

## **Section III: Land Use Description of the Watershed**

### **Land Use**

The watershed study area is heavily populated and touches most of the urbanized communities in northern Lake and northwestern Porter counties. While the watershed area is primarily urban, land uses range from agricultural to industrial.

Due to the large variety of land uses in the watershed eleven (11) different land use categories were delineated. They include the following:

- High Density Urban
- Medium Density Urban
- Excavation
- Forest
- Grassland/Suburban land
- Agriculture
- Wetlands: Forest
- Wetlands: Other Vegetation
- Wetlands: Bare
- Open Water
- Roads

Many of the land use categories are self explanatory but others do need further definition. The difference between a high density urban area and a medium density urban area is the number of dwellings per acre. A high density area will have five (5) to seven (7) dwellings per acre while a medium density area will only have two (2) to four (4) dwellings per acre. All golf courses are included in the grassland/suburban land category and only major roads (i.e. interstates and U.S. Highways) are delineated for the road category. The wetlands were divided into three land use categories so that the quality could be noted. The forest wetlands include areas along the river and other bodies of water that are wooded. The other vegetation category includes the Heron Rookery and portions of the Oxbow Park while the bare category refers mostly to marshes and swamps.

The land use delineation for the three 14-digit HUC watersheds are shown in Figures 3.1 to 3.3 with a table included in each figure showing the total area, in acres, of each land use category. In all three watersheds the prevailing land use is Medium Density Urban. Table 3.1 summarizes the land use areas for the entire study area. The overall second most common land use was found to be High Density Urban. The three other major land use contributors are Forest, Grassland/Suburban land and Agriculture. These five land use categories cover over 87% of the study area.

