

## **Section II: Physical Description of the Watersheds**

### **Watershed Boundaries**

The watersheds covered by this study consist of the West Branch Little Calumet River, Deep River, and Willow Creek. The Little Calumet River includes areas to the east in the City of Portage and west in the City of Hammond and the Town of Highland. This river segment is crossed by the continental divide. From this point, the river flows both east toward the Great Lakes and west toward the Mississippi River.

The Little Calumet River and its tributaries in this study flow through the borders of [Hammond](#), [Highland](#), [Griffith](#), [Gary](#), Hobart, Lake Station, and Portage in Indiana. Portions of this watershed are also located in unincorporated Lake and Porter Counties. Figure 2.1 shows the study area and how it fits into the local communities and unincorporated areas.

### **Physical Setting**

The Little Calumet River E-W Split (07120003030050) and Willow Creek /Burns Ditch (04040001040030) Watersheds are densely populated areas. The two watersheds contain very little unincorporated area. However, they contain little industrial area as the majority of the industry is north of this watershed study area.

The west branch of the Little Calumet River is approximately 18 miles long, with 10 miles located within the City of Gary. The major tributaries located within the study area to the Little Calumet River are Turkey Creek, Deep River, and Salt Creek. Each tributary originates on the Valparaiso Moraine and flows north to the Little Calumet River.

The Little Calumet River has major tributaries but collects most of its waters from small streams and drainage ditches in northwest Indiana. The flow of the river is roughly parallel to the Lake Michigan shoreline and the flow direction may change depending on a number of factors. The eastward flow empties into Lake Michigan via Burns Ditch and the westward flow enters the Calumet Harbor in Illinois. A unique feature of the Little Calumet River is that its direction of flow corresponds with the water levels in Lake Michigan. The location of the east-west split in flow depends on the water levels in both Lake Michigan and the river as well as climate conditions throughout the year.

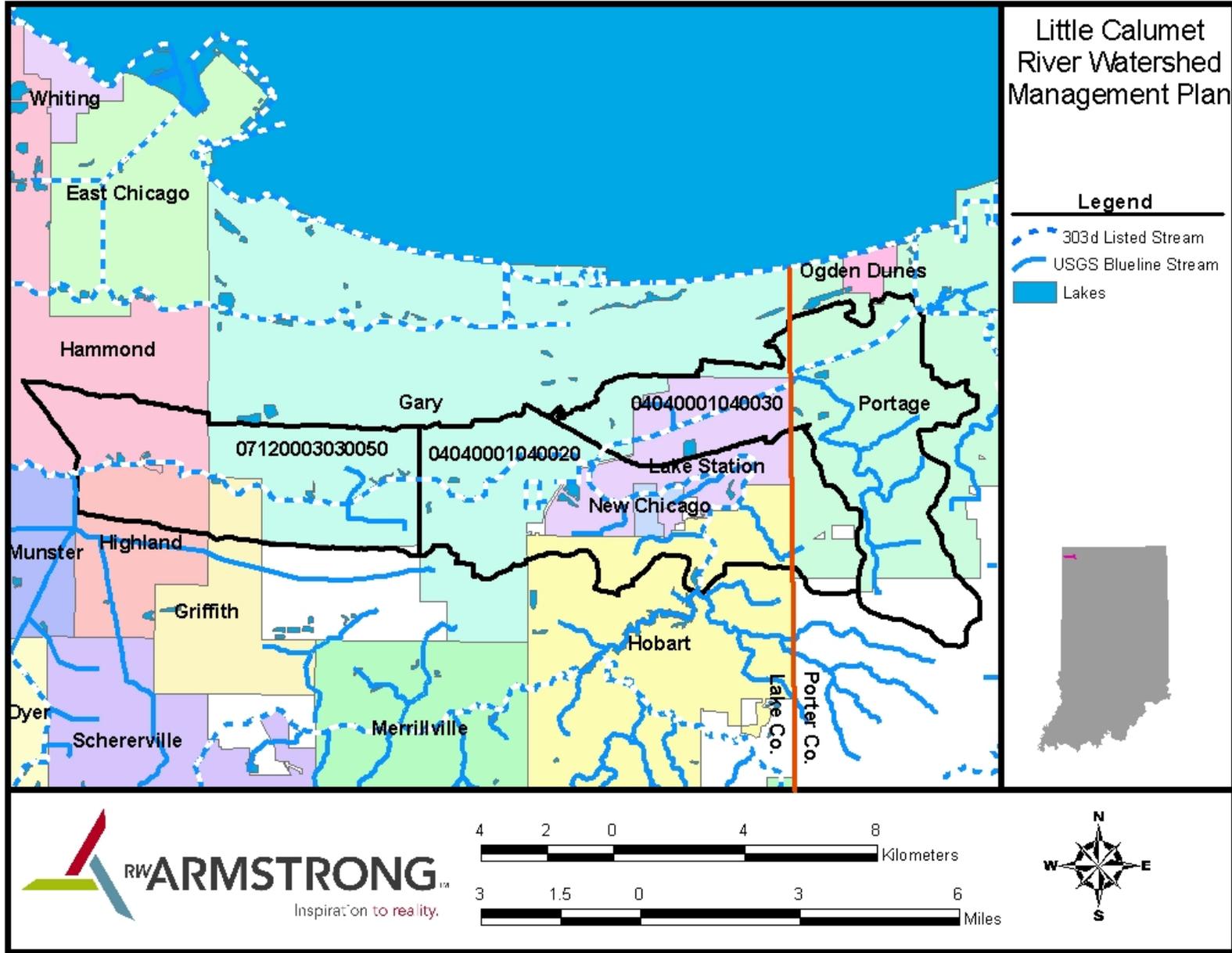


Figure 2.1: Little Calumet River Watershed Management Plan study area showing the local communities.

