Wabash – Maumee Connection Site Visit

Field Report

Prepared For

U.S. Environmental Protection Agency
Great Lakes National Program Office

Submitted by

Tetra Tech EM Inc.
1 South Wacker Drive, 37th Floor
Chicago, IL 60606

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Table of Contents

Appendices

1.0 Introduction

The U.S. EPA Great Lakes National Program Office (GLNPO) requested the support of Tetra Tech, EM Inc. for a meeting and field visit to assess the floodplain areas between the Wabash and Maumee Rivers in Fort Wayne, Indiana on Friday, July 09, 2010.

1.1 Background

Asian carp are a family of aquatic invasive species (AIS) brought over from Asia. Of primary concern are the Silver and Bighead carp which have been expanding their habitats within the Mississippi River basin for at least the past twenty years where they have decimated native fish populations by as much as 97 percent in some areas. These fish are currently threatening to enter the Great Lakes, a valuable fresh water resource.

Asian carp have been known to exist within the Wabash River for nearly 20 years. However, in May 2010 Indiana DNR observed Asian Carp eggs and spawning behavior much further upstream on the Wabash than was previously anticipated. Therefore, documented evidence exists that they have been able to expand their range upstream from the Mississippi River basin. The Wabash River was a "dead-end" for these fish as the Roush Dam prevents Asian carp from reaching the headwaters of the Wabash River. However, the Little River connects to the Wabash below the dam and its headwaters ebb into marshland on the southwestern edge of Fort Wayne, Indiana. Due to its proximity to the Maumee River system and recent flood events that have occurred within the floodplains between these two systems, there may be an opportunity for Asian carp to swim across the drainage divide at this location between the Great Lakes and the Mississippi River Basins. See Figures 1 and 2 respectively for site location overview and known Asian carp presence. This is a critical concern because the Maumee River flows into Lake Erie, thus providing Asian carp with a potential for direct access to the Great Lakes.

1.2 Purpose

Coordinating stakeholder agencies met on Friday, July 09, 2010 at Eagle Marsh in Fort Wayne, Indiana to discuss this potential surface water connection spanning the drainage divide between the Little River and the Maumee River. Detailed maps and hydrology data were posted to a common web site to allow stakeholder agency representatives to evaluate relevant data prior to the meeting and site visit at Eagle Marsh. The site visit was considered necessary to allow stakeholder agencies to be able to put the hydrology data and mapping into perspective and better assess the risks associated with this potential surface water connection. The purpose of this report is to provide a detailed summary of events, attendee list, and relevant photos to all stakeholder agencies and those unable to attend the meeting.

Figure 1. Wabash – Maumee Connection Site Overview

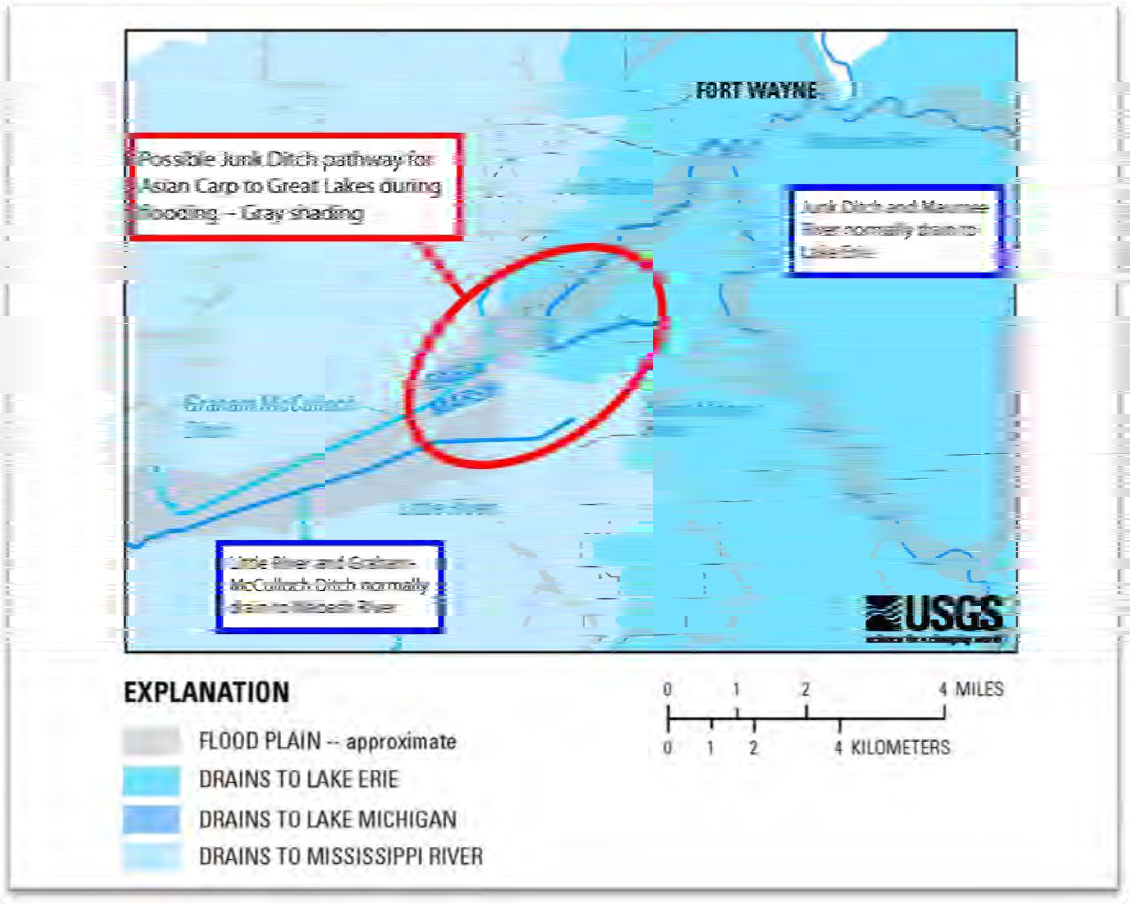
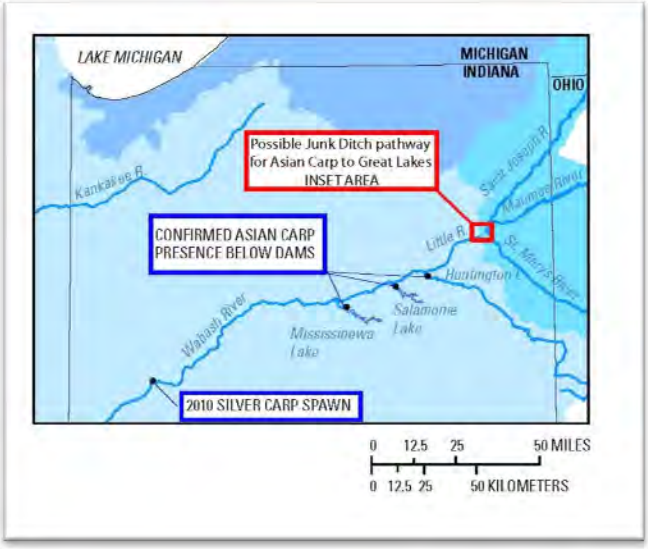


Figure 2. Wabash River Asian Carp Sightings



2.0 Meeting Summary

This meeting was convened by the Indiana Department of Natural Resources (InDNR) in the interest of agency collaboration in dealing with Asian carp and the efforts to keep them from entering the Great Lakes. Representatives from Allen County Soil and Water Conservation District (SWCD), Indiana Department of Natural Resources (InDNR), Little River Wetlands Project (LRWP), Maumee River Basin Commission (MRBC), U. S. Department of Agriculture Natural Resource Conservation Service (NRCS), U.S. Geological Survey (USGS), U.S. Army Corps of Engineers (USACE), and U.S. Environmental Protection Agency (USEPA) Great Lakes National Program Office met and reviewed results of 2009 Flood Insurance Survey along with various maps, aerial photos, and charts relevant to the backflow of water from the Maumee River Basin into the Wabash River Basin during flooding events. See attached attendee list for complete contact list of those in attendance.

All attendees were in agreement for the need to have comprehensive stakeholder collaboration and consensus on a solution.

2.1 Preliminary Great Lakes Inter-basin Connections Risk Characterization

The USACE representative notified the stakeholders about a very short-term study to identify and characterize all potential surface water connections between the Great Lakes and the Mississippi River Basins relative to the potential for transfer of AIS as part of the more comprehensive Great Lakes and Mississippi River Basin Inter-basin Study (GLMRIS). It was stated that the immediate goal of the short-term study is to identify all connections into and out of the Great Lakes Basin, similar to this Wabash/Maumee connection where AIS could possibly cross the drainage divide between the basins.

The USACE representative indicated that this will be a very fast-track effort to expeditiously produce a reconnaissance level report by the end of September 2010 that provides a relative risk characterization of all potential surface water connection s between the Great Lakes and Mississippi River Basins. He indicated that the plan for this limited study is for the best local experts within the Corps and other federal, state, and local resource agencies to use currently available hydrologic data to assign a relative risk to the nature of the surface water connection, and use published information and local knowledge on AIS to assign a relative risk related to the transfer of AIS of concern at each location. USACE also explained that the information recently put together at Fort Wayne regarding the surface water connection and the proximity of Asian carp will likely put Fort Wayne near or at the top of the list, and that at potential high risk sites like this one, the Asian Carp Regional Coordinating Committee (ACRCC) is looking to USACE and others to find ways to fast-track solutions.