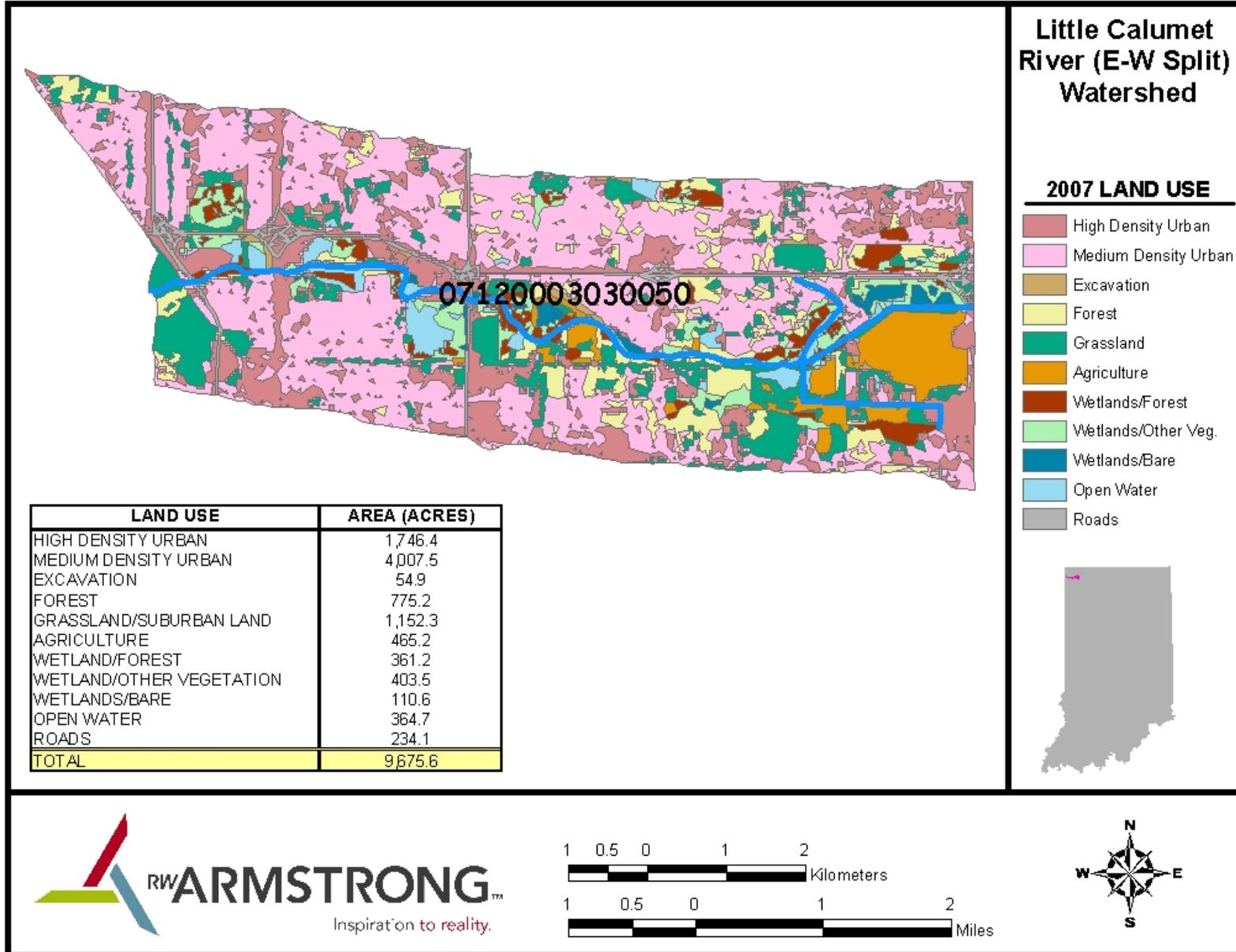


Figure 3.1: Land use map for HUC 07120003030050, Little Calumet River E-W Split Watershed.

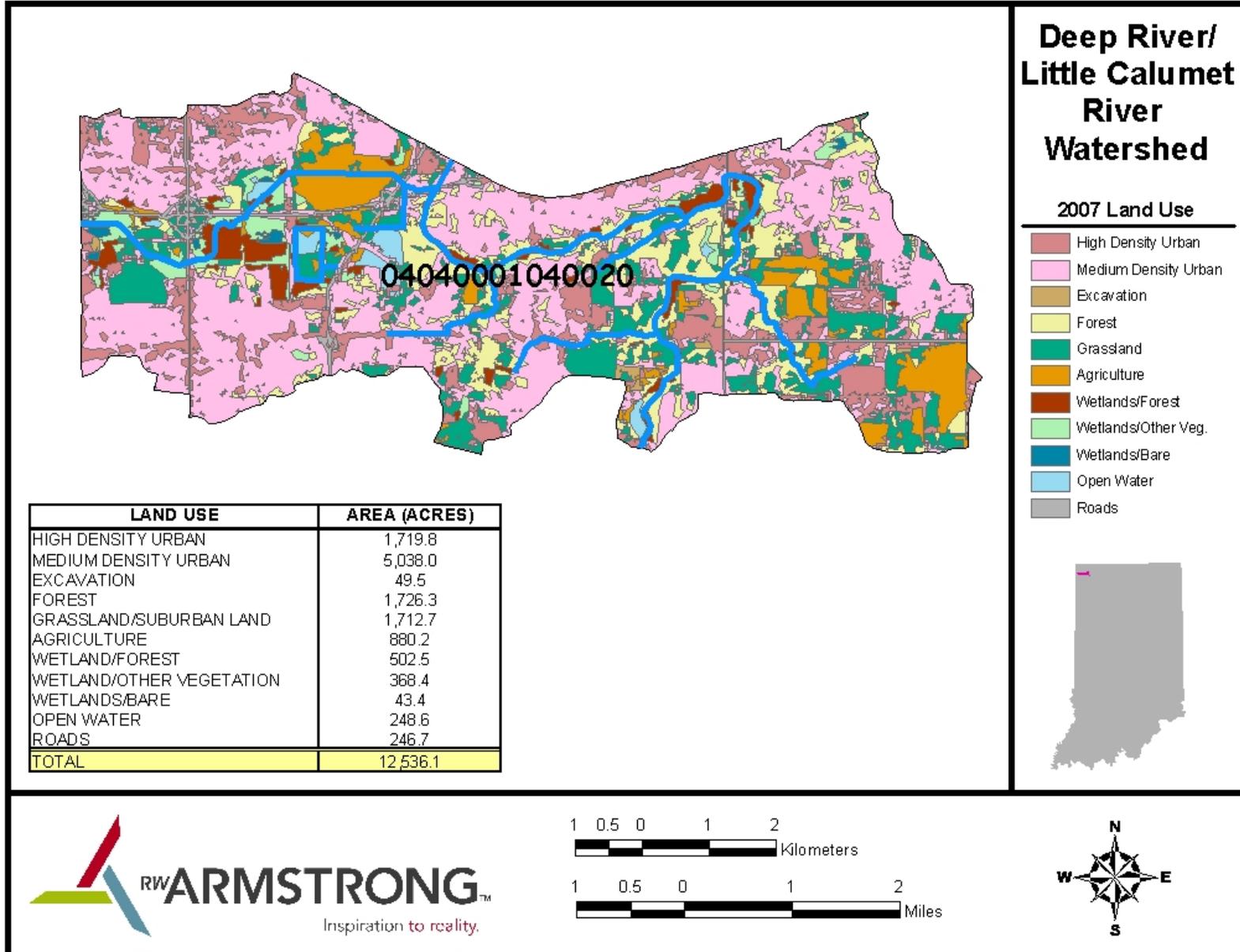


Figure 3.2: Land use map for HUC 04040001040020, Deep River & Little Calumet River Watershed.

