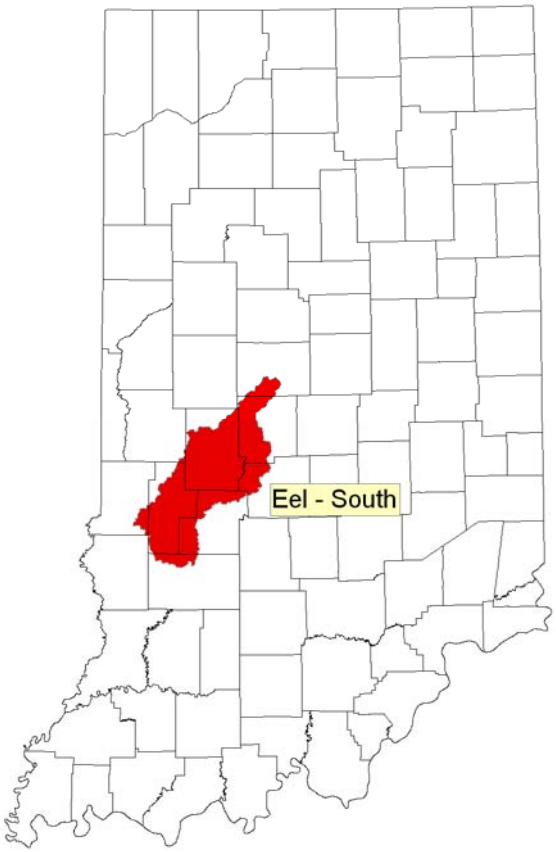
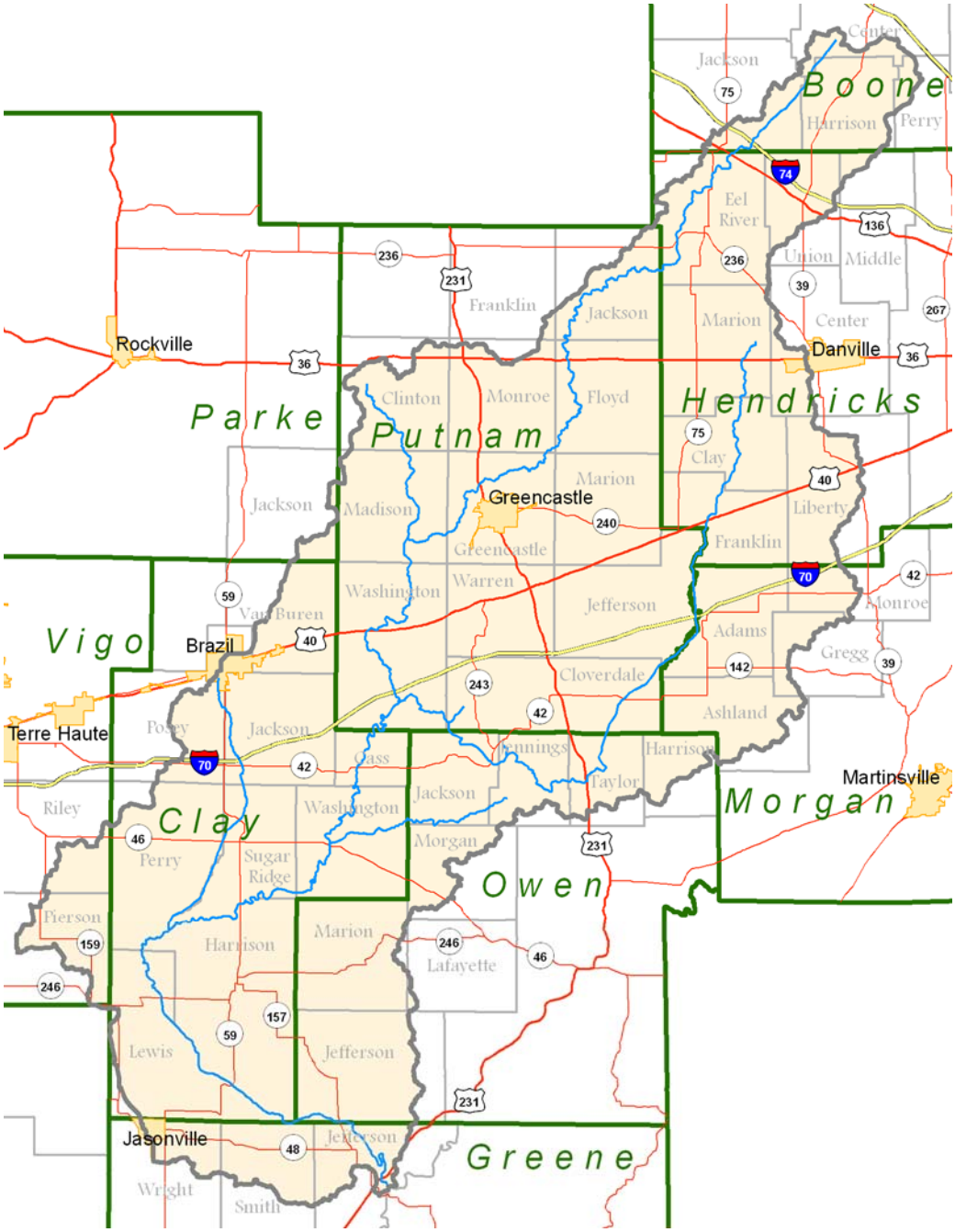
Rapid Watershed Assessment
Eel Watershed

Rapid Watershed Assessments provide initial estimates of where conservation investments would best address the concerns of land owners, conservation districts, and community organizations and stakeholders. These assessments help land owners and local leaders set priorities and determine the best actions to achieve their goals.