## **Slope and Elevation**

The area encompassed by the watershed study area is extremely flat and many areas have little relief or elevation. This lack of difference between the normal flow elevation of the river and the surrounding communities make flooding a serious concern. Open ditches designed for stormwater drainage are an added problem as sedimentation eliminates the small amount of slope they are built with.

## **History**

Thousands of years ago, the study area was glaciated. The advancing and retreating of glaciers formed the geology and soils of the region. Advancing and retreating of glaciers leads to the creation of complex geological arrangements known as “moraines.” Thus the soils, geology and topography of the region is not likely to be uniform and is more likely to be quite diverse, even within the same basin.

The Little Calumet River has gone through many changes since the glaciers melted away and reshaped the land. At one time the Little Calumet River and Grand Calumet River was one water body. The Calumet River flowed westward into Illinois, made a hairpin turn at present-day Blue Island, and flowed back eastward into Indiana; where it eventually discharged into Lake Michigan at present-day Marquette Park Lagoon.

This area has been claimed by the Menomonee and Potawatomi, as well as by France, England, and the United States over its history. However, not much is known about the history of the Grand Calumet River (GCR) and Little Calumet River (LCR) before the 1800s, but the earliest known name for the rivers, given by the Native Americans, was the “Grand and Little Killainick Rivers”.

The 1800’s saw a variety of changes in this area. The war of 1812 saw the French expelled from the region and the 1830’s saw the Native Americans forced from the area. European settlement in this area continued through these times and into the mid 1800’s. The growth rate in the Chicago area though dwarfed the growth rate of northwest Indiana which was viewed as a “marshy hinterland” and not suitable for urbanization.

In the late 1800s, as Chicago became more of a transportation hub, the U.S. Congress delegated funds to allow construction of a “Harbor of Refuge” for Lake Michigan which was located in the Calumet area. Until this time, the Calumet Rivers were shown on maps as a swamp area. This began the flow of the Calumet Rivers into Lake Michigan at Chicago. The Little Calumet River became the smaller river to the south discharging to Lake Michigan in Illinois, while the Grand Calumet River ran to the north and discharged to the east in Indiana. Soon after construction was completed, ships started to use this new channel.

In the early 1870s, after the great Chicago fire, many manufacturing companies that were destroyed relocated to the Calumet area. The present outlet for the Grand Calumet River was constructed in the 1900s at the Indiana Harbor Ship Canal. A U.S. Topographic Bureau map from 1845 showed the Grand Calumet River no longer flowing into Lake Michigan because it was clogged with aquatic vegetation and sand (IDNR-ILMCP, 2001).

The late 1800's also saw the rise of the railroad industry and steel industry in this region. This industrialization brought a population boom to the area. This led directly to the draining of the marshes through the installation of ditches and sewers to make the area more suitable to its residents.

Much of the region's sanitary sewage and garbage was dumped into the river systems. This dumping, combined with the ship and barge traffic, polluted both the river and Lake Michigan. The pollution in Lake Michigan was severe, especially by the early 1920s.

In the early 1960s, the Army Corps of Engineers (ACOE) designed the T.J. O'Brien Lock and Dam. This lock system reversed the flow of the LCR and GCR away from Chicago. Until this time, the LCR flowed into the GCR near the Illinois border. The LCR now combines with Deep River near the intersection of Interstate 80/94 and Interstate 65. As it flows east from its confluence with Deep River, the LCR is sometimes referred to as "Burns Ditch". Burns Ditch is a channelized section of the LCR that connects it to Burns Harbor. The outlet to Lake Michigan at Burns Harbor is in Portage, Indiana. Burns Ditch is a man-made channel which allows the LCR and Deep River to flow into Lake Michigan, via Burns Harbor.

According to the ACOE, the LCR still has a high point in its channel bed somewhere near Indianapolis Boulevard which is in the City of Hammond. The channel bed undulates but gradually slopes down to the east and west from this point.

The massive hydromodifications to the river channel itself in addition to the development within the watershed have drastically changed the flow characteristics of the river. Reversing the flow direction left the river with just enough slope over its entire length to flow to the east. The minimal slope in that direction leaves the river prone to influence by the water levels in Lake Michigan. Flow direction can change based on lake levels and weather patterns.

## **Soils**

The majority of the soil types in the watershed are sand or silt. These highly permeable and erodible soils allow relatively quick infiltration; however, the ground water table is very high throughout most of the watershed study area.

Much of the basin has been drained by ditches and buried drainage tiles to allow agricultural and urban development in this watershed study area. High ground water tables still hamper development in many areas though. The sandy soils are not well suited to on site sewage disposal facilities as little attenuation of the pollutants is achieved before the effluent reaches the ground water.

Soils on the low parts of the landscape have hydric morphology, periodically high water tables, redox depletions (gray colors), and supported hydrophytic vegetation. Soils on dunes have deep water tables, lack redox depletions and concentrations, and have upland vegetation.