2.2 Wabash/Maumee Connection Discussion

InDNR led a comprehensive review and presentation of available Hydrology information from 2009 Flood Insurance Study (FIS), including mapping, aerial photos, and charts that define the nature of the

hydraulic connection (See attached slides). The GIS maps show the flood plains in the area where there is possible connection between the Wabash and Maumee Rivers during flood events. They indicated that it appears flow occurs across the boundary associated with a 10-year frequency storm event and that the field trip to the Marsh would allow observations of evidence of annual high water levels and perspective on the broad wetland connection. The charts indicated that at Eagle Marsh, the 1% frequency storm elevation is 755.6 ft mean sea level (MSL), and Light Detection and Ranging (LiDAR) mapping indicated perennial water elevation in the marsh pond is approximately 749.0 MSL. Additionally, gauge data showed the number of times in the past years when the levels were above the storm elevations and overland flow may have occurred.

Significant discussion occurred regarding the water elevation in the Marsh necessary to provide conditions for Asian carp to swim across the divide. USGS indicated general consensus among their experts that a 10% frequency event would allow for sufficient water depths where Asian carp could swim through this connection. However, they expressed concern with the level of sophistication in the modeling used to support the 2009 FIS and noted that a two-dimensional model as well as an unsteady model would be helpful to support an accurate estimate of the water elevation in the Marsh necessary to provide conditions for Asian carp to swim across the divide and to support design of a barrier and water level control structure. USGS has looked into how often the area flooding gets above 750 feet, but it is important to note that they do not currently know the amount of flow and duration during flooding events. It was also suggested to place a water level gauge in the marsh to facilitate accurate data at this critical location. Once these models are complete, agencies will be able to figure out if the short-term measures are adequate to deal with the potential for Asian carp to cross the floodplain into the Maumee River system.

A question was raised about the possibility of underground connections that could serve as a bypass to any type of structure that may be considered for either a temporary or permanent measure to prevent Asian carp from migrating from the Little River into the Maumee River during a high flow event. For instance, it was pointed out that the railroad berm forms the southern edge of the 100-year floodway, but that the floodway appears to extend slightly south of the railroad berm near the western end of a landfill located to the southeast of Eagle Marsh. It was concluded that any underground connections, culverts, etc. through the agricultural berm and railroad berm in or around Eagle March would need to be identified through detailed inspection of the area in the short-term. For implementation of any long-term measures, sewer maps of Fort Wayne may need to be studied or additional mapping needed to ensure no additional connections existed. USACE indicated a capability to provide technical support in this area. It was noted that the county surveyor may have a better idea on this issue and should be contacted for available information and first-hand knowledge and experience with the Fort Wayne surface water drainage and sewers.

An InDNR representative indicated potential locations for a physical barrier within the Eagle Marsh. The NRCS representative indicated that a downstream location along Homestead Road to the west of

Interstate Highway I-69 should be considered and that it may facilitate additional expansion of marsh restoration in the headwaters of the Little River. Detailed discussion on numerous aspects of Hydrologic uncertainties and relative merits of potential barrier alignments were discussed, including possible bypasses around a barrier for a larger storm event and possible sewer connections. The Allen County SWCD representative indicated they would take lead in contacting appropriate local stakeholders for sewer information and to convey meeting discussions.

The USACE representative commented that site conditions appeared very amenable to a physical barrier and one could likely compliment Eagle Marsh and restoration of additional wetlands in the future, but indicated it would likely require a minimum of 6-8 months to plan and design if done under Continuing Authorities Program (CAP) Section 206 Authority. Projects implemented under the CAP Section 206 are subject to a deliberate planning process that requires execution of a formal agreement with a local sponsor, consideration of a wide range of potential environmental and economic benefits and impacts, availability and ability to procure real estate interest, public involvement, appropriate permits, detailed analyses, and availability of funds. Lastly, the maximum Federal expenditure allowable under a CAP Section 206 Authority project is $5 million. (Note: at present there are no new starts allowed under CAP Section 206.)

USACE also indicated this type project could fit within the Corps' Section 506 authority, which is specific to the Great Lakes and has less restrictive Federal cost limitations. USACE indicated need to have high quality detailed topography maps to plan and support design of a permanent measure to prevent Asian carp and other AIS migration from the Little River into the Maumee River. It was indicated that the County has high-resolution LiDAR maps, but there was significant uncertainty about when that mapping might be available for use by others. Allen County is working with the USGS to obtain a grant to process the LiDAR data and make it available.

The topic of eDNA was discussed to assess both sides of this intermittent connection and see if there is any indication of Asian carp already present in either system proximate to Eagle Marsh. The USEPA representative indicated he had already been in contact with InDNR and that they will put together a sampling plan in conjunction with the Ohio Department of Natural Resources. They are expected to obtain and analyze samples in the next several weeks.

3.0 Site Visit

See attached photo log for site locations and descriptions.

3.1 Eagle Marsh Site Visit

Representatives of the Little River Wetlands Project (LRWP) led a short walking tour of the Eagle Marsh project, pointing out various features indicative of constant water level and annual flood event levels in the marsh and the swales that make up the Eagle Marsh area. The group then took a short drive to view the Graham McCulloch Ditch near the location and alignment where the InDNR indicated some form of barrier might be constructed. The top of the agricultural berm along the ditch was approximately eight feet above the ground level in the adjacent wetlands. Also clearly visible was a corrugated metal pipe through the base of the berm, connecting a small oxbow pond in Eagle Marsh with the Graham McCulloch ditch. The USEPA representative suggested the possibility of a mesh fence, similar to the one being employed to separate the Des Plaines and Chicago Sanitary Ship Canal, as a risk reduction measure that could be taken quickly. The Little River Wetland and USACE representatives concurred that a mesh fence spanning the distance between the agricultural berm along the Graham McCulloch Ditch on the north and the railway embankment to the south might be feasible. Based on the LIDAR mapping, both ends of the fence could be connected to ground well above the 100-year flood level, and the broad expanse of the marsh made it appear unlikely that a fence would induce flooding. The NRCS Wetland Reserve Program Manager and InDNR, co-owner of the Eagle Marsh site with LRWP, also concurred and supported the concept as something they could likely do if funding were available.

3.2 Homestead Site Visit

USACE representatives visited a location west of I-69 along Homestead Road with the NRCS representative to view another possible physical barrier location for a long term remedy. This location looked as though it might require a much shorter length of berm than the possible Eagle Marsh alignments, and it appeared that a barrier and water level control structure at this location further into the Little River Basin might also offer an opportunity to support future restoration of many acres of wetlands. Figure 3 below shows the area visited and potential location for barrier placement.

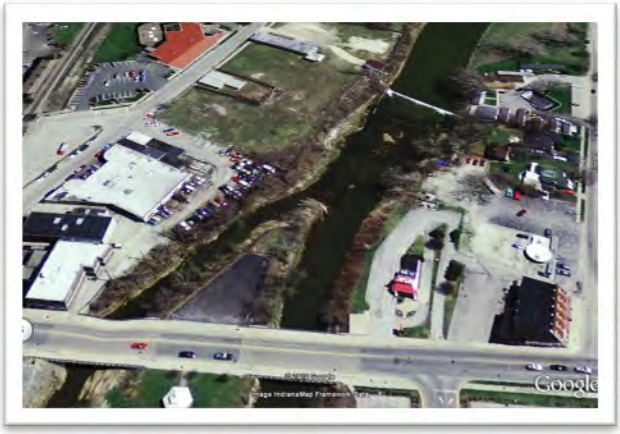
3.3 Huntington Dam Site Visit

The USACE representatives also visited a small dam on the Little River located in the town of Huntington, Indiana, approximately 20 miles from Eagle Marsh. This site was visited to assess how significant an obstacle it might pose to further upstream migration of Asian carp (See Appendix B: Photo Log for site photo). The dam is reportedly six-feet high, and as shown in the photo, is in disrepair, with significant erosion on the right descending bank and in the foundation of the dam. However, the dam appears to remain a formidable obstacle to upstream movement of Asian carp during low flow conditions. See figures 4 and 5 below for aerial map overview and dam location.

Figure 3. Homestead Area Visit

Figure 4. Aerial Map of Huntington

Figure 5. Aerial View of Huntington Dam



4.0 Closing Session

Several possible recommendations for long-term remedies were discussed as well as the concept of mesh fencing across the marsh as a short term risk reduction measure. Use of construction specifications developed by the USACE Chicago District for a current project separating overflows between the Chicago Sanitary Ship Canal and the Des Plaines River was suggested as possible means to expedite a short-term solution. Woody debris that could float and move during high flow was mentioned as a hazard to a mesh fence, and it was noted that after every significant water level rise, inspection and maintenance of the mesh fence would be required. The need to coordinate with Allen County was discussed. Ultimately, mesh fencing across the Marsh was judged by all stakeholders present to be the best short-term solution to mitigate the risks of Asian carp passage into the Great Lakes Basin.