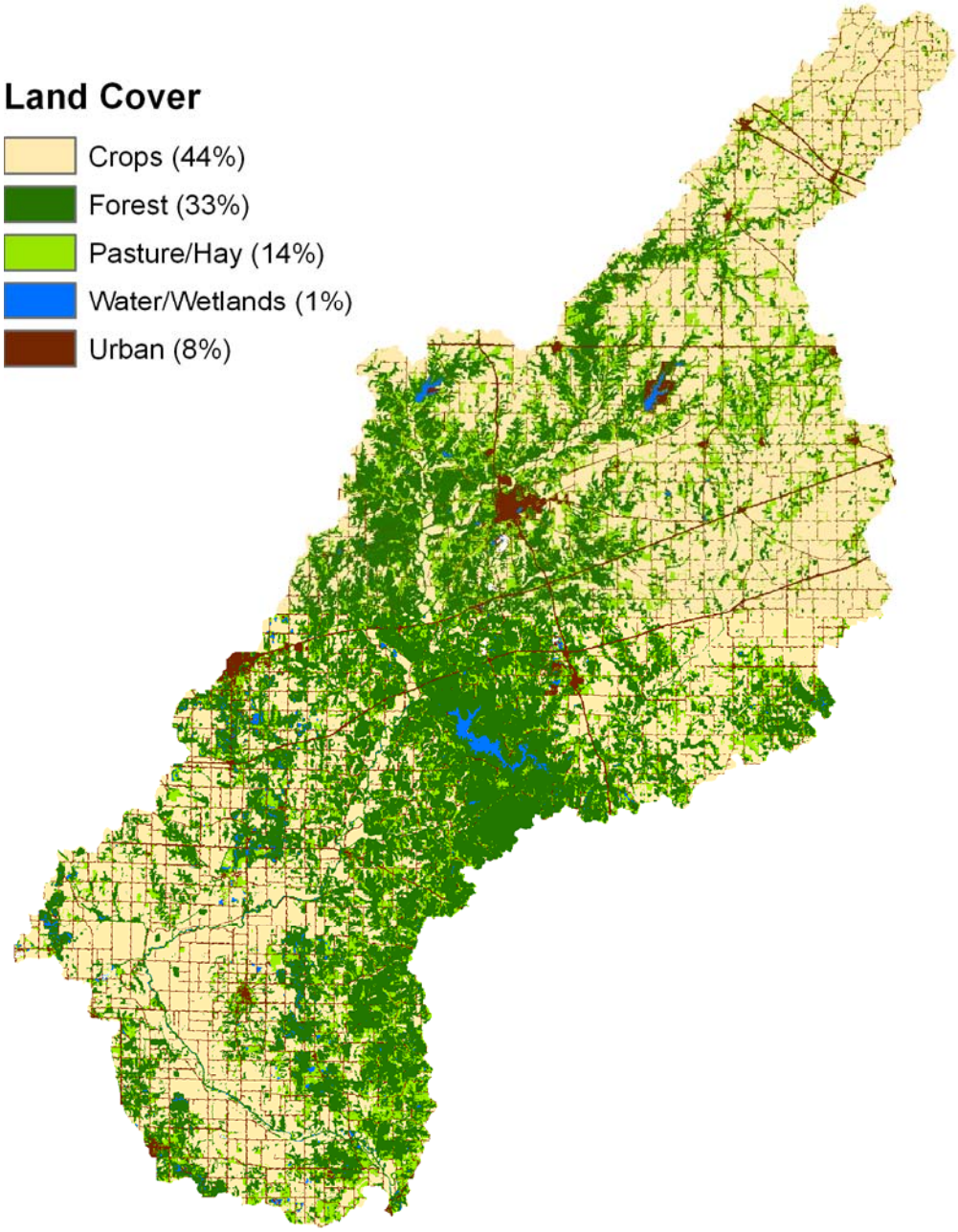


Eel Watershed



Introduction

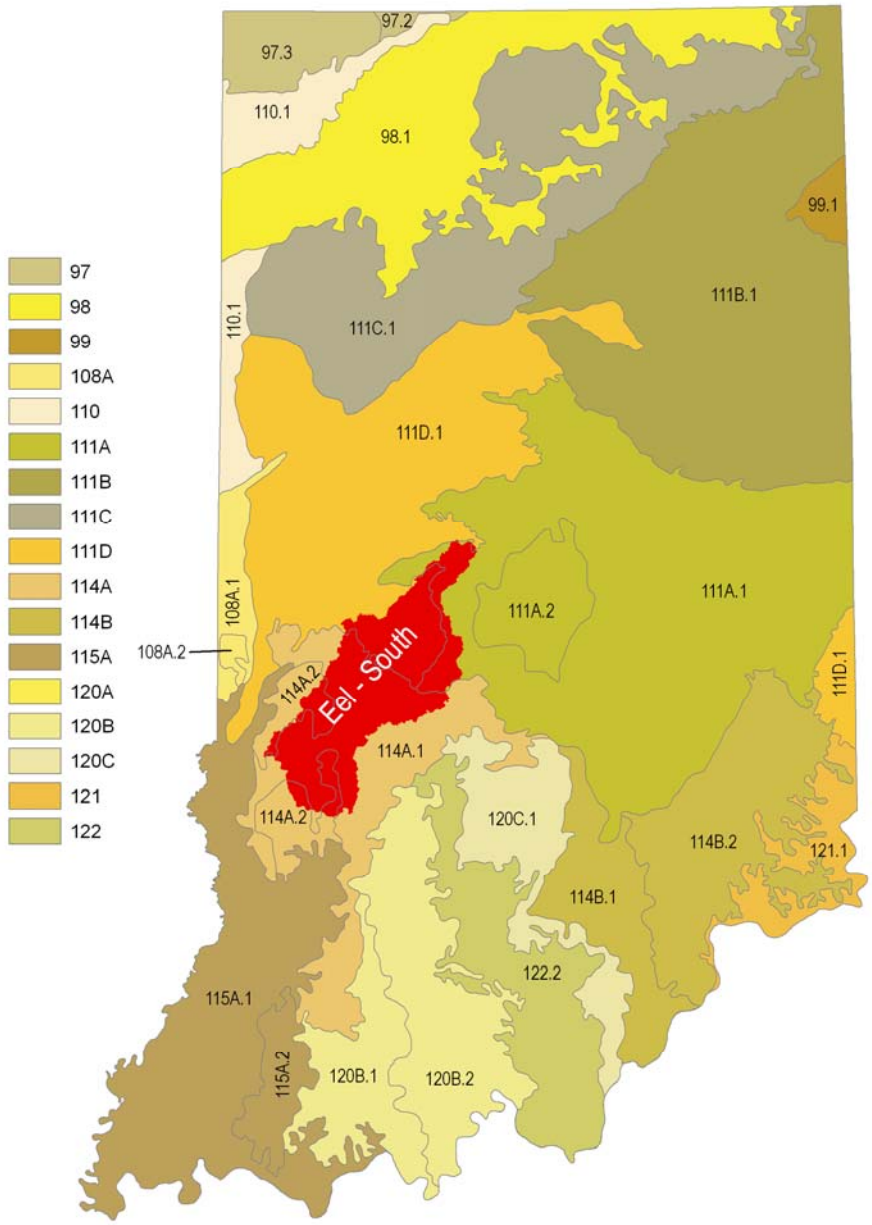
The Eel watershed is an eight digit (05120203) hydrologic unit code HUC) watershed located in the East-Central part of Indiana. The watershed drainage area is just over 764,300 acres. The watershed covers ten different Indiana counties. It is subdivided into 46 subbasins represented on the map by 12 digit HUCs (Figure 2-1).



Common Resource Area

There are four common resource areas for the watershed:

The Indiana and Ohio Till Plain, Central Part – (111A.1) Level to rolling glacial till plain broken by hilly end moraines, kames, and outwash terraces with moderate relief. Corn, soybean, and livestock farming with scattered woodlands in areas not affected by urban development. Soils dominantly are well drained to very poorly drained, formed in Wisconsin Age glacial drift derived mostly from limestone and dolomite.



