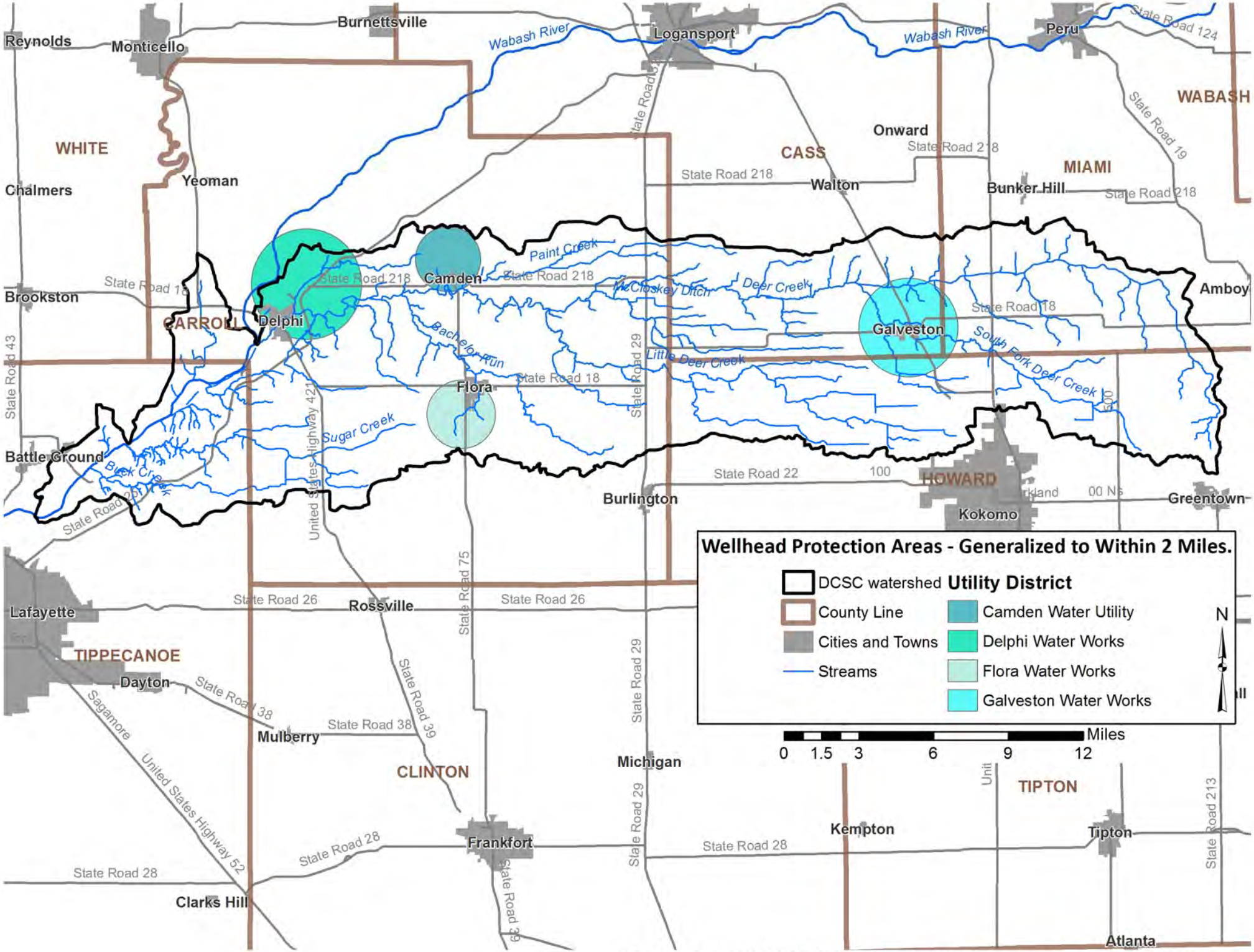
Well fields & Groundwater Maps



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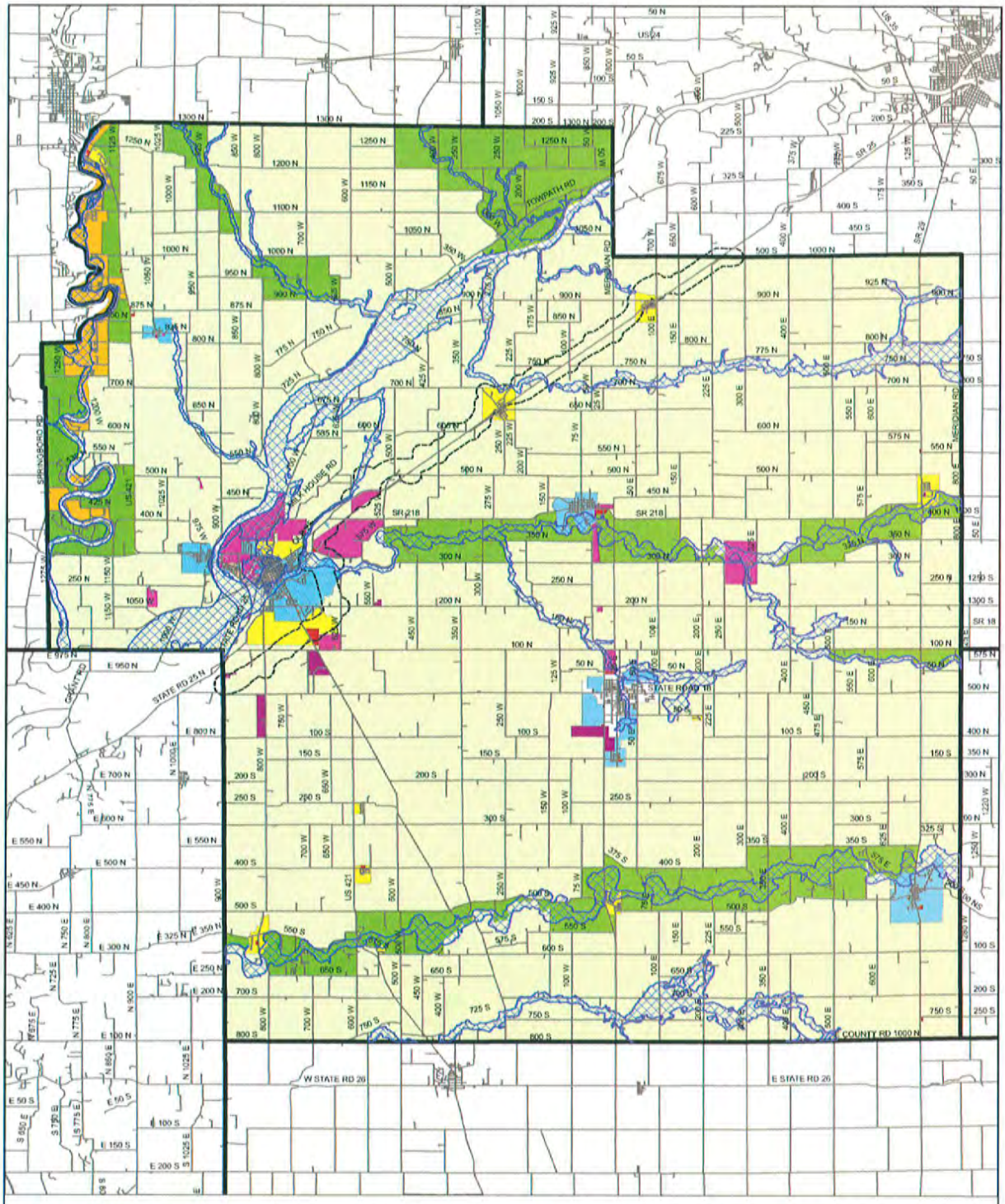
Carroll County Maps



Carroll County, Indiana Zoning Map

Zoning Legend

- A
- B-1
- B-2
- B-3
- I-1
- I-2
- L-1
- S-1
- U-1
- U-2
- R-R

Base Map Legend

- FEMA Floodplain
- County Boundary
- Hoosier Heartland Highway ROW
- Road Centerline

Engineers · Architects · Planners

GRW Engineers, Inc.
7112 Waldemar Drive
Indianapolis, IN 46268
Voice 317.347.3650
Fax 317.347.3656