All stakeholders present also concurred that the risks of Asian carp reaching the Great Lakes through this connection warranted prompt implementation of a permanent measure, but that additional information and some time are needed to develop and implement an appropriate solution. All stakeholders expressed a desire by their agencies to collaborate and provide their relevant expertise and capabilities to expeditiously plan, design, and build a permanent solution.

Proposed Interim Measures:

- Inspect and increase/reinforce existing berm as necessary.
- Fencing from Graham McCulloch Ditch berm to railroad embankment.
- Place mesh grates at the ends of underground conduits or cover the openings on both ends with large rock to allow water to flow through but impede fish passage.

Potential Long-Term Measures (requiring additional planning and design analysis):

- Potential for a physical separation measure with a water level control structure located within or to the west of Eagle Marsh.
- Potential fortification of Huntington Dam.

The meeting was closed by naming and seeking consent from individuals to participate on an Executive Steering Committee for the Fort Wayne Inter-basin Separation project.

Agencies represented on the Committee:

USACE
USEPA
InDNR
Little River Wetlands Project
Maumee River Basin Commission (MRBC)
USGS
USFWS
NRCS
Allen County SWCD

Action Items:

- USGS will work on Modeling. The committee will check with USGS representative in 1 month for update.
- USGS will work with the County to obtain LiDAR maps and process the data.
- USGS is working with USACE to put together a list of team members that can work together to provide the necessary expertise to move forward on the GLMRIS project.
- USGS will work with Allen County Supervisor to obtain, analyze, and provide detailed topographic data and LiDAR maps that includes the Wabash River – Junk Ditch – Maumee River area to provide additional information for hydraulic models and to further define risks for Asian carp entry from this connection.
- USGS will conduct 2-D surface water modeling and ground truthing to validate these models or will provide the necessary info to USACE to run the models.
- USGS will install a new stream gauge on the Little River to provide data to better define flow exchanges in the Eagle Marsh area and assess risk of Asian carp movement through the area.
- Wabash/Maumee interim and permanent measures should be addressed in the Asian Carp Control Strategy Framework.
- Work will begin over the next several weeks to obtain and analyze eDNA samples from around the connection area and into the Maumee River. Work will be coordinated through InDNR.
- Contact local landfill concerning ground pipes for underground connections in the vicinity of Eagle Marsh.
    - USEPA may have GPR equipment to help with this task. USGS also has equipment and expertise (GPR and electromagnetic induction) that can assist if EPA is busy.
    - SWCD will contact appropriate local stakeholders for sewer information and to convey meeting discussions.
- USACE will provide as needed technical support to the InDNR for implementation of the mesh fence and will develop a proposal for a potential path forward towards a long term solution.
- All NEPA issues and concerns will be addressed as both the interim and permanent remedies are developed.

Appendix A

Attendee List

EAGLE MARSH SITE VISIT ATTENDEES (7/9/2010)

Name, Agency	Phone	Email
Jim Galloway, USACE-Detroit	313-226-6760	jim.e.galloway@usace.army.mil
Cindy Jarema, USACE-Detroit	313-226-6127	cynthia.a.jarema@usace.army.mil
Mike Saffran, USACE-Louisville	502-640-2002	michael.j.saffran@usace.army.mil
Roger Setters, USACE-Louisville	502-315-6891	roger.d.setters@usace.army.mil
Bill Bolen, U.S. EPA	312-353-6316	bolen.bill@epa.gov
Paul Buszka, USGS	317-290-3333 (ext. 179)	pmbuzka@usgs.gov
Scott Morlock, USGS	317-290-3333 (ex6. 153)	smorlock@usgs.gov
Sandy Morrison, USGS	734-214-9393	smorrison@usgs.gov
Sherman Liechty, NRCS	260-484-5848	sherman.liechty@in.usda.gov
Phil Bloom, Indiana DNR (Communications)	317-232-4003	pbloom@dnr.IN.gov
Steve Donabauer, Indiana DNR (Fish & Wildlife	260-244-6805	sdonabauer@dnr.IN.gov
Doug Keller, Indiana DNR (Fish & Wildlife)	317-234-3883	dkeller@dnr.IN.gov
Dave Nance, Indiana DNR (Water)	317-234-1111	dnance@dnr.IN.gov
Jed Pearson, Indiana DNR (Fish & Wildlife)	260-244-6805	jpearson@dnr.IN.gov
Traci Powell, Indiana DNR (Water)	317-232-4179	tmpowell@dnr.IN.gov
Greg Lake, Allen County SWCD	260-410-8205	greg.lake@in.nacdnet.net
Tony Fleming, Little River Wetlands Project	260-698-3257	(UNREADABLE)
Betsy Yankowiak, Little River Wetlands Project	260-478-2515	execdir@lrwp.org
Bethany Hand, TetraTech	312-201-7457	bethany.hand@tetratech.com

Appendix B

Photo Log

Representatives from Allen County, IDNR, Little River Wetlands Project, NRCS, Tetra Tech, USEPA, and USACE gather for Eagle Marsh site walk overview.

Tony Flemming, Little River Wetlands Project explains which areas of Eagle Marsh and McCulloch Ditch will be toured during the site walk.

Photo showing part of the main swale of Eagle Marsh. Standing water remains in this wetland area. Camera facing west.

Photo showing utility company owned property over the main swale of Eagle Marsh. Camera facing east.

Photo showing part of the south swale of Eagle Marsh at the property line with Servall. Tony Flemming is pointing at the high watermark on the trees. Camera facing north.

Photo showing Buttonbush swamp portion of Eagle Marsh. This area low area typically experience flooding and standing water. Camera facing south (41.0357, -85.224019).

Photo showing portion of Buttonbush swamp under standing water. This area is under consideration for berm construction. The elevation is 750 feet. Camera facing southwest (41.03457, -85.224752).

Photo showing group driving west to Graham McCulloch Ditch. Camera facing west.

Photo showing man-made berm running along McCulloch Ditch to Interstate-69. At this point berm stands at about 15-20 feet in height. Camera facing northwest (41.033317, -85.230681).

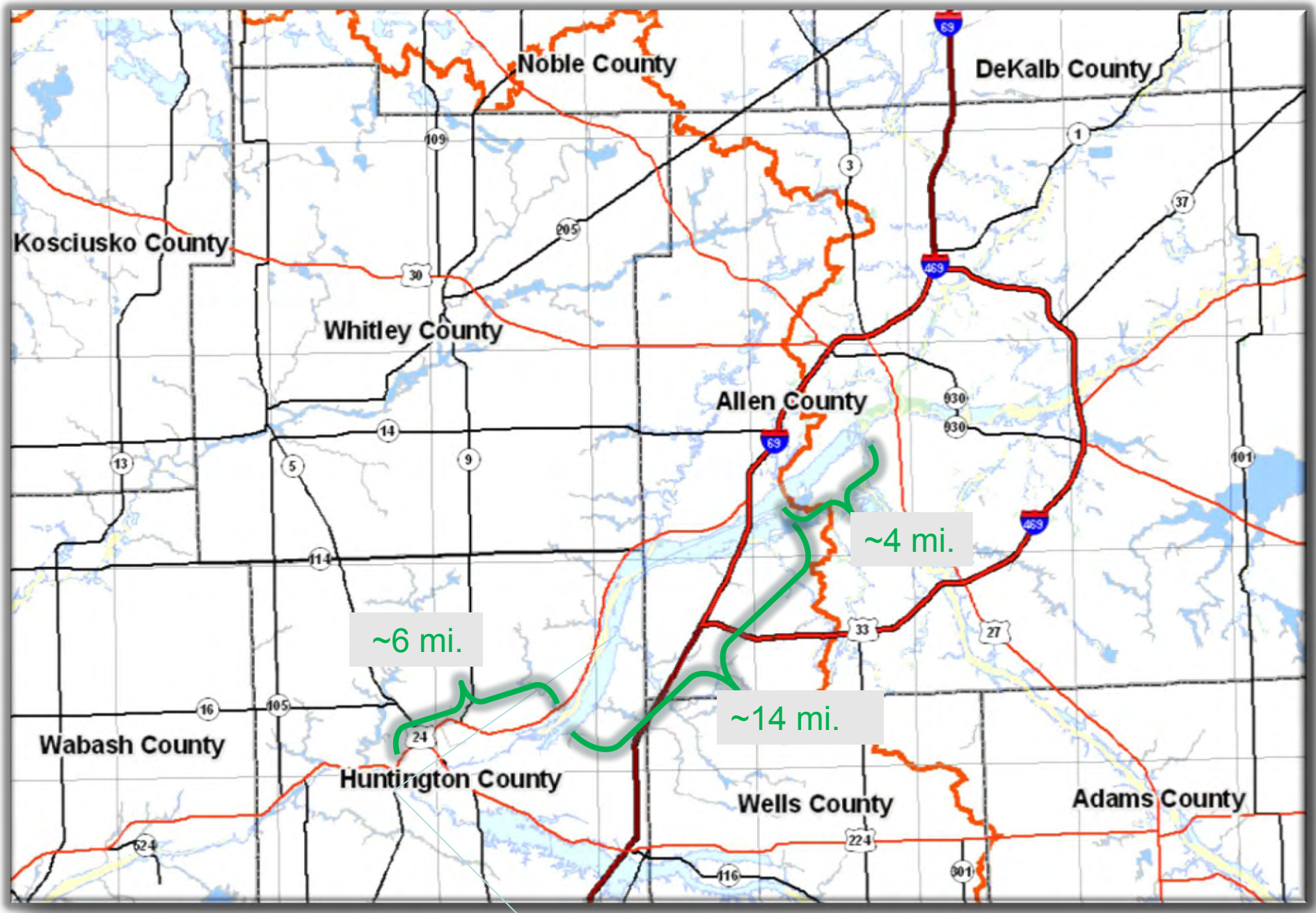
Photo showing Ox Bow portion of Eagle March (standing water) and railroad berm running parallel to McCulloch Ditch and berm. Camera facing south (41.033052, -85. 231179).