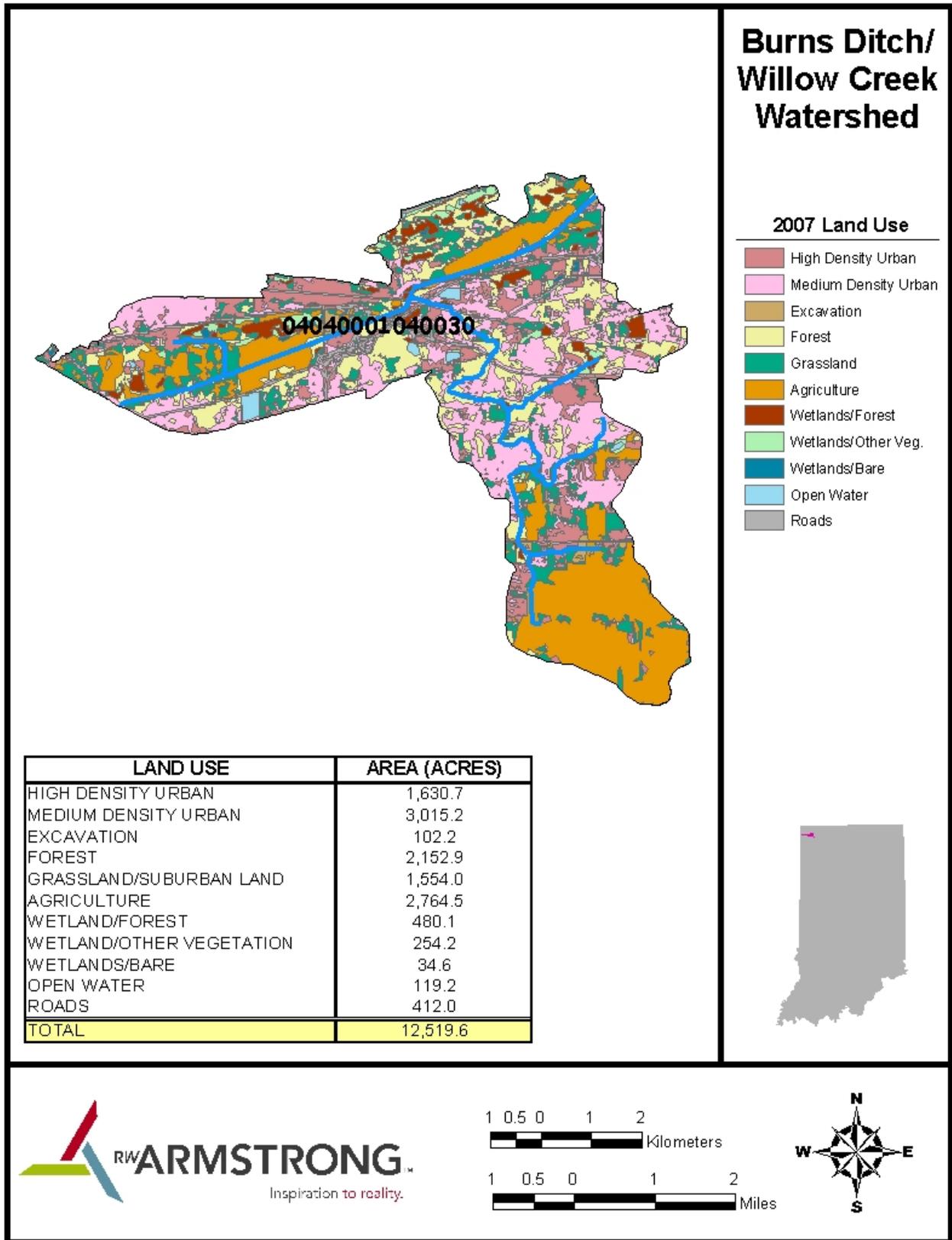


Figure 3.3: Land use map for HUC 04040001040030, Burns Ditch & Willow Creek Watershed.

<b>LAND USE TYPE</b>	<b>AREA (ACRES)</b>	<b>% OF TOTAL AREA</b>
HIGH DENSITY URBAN	5,097.0	14.68%
MEDIUM DENSITY URBAN	12,060.7	34.73%
EXCAVATION	206.6	0.59%
FOREST	4,654.4	13.40%
GRASSLAND/SUBURBAN LAND	4,419.0	12.72%
AGRICULTURE	4,109.9	11.83%
WETLANDS: FOREST	1,343.8	3.87%
WETLANDS: OTHER VEGETATION	1,026.1	2.95%
WETLANDS: BARE	188.6	0.54%
OPEN WATER	732.5	2.11%
ROADS	892.9	2.57%
<b>TOTAL AREA =</b>	<b>34,731.5</b>	<b>100.00%</b>

Table 3.1: Land use acreage for entire watershed study area.