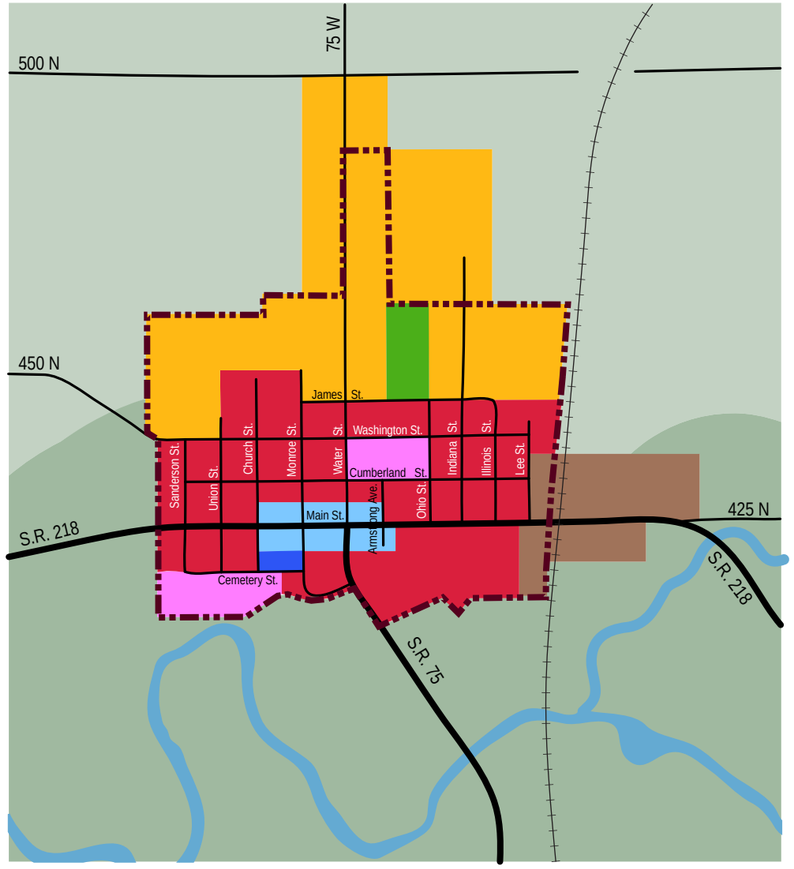
N W E S

0 6,000 12,000 24,000

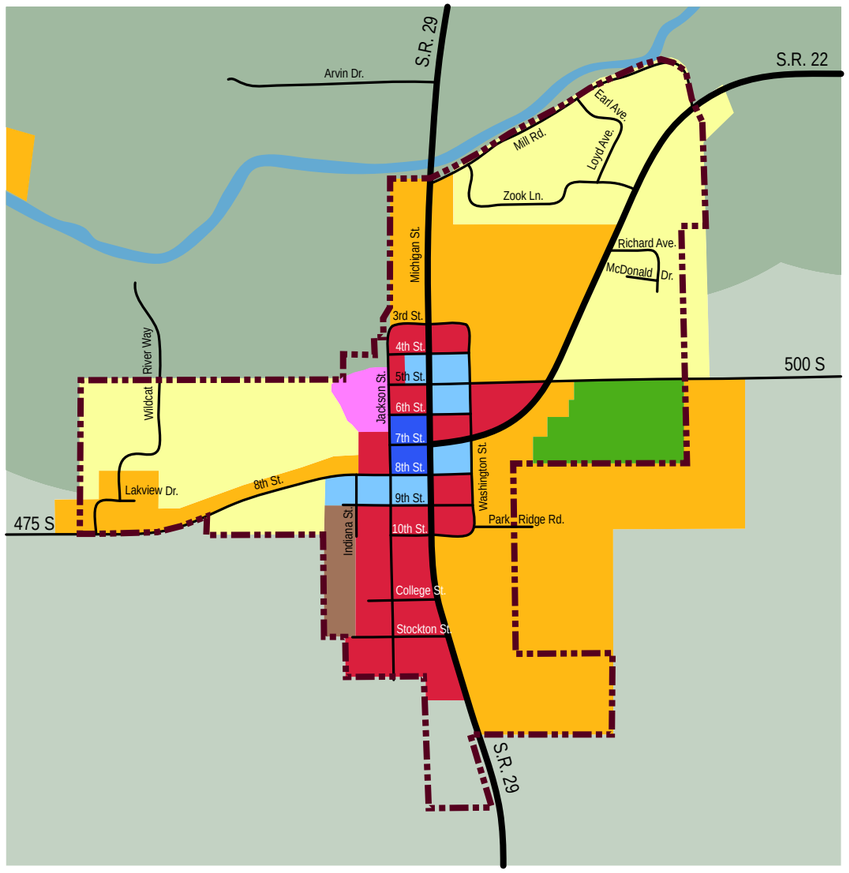
Scale In Feet

Printed: September 19, 2013

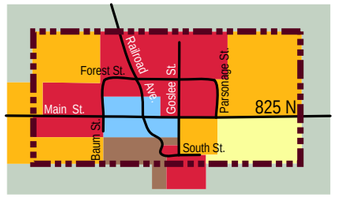
Future Land Use Map
Burlington, Camden and Yeoman, Indiana



Camden



Burlington



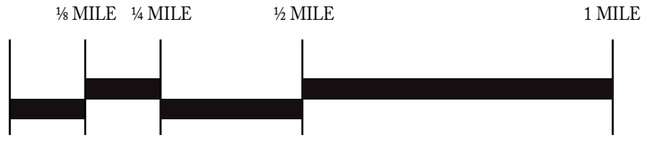
Yeoman

MAP LEGEND

- Environmentally Managed Land
- General Agriculture
- Parks and Recreation
- Low Density Residential
- Medium Density Residential
- Lake Residential
- High Density Residential
- Institutional
- Downtown Mixed
- General Commercial
- Highway Commercial
- Business Park
- Industrial
- Proposed Industrial/Flex Option
- Mineral Resources
- Corporate Limits
- River/Stream
- Railroad

N

This Future Land Use Map is to be considered a guide for future development. However, each proposed development should be judged upon its merit and compatibility with surrounding land uses as well as the goals and objectives set by the governing body.



GroundRules, Inc.
website www.groundrulesinc.com

Future Land Use Map
Delphi, Indiana

MAP LEGEND

- Environmentally Managed Land
- General Agriculture
- Parks and Recreation
- Low Density Residential
- Medium Density Residential
- Lake Residential
- High Density Residential
- Institutional
- Downtown Mixed
- General Commercial
- Highway Commercial
- Business Park
- Industrial
- Proposed Industrial/Flex Option
- Mineral Resources
- Corporate Limits
- River/Stream
- Railroad
- County Line

N

This Future Land Use Map is to be considered a guide for future development. However, each proposed development should be judged upon its merit and compatibility with surrounding land uses as well as the goals and objectives set by the governing body.

⅛ MILE ¼ MILE ½ MILE 1 MILE

GroundRules
website www.groundrulesinc.com

Future Land Use Map
Carroll County, Indiana

MAP LEGEND

- Environmentally Managed Land
- General Agriculture
- Parks and Recreation
- Low Density Residential
- Medium Density Residential
- Lake Residential
- High Density Residential
- Institutional
- Downtown Mixed
- General Commercial
- Highway Commercial
- Business Park
- Industrial
- Proposed Industrial/Flex Option
- Mineral Resources
- Corporate Limits
- Airport Hazard Area
- Lake
- River/Stream
- Railroad
- County Line

This Future Land Use Map is to be considered a guide for future development. However, each proposed development should be judged upon its merit and compatibility with surrounding land uses as well as the goals and objectives set by the governing body.

N

1 MILE 2 MILES 3 MILES

GroundRules, Inc.
website www.groundrulesinc.com

Cass County Maps

Figure 6-2: Park and Recreation/Connectivity Opportunities map.