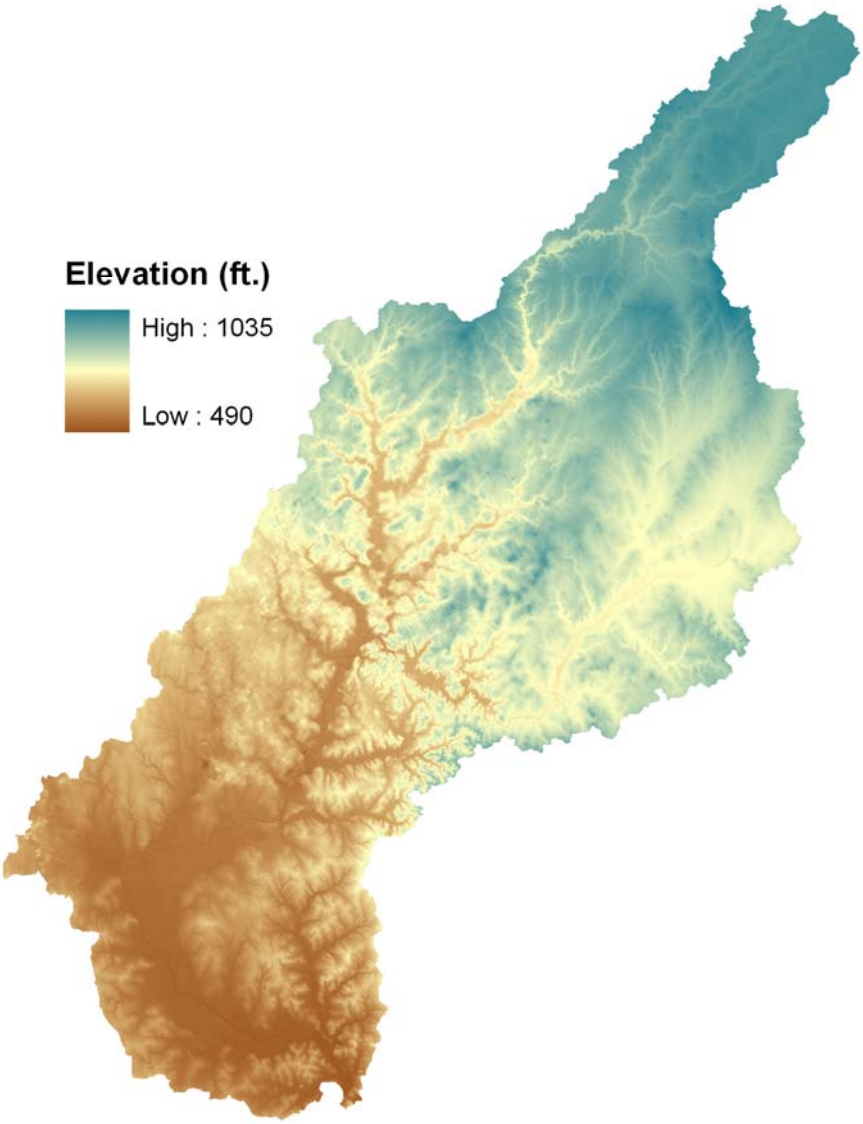
The Indiana and Ohio Till Plain, Western Part (111D.1) – Relatively flat-lying ground moraine with moderate relief, cut by steep-volleyed large streams. Extensive corn, soybean and livestock farming with scattered woodlands and residential, commercial and industrial development. Soils are well drained to very poorly drained, formed in thin to moderately thick loess and Wisconsin Age glacial drift derived mostly from limestone and dolomite.

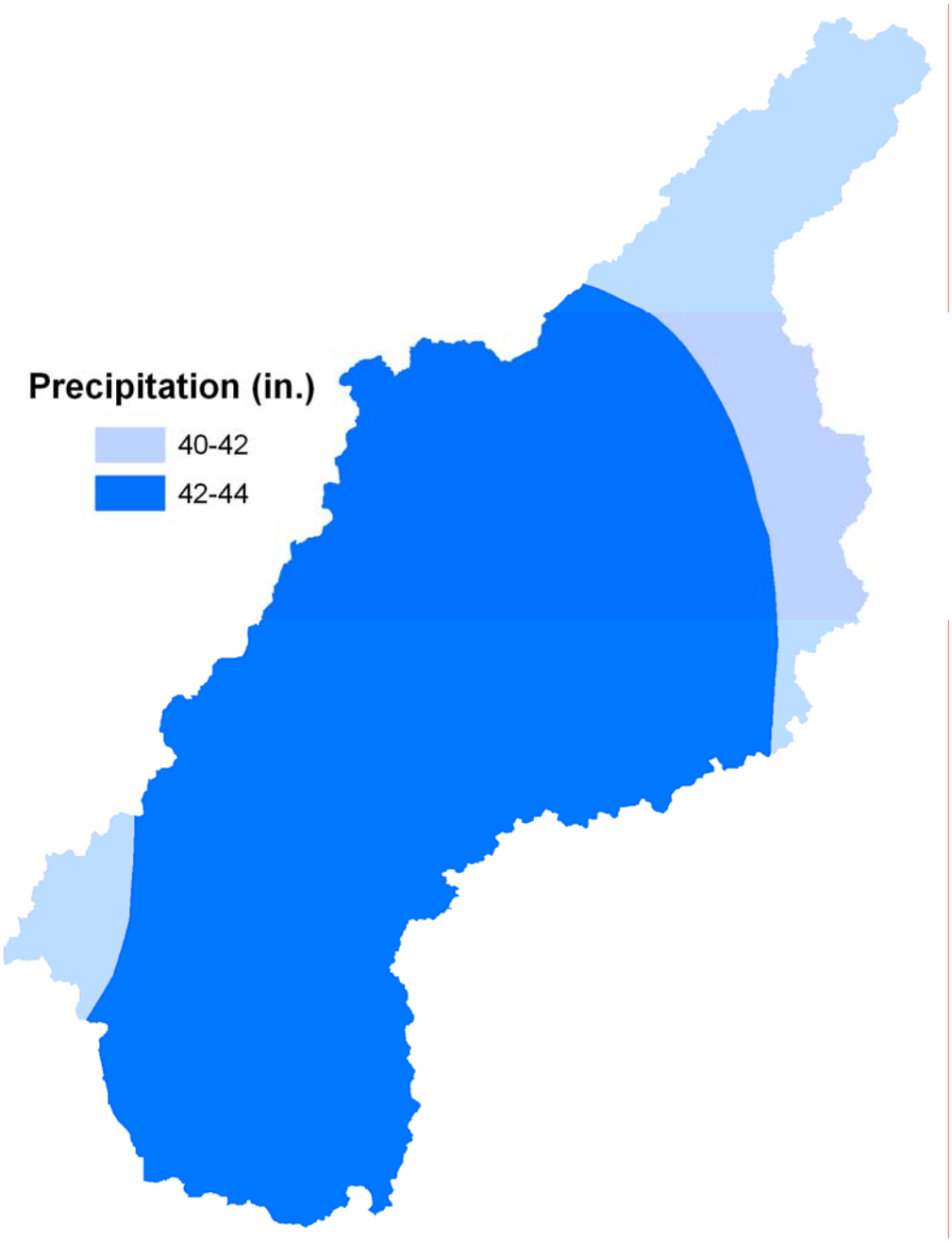
The Illinois, Indiana and Ohio Thin Loess and Till Plain, Eastern Part – (114A.1). Pre-Wisconsin till plain with a moderately thinck mantle of loess in most places. Corn, soybeans, livestock, and general farming are the main uses with some woodland and tobacco farms. Soils are poorly drained to well drained, formed in Illinoian Age till and overlain in many areas with a layer of loess.

The Karst subsection – Southern Illinois and Indiana Thin Loess and Till Plain, Eastern Part – (114A.2). Pre-Wisconsin till plain with a moderately think mantel of loess in most places. It is influenced by karst topography. Corn, soybeans, livestock and general farming are the main uses with some woodland and tobacco farms. Soils dominantly are poorly drained to well drained, formed in Illinoian Age till and overlain in many areas with a layer of loess.

Physical Description

The Eel watershed is an eight digit (05120203) hydrologic unit code HUC) watershed located in the East-Central part of Indiana. The watershed drainage area is just over 764,300 acres. The watershed covers ten different Indiana counties. It is subdivided into 46 subbasins represented on the map by 12 digit HUCs (Figure 2-1).



