $40/ac)	$100,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase landowner awareness of Drainage Water Management practices (Underground Outlet-blind inlet, Saturated Buffers, etc.).	Agricultural Landowners & Operators; County Surveyors; Tile Installers; Contractors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Purdue Extension WQ Program, TNC, LICA	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Develop survey to evaluate barriers to using practices.	E&O program		
		Using all funding sources, install one drainage water mgmt. practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants,
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Restrict livestock access from 1,000 feet of watershed streams and increase Prescribed Grazing and Waste Utilization on 500 acres.	Landowners with livestock; livestock access to watershed streams	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E& O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement livestock exclusion practices (fence, stream crossings, etc.) on 1,000 feet of streams, and prescribed grazing and waste utilization on 500 ac. over 5 years.	Exclusion: $10,000 Grazing: $14,000 Waste Utilization: $23,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Develop a Low Impact Development educational program.	Urban residents; Contractors; Developers	Conduct 1 public meeting featuring BMPs beginning in 2015.	E& O program	SWCDs, Purdue Extension, Area Plan Commission	IDEM 319 Grants, ISDA Clean Water Indiana Grants, Private Grants
		Survey local contractors on use of low impact development measures	E&O program		
Promote Rain Gardens and Rain Barrels.	Urban and rural residential landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	SWCDs, Purdue Extension	IDEM 319 Grants, , ISDA Clean Water Indiana Grants, Private Grants
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
Increase awareness of septic system problems and maintenance.	Rural residential landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	SWCDs, Purdue Extension, IOWPA, Health Departments	IDEM 319 Grants, Private Grants
		Conduct 1 workshop program featuring BMPs beginning in 2015.	E&O program		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

5-year *E. coli* Goal: Reduce *E. coli* average concentrations so that the exceedances of the state standard of 235 cfu/100mL occurs in no more than 35% of monitoring samples by 2020.

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase landowner awareness of Drainage Water Management practices (Underground Outlet-blind inlet, Saturated Buffers, etc.).	Agricultural Landowners & Operators; County Surveyors; Tile Installers; Contractors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Purdue Extension WQ Program, TNC, LICA	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Develop survey to evaluate barriers to using practices.	E&O program		
		Using all funding sources, install one drainage water mgmt. practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Precision/ Variable Rate Technology for fertilizer and manure application on 1,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Provide cost-share for equipment modifications. ($7,500 each)	$37,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement livestock practices (fencing, diversion, waste utilization, etc.) at 5 "hobby farm" locations.	Livestock "hobby farms"	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	$10,000/yr*		
		Using all funding sources, annually implement livestock practices on 1 hobby farm. ($5,000 to $6,000 ea)	$20,000 - $30,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase awareness of septic system problems and maintenance	Rural residential landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	SWCDs, Purdue Extension, IOWPA, Health Departments	IDEM 319 Grants, Private Grants
		Conduct 1 workshop program featuring BMPs beginning in 2015.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

5-year Sediment Goal: Reduce average concentrations of turbidity measurements by 15% by 2020.