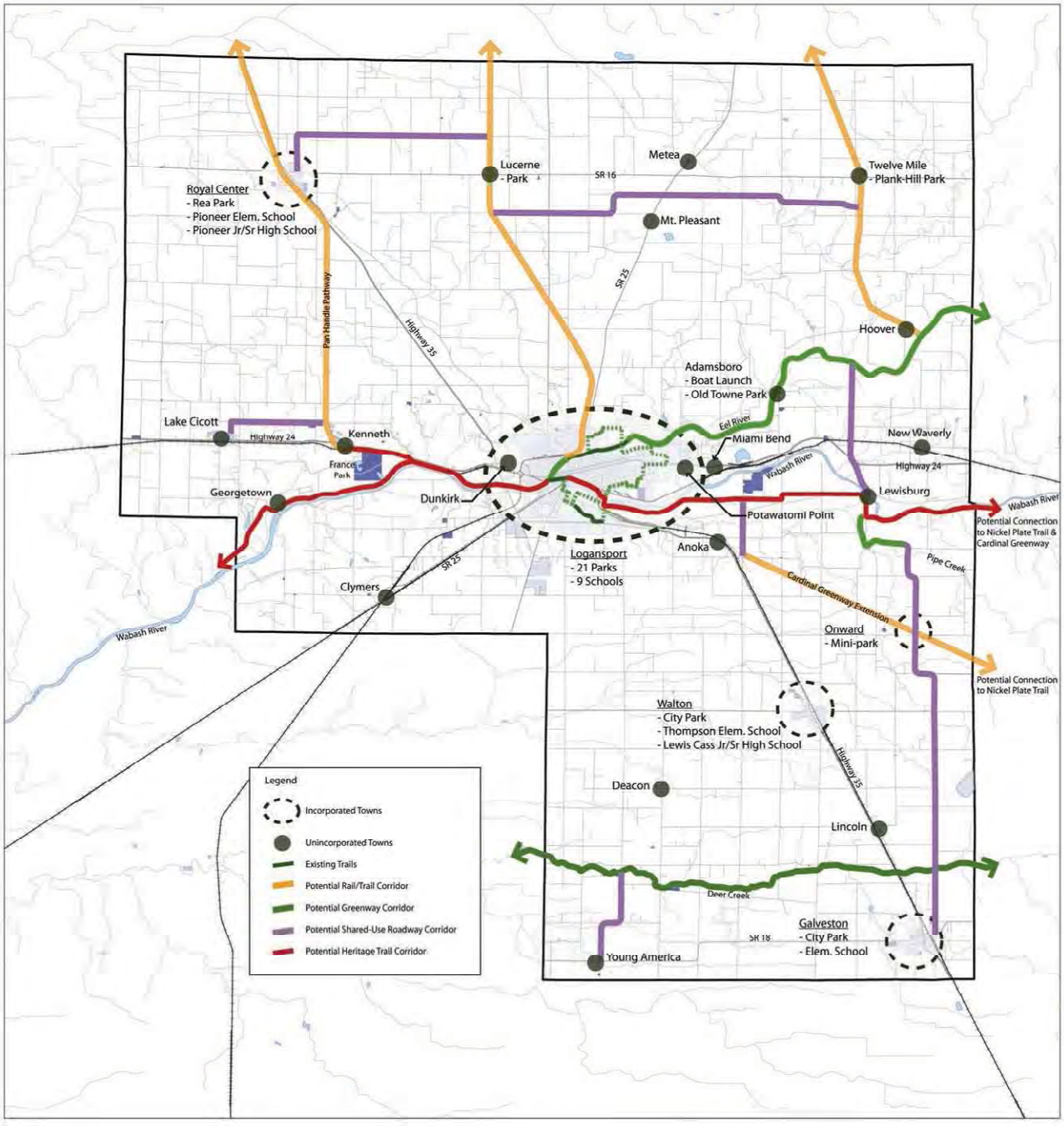


Figure 4-2: Future Land Use

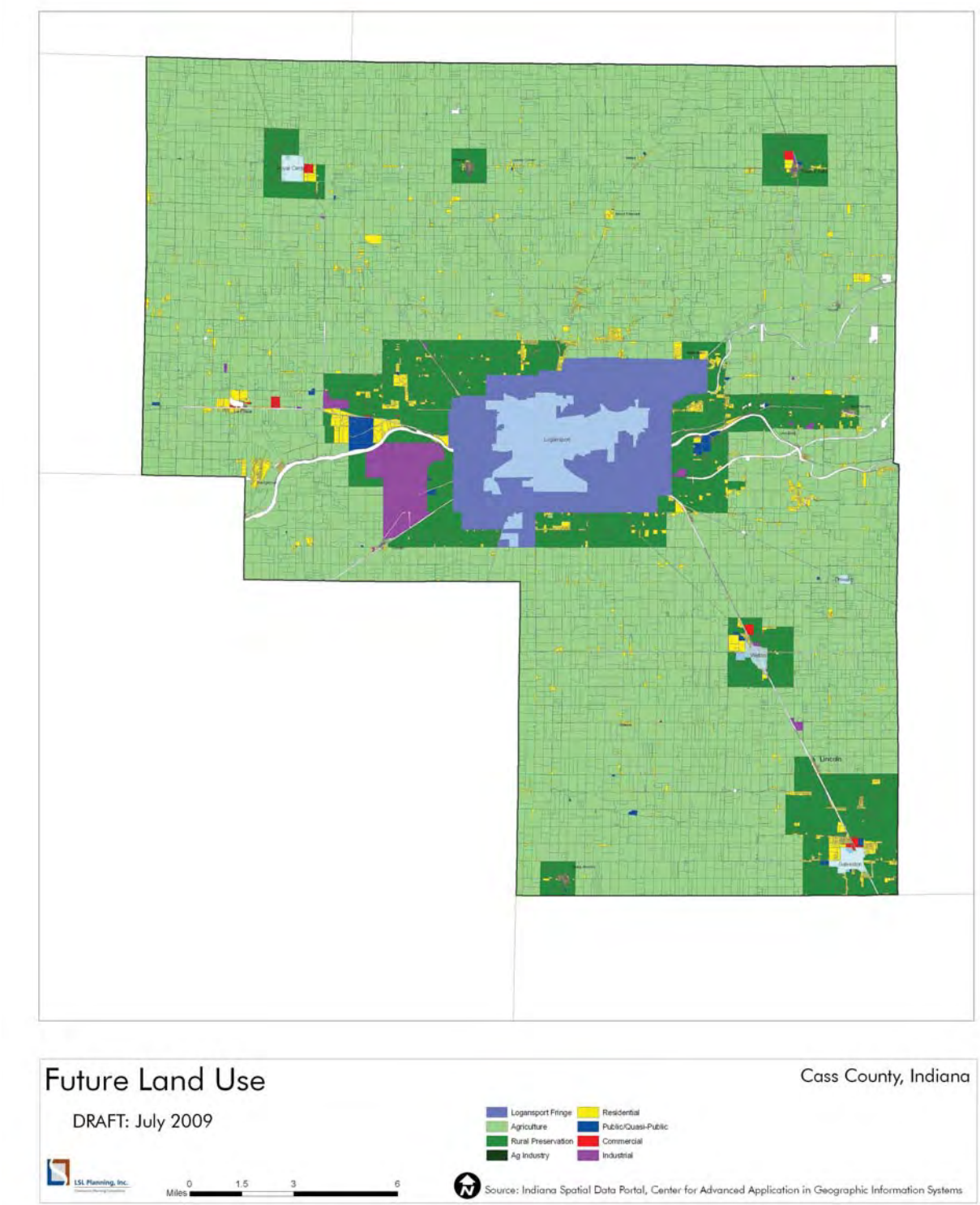
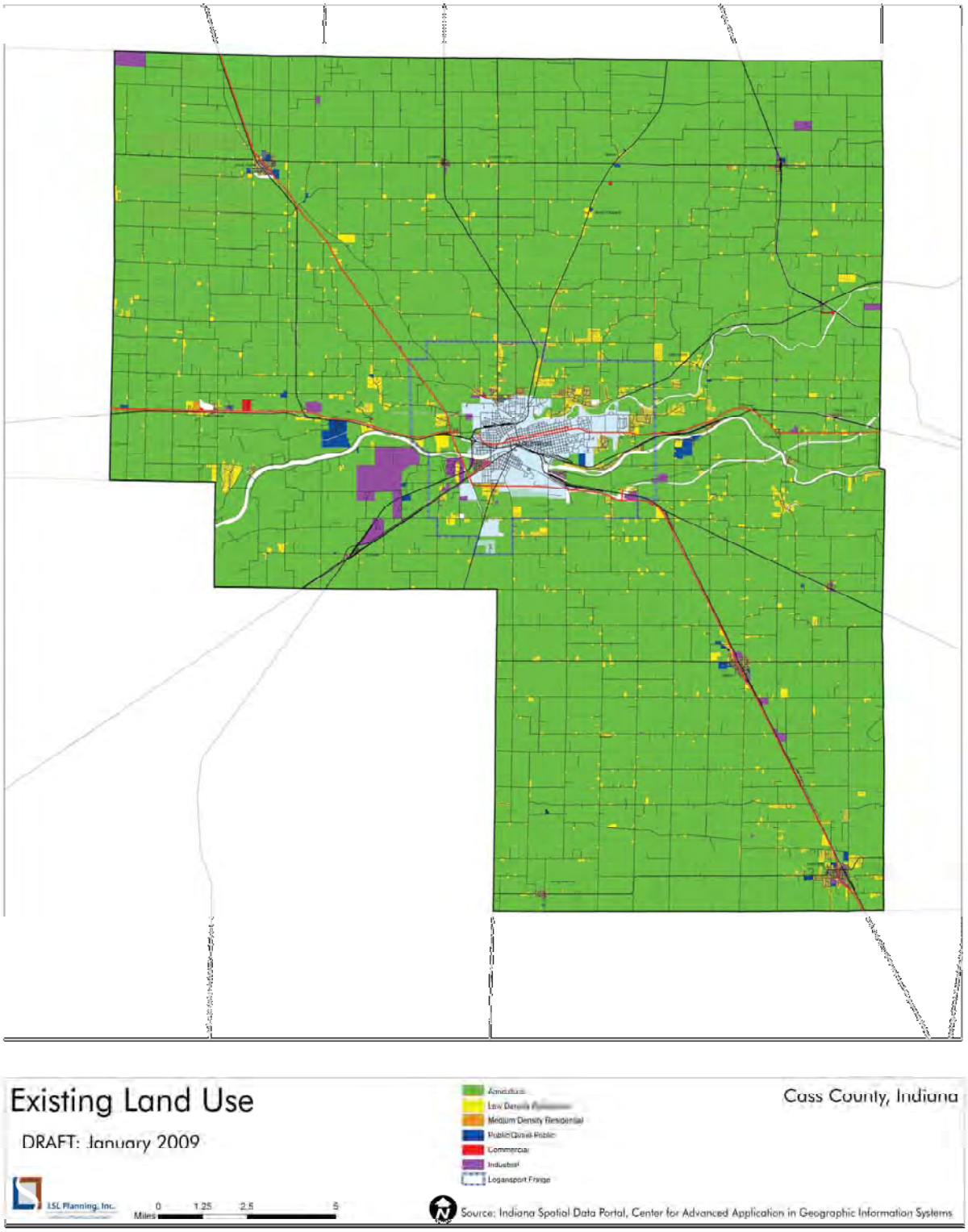