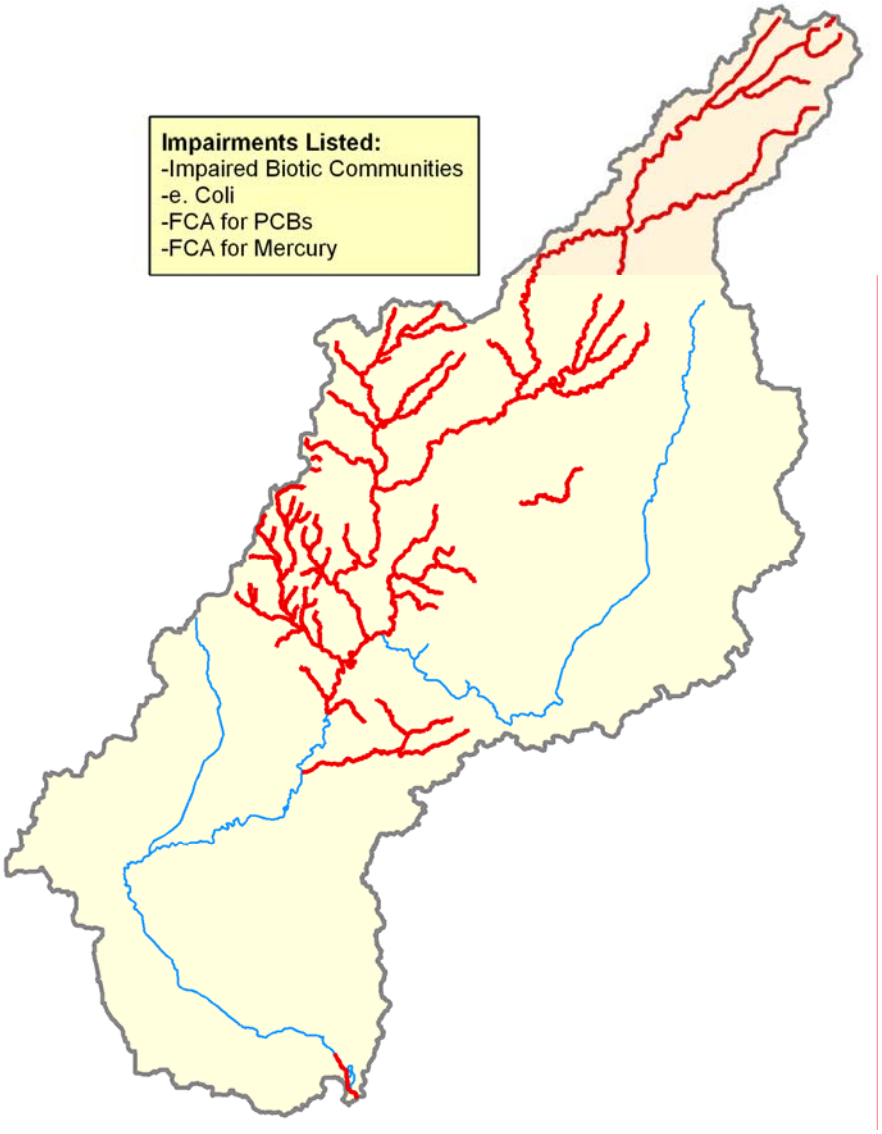

Precipitation (in.)
40-42
42-44

Assessment of waters

Section 303(d) of the Clean Water Act requires states to identify waters that do not meet, or are not expected to meet, applicable water quality standards. The Clean Water Act Section 303(d) list for Indiana provides a basis for understanding the current status of water quality in the Driftwood Watershed.

WATERBODY SEGMENT ID	WATERBODY SEGMENT NAME	CAUSE OF IMPAIRMENT
INW0321_T1001	BIG WALNUT CREEK	FCA for MERCURY
INW0323_T1003	BIG WALNUT CREEK	FCA for MERCURY
INW0326_T1004	BIG WALNUT CREEK	FCA for MERCURY
INW0327_T1005	BIG WALNUT CREEK	FCA for MERCURY
INW0341_T1006	BIG WALNUT CREEK	FCA for MERCURY
INW0342_T1007	BIG WALNUT CREEK	FCA for MERCURY
INW0321_T1001	BIG WALNUT CREEK	E. COLI
INW0323_T1003	BIG WALNUT CREEK	E. COLI
INW0326_T1004	BIG WALNUT CREEK	E. COLI
INW0327_T1005	BIG WALNUT CREEK	E. COLI
INW0341_T1006	BIG WALNUT CREEK	E. COLI
INW0342_T1007	BIG WALNUT CREEK	E. COLI
INW0322_T1002	BIG WALNUT CREEK-ERNIE PYLE MEMORIAL	FCA for MERCURY
INW0322_T1002	BIG WALNUT CREEK-ERNIE PYLE MEMORIAL	E. COLI
INW0321_00	BIG WALNUT-BARNARD TRIBUTARIES	E. COLI
INW0323_00	BLEDSOE BRANCH BASIN	E. COLI
INW03P1013_00	CAGLES MILL LAKE	FCA for MERCURY
INW0324_00	CLEAR CREEK-HEADWATERS (PUTNAM)	E. COLI
INW0325_00	CLEAR CREEK-MILLER CREEK	E. COLI
INW0372_00	CROYS CREEK-BILLY CREEK	E. COLI
INW0371_00	CROYS CREEK-VAN BUREN CREEK	E. COLI
INW0357_00	DEER CREEK-LEATHERWOOD CREEK	E. COLI
INW0355_00	DEER CREEK-MOSQUITO CREEK	E. COLI
INW0356_00	DEWEESE CREEK	E. COLI
INW0317_00	EAST FORK BIG WALNUT CREEK-LOWER	E. COLI
INW0316_00	EAST FORK BIG WALNUT CREEK-ROSS DITCH	E. COLI
INW0393_T1014	EEL RIVER	FCA for MERCURY
INW0393_T1014	EEL RIVER	FCA for PCBs
INW0394_T1016	EEL RIVER	FCA for MERCURY
INW0394_T1016	EEL RIVER	FCA for PCBs
INW0397_T1018	EEL RIVER	FCA for MERCURY
INW0397_T1018	EEL RIVER	FCA for PCBs
INW0398_T1015	EEL RIVER	FCA for MERCURY
INW0398_T1015	EEL RIVER	FCA for PCBs
INW039C_T1024	EEL RIVER	FCA for MERCURY
INW039D_T1025	EEL RIVER	FCA for MERCURY
INW039C_T1024	EEL RIVER	FCA for PCBs
INW039D_T1025	EEL RIVER	E. COLI
INW039D_T1025	EEL RIVER	FCA for PCBs
INW0373_00	EEL RIVER-SLATE/AHLEMEYER BRANCHES	E. COLI
INW0333_T1008	JONES CREEK	E. COLI
INW0333_T1008	JONES CREEK	IMPAIRED BIOTIC COMMUNITIES
INW0333_00	JONES CREEK TRIBUTARIES	E. COLI