Figures 2.2 and 2.3 show the soils in Lake and Porter Counties; respectively. A summarized breakdown of the soil types, including a definition for the soil abbreviations, can be found in Table 2.1 and 2.2 for Lake and Porter Counties; respectively.

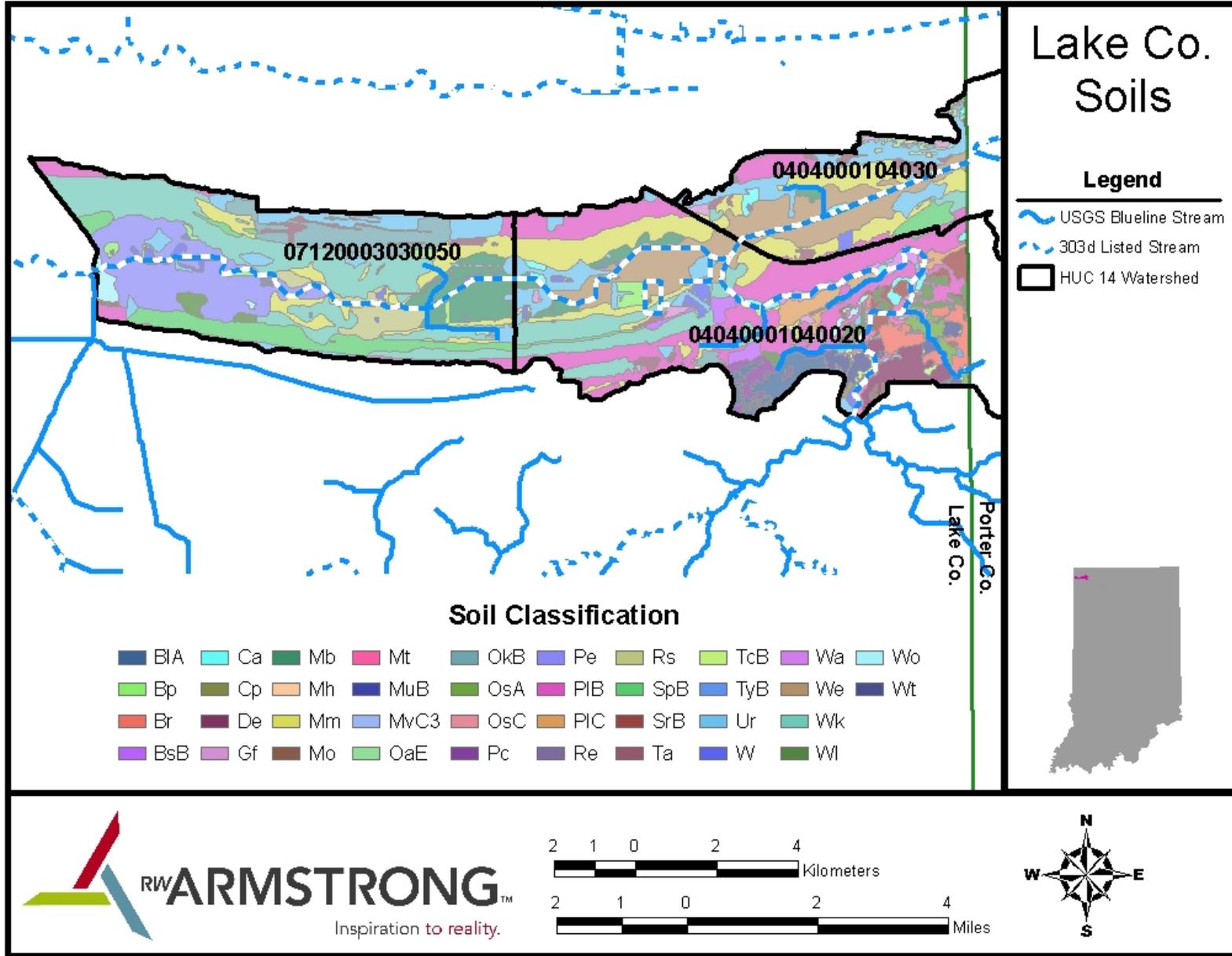


Figure 2.2: Lake County soil classification

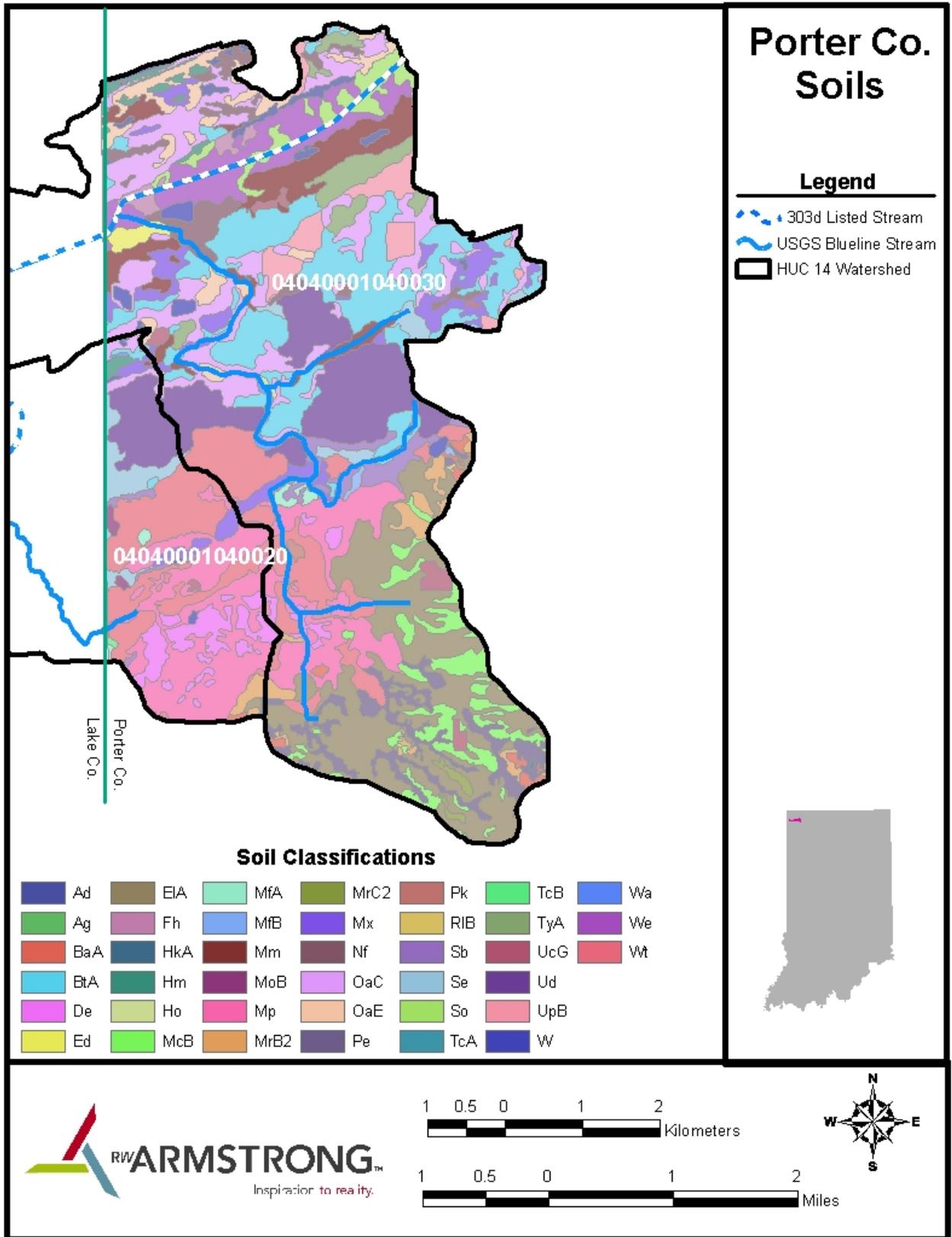


Figure 2.3: Porter County soil classifications.

Map Unit Symbol	Lake County Description	Area (Acres)	Percentage
BIA	Blount silt loam, 0 to 2 percent slopes	343.9	1.42%
Bp	Borrow pits	211.5	0.87%
Br	Brady fine sandy loam	330.2	1.36%
BsB	Brems fine sand, 0 to 4 percent slopes	162.6	0.67%
Ca	Houghton muck, drained, 0 to 1 percent slopes	206.2	0.85%
Cp	Clay pits	13.9	0.06%
De	Del Rey silt loam	384.2	1.59%
Gf	Gilford mucky fine sandy loam	137.4	0.57%
Mb	Marl beds	981.4	4.05%
Mh	Marsh	11	0.05%
Mm	Maumee loamy fine sand	2760.8	11.40%
Mo	Milford silt loam, overwash	50.5	0.21%
Mt	Milford-Palms-Walkkill complex	254.2	1.05%
MuB	Morley silt loam, 2 to 6 percent slopes	30	0.12%
MvC3	Morley silty clay loam, 6 to 12 percent slopes, severely eroded	23.1	0.10%
OaE	oakville fine sand, 12 to 25 percent slopes	100.7	0.42%