Figure 4-1: Existing Land Use



Chapter 4: Land Use

Howard County Maps

Future Land Use Map
Howard County, Indiana

DRAFT

MAP LEGEND

- Conservation
- Agricultural
- Rural Residential
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Government/Institutional
- Village Commercial
- General Commercial
- Light Industrial
- Heavy Industrial
- Streets
- Railroad
- Creek/Stream
- Municipal Jurisdiction
- Currently Not Used
- Airport Hazard Zone

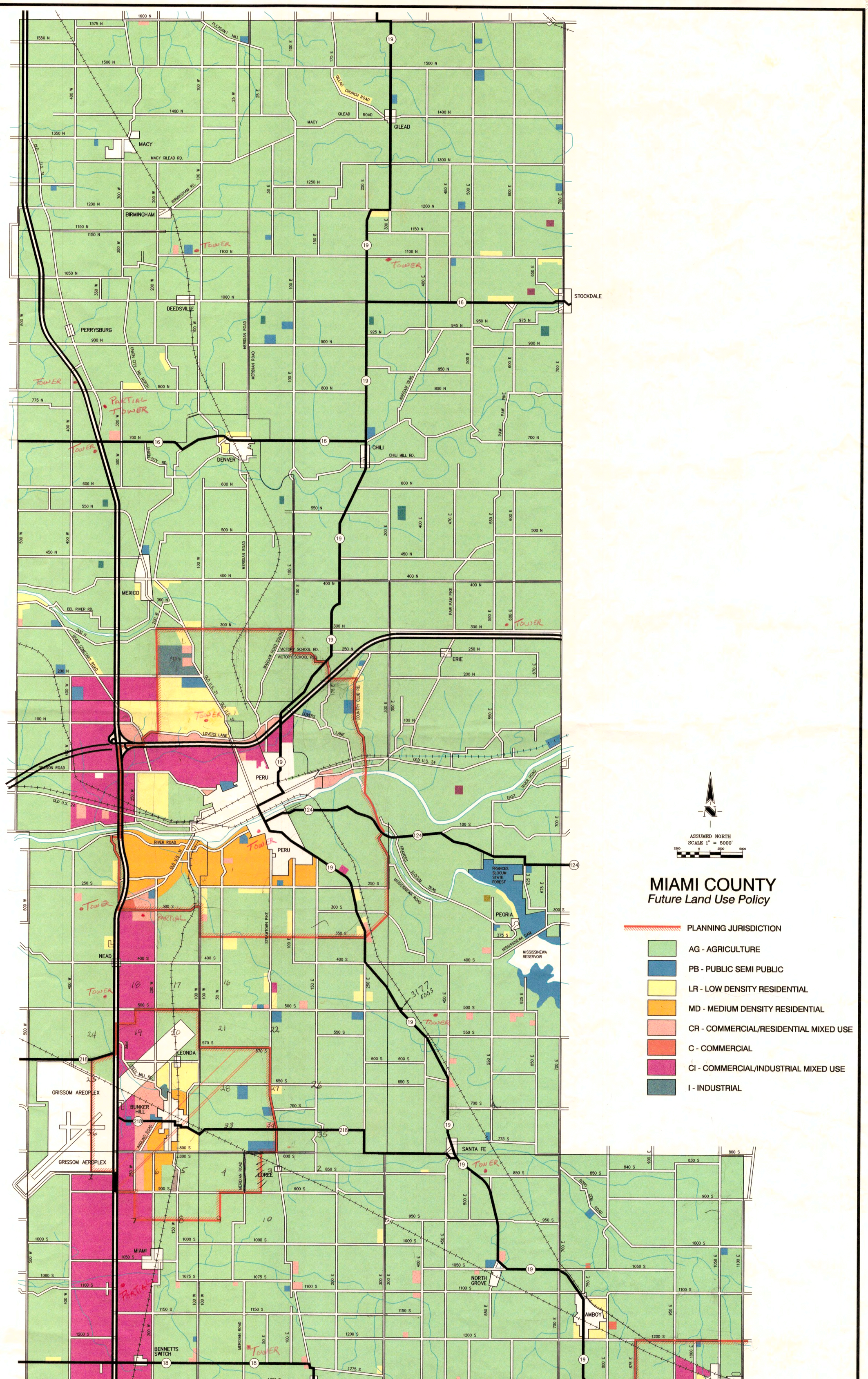
GroundRules
website www.groundrulesinc.com

1 MILE 2 MILES 3 MILES

North

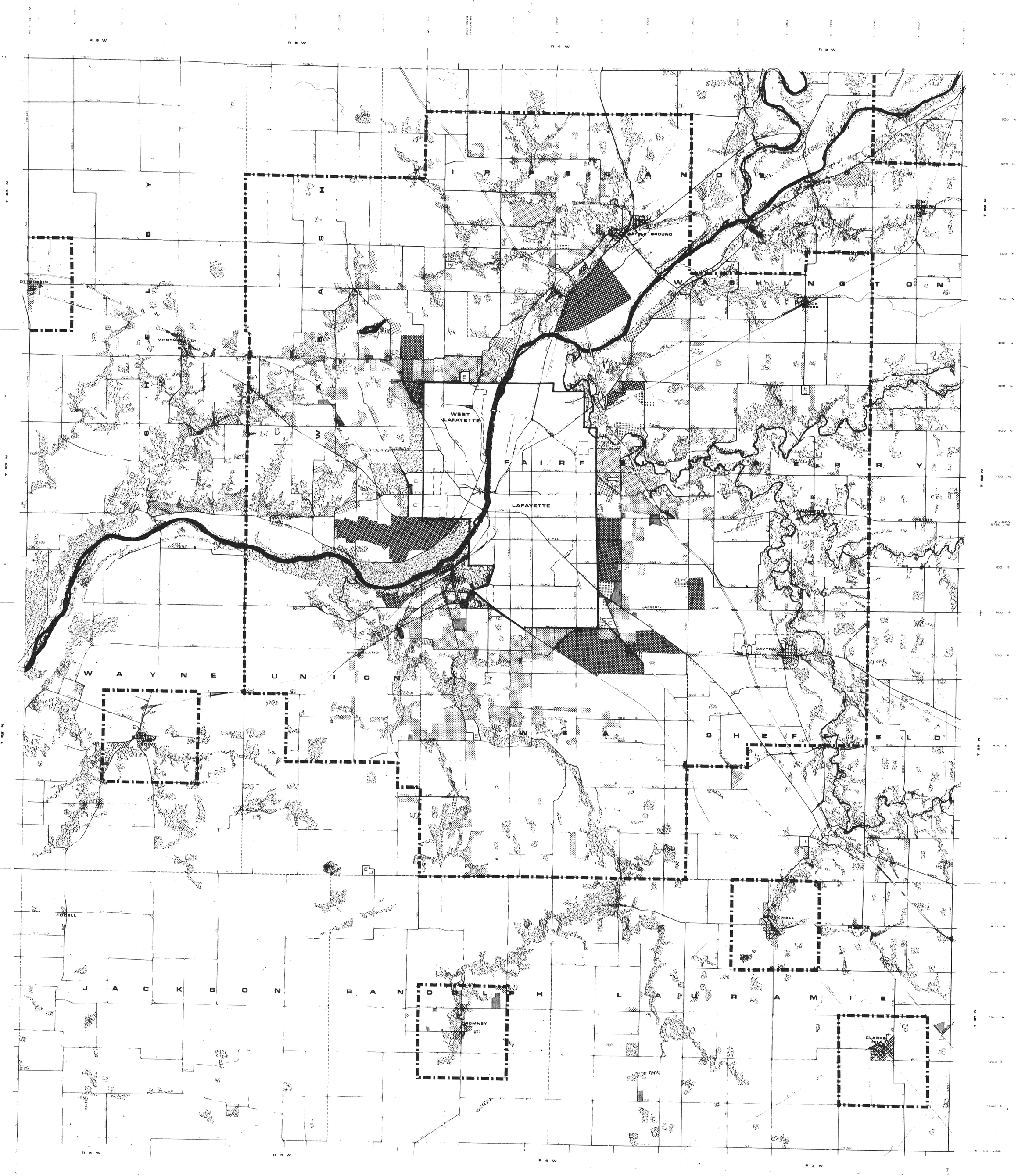
Last Revised: May 5, 2005

Miami County Maps


MIAMI COUNTY
Future Land Use Policy
PLANNING JURISDICTION
AG - AGRICULTURE
PB - PUBLIC SEMI PUBLIC
LR - LOW DENSITY RESIDENTIAL
MD - MEDIUM DENSITY RESIDENTIAL
CR - COMMERCIAL/RESIDENTIAL MIXED USE
C - COMMERCIAL
CI - COMMERCIAL/INDUSTRIAL MIXED USE
I - INDUSTRIAL
ASSUMED NORTH
SCALE 1" = 5000'
GILEAD
MACY
BIRMINGHAM
DEEDSVILLE
PERRYSBURG
DENVER
MEXICO
PERU
CHILI
ERIE
STOCKDALE
FRANCES SLOCUM STATE FOREST
PEORIA
MISSISSINEWA RESERVOIR
NEAD
LEONDA
GRISSOM AEROPLEX
BUNKER HILL
SANTA FE
LOREE
MIAMI
NORTH GROVE
AMBOY
BENNETTS SWITCH
WAUPECONG
CONVERSE
GILEAD CHURCH ROAD
MACY GILEAD RD.
BIRMINGHAM RD.
MERIDIAN ROAD
MARSHALL TRAIL
PAW PAW PIKE
CHILI MILL RD.
VICTORY SCHOOL RD.
EEL RIVER RD.
RIDER CEMETERY ROAD
BREEZE MILL RD.
LOVERS LANE
DIVISION ROAD
RIVER ROAD
STRAWTOWN PIKE
MISSISSINEWA ROAD
ANGLING ROAD
BOND GEM ROAD
COUNTRY CLUB RD.
UNION CITY RD. NORTH
OLD U.S. 31
OLD U.S. 24
TOWER
PARTIAL TOWER