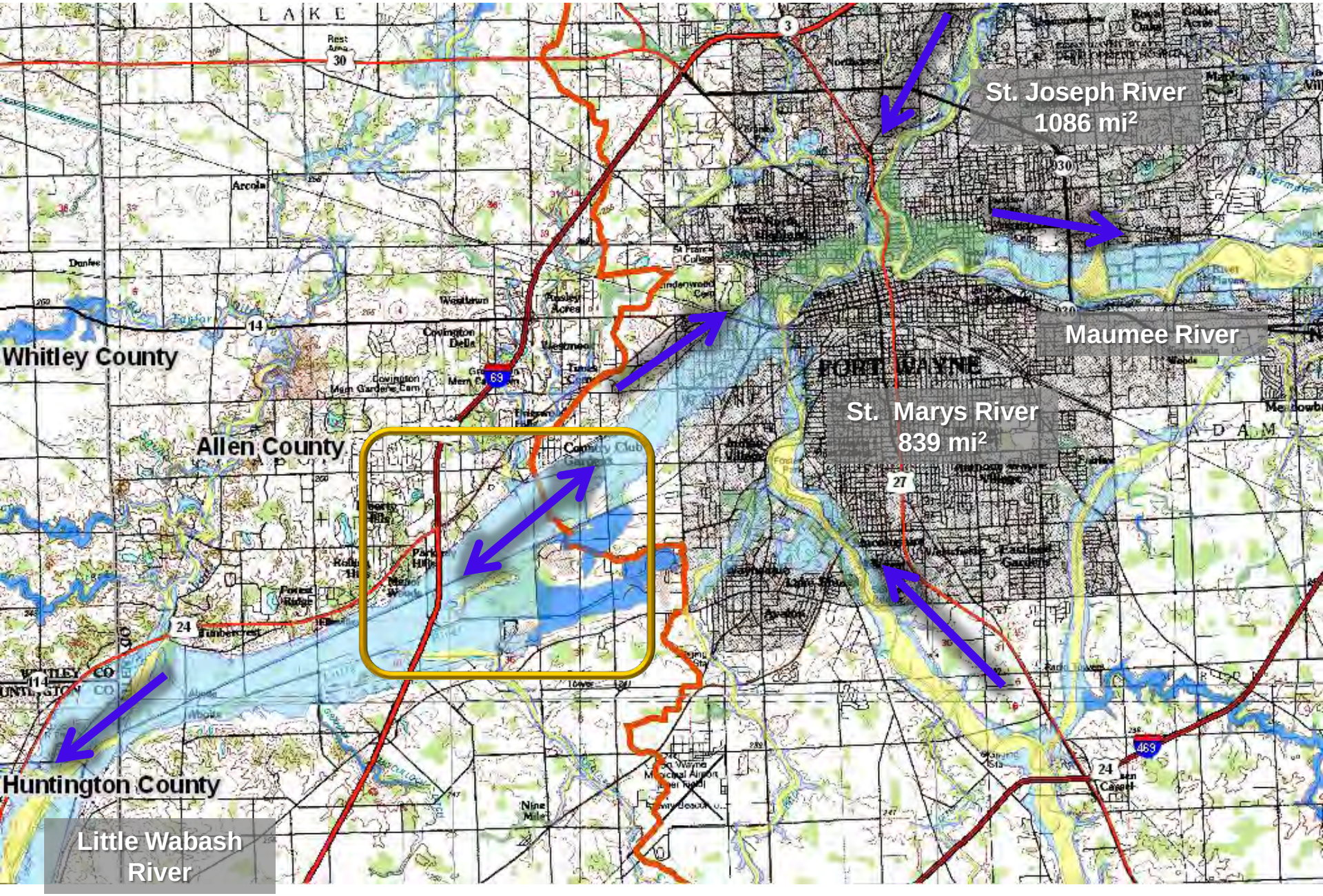
Photo showing McCulloch Ditch (Canberry Creek) adjacent to the mad-made berm directly to the north (41.03305, -85.231179).

Photo showing Huntington Dam. Damage can be seen on the left of the dam but currently serves as an adequate barrier against fish movement.

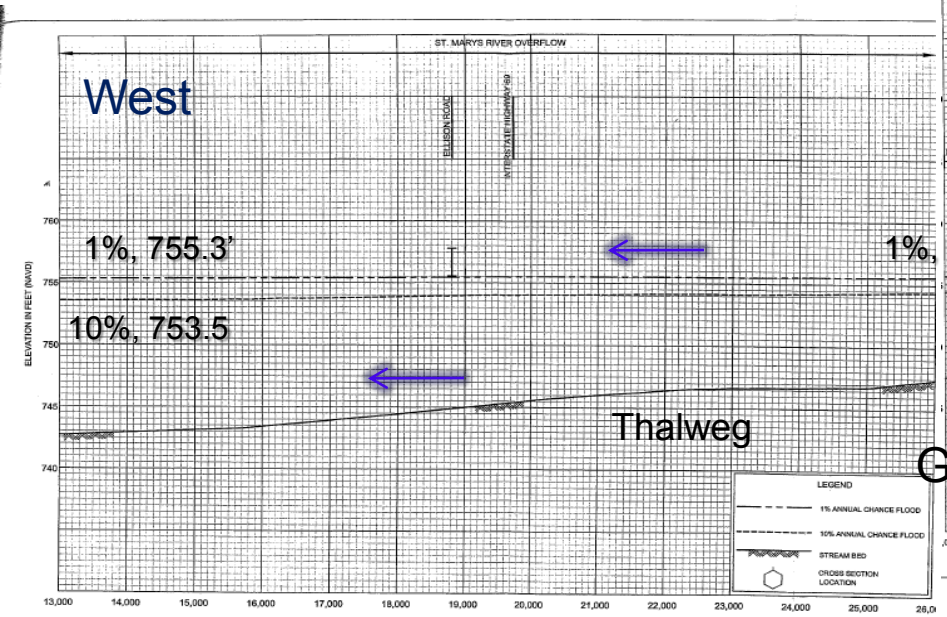
Appendix C

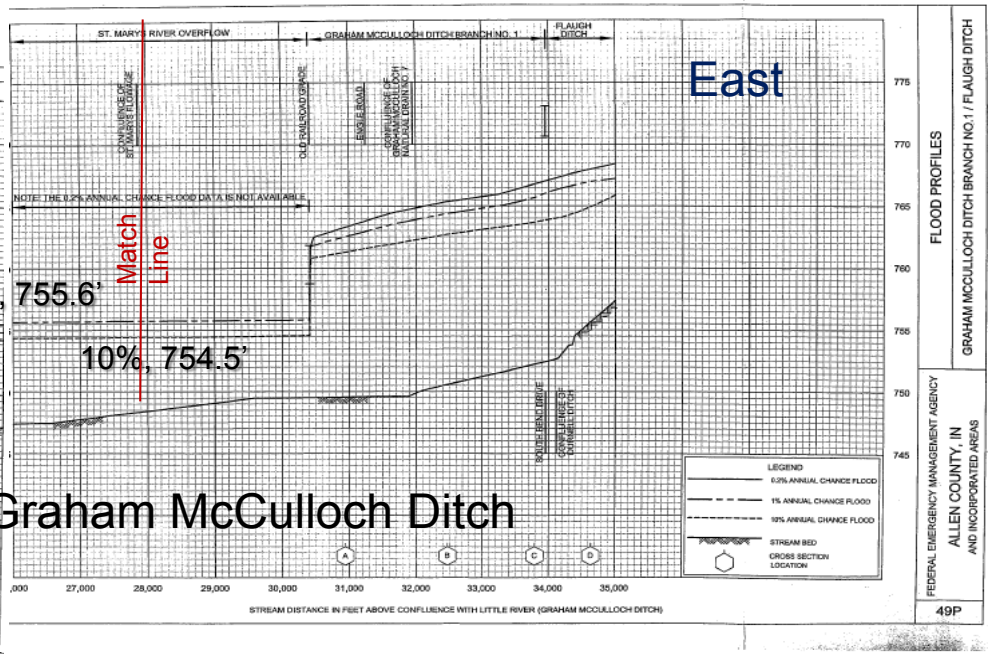
Slide Presentation

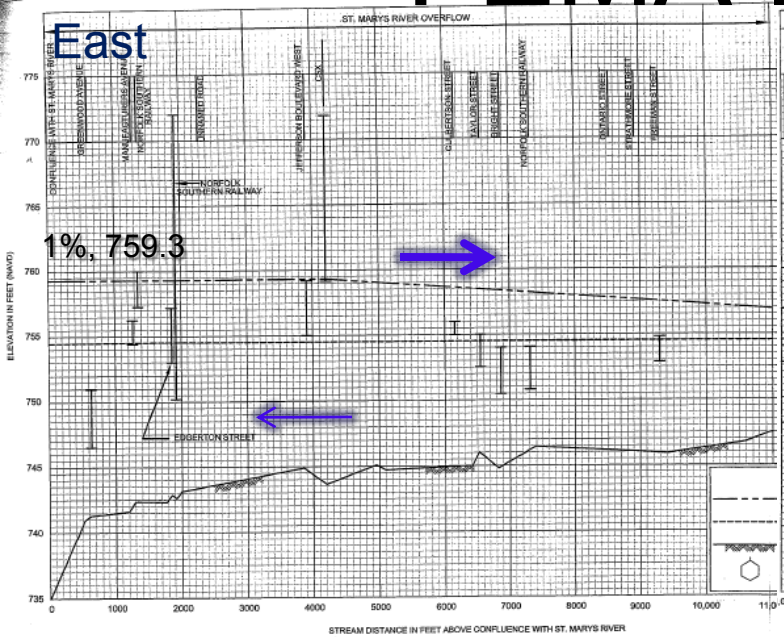

Noble County
DeKalb County
Kosciusko County
Whitley County
Allen County
~4 mi.
~6 mi.
~14 mi.
Wabash County
Huntington County
Wells County
Adams County