OkB	Oakville-Adrian complex, 0 to 6 percent slopes	825.4	3.41%
OsA	Oshtemo fine sandy loam, 0 to 2 percent slopes	146	0.60%
OsC	Oshtemo fine sandy loam, 6 to 12 percent slopes	16.4	0.07%
Pc	Pewamo silty clay loam	208.4	0.86%
Pe	Pewamo silty clay loam, calcareous variant	1639.4	6.77%
PIB	Plainfield fine sand, 0 to 6 percent slopes	3570.8	14.75%
PIC	Plainfield fine sand, 6 to 12 percent slopes	275.5	1.14%
Re	Rensselaer loam	21.4	0.09%
Rs	Rensselaer loam, calcareous subsoil variant	390.1	1.61%
SpB	Sparta fine sand, 0 to 4 percent slopes	1156.4	4.78%
SrB	Sparta fine sand, silty clay loam substraatium, 0 to 4 percent slopes	236.2	0.98%
Ta	Adrian muck, drained, 0 to 1 percent slopes	398.6	1.65%
TcB	Tracy loam, 2 to 6 percent slopes	60.8	0.25%
TyB	Tyner loamy fine sand, 0 to 6 percent slopes	7.1	0.03%
Ur	Urban land	2163.9	8.94%
W	Water	569	2.35%
Wa	Walkkill silt loam	205.5	0.85%
We	Warners silt loam	2034.9	8.40%
Wk	Watseka loamy fine sand	3600.2	14.87%
WI	Watseka loamy sand, moderately deep variant	318.8	1.32%
Wo	Wauseon fine sandy loam	150.8	0.62%
Wt	Whitaker loam	216.9	0.90%
<b>TOTALS</b>		<b>24214.2</b>	<b>100.00%</b>

Table 2.1: Lake County soil descriptions and percentage of total area covered.