Tippecanoe County Maps

CURRENT AND EXPECTED LAND USE



LEGEND

- RESIDENTIAL
- AGRICULTURAL
- INDUSTRIAL
- COMMERCIAL
- OPEN SPACE
- E J H C — SCHOOLS
- URBAN BOUNDARY
- URBANIZING BOUNDARY

N

0 6000

DRAWN BY R A DAVIS
TIPPECANOE COUNTY
AREA PLAN COMMISSION
SUMMER 1980
REVISED AUGUST 1981

Howard County Little Deer Watershed Management Plan Maps

Critical Areas for Land Treatment

Critical areas for implementing water quality protection practices were identified by comparing pollutant loads and yields from individual sub-watersheds. The project area was divided into has five sub-watersheds (Figure 4) defined by the location of water sampling sites (Table 5). The size of each sub-watershed was estimated from 1:20,000 scale soil maps using an acreage measuring grid.

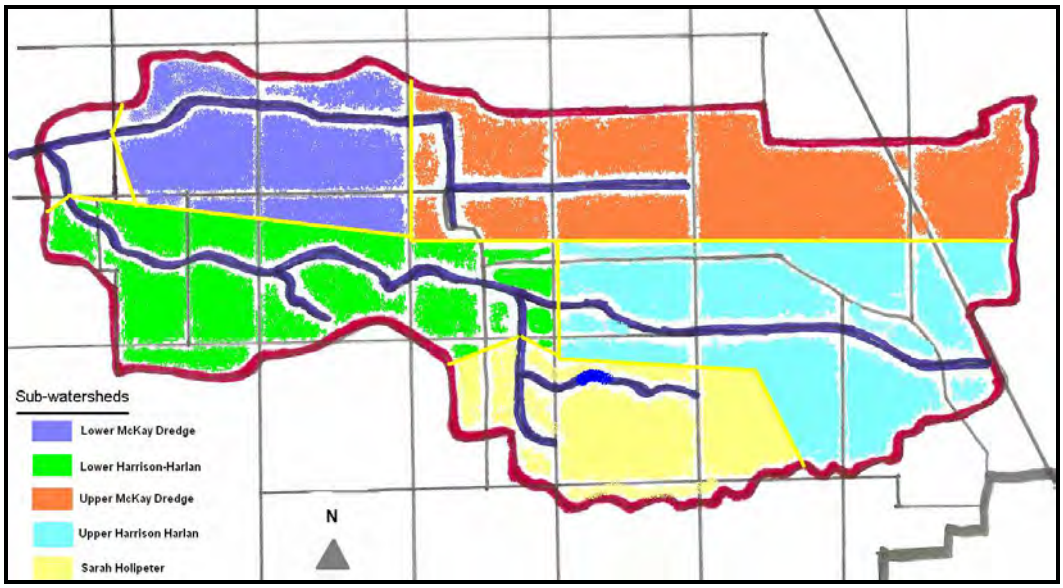


Figure 4. Estimated Sub-watersheds of Little Deer Creek Headwaters 205j Project.

Table 5. Estimated acreages of sub-watersheds in the Little Deer Creek Headwaters 205j project area.

Sub-watershed Name	Estimated Acres	Sub-watershed Outlet Water Sampling Site
Lower McKay Dredge[1]	1,100	MD 1 (MD 3)
Lower Harrison Harlan Ditch[1]	2,250	MD 2 (MD 4 & 5)
Upper McKay Dredge Ditch	2,525	MD 3
Sarah Holipeter Ditch	1,400	MD 4
Upper Harrison Harlan Ditch	1,950	MD 5

[1] These locations also include inputs from upstream sub-watersheds named in parentheses.

Pollutant Loads

The quantity of pollutant leaving a watershed over time is called a load. Comparison of pollutant loads is useful for identifying problem areas (critical areas) within a watershed. Pollutant loads were calculated for each sub-watershed using test results for spring and fall water samples plus stream discharge measurements (Table 6). Although this is a rough analysis and there are only two water samples to compare at each site, this approach helps in locating needs for certain conservation practices.

Table 6. Pollutant Loads Leaving Little Deer Creek Headwaters Watershed During High and Low Stream Flow.

Pollutant	Spring (high flow) Total Load	Fall (low flow) Total Load
Ammonia	119 (lbs/day)	3 (lbs/day)
Total Kjeldahl Nitrogen	1,523 (lbs/day)	23 (lbs/day)
Nitrite+Nitrate	9,109 (lbs/day)	354 (lbs/day)
Total Phosphorus	338 (lbs/day)	2 (lbs/day)
Atrazine	1850 (g/day)	7 (g/day)
E. Coliform bacteria	8.E + 12 (cfu/day)	2.E +10 (cfu/day)

Pollutant loads in spring runoff are much higher than in fall stream flow as shown in Figures 5-10. The three most upstream sub-watersheds (Upper McKay Dredge, Sarah Holipeter and Upper Harrison Harlan) carry significant loads of nitrogen and phosphorus when stream discharge is high, such as after a rain event of at least 0.5" as was measured in this project. Pollutant loading drops to low levels when discharge falls. High loads are usually associated with agricultural activities that take place during spring when vegetative cover to protect soils from rains is at a minimum and the application of manure and chemicals (pesticides and fertilizers) is taking place. Failing or incomplete septic systems are also a source of nutrient loading.

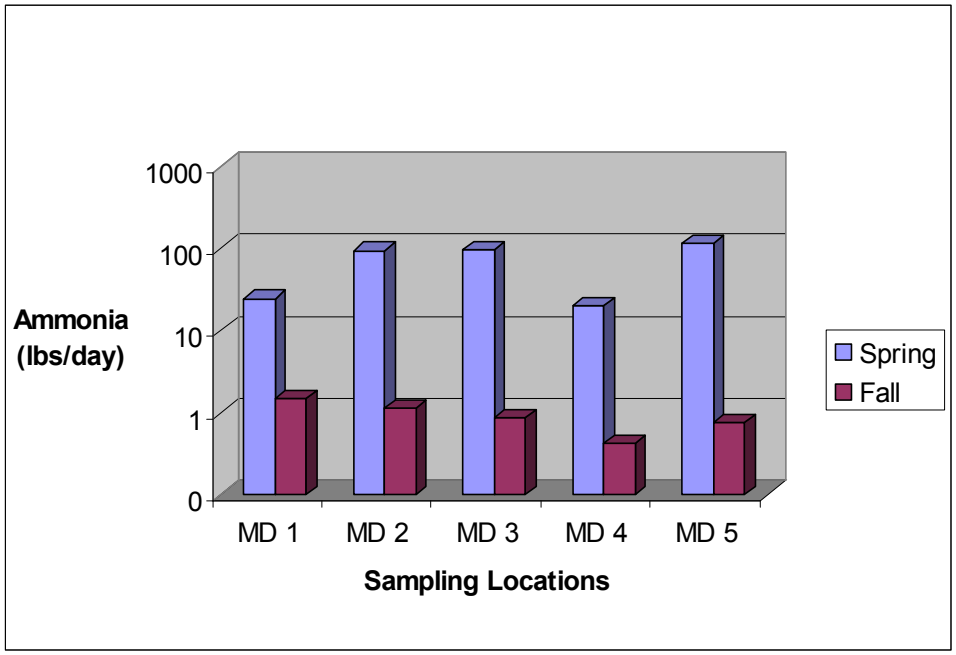


Figure 5. Ammonia Load: Spring vs. Fall (2003)