### **Impervious Areas**

Urbanization and the resulting impervious areas are one of the most significant factors affecting non-point source pollution.

Several studies have reported a direct relationship between the increase of impervious areas and the degradation of the receiving water bodies. Of these studies, most agree that once impervious cover exceeds 10% of the land in the watershed, the receiving waters will be negatively impacted. Watersheds with an impervious cover of 10% to 30% are often said to be “impacted” and watersheds with greater than 30% of the available land covered with an impervious surface are often categorized as seriously degraded.

An increase in impervious area leads directly to an increase in runoff volume and a reduction of surface water infiltration. This added runoff often leads to increased flow velocities, increased flooding severity and frequency, and a decrease in water quality.

The impervious area was calculated for all three HUC watersheds (Tables 3.2 to 3.4) according to their land use map category. Impervious area factors were used based on the land use type and a total area of 12,905 acres was found to be impervious. This acreage results in 37% of the overall watershed study area being considered impervious and consequently puts the area in the seriously degraded category.

<b>LITTLE CALUMET RIVER (E-W SPLIT) WATERSHED HUC 07120003030050</b>				
<b>LAND USE</b>	<b>AREA (ACRES)</b>	<b>IMPERVIOUS AREA FACTOR</b>	<b>IMPERVIOUS AREA (ACRES)</b>	<b>% OF HUC WATERSHED</b>
HIGH DENSITY URBAN	1,746.4	75%	1,309.8	13.54%
MEDIUM DENSITY URBAN	4,007.5	65%	2,604.9	26.92%
EXCAVATION	54.9	2%	1.1	0.01%
FOREST	775.2	2%	15.5	0.16%
GRASSLAND/SUBURBAN LAND	1,152.3	2%	23.0	0.24%
AGRICULTURE	465.2	4%	18.6	0.19%
WETLAND/FOREST	361.2	0%	0.0	0.00%
WETLAND/OTHER VEGETATION	403.5	0%	0.0	0.00%
WELANDS/BARE	110.6	0%	0.0	0.00%
OPEN WATER	364.7	0%	0.0	0.00%
ROADS	234.1	100%	234.1	2.42%
<b>TOTALS</b>	<b>9,675.8</b>		<b>4,207.1</b>	<b>43.48%</b>

Table 3.2: Impervious area based on land use category for E-W Split Watershed.

<b>LITTLE CALUMET RIVER &amp; DEEP RIVER WATERSHED HUC 04040001040020</b>				
<b>LAND USE</b>	<b>AREA (ACRES)</b>	<b>IMPERVIOUS AREA FACTOR</b>	<b>IMPERVIOUS AREA (ACRES)</b>	<b>% OF HUC WATERSHED</b>
HIGH DENSITY URBAN	1,719.8	75%	1,289.9	10.29%
MEDIUM DENSITY URBAN	5,038.0	65%	3,274.7	26.12%
EXCAVATION	49.5	2%	1.0	0.01%
FOREST	1,726.3	2%	34.5	0.28%
GRASSLAND/SUBURBAN LAND	1,712.7	2%	34.3	0.27%
AGRICULTURE	880.2	4%	35.2	0.28%
WETLAND/FOREST	502.2	0%	0.0	0.00%
WETLAND/OTHER VEGETATION	368.4	0%	0.0	0.00%
WELANDS/BARE	43.4	0%	0.0	0.00%
OPEN WATER	248.6	0%	0.0	0.00%
ROADS	246.7	100%	246.7	1.97%
<b>TOTALS</b>	<b>12,535.8</b>		<b>4,916.2</b>	<b>39.22%</b>

Table 3.3: Impervious area based on land use category for Little Calumet & Deep River Watershed.

BURNS DITCH & WILLOW CREEK WATERSHED HUC 04040001040030				
LAND USE	AREA (ACRES)	IMPERVIOUS AREA FACTOR	IMPERVIOUS AREA (ACRES)	% OF HUC WATERSHED
HIGH DENSITY URBAN	1,630.7	75%	1,223.0	9.77%
MEDIUM DENSITY URBAN	3,015.2	65%	1,959.9	15.65%
EXCAVATION	102.2	2%	2.0	0.02%
FOREST	2,152.9	2%	43.1	0.34%
GRASSLAND/SUBURBAN LAND	1,554.0	2%	31.1	0.25%
AGRICULTURE	2,764.5	4%	110.6	0.88%
WETLAND/FOREST	480.1	0%	0.0	0.00%
WETLAND/OTHER VEGETATION	254.2	0%	0.0	0.00%
WELANDS/BARE	34.6	0%	0.0	0.00%
OPEN WATER	119.2	0%	0.0	0.00%
ROADS	412.0	100%	412.0	3.29%
<b>TOTALS</b>	<b>12,519.6</b>		<b>3,781.7</b>	<b>30.21%</b>

Table 3.4: Impervious area based on land use category for Burns Ditch & Willow Creek Watershed.