Map Unit Symbol	Porter County Description	Area (Acres)	Percentage
Ad	Adrian muck, drained	91.7	0.87%
Ag	Alida loam	0.7	0.01%
BaA	Blount silt loam, 0 to 3 percent slopes	58.4	0.56%
BtA	Brems sand, 0 to 3 percent slopes	1074.9	10.22%
De	Del Rey silt loam	254.6	2.42%
Ed	Edwards muck, drained	41.4	0.39%
EIA	Elliott silt loam, 0 to 3 percent slopes	1207.8	11.48%
Fh	Fluvaquents	51.5	0.49%
HkA	Haskins loam, 0 to 2 percent slopes	2.5	0.02%
Hm	Houghton muck, ponded	72.5	0.69%
Ho	Houghton muck, drained	9	0.09%
McB	Markham silt loam, 2 to 6 percent slopes	346	3.29%
MfA	Martinsville loam, 0 to 2 percent slopes	30.4	0.29%
MfB	Martinsville loam, 2 to 6 percent slopes	12.3	0.12%
Mm	Maumee loamy sand	433.2	4.12%
MoB	Metae loamy fine sand, 1 to 6 percent slopes	16.3	0.15%
Mp	Milford silty clay loam	1063.9	10.12%
MrB2	Morley silt loam, 2 to 6 percent slopes,eroded	155	1.47%
MrC2	Morley silt loam, 6 to 12 percent slopes, eroded	24.3	0.23%
Mx	Morocco loamy sand	372	3.54%
Nf	Newton loamy fine sand	227.7	2.16%
OaC	Oakville fine sand, 4 to 12 percent slopes	944.6	8.98%
OaE	Oakville fine sand, 18 to 40 percent slopes	256.8	2.44%
Pe	Pewamo silty clay loam	321.9	3.06%
Pk	Pits	9.6	0.09%
RIB	Riddles silt loam, 2 to 6 percent slopes	1.6	0.02%
Sb	Sebewa loam, shaly sand substratum	194.4	1.85%
Se	Selfridge loamy fine sand	191.5	1.82%
So	Suman silt loam	155.2	1.48%
TcA	Tracy sandy loam, 0 to 2 percent slopes	0.2	0.00%
TcB	Tracy sandy loam, 2 to 6 percent slopes	2.5	0.02%
TyA	Tyner loamy sand, 0 to 3 percent slopes	199.3	1.89%
UcG	Udorthents, loamy, 3 to 30 percent slopes	78.2	0.74%
Ud	Urban land-Brems complex	893.5	8.49%
UpB	Urban land-Psamments complex, 0 to 6 percent slopes	234.9	2.23%
W	Water	107.1	1.02%
Wa	Walkkill silt loam	29.9	0.28%
We	Warners silt loam	375.8	3.57%
Wt	Whitaker loam	974.6	9.27%
<b>TOTALS</b>		<b>10517.4</b>	<b>100.00%</b>

Table 2.2: Porter County soil descriptions and percent of total area covered.

## **Topography**

The watershed area covered in this study is extremely flat. The river has experienced both course and direction changes throughout the year. The low gradient gives the river only a small current. Before human alteration, water flowed westward from [LaPorte County, Indiana](#) along the Little Calumet River, made a complete turn, and flowed east along the Grand Calumet into [Lake Michigan](#) at the Miller section of [Gary, Indiana](#).

As Figure 2.4 shows, most of the watershed is located in the flat areas along the Little Calumet River itself and is contained within the 605 contour line. Higher elevations are found in the Willow Creek watershed, especially as you move south, but elevation drops off rapidly as the creek flows north.

## **Wetlands**

The U.S. Fish and Wildlife Services wetlands are delineated in Figures 2.5 through 2.7, one map for each 14-digit HUC watershed. The vast majority of wetlands within the study area are located along the river channel and its tributaries. This is expected given the highly developed state of the watershed study area. Table 2.3 summarizes the wetland categories found in each watershed and the acreage they cover.

Once the ACOE has completed the levee system for the Little Calumet River large areas of land located between the lines of protection may present opportunities to increase the wetlands acreage.