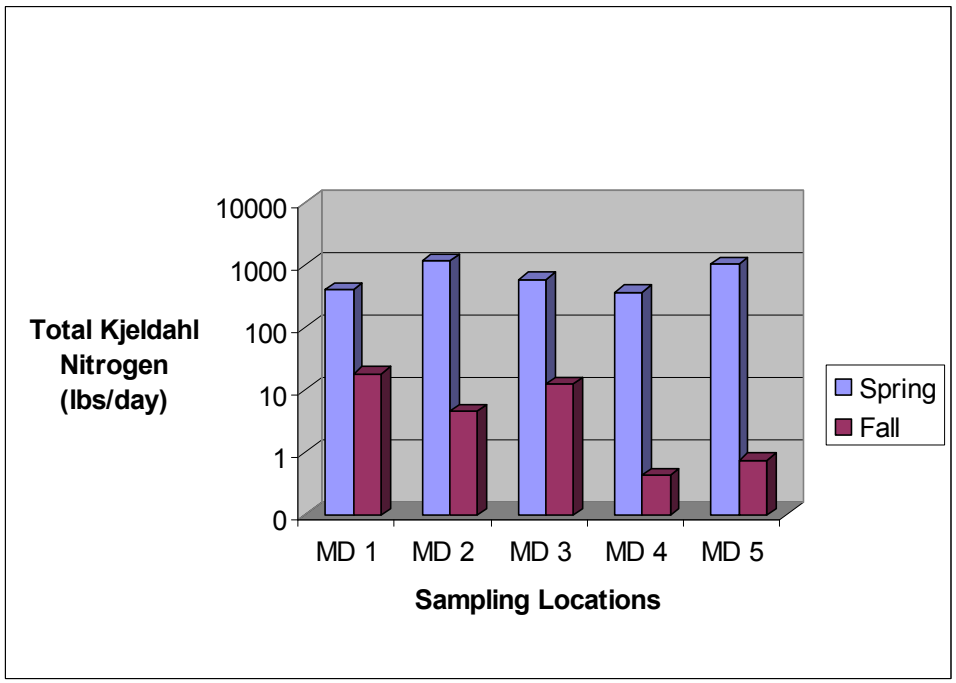


Figure 6. Total Kjeldahl Nitrogen Load: Spring vs. Fall (2003)

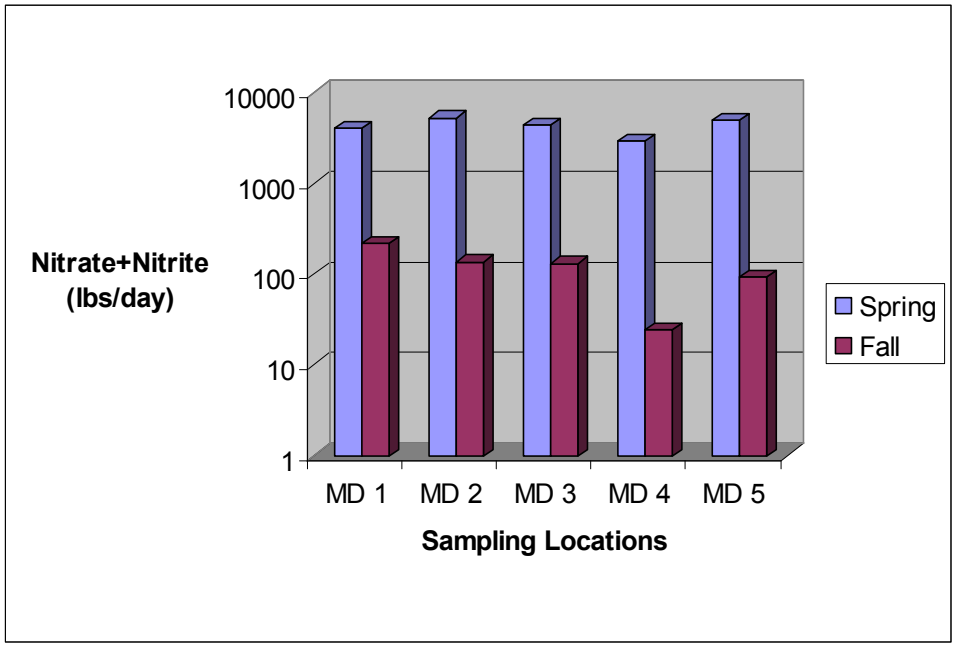


Figure 7. Nitrate + Nitrite Load: Spring vs. Fall (2003)

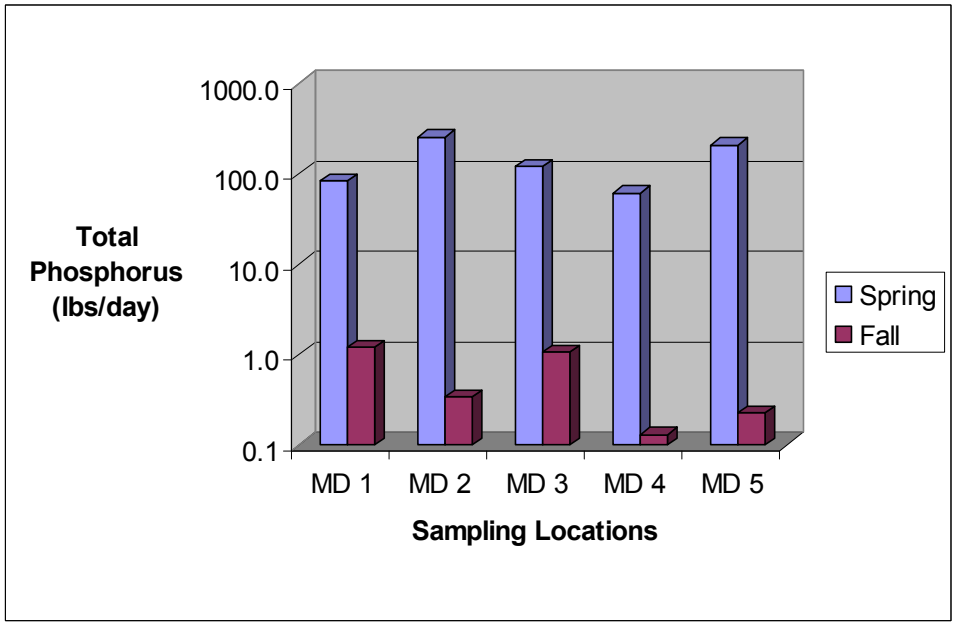


Figure 8. Total Phosphorus Load: Spring vs. Fall (2003)

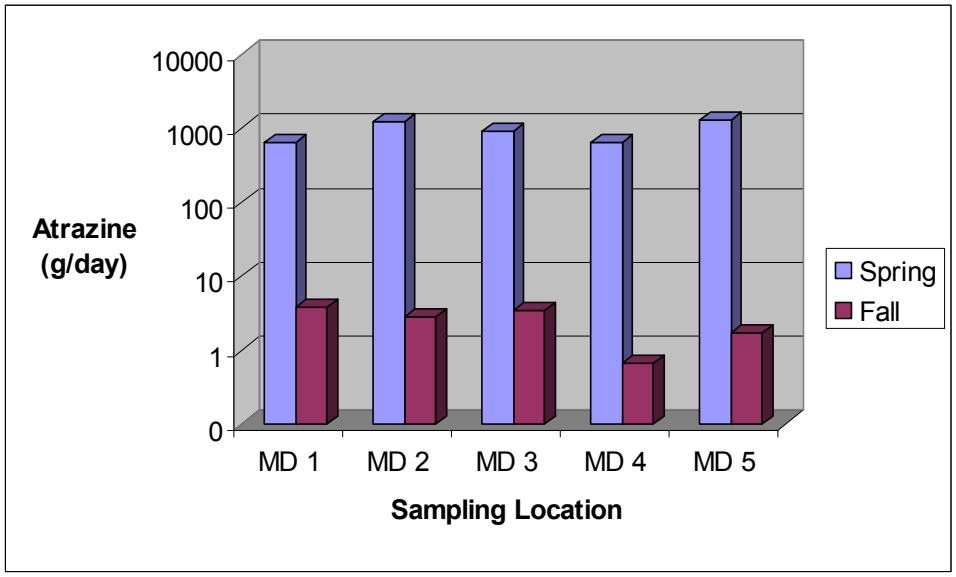


Figure 9. Atrazine Load: Spring vs. Fall (2003)

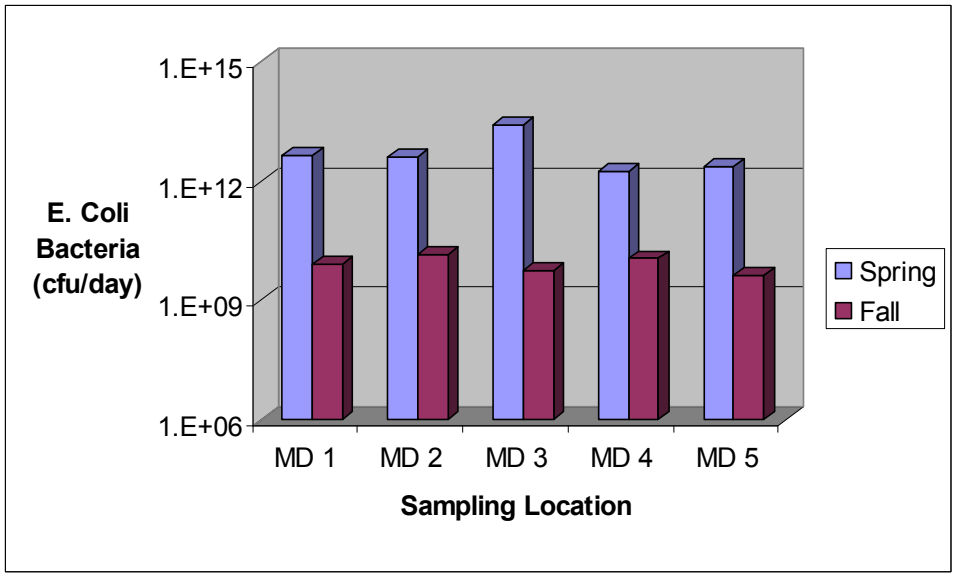


Figure 10. E. Coli Bacteria Load: Spring vs. Fall (2003)

Pollutant Yields

Another method of comparing the amount of pollutants contributed from different sub-watersheds is to calculate the yield (load divided by drainage area), or the amount of pollutant generated per acre in each sub-watershed. Figures 11 and 12 show that all three headwaters watersheds are fairly close in nutrient and Atrazine yield, but the Upper Harrison Harlan (above MD 5) sub-watershed has slightly greater pollutant yields.