WATERBODY SEGMENT ID	WATERBODY SEGMENT NAME	CAUSE OF IMPAIRMENT
INW0377_00	JORDAN CREEK-LOWER	E. COLI
INW0375_00	JORDON CREEK-HEADWATERS (OWEN)	E. COLI
INW0352_T1009	LITTLE DEER CREEK	IMPAIRED BIOTIC COMMUNITIES
INW0332_00	LITTLE WALNUT CREEK-HEADWATERS	E. COLI
INW0334_00	LITTLE WALNUT CREEK-LEATHERMAN CREEK	E. COLI
INW0335_00	LITTLE WALNUT CREEK-LONG BRANCH	E. COLI
INW0341_T1027	MAIDEN RUN	IMPAIRED BIOTIC COMMUNITIES
INW0313_00	MAIN EDLIN DITCH-GRASSY BRANCH	E. COLI
INW0312_00	MAIN EDLIN DITCH-SMITH DITCH	E. COLI
INW0342_00	MILL CREEK	E. COLI
INW0376_00	NORTH FORK JORDAN CREEK	E. COLI
INW0331_00	OWL CREEK	E. COLI
INW0311_00	WEST FORK BIG WALNUT CREEK-HEADWATERS	E. COLI
INW0314_00	WEST FORK BIG WALNUT CREEK-LOWER	E. COLI



Soils

The dominant soil orders in MLRA (111A.1) are Alfisols, Inceptisols, and Mollisols. The MLRA also has small areas of Histosols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They are very deep, generally are very poorly drained to somewhat poorly drained, and are loamy or clayey. The dominant kinds of parent material are till, outwash, and loess. Others include alluvium, glaciolacustrine sediments, residuum, and organic deposits. Hapludalfs (Cardington, Celina, Lewisburg, Losantville, Miami, Miamian, Milton, Russell, Strawn, Wawaka, Williamstown, and Xenia series) and Epiaqualfs (Crosby and Fincastle series) are on moraines. Some Argiaquolls (Brookston, Cyclone, Kokomo, and Treaty series) are in depressions on ground moraines. Other Argiaquolls (Lippincott and Westland series) and Endoaquolls (Patton and Pella series) are in depressions on outwash plains and terraces. Hapludalfs (Eldean, Fox, Martinsville, and Ockley series) and Endoaqualfs (Sleeth and Whitaker series) are on terraces and outwash plains. Haplosaprists (Linwood and Palms series) and Humaquepts (Martisco series) are in deep depressions or potholes. Eutrudepts (Eel and Genesee series), Hapludolls (Ross series), Endoaquepts (Shoals series), and Endoaquolls (Sloan series) are on flood plains.

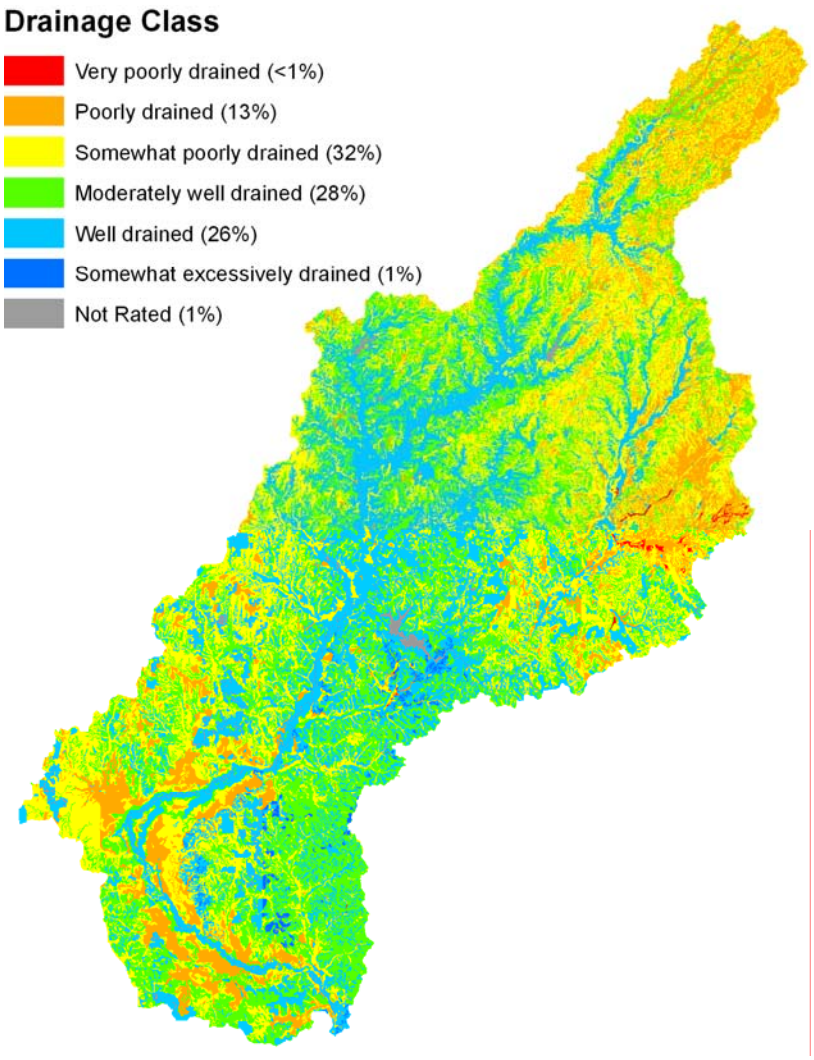
The dominant soil orders in MLRA (111D.1) are Alfisols, Inceptisols, and Mollisols. The MLRA also has small areas of Histosols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They are dominantly very deep, very poorly drained to well drained, and loamy or silty. The dominant kinds of parent material are till, outwash, loess, and alluvium. Hapludalfs (Celina, Miami, Miamian, Reesville, Russell, Wynn, and Xenia series) and Epiaqualfs (Crosby and Fincastle series) are on till plains. Endoaquolls (Drummer series), Argiaquolls (Cyclone, Kokomo, Mahalasville, Ragsdale, and Treaty series), and Endoaqualfs (Starks series) are on till plains or outwash plains. Haplosaprists (Houghton and Palms series) are in deep depressions and potholes. Hapludalfs (Camden, Eldean, Fox, Martinsville, and Ockley series) and Endoaqualfs (Sleeth series) are on terraces and outwash plains. Argiaquolls (Westland series) are in depressions on terraces and outwash plains. Eutrudepts (Beckville, Eel, and Genesee series), Endoaquepts (Shoals series), and Endoaquolls (Sloan series) are on flood plains.

The dominant soil orders in MLRA (114A.1 – 114A.2) are Alfisols and Inceptisols. The MLRA also has small areas of Entisols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They formed in loess, Illinoian glacial till or outwash, and alluvium derived from these deposits. The soils are deep or very deep, poorly drained to well drained, and loamy, silty, or clayey. Glossaqualfs (Avonburg, Clermont, and Cobbsfork series) are on broad, flat till plains. Fragiudalfs (Cincinnati, Homewood, Nabb, and Rossmoyne series) are on gently sloping to strongly sloping side slopes on till plains. Hapludalfs (Blocher, Bonnell, and Hickory series) are on moderately sloping to very steep side slopes on till plains. Hapludalfs (Cana, Grayford, and Jessup series), Paleudalfs (Ryker series), and Fragiudalfs (Weisburg series) are on gently sloping to steep side slopes that are underlain