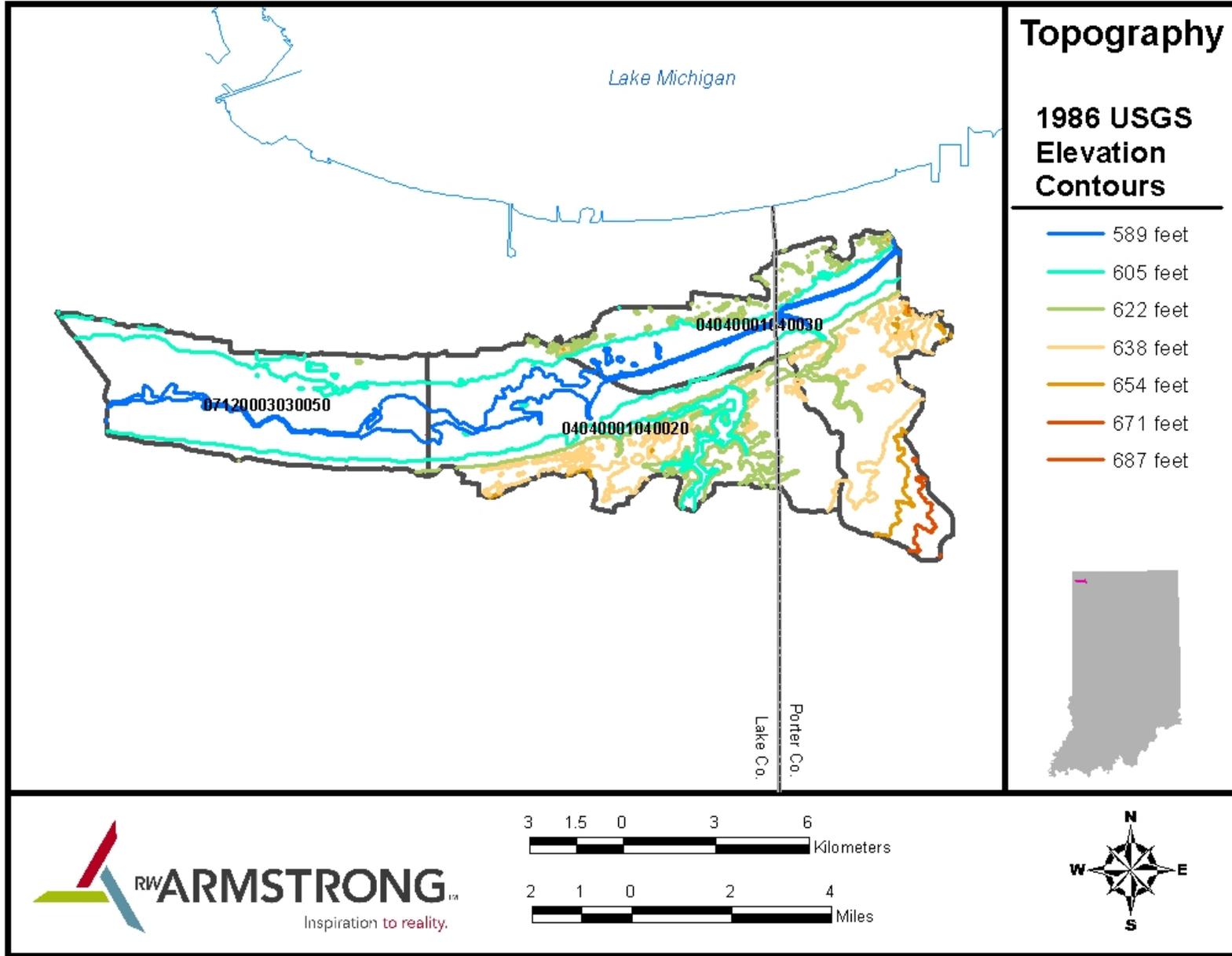


Figure 2.4: Topography for the study area, note the flat portions in the west and central portions.