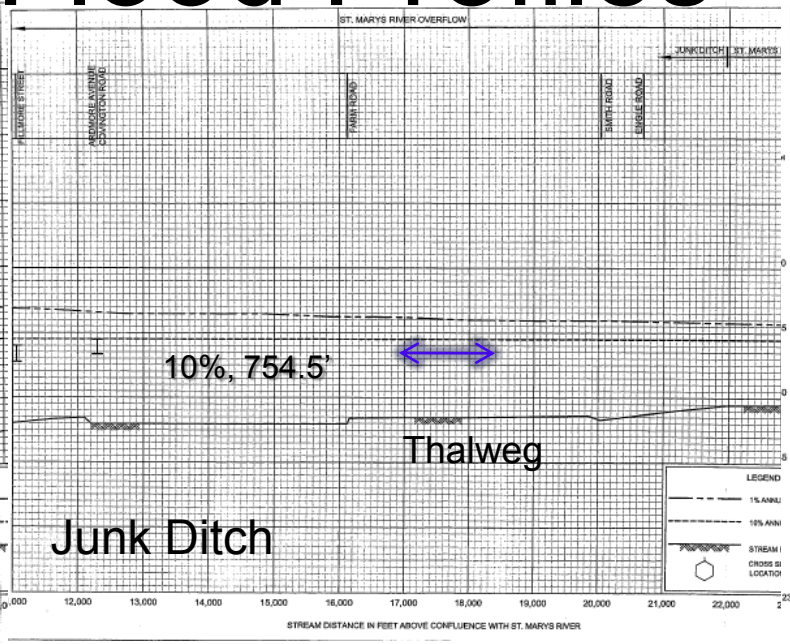

St. Joseph River
1086 mi²
Maumee River
St. Marys River
839 mi²
Whitley County
Allen County
Huntington County
Little Wabash
River
FORT WAYNE
LAKE

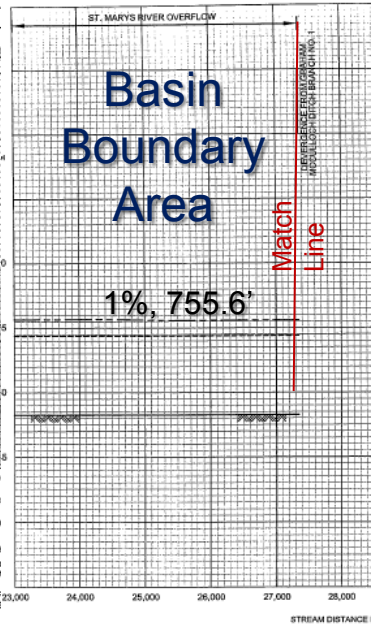
FEMA Flood Profiles












Junk Ditch
Great Lakes Basin
Mississippi Basin
Landfill
Quarry
Graham McCulloch Ditch
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Allen County
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Elmae Dr
Three Oaks Dr
Knoll Rd
Macbeth Rd
Sand Point Rd
Smith Rd
Yohne Rd
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Coventry Ln
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Anoka Dr
Hessen Cassel Rd
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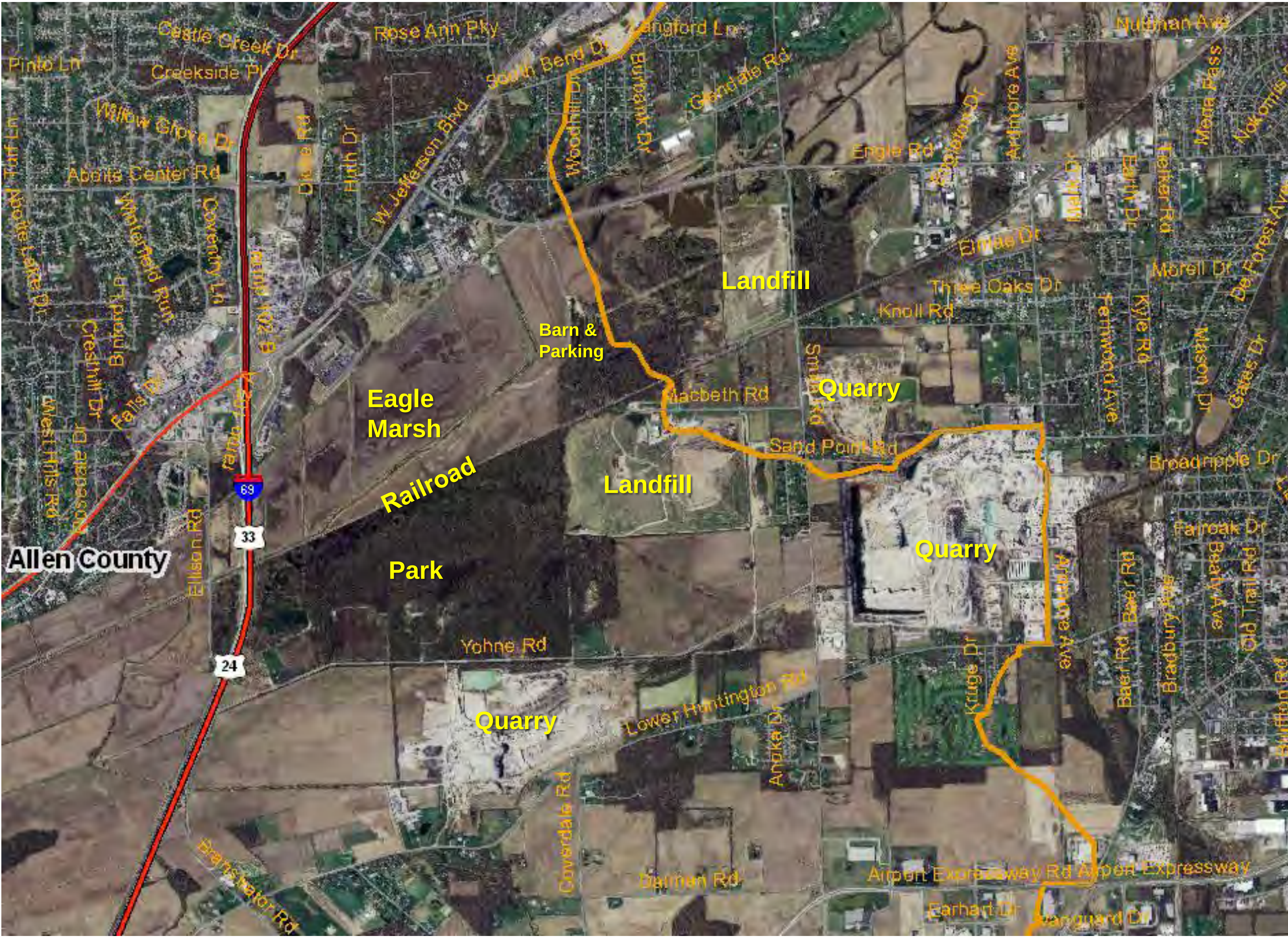
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Barn & Parking
Quarry
Eagle Marsh
Railroad
Landfill
Quarry
Park
Allen County
Quarry
Castle Creek Dr
Rose Ann Pky
Langford Ln
Pinto Ln
Creekside Pl
South Bend Dr
Glendale Rd
Willow Grove Dr
W Jefferson Blvd
Engle Rd
Ardmore Ave
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Three Oaks Dr
Knoll Rd
Morell Dr
Macbeth Rd
Sand Point Rd
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Fairoak Dr
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Coverdale Rd
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Castle Creek Dr
Rose Ann Pky
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Creekside Pl
South Bend Dr
Burbank Dr
Glendale Rd
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Woodhill Dr
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Huth Dr
W Jefferson Blvd
Engle Rd
Aboite Center Rd
Winterfield Run
Coventry Ln
Tielker Rd
Elmae Dr
Morell Dr
De Forest Ave
Three Oaks Dr
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Kyle Rd
Mason Dr
Bates Dr
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Bluffton Rd
Anoka Dr
Coverdale Rd
Dalman Rd
Airport Expressway Rd
Airport Expressway
Earhart Dr
Vanguard Dr