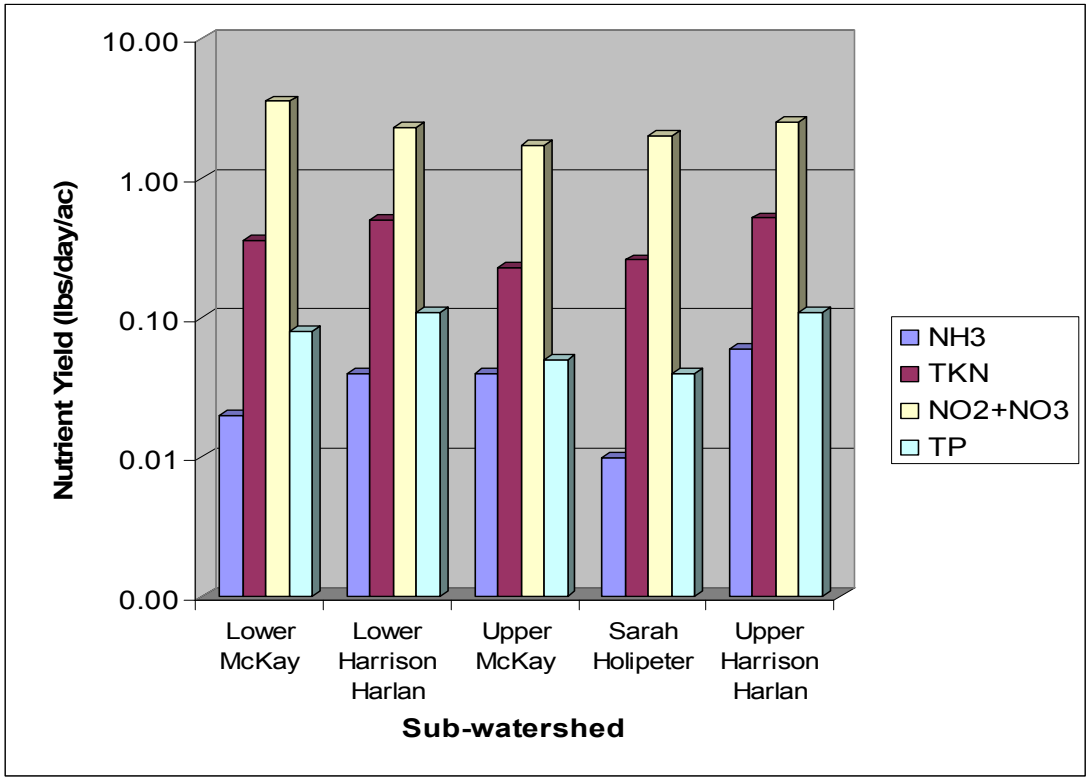


Figure 11. Nutrient Yield From Sub-watersheds: Spring (2003)

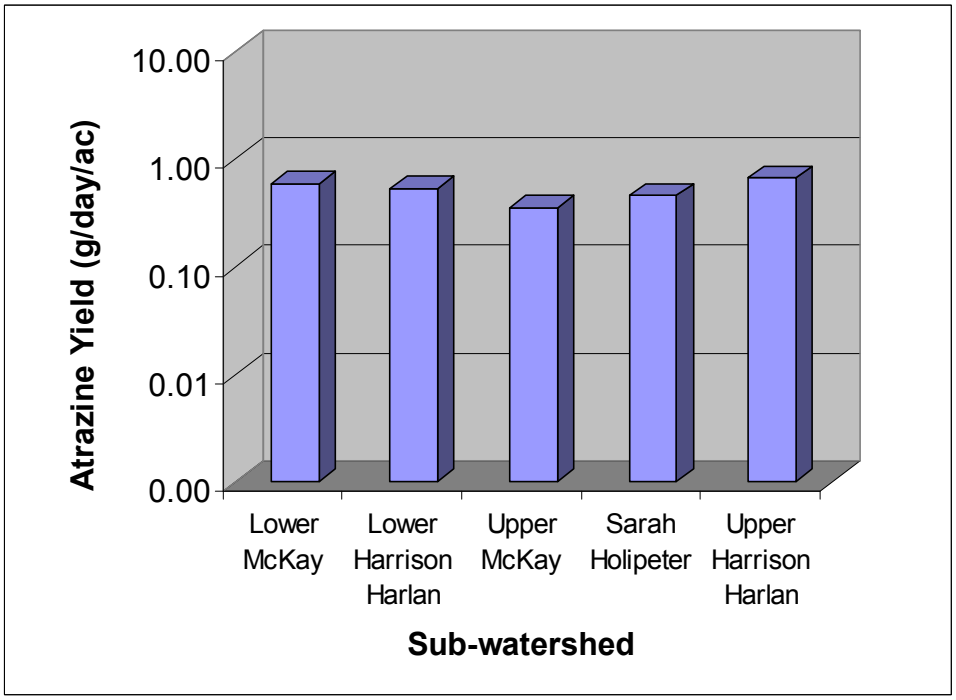


Figure 12. Atrazine Yields From Sub-watersheds: Spring (2003)

Wabash River Total Maximum Daily Load Report Maps

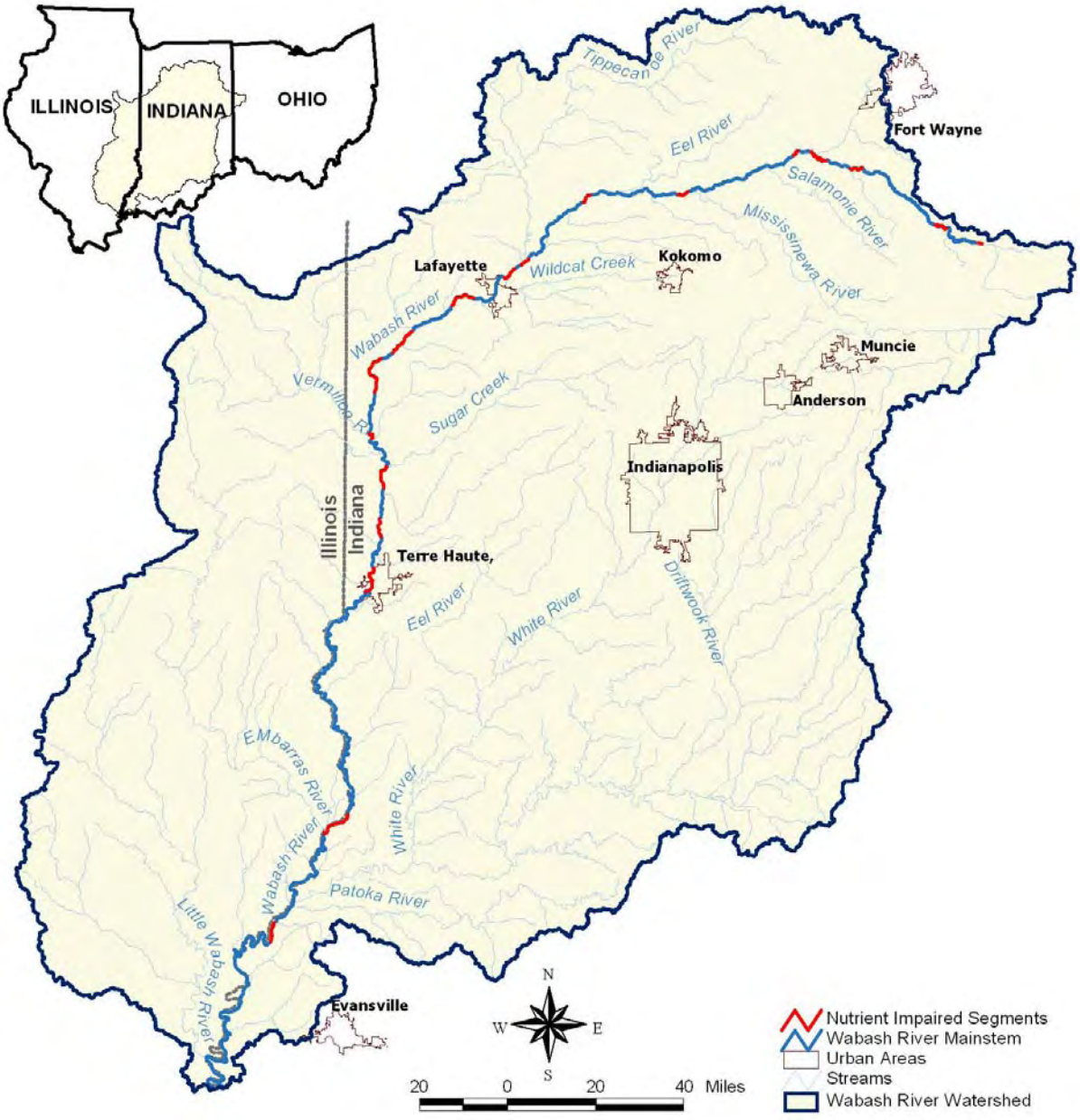


Figure 2-3. Verified nutrient impaired segments.