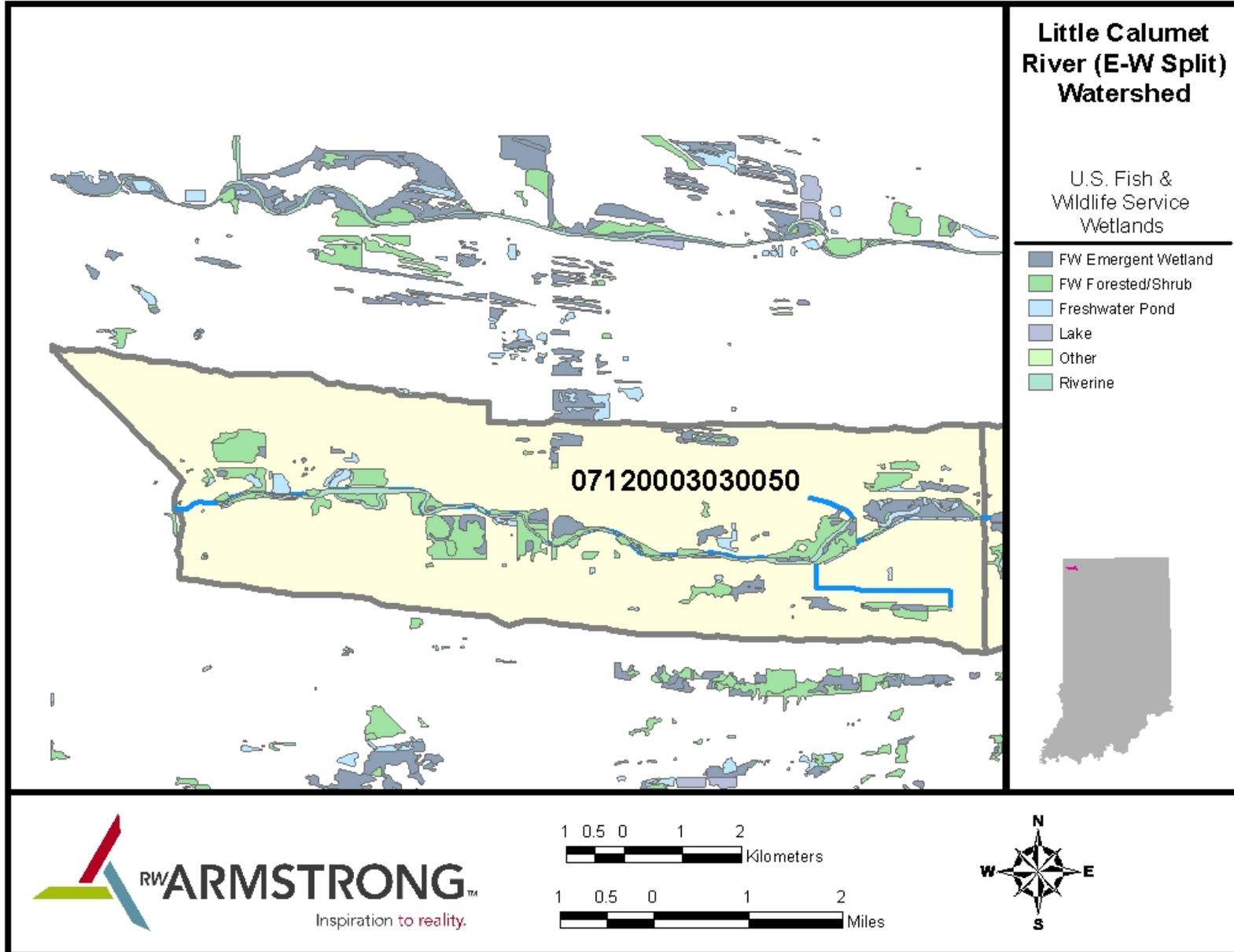


Figure 2.5: Little Calumet River (E-W Split) watershed wetlands.

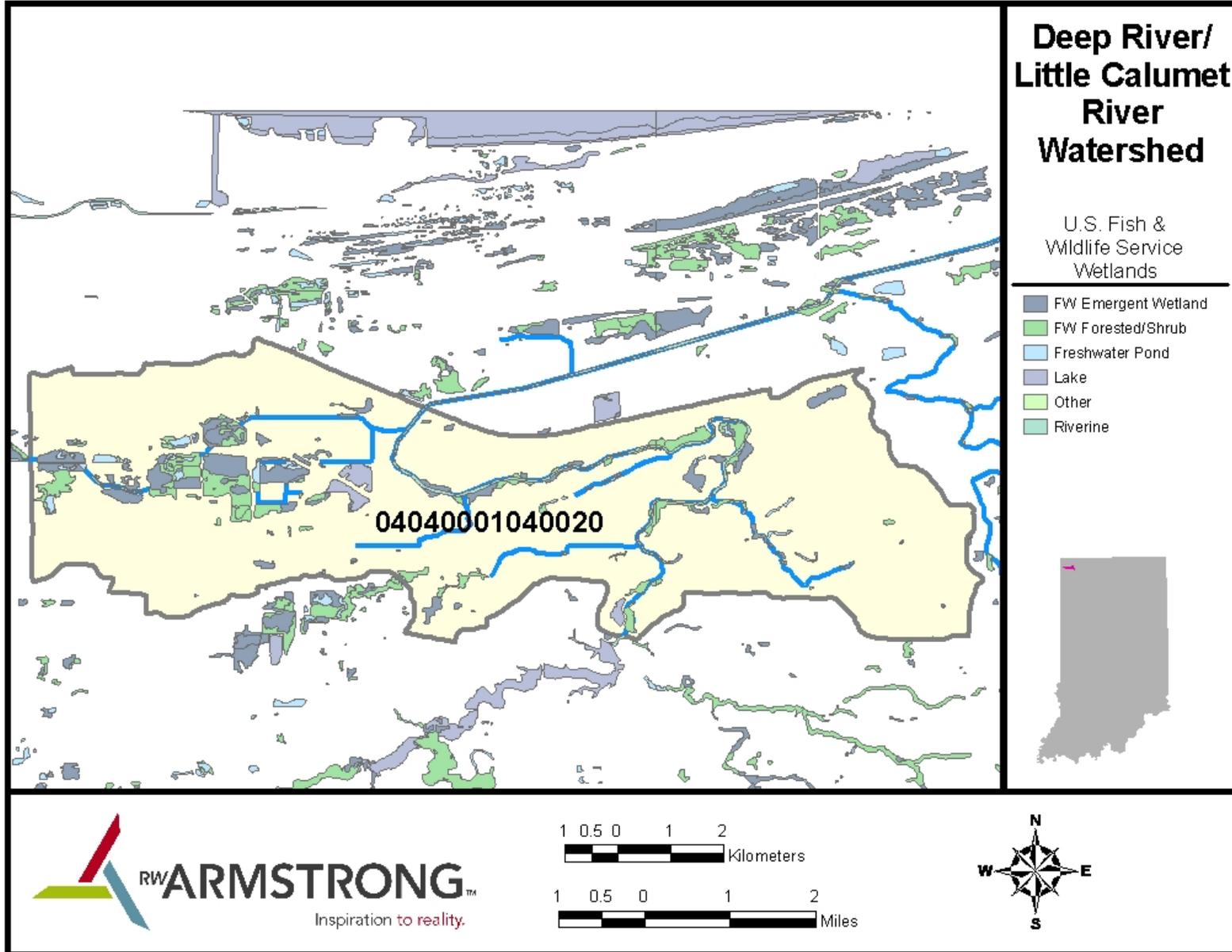


Figure 2.6: Little Calumet River and Deep River Watershed wetlands map.