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Possible
Berm - B
Possible
Berm - C
Western Lake Erie
Wabash
Knoll Rd
Smith Rd
Macbeth Rd
Engle Rd
Laura Ln
Woodhill Dr
Taylor Rd


W JEFFERSON BLVD
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ENGLE RD
ENGLE RD
Graham - Mc Cullough #1
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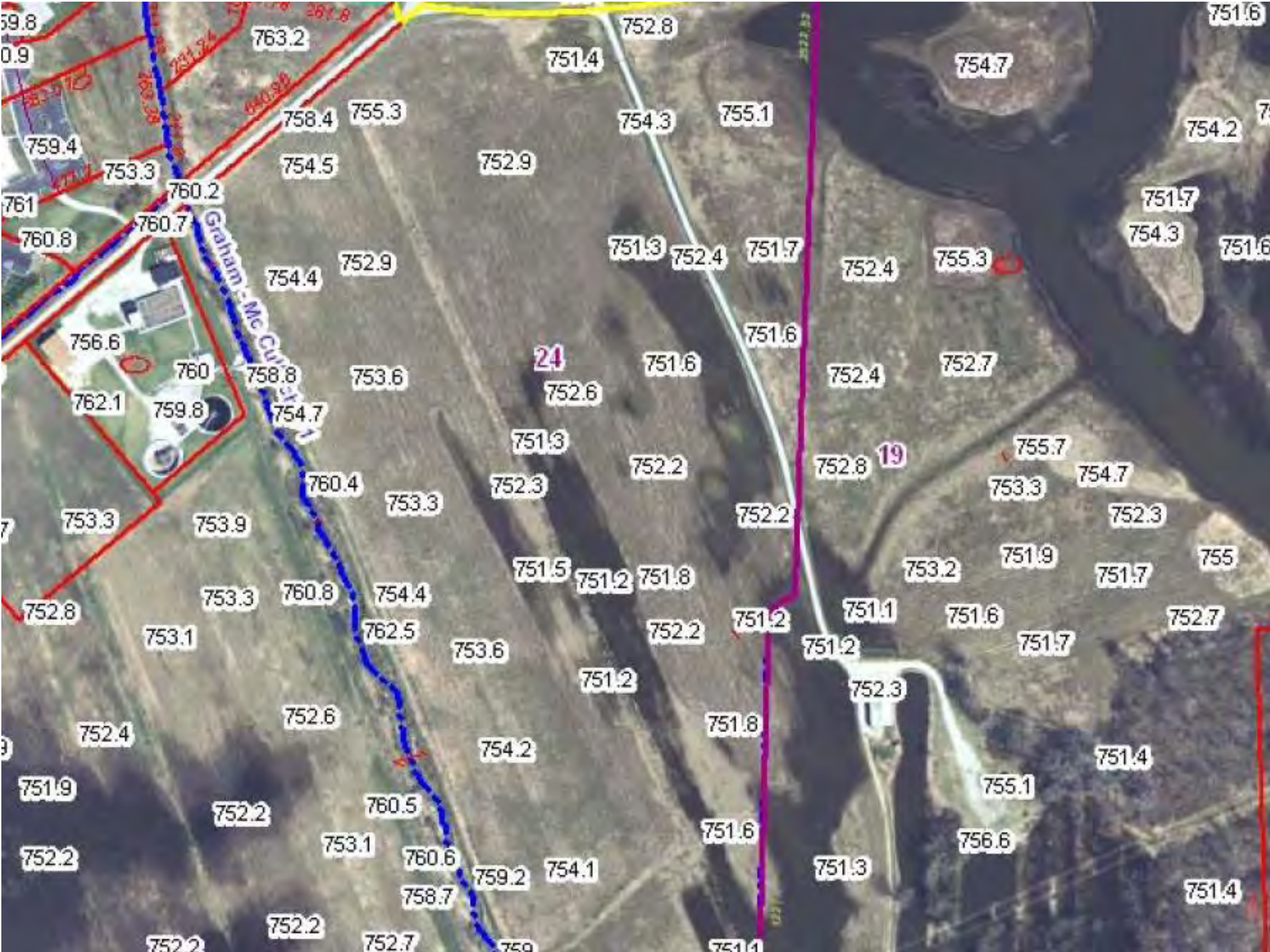
PRIVATE CORP LINE



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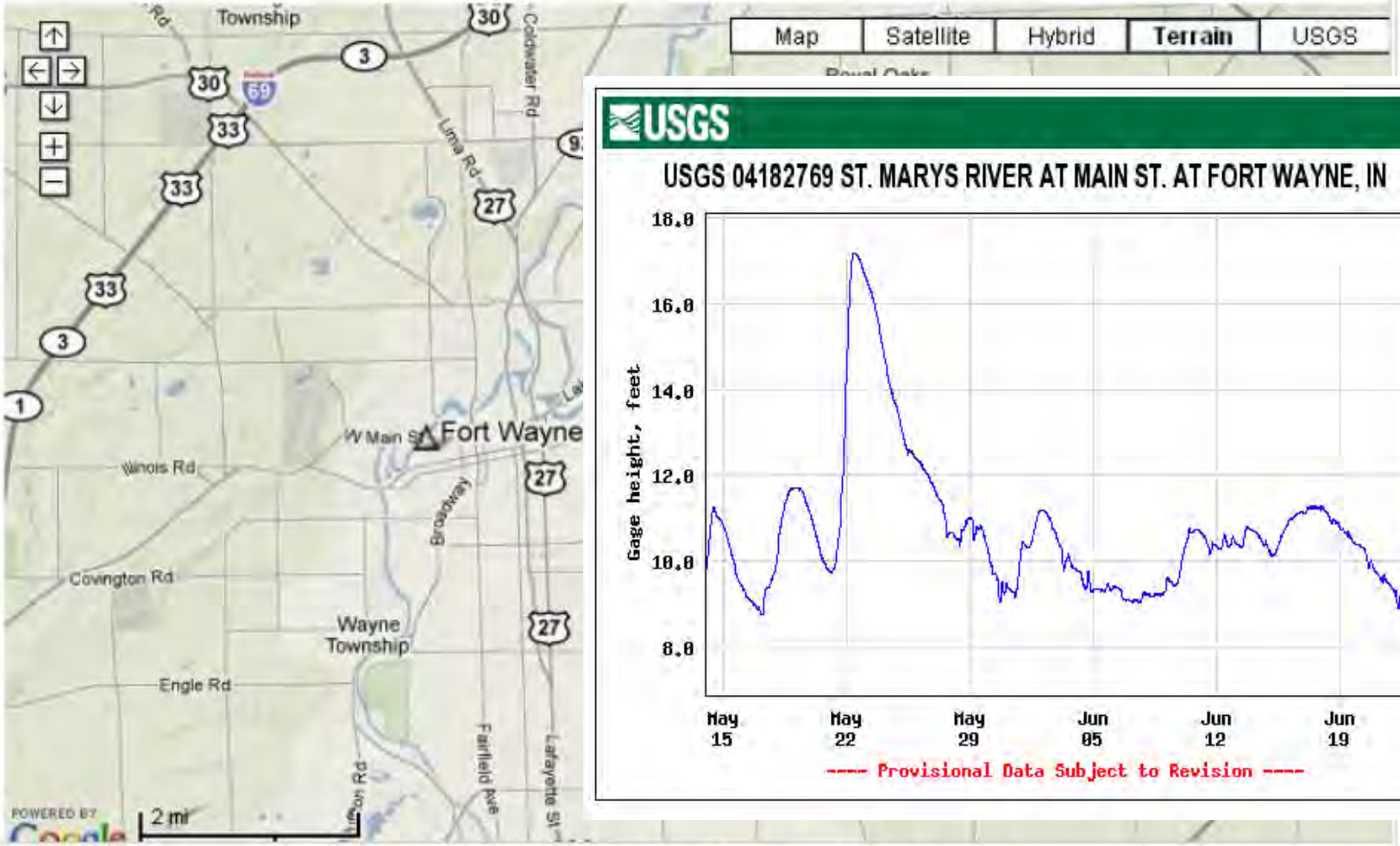
759.2
751.4
758.7
752.2
752.7

Allen County, Indiana
Hydrologic Unit Code 04100004
Latitude 41°04'43", Longitude 85°09'16" NAD27
Drainage area 822.6 square miles
Contributing drainage area 821.6 square miles
Gage datum 735.00 feet above sea level NAVD88

Location of the site in USA.