2.4 Sources

A variety of different types of sources contribute pollutants to the Wabash River. Due to the extremely large size of the watershed it was beyond the scope of this study to evaluate each of these sources individually. Instead, existing loads and load allocations were made to the following three source categories:

1) National Pollutant Discharge Elimination System (NPDES) facilities that discharge directly to the Wabash River
2) Subwatersheds draining directly to the Wabash River

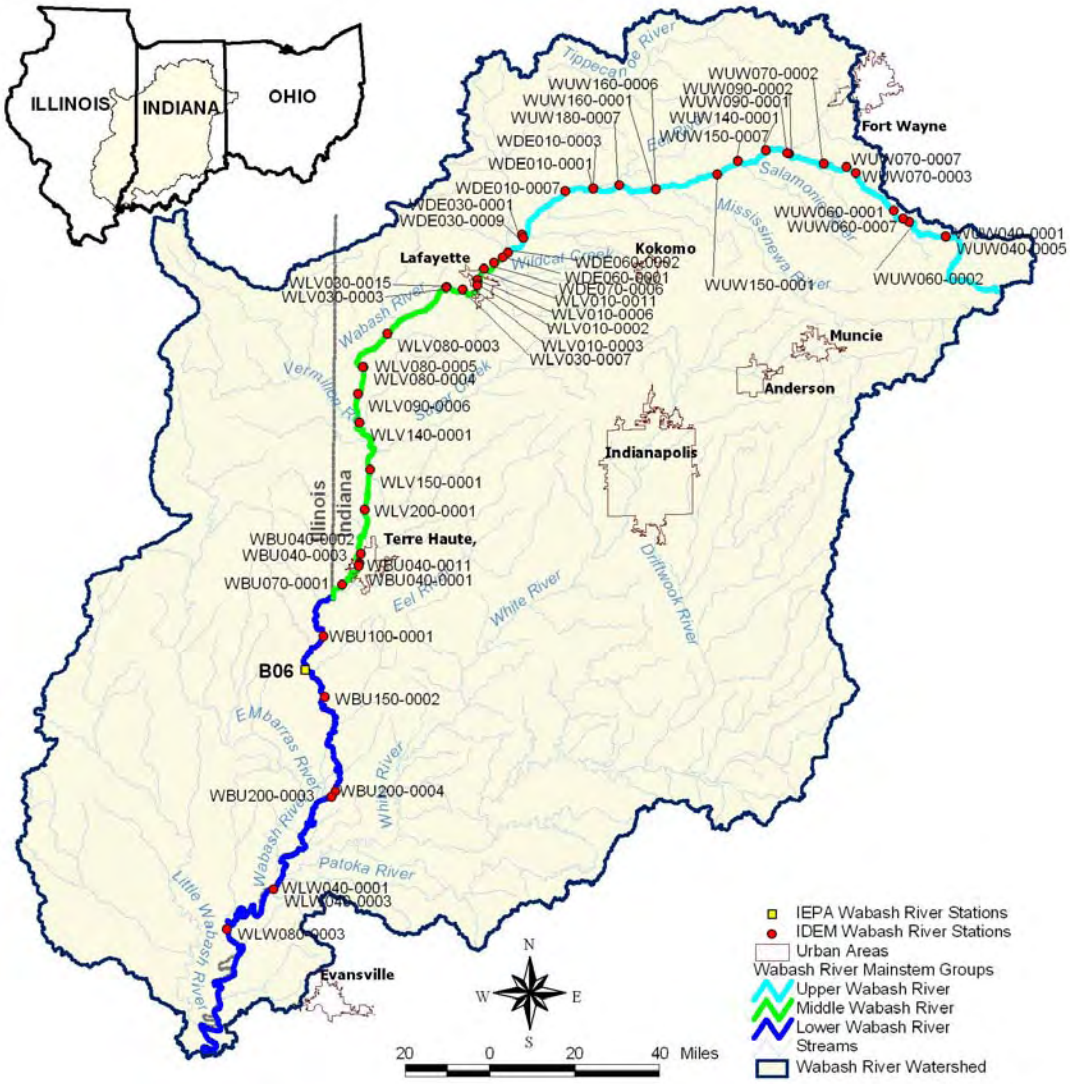


Figure 2-2. Water quality sampling stations along the Wabash River.

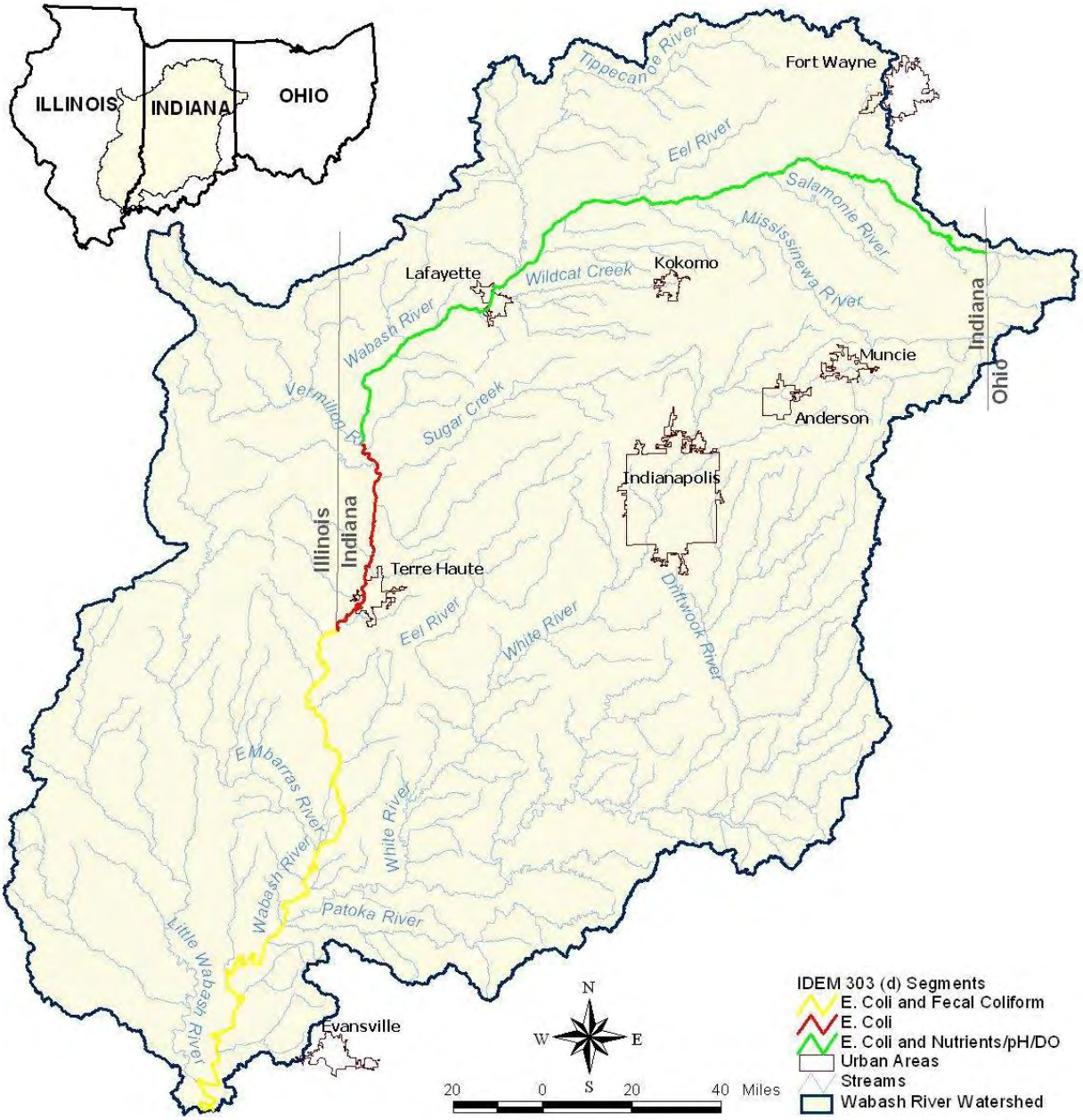


Figure 2-1. Location of impaired Wabash River segments addressed by the TMDLs presented in this report.