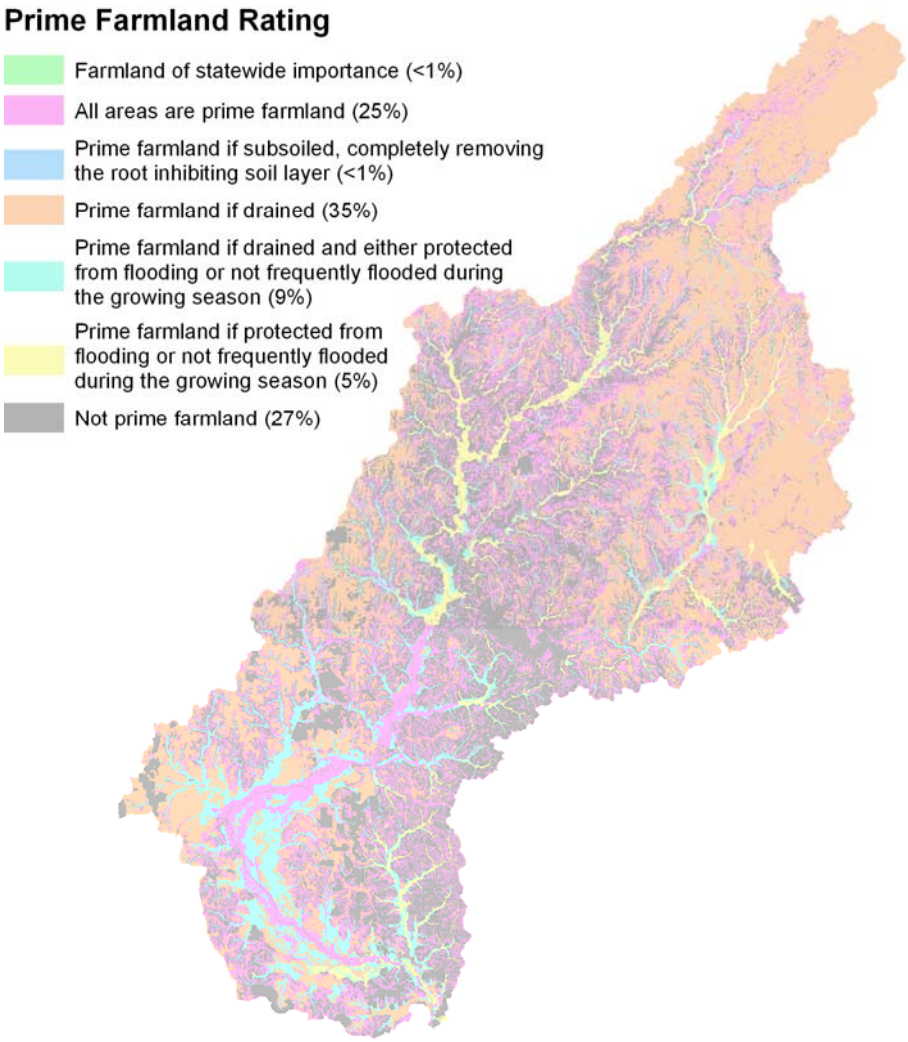
by bedrock residuum. Paleudalfs (Negley series), Hapludalfs (Parke and Pike series), and Fragiudalfs (Medora series) formed in outwash deposits on high stream terraces, kames, and moraines. Fragiudalfs (Otwell and Haubstadt series) and Fragiaqualfs (Dubois series) formed in a thin layer of loess and the underlying weathered outwash, lacustrine sediments, or old alluvium on high stream terraces or lake plains. Eutrudepts (Haymond, Oldenburg, Wilbur, and Wirt series), Endoaquepts (Holton and Stendal series), and Fluvaquents (Birds, Bonnie, and Wakeland series) formed in alluvium on flood plains.

Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized–excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."



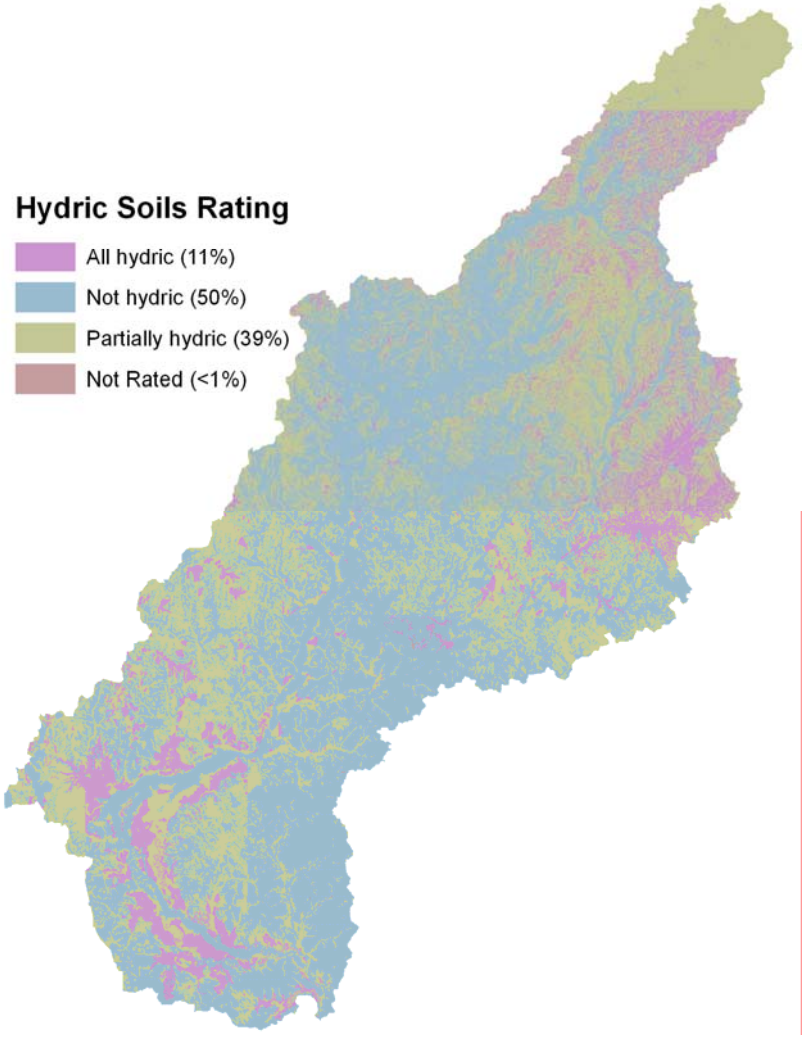
Farmland Classification Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.



Hydric Soils This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of non-hydric soils in the higher positions on the landform, and map units dominantly made up of non–hydric soils may have inclusions of hydric soils in the lower positions on the landform.