### **Recreational Areas and Publicly Controlled Lands**

As part of the Little Calumet River Basin Development Commission (LCRBDC) project being completed in conjunction with the Army Corp of Engineers (ACOE), recreational features are being added along the river. The recreational features being included in the flood protection project include canoe launches, walking trails, and fishing piers. A preliminary outline of the LCRBDC recreational features is shown in Figure 3.4.

In addition to the recreational features being added to the study area by the ACOE there are many other features in the watershed area currently that can be used for recreation. Figures 3.5 to 3.7 highlight the publicly controlled lands in each of the 14-digit HUC watersheds. Majority of the areas included are undeveloped and will remain that way, with the exception of schools and other government lands that were included. The maps created for the recreational features are the result of data taken from several sources, including aerial photographs, park foundation maps from Lake and Porter Counties, local street maps and information listed in other previous studies.

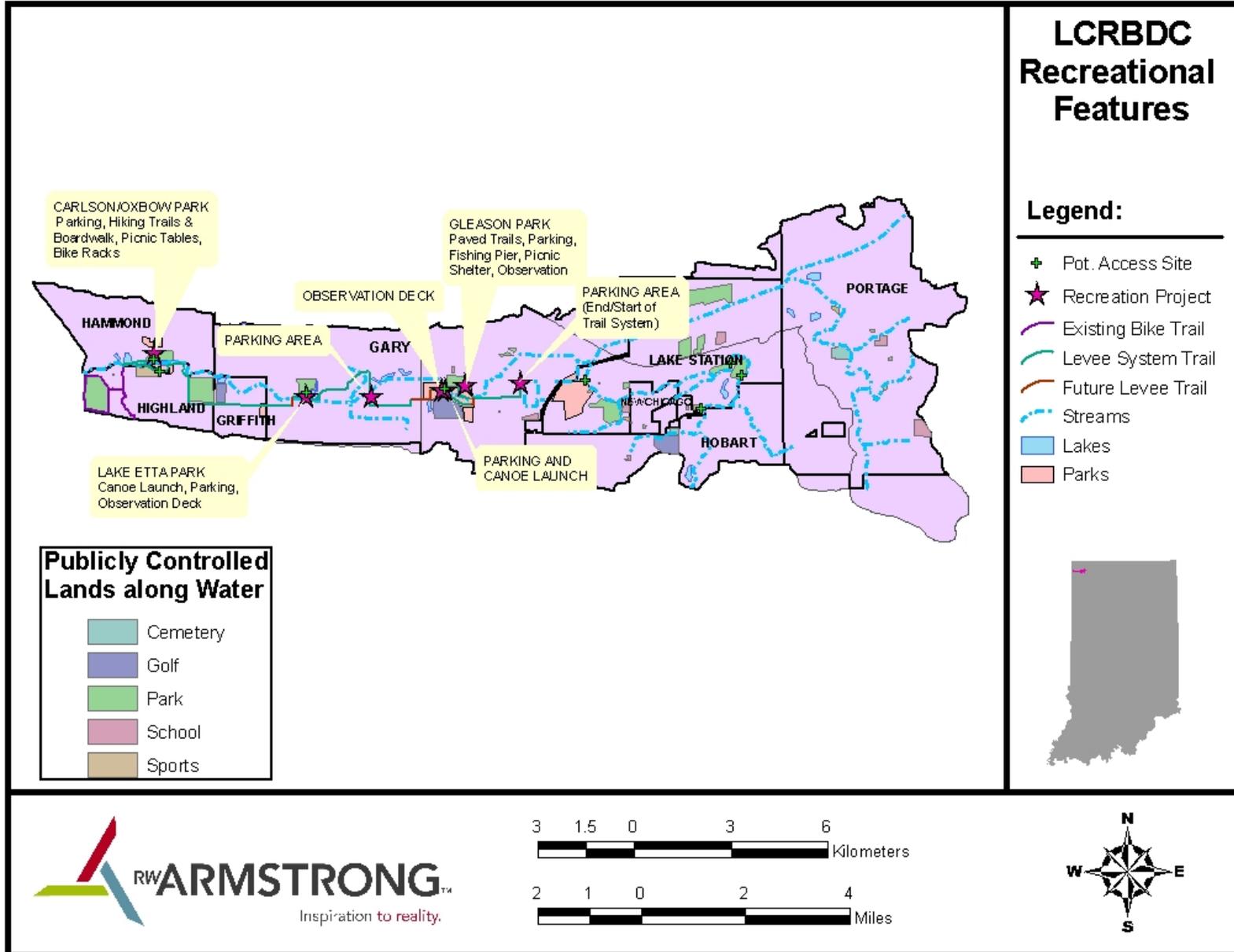


Figure 3.4: Recreational features being included in the LCRBDC project in conjunction with the ACOE