Maps are generated by NWIS Mapper

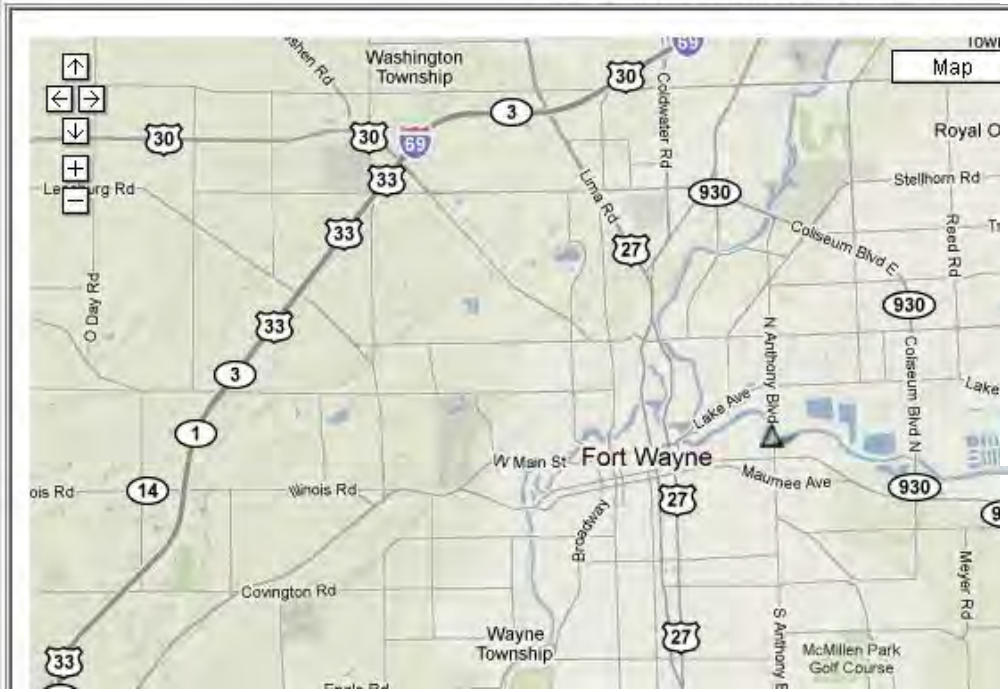
Site Map for the Nation

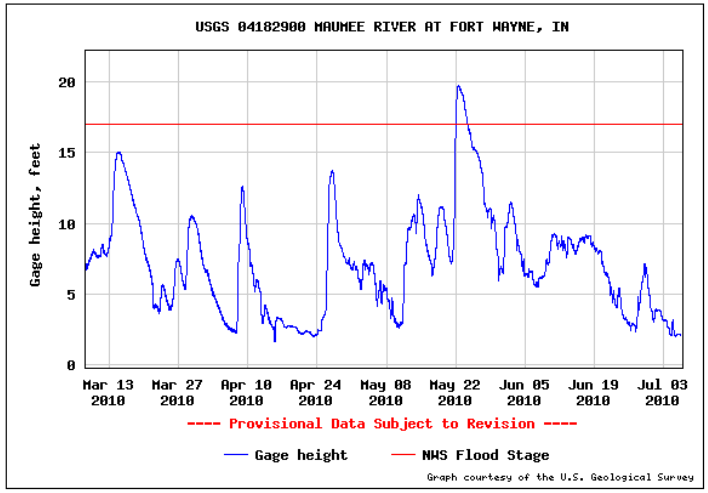
USGS 04182900 MAUMEE RIVER AT FORT WAYNE, IN

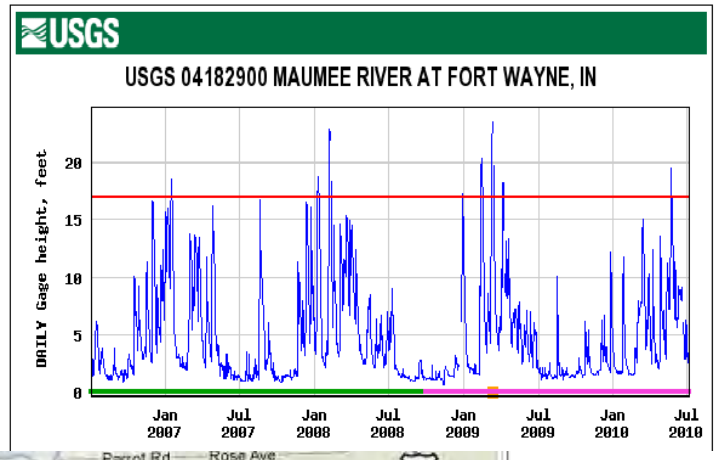
Available data for this site | Site map

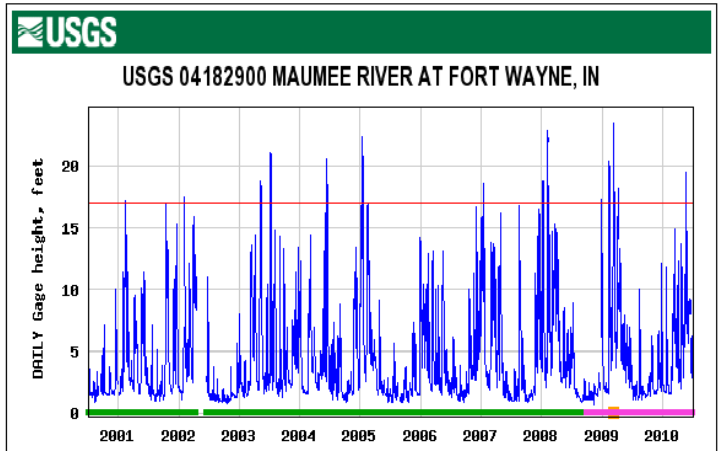
Allen County, Indiana
Hydrologic Unit Code 04100005
Latitude 41°04'57", Longitude 85°06'55" NAD27
Drainage area 1,926 square miles
Gage datum 730.07 feet above sea level NGVD29

Location of the site in USA.









USGS
Indiana StreamStats

Graham McCulloch
Ditch from I 69

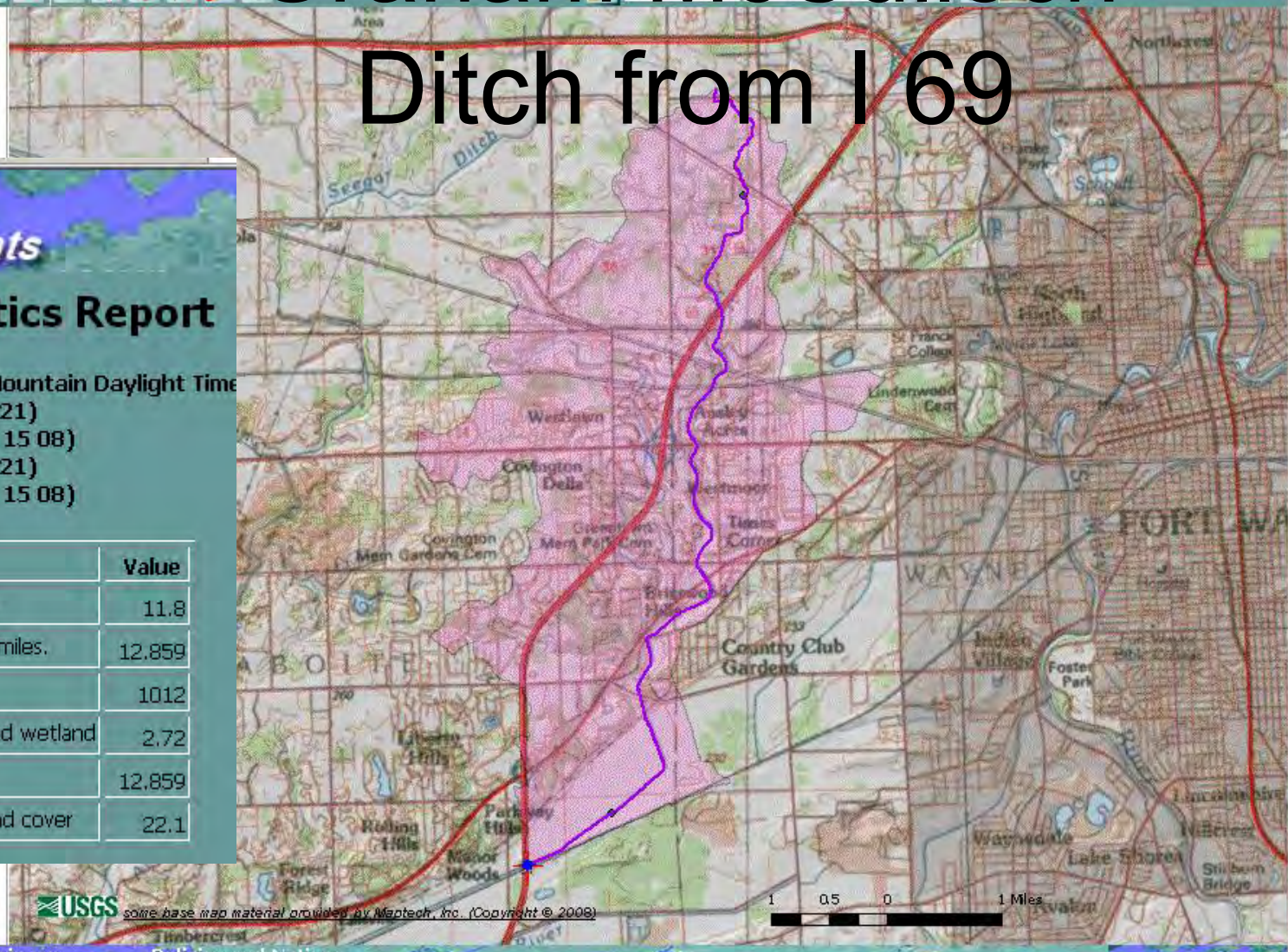
Results
Map Contents
Navigation
Overview