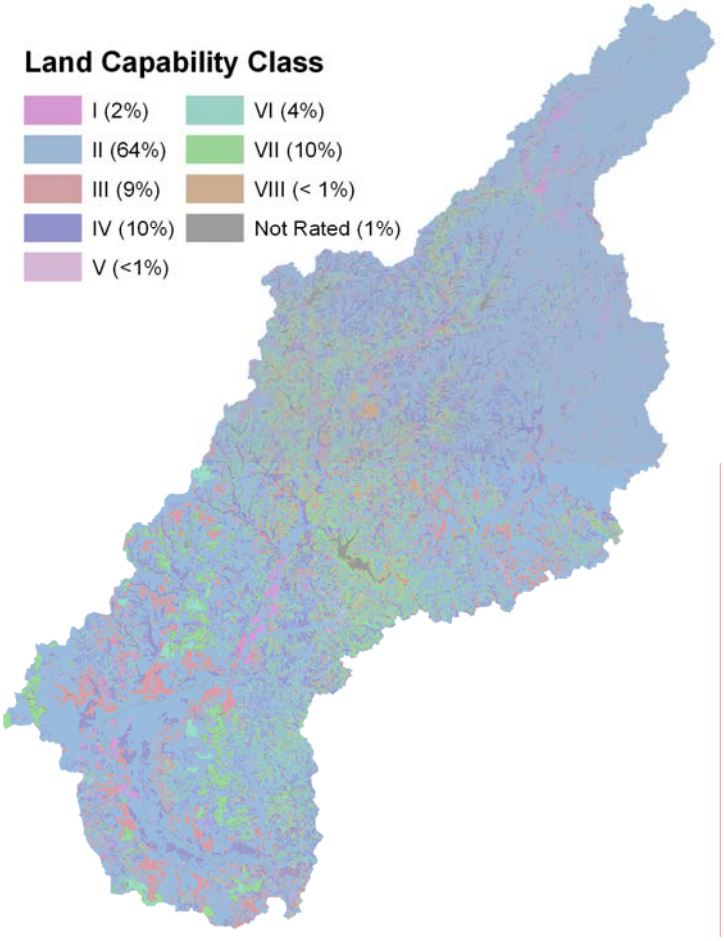
Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make on site determinations of hydirc soils are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and others, 2002).



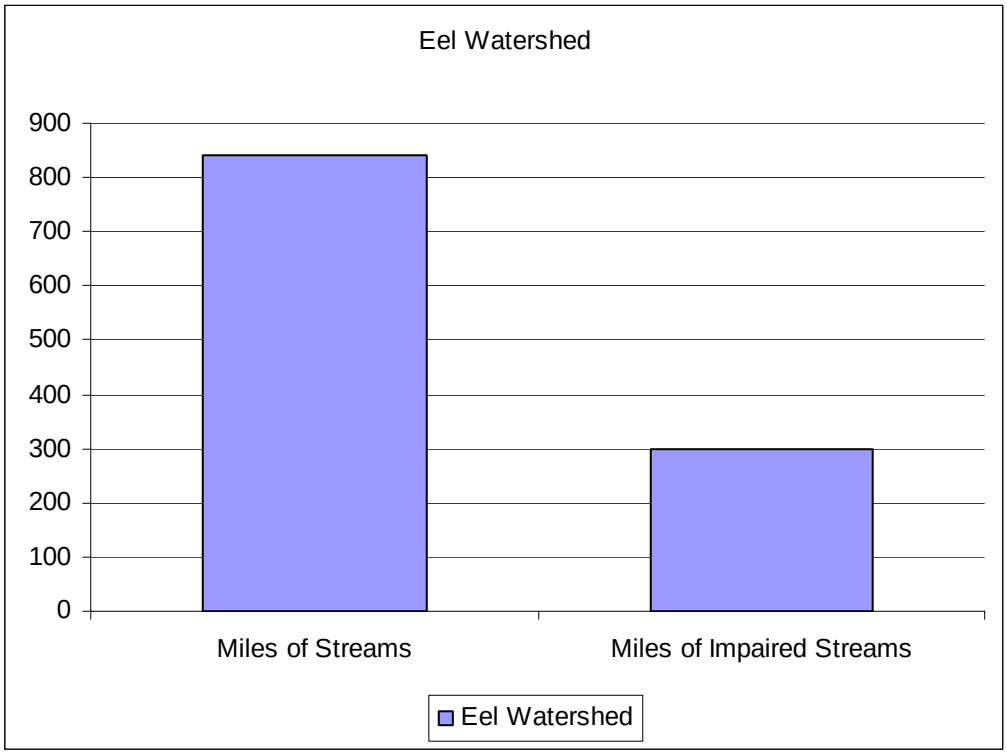
Highly Erodible Land (HEL)
A soil map unit with an erodibility index (EI) of 8 or greater is considered to be highly erodible land (HEL). The EI for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990. Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.

Land Capability Classification
Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



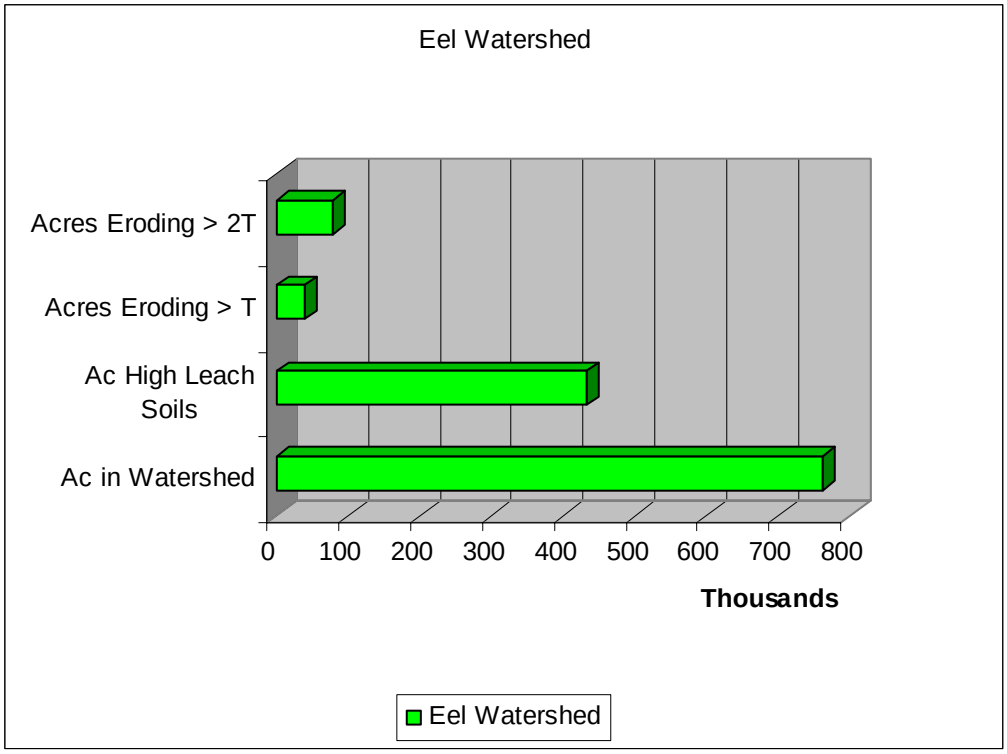
Resource Concerns
Stakeholders and electronic analysis have been identified the following resource concerns as being the top priority:

- Surface Water Quality – There is approximately 36 percent or 299 miles of the 841 total miles of the streams within the watershed that have identified impairments. Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing an unbalanced fish community with depressed populations and limited diversity.