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Amend Soil Properties with Gypsum Products on 1,000 acres of cropland.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement 500 acres of gypsum applications. ($35/ac)	$35,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Bottomland Timber Establishment/ Tree and Shrub Establishment on 50 acres of floodplain areas.	Agricultural Landowners & Operators; Landowners of floodplain areas.	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants,
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement bottomland timber and tree and shrub establishment practices on 10 acres. ($825/ac)	$41,250		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase Conservation Tillage - residue and tillage management, mulch till and no till/strip till by 5,000 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CTIC, CCSI, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	$10,000/yr*		
		Using all funding sources, annually implement 1,000 acres of conservation tillage. (avg. $20/ac)	$100,000		
		Provide cost-share for equipment modifications. (avg. $4,000 each)	$20,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Implement cover crops on 2,500 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, CCSI, Purdue Extension, Ag Vendors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Promote Soil Health with partners.	E&O program		
		Using all funding sources, annually implement cover crops on 500 acres. (avg. $40/ac)	$100,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, annually implement buffer practices on 20 acres. ($9/ac to $825/ac.)	$10,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase Grassed Waterway & Grade Stabilization Structures on 20 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension,	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement grass waterway and grade stabilization structures on 4 acres annually. (WW-$4,200/ac)	WW: $84,000; Structure $5,000 ea		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase landowner awareness of Drainage Water Management practices (Underground Outlet-blind inlet, Saturated Buffers, etc.).	Agricultural Landowners & Operators; County Surveyors; Tile Installers; Contractors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, Purdue Extension WQ Program, TNC, LICA	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Develop survey to evaluate barriers to using practices.	E&O program		
		Using all funding sources, install one drainage water mgmt. practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Promote Water and Sediment Control Basins and install practice if possible	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, install one WASCOB practice.	$3,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Promote and complete Clearing and Snagging practice in 5 locations to reduce in-stream sedimentation.	Landowners along streams and river; County Surveyors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, County Surveyors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, Ditch Maintenance Funds
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, complete clearing and snagging at 5 locations. ($8,000/500 ft.)	$40,000		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Increase awareness on the use of 2-stage ditches, and implement a 2- stage ditch as possible.	Landowners along streams and river; County Surveyors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, TNC, Purdue Extension, County Surveyors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants, Ditch Maintenance Funds
		Personal visits with landowners.	$10,000/yr *		
		Conduct 1 field day program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement two-stage ditches	Unable to determine		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement livestock practices – stream crossing, prescribed grazing, waste utilization, diversion, critical area plantings, and/or heavy use area protection - at 5 locations.	Landowners with livestock	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA Clean Water Indiana Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement 500 acres/or 5 locations of prescribed grazing, waste utilization, diversions, etc. (Grazing $28/ac, diversion $6/ft, heavy use $1.50/ft2, waste utilization $47/ac)	Depending on practice installed		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Investigate Low Impact Development programs.	Urban residents; Contractors; Developers	Survey local contractors on use of low impact development measures	E&O program	SWCDs, Purdue Extension, Area Plan Commission	IDEM 319 Grants, ISDA Clean Water Indiana Grants, Private Grants

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Develop educational program and implement Stormwater Runoff Control practices as possible.	Urban, rural development sites; Contractors; Developers; City and Town Officials	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	SWCDs, IDEM Rule 5 staff, Purdue Extension, Area Plan Commission	IDEM 319 Grants, ISDA Clean Water Indiana Grants, Private Grants
		Survey local contractors and developers on use of stormwater runoff control practices.	E&O program		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

20-year Habitat and Recreation Goals: Restore natural habitat and protect natural land uses within stream and river corridors to meet their aquatic life use.

Develop partnerships with trail groups to install connecting trails and green space along the river corridor for recreational purposes.

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Bottomland Timber Establishment/ Tree and Shrub Establishment on 50 acres of floodplain areas.	Agricultural Landowners & Operators; Landowners of floodplain areas	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Critical Area Plantings on 3,000 feet of streambanks, or 4 acres of other areas needing stabilization to reduce erosion.	Agricultural Landowners & Operators; Landowners of floodplain areas; County Surveyors	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR, County Surveyors	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement critical area plantings on 3,000 feet of streambanks, or 4 acres of other areas needing stabilization. ($325/ac)	$1,500		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Promote Greenways and Trails for outdoor recreation opportunities	Landowners, County Residents, Local Government	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	IDNR, Local Government, Acres, Inc., local trail groups	IDNR Outdoor Recreation Grants, Private Grants
		Identify alternative funding sources for trail development	E&O program		
Increase Wetland Creation, Enhancement and Restoration on 20 acres for water storage and water quality improvement.	Agricultural Landowners & Operators; Suburban and rural landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, DNR, USF&W, TNC, Acres Inc.	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants, Private Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement wetland creation, enhancement and restoration on 20 acres. ($500 - $4,500/ac)	$10,000 - $90,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

5-year Flooding/Floodplain Management Goal: Increase stakeholder awareness of the benefits of upland storm water storage areas and floodplain management practices; such as riparian forest buffers, riparian herbaceous cover, bottomland timber establishment, 2-stage ditches, and wetland creation, enhancement and restoration by 2020.