USGS
Indiana StreamStats

Basin Characteristics Report

Date: Fri Jun 18 2010 08:50:18 Mountain Daylight Time
NAD27 Latitude: 41.0225 (41 01 21)
NAD27 Longitude: -85.2521 (-85 15 08)
NAD83 Latitude: 41.0226 (41 01 21)
NAD83 Longitude: -85.2521 (-85 15 08)

Parameter	Value
Channel 10-85 slope in feet per mile	11.8
Contributing drainage area in square miles.	12.859
Region number	1012
Percent of area covered by water and wetland	2.72
Total drainage area in square miles	12.859
Percent of area covered by urban land cover	22.1



USGS Indiana StreamStats

Junk Ditch at Mouth

Results
Map Contents
Navigation
Overview

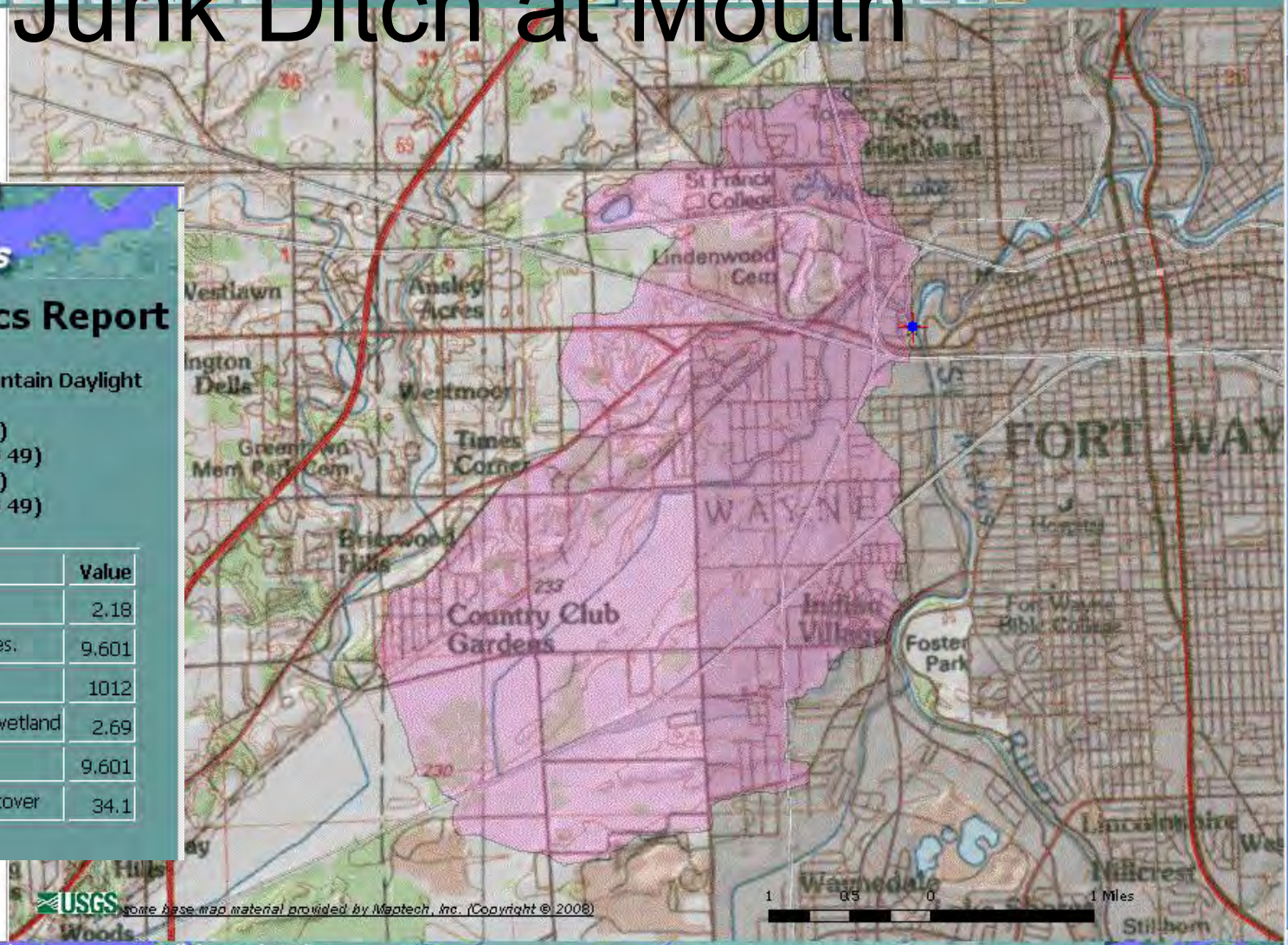
Home

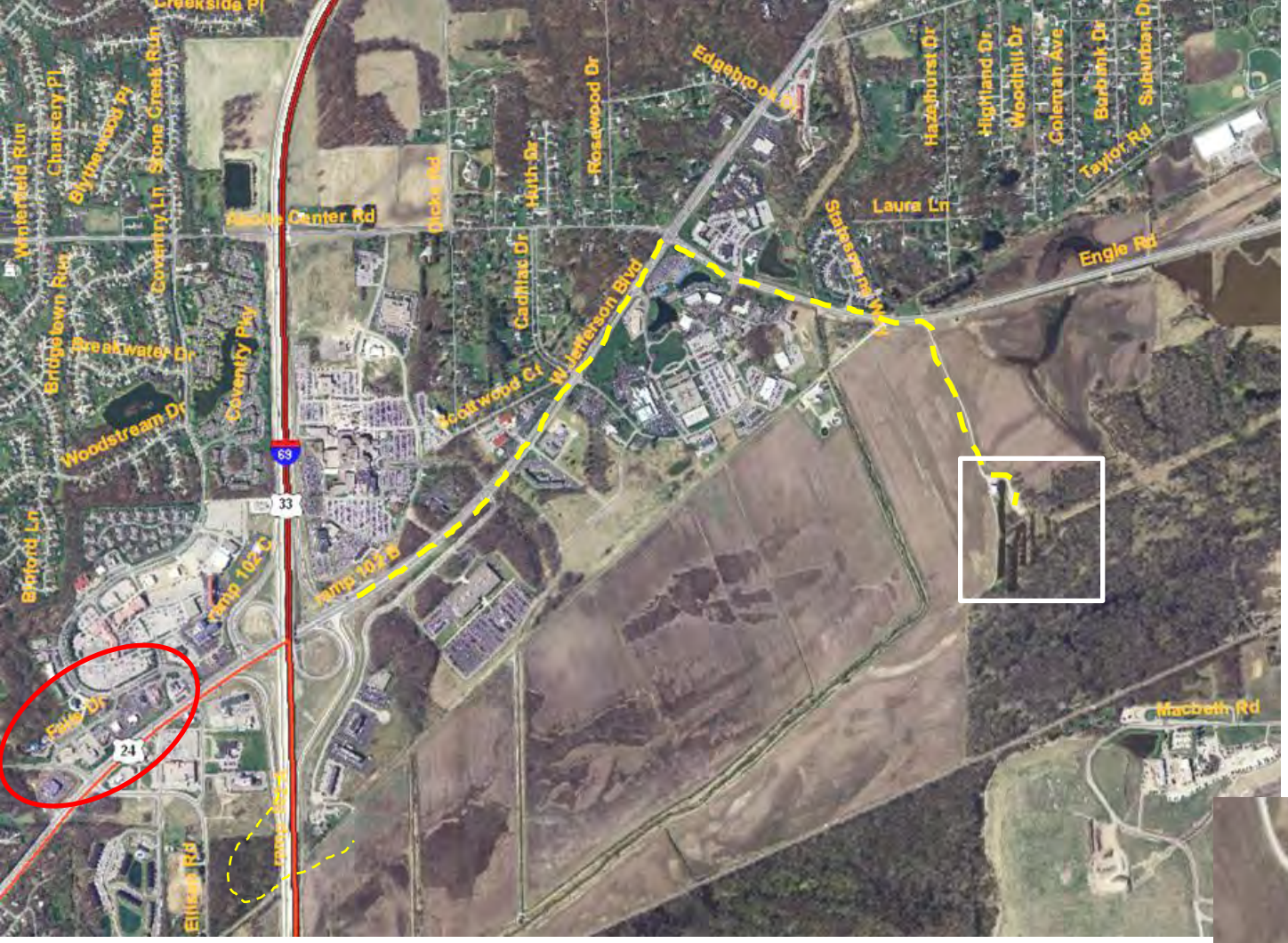
USGS Indiana StreamStats

Basin Characteristics Report

Date: Fri Jun 18 2010 09:01:15 Mountain Daylight Time
NAD27 Latitude: 41.0742 (41 04 27)
NAD27 Longitude: -85.1637 (-85 09 49)
NAD83 Latitude: 41.0743 (41 04 27)
NAD83 Longitude: -85.1637 (-85 09 49)

Parameter	Value
Channel 10-85 slope in feet per mile	2.18
Contributing drainage area in square miles.	9.601
Region number	1012
Percent of area covered by water and wetland	2.69
Total drainage area in square miles	9.601
Percent of area covered by urban land cover	34.1





The Little River Wetlands Project website for Eagle Marsh can be found at the address below. The website presents directions, trail maps. and additional information about the natural resources and history of the site. http://www.lrwp.org/eaglemarsh.php