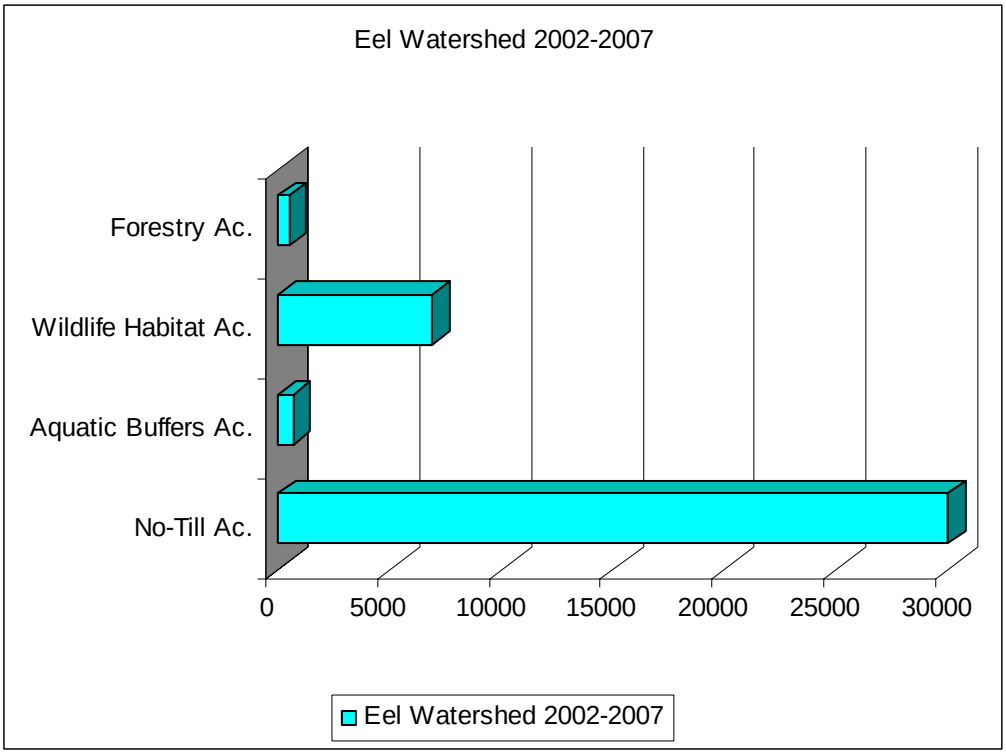
- Ground Water Quality - The watershed has in excess of 432,800 acres of soils with high leaching index (> 10) which allows containments on the land surface to be carried easily into the ground water from infiltrating water. There are an additional 5,500 acres of wellhead protection areas. Because of this condition, non–point pollutants such as fertilizers, pesticides, and livestock waste have the potential to contaminate the ground water aquifer.
- Air Quality – 29.7 percent of the watershed has been identified by the Environmental Protection Agency as have an air quality concern.

- Threatened & Endangered Species – Just over 8.6 percent of the 764,300 acres in the watershed lie within the range of know Threatened and Endangered Species.



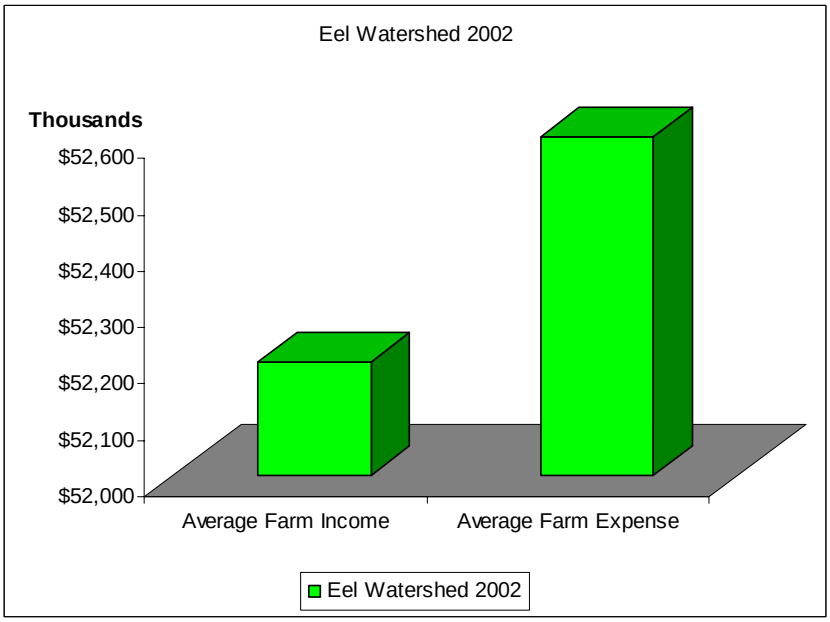
- Soil Quality – The watershed has over 117,300 acres of soils subject to soil erosion. There is over 78,100 acres eroding at twice the tolerable level or "T".

Performance Results System and Other Data
The producers within the watershed have implemented a variety of conservation practices over the past five years.



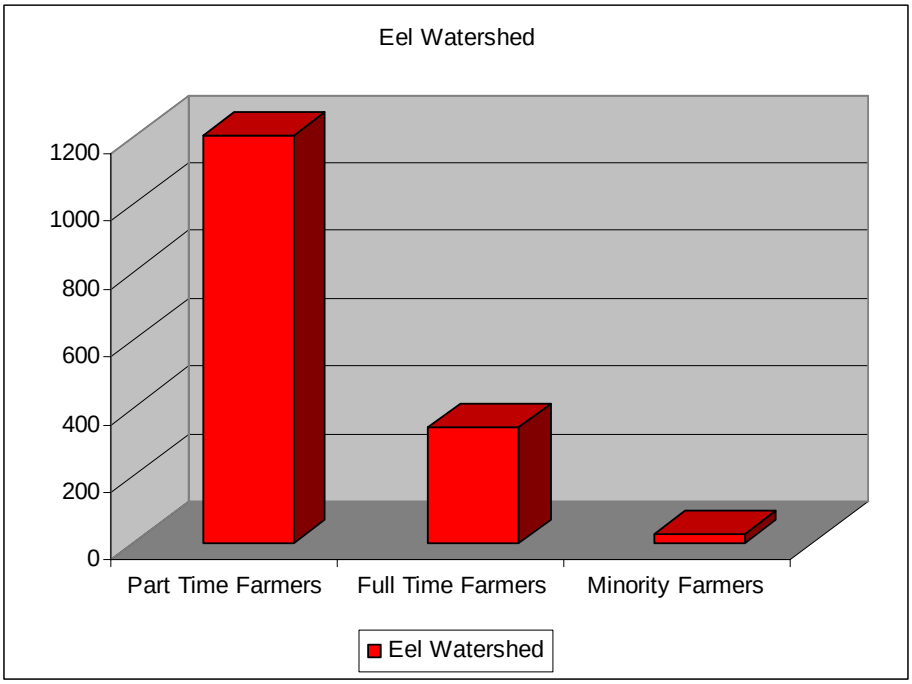
Since 2002 through 2007 landowners have implemented over 30,000 acres of No-Till, approximately 192,600 feet of upland buffers, and just over 650 acres of aquatic buffers. Wildlife habitat has been improved or established on more than 6,900 acres within the watershed and just over than 500 acres of forestry practices have been applied.

Census and Social Data (Relevant)
There are approximately 6473 farms in the watershed that average approximately 265 acres in size.



The 2002 average farm total income for all the counties was $52,200,000 while average expense was $52,600,000.

There are approximately 1,200 part time farmers, 340 full time farmers and 28 minority farmers.



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Data Sources:

Indiana Common Resource Area (CRA) Map delineations are defined as geographical areas where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a CRA.

Indiana Agricultural Statistics 2003 – 2004 - Indiana Agricultural Statistics, 1435 Win Hentshcel Blvd., Suite B105, West Lafayette

Major Land Resource Area Map Tool - Indiana NRCS Soils Page - http://www.in.nrcs.usda.gov/mlra11/soils.html

Indiana Hydrologic Units Indiana Geodata

Indiana Watershed Action Strategy Plan

Indiana Rapid Watershed Assessment (Electronic Data Sets – Web based application.

Indiana 2006 303d List – Indiana Department of Agriculture, Division of Natural Resources

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