Objectives	**Target Audience**	**Milestones**	**Estimated Costs**	**Potential Partners/ Technical Assistance**	**Potential Funding Sources**
Increase the use of Field Borders, Filter Strips, Conservation Cover, Riparian Forest Buffers and Riparian Herbaceous Cover on 100 acres.	Agricultural Landowners & Operators	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Implement Bottomland Timber Establishment/ Tree and Shrub Establishment on 50 acres of floodplain areas.	Agricultural Landowners & Operators; Landowners of floodplain areas	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, Purdue Extension, DNR	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement buffer practices on 20 acres annually. ($9/ac to $825/ac.)	$10,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		
Promote Greenways and Trails for outdoor recreation opportunities	Landowners, County Residents, Local Government	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	IDNR, Local Government, Acres, Inc., local trail groups	IDNR Outdoor Recreation Grants, Private Grants
		Identify alternative funding sources for trail development	E&O program		
Increase Wetland Creation, Enhancement and Restoration on 20 acres for water storage and water quality improvement.	Agricultural Landowners & Operators; Suburban and rural landowners	Develop and promote cost-share program beginning in 2015.	$15,000/yr*	NRCS, ISDA, SWCDs, DNR, USF&W, TNC, Acres Inc.	IDEM 319 Grants, NRCS Farm Bill Programs and initiatives, ISDA CREP and Clean Water Indiana Grants, LARE Grants, Private Grants
		Personal visits with landowners.	$10,000/yr *		
		Conduct E&O program featuring BMPs beginning in 2015.	E&O program		
		Using all funding sources, implement wetland creation, enhancement and restoration on 20 acres. ($500 - $4,500/ac)	$10,000 - $90,000		
		Identify alternative funding sources to increase participation.	E&O program		
		Conduct water quality monitoring to measure possible reductions.	13,000/yr*		

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.

Action Register and Schedule

Education and Outreach Programs and Activities

Objectives	Target Audience	Milestones	Estimated Costs	Potential Partners/ Technical Assistance	Potential Funding Sources
Host BMP field days, and workshops annually.	Community Residents, Landowners, Agricultural Producers	Conduct E&O program featuring BMPs beginning in 2015.	$6,000/yr*	NRCS, CTIC ISDA, CCSI, SWCDs, Purdue Extension, DNR, Ag Vendors, others	IDEM 319 Grants, Water Indiana Grants, Ag Vendors, Private Grants
		Identify additional partners for E&O programs.	E&O program		
		Identify alternative funding sources to increase BMP installation.	E&O program		
Continue routine water quality monitoring and Hoosier Riverwatch volunteer monitoring activities	Community Volunteers, Schools, FFA and other Youth Groups	Conduct E&O program featuring monitoring activities.	$2,000/yr*	ISDA, SWCDs, Hoosier Riverwatch	IDEM 319 Grants, SWCDs, Private Grants
		Identify funding sources to continue monitoring programs.	E&O program		
Develop strategies to reduce CSO impacts to waterways.	Waste treatment facilities, City and Town Officials	Conduct E&O program featuring BMPs beginning in 2015.	E&O program	SWCDs, Purdue Extension, Health Departments	City / Town Funding, User Fees
Provide opportunities for stakeholder involvement in environmental activities.	Community Volunteers, Businesses, Schools, FFA and other Youth Groups	Conduct E&O program featuring river clean-ups, water quality monitoring, canoe floats, and other events.	$1,000/yr*	ISDA, SWCDs, Hoosier Riverwatch, IDNR, Parks Department	SWCDs, Businesses, Private Grants
		Identify funding sources to continue programs.	E&O program		
Share and communicate activities on a regular basis.	Community members; Community groups; Local Government Officials	Conduct E&O program with updates to website, social media, newsletters, public meetings, media releases, fairs, river events, etc.	$500/yr*	NRCS, ISDA, SWCDs, IDNR, Parks Departments, and others	UWRBC Funding, Private Grants
Develop partner list and track stakeholder participation.	Community members	Conduct E&O program that will include developing partner list and track stakeholder participation.	$500/yr*	NRCS, ISDA, SWCDs	UWRBC Funding, SWCDs

* One cost-share program, one education and outreach (E&O) program, and one water quality monitoring (WQM) program will be developed covering all strategies. Development and promotion of the cost-share program is 37.5% of the Watershed Coordinator (WC) salary. The personal landowner visits are 25% of the WC salary. Education and outreach costs are 25% of the WC salary, as well as costs to conduct meetings, field days, workshops or other events. The water quality monitoring program costs include 12.5% salary for the WC and costs for consulting services for monitoring and laboratory services.