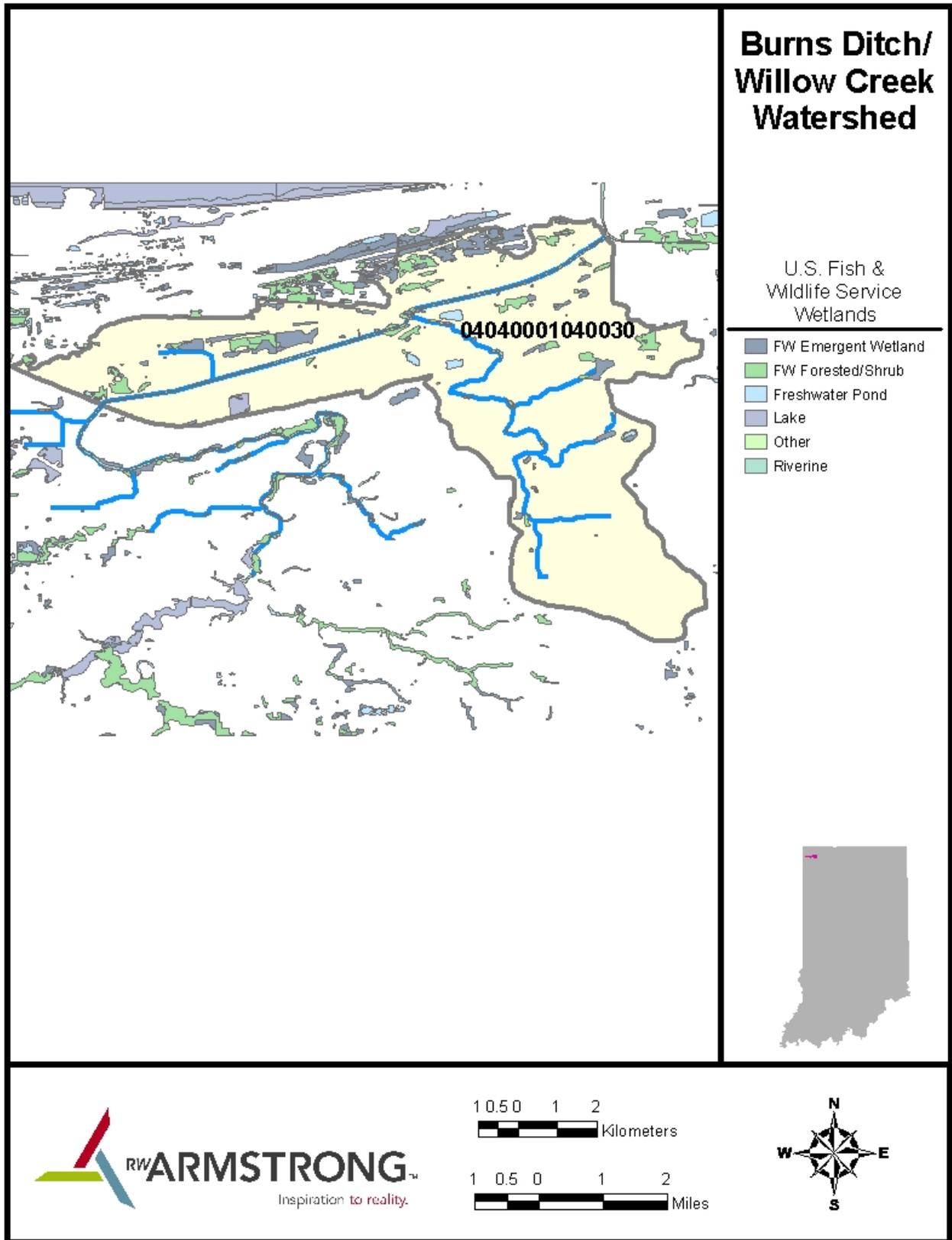


Figure 2.7: Willow Creek and Burns Ditch Watershed wetlands map.

Watershed		Area (acres)	% of Total Area
E-W Split Wetlands HUC 07120003030050	Freshwater Emergent Wetland	324.7	3.4
	Freshwater Forested/Shrub Wetland	643.3	6.6
	Riverine	115.3	1.2
		1083.3	11.2
Deep River Wetlands HUC 04040001040020	Freshwater Emergent Wetland	520	4.1
	Freshwater Forested/Shrub Wetland	463.6	3.7
	Riverine	314.8	2.5
		1298.4	10.4
Burns Ditch Wetlands HUC 04040001040030	Freshwater Emergent Wetland	593.8	4.7
	Freshwater Forested/Shrub Wetland	535.9	4.3
	Riverine	246.7	2
		1376.4	11

Table 2.3: Watershed study area wetlands classification and acreage.

## **Endangered Species**

Appendix 10: NIRPC Watershed Management Framework Plan contains a listing of threatened and endangered species found within Lake, Porter, and LaPorte Counties taken from the Watershed Management Framework Plan produced by NIRPC in October of 2005. Appendix 9: Gary Green Link Master Plan contains a list of endangered and threatened species identified in the Gary Green Link Master Plan. Also included is a figure from the plan that maps the habitats of the endangered and threatened species.