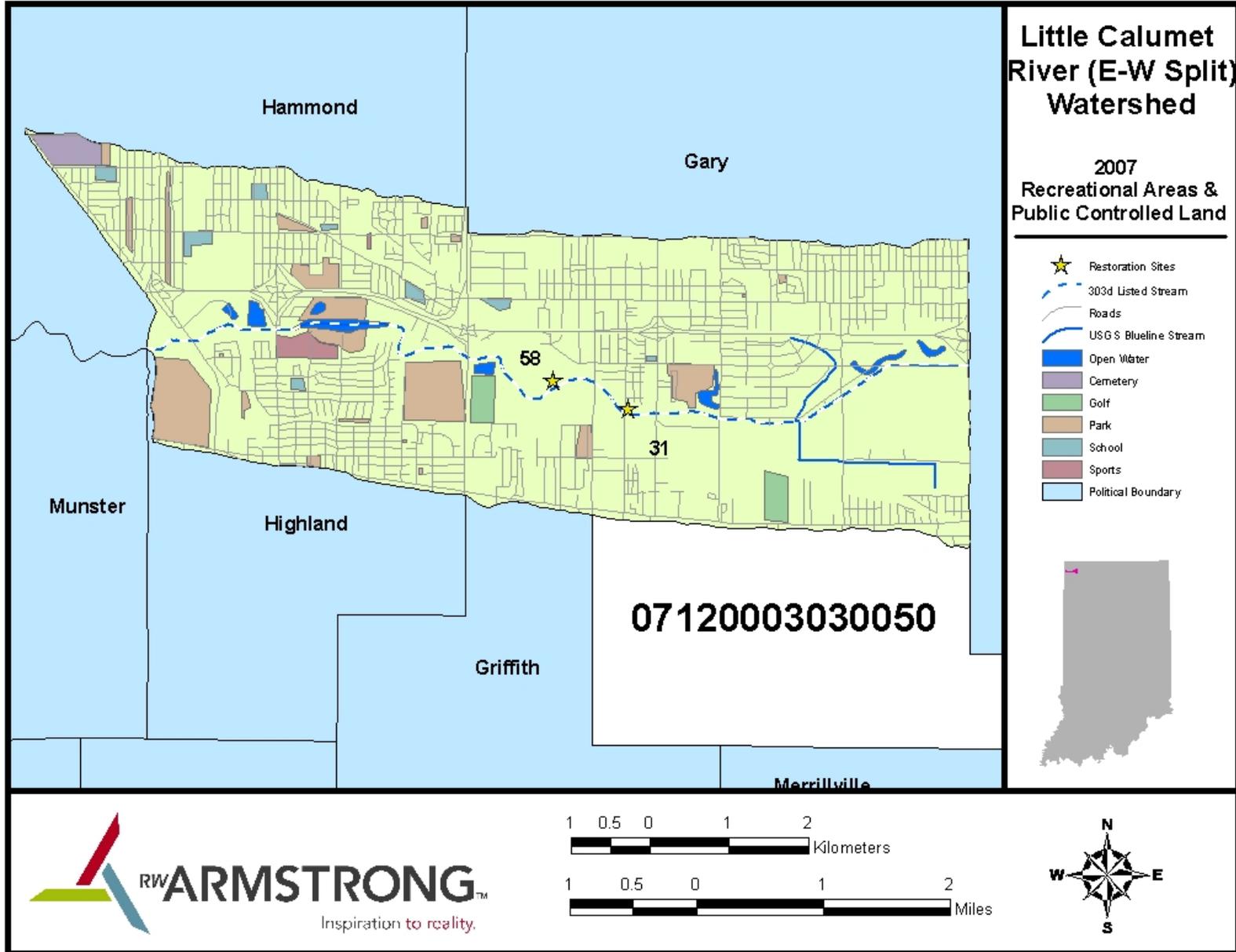


Figure 3.5: Publicly controlled lands for HUC 07120003030050, Little Calumet River E-W Split Watershed.

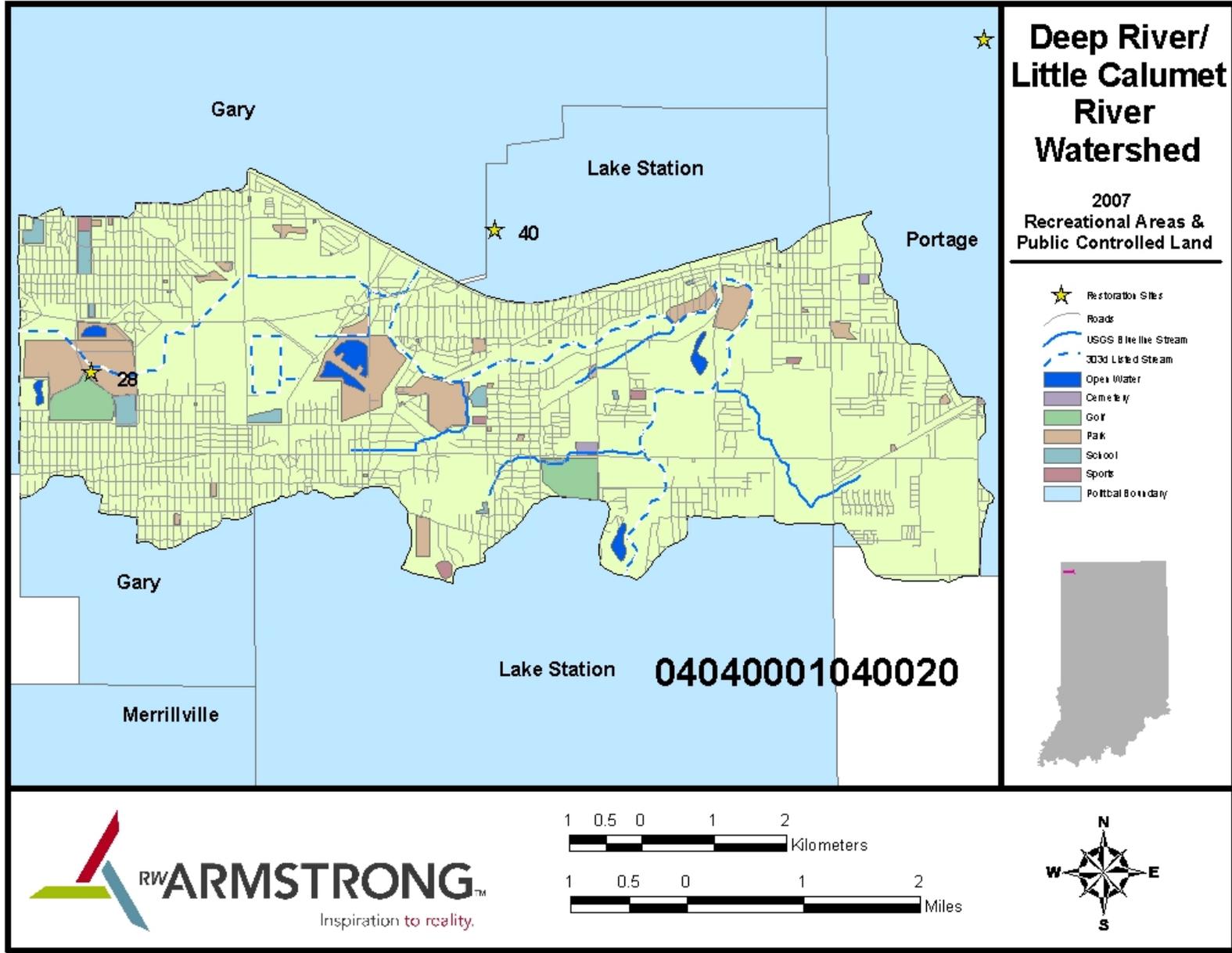


Figure 3.6: Publicly controlled lands for HUC 04040001040020, Little Calumet River and Deep River Watershed.

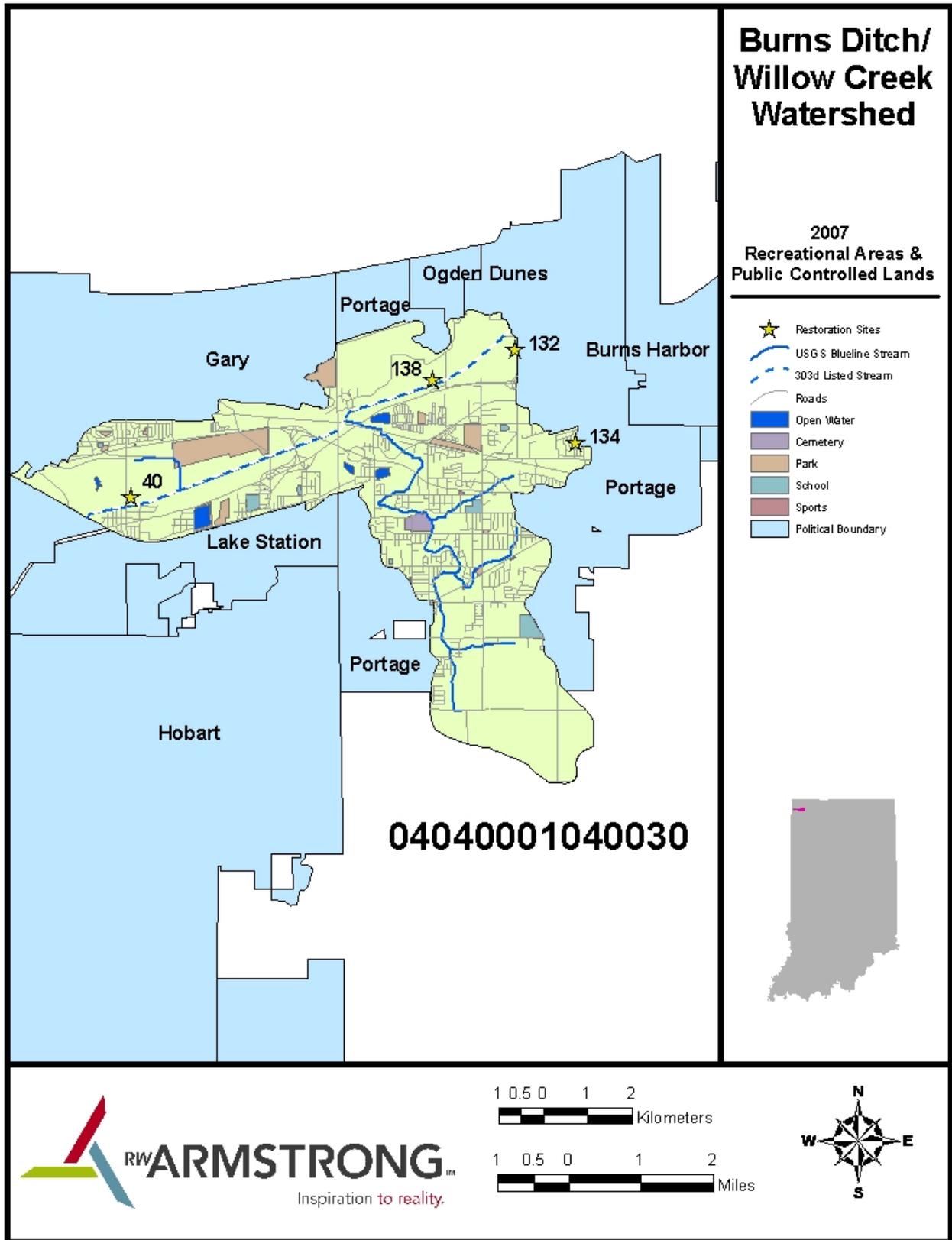


Figure 3.7: Publicly controlled lands in HUC 04040001040030, Burns Ditch and Willow Creek Watershed.

## **Riparian Buffer Areas**

Natural areas currently exist along the river from the western boundary of the study area to approximately the Lake/Porter County Line. The Burns Ditch and Willow Creek watershed has very little natural buffer along the Little Calumet River (Burns Ditch). Figure 3.8 to 3.10 show the natural buffer areas, as delineated using aerial photographs and previously conducted studies including the Gary Green Link Master Plan.

Projects are currently under way that will increase the natural buffer areas in the western portion of the study area, but not in the eastern portion where it is perhaps needed the most. The riparian areas in the western portion of the study area are undergoing changes currently that will increase their size and hopefully their effectiveness. The Army Corp of Engineers (ACOE) is in the process of building a levee system along the Little Calumet River. The East Reach of the ACOE project includes the western portion of this watershed study area. Figure 3.11 shows the levee system that is currently being built by the ACOE. All of the area within the flood control project will remain as natural areas.

Large natural buffers along the river have multiple positive impacts to the water quality. They increase the stability of the slope due to the vegetation that will develop and have deeper root systems than those of crops or summer grass. The effect that floods will have on the local community will decrease in severity due to the water having a place to pool before reaching individual communities and homes. The wildlife habitat in the area will also improve as the non-point source pollution is reduced by slowing down the physical runoff and giving sufficient time for sediments to settle out before reaching the water.

## **Future Population and Development Trends**

Population projections through 2030 show the population decreasing in the western portion of the study area while the eastern portion looks to have population increases, especially in Porter County. Figure 3.12 shows the breakdown of population trends, according to traffic analysis zones, created using population projection data from the Northern Indiana Regional Planning Commission (NIRPC). NIRPC is currently in the process of creating new future population data which will alter these projections. Infrastructure that was expected to be completed, and therefore taken into account when creating these projections was not able to be constructed; resulting in lower population increase projections in some communities.

Comparison of the future population projections with the land use maps in this plan indicates that the areas projected to grow the fastest over the next 20 plus years will be areas that are currently shown as large agricultural tracks. The area shown in HUC 071200030050 that is delineated to increase between 701 to 1,000 and the area in the southern tip of HUC 04040001040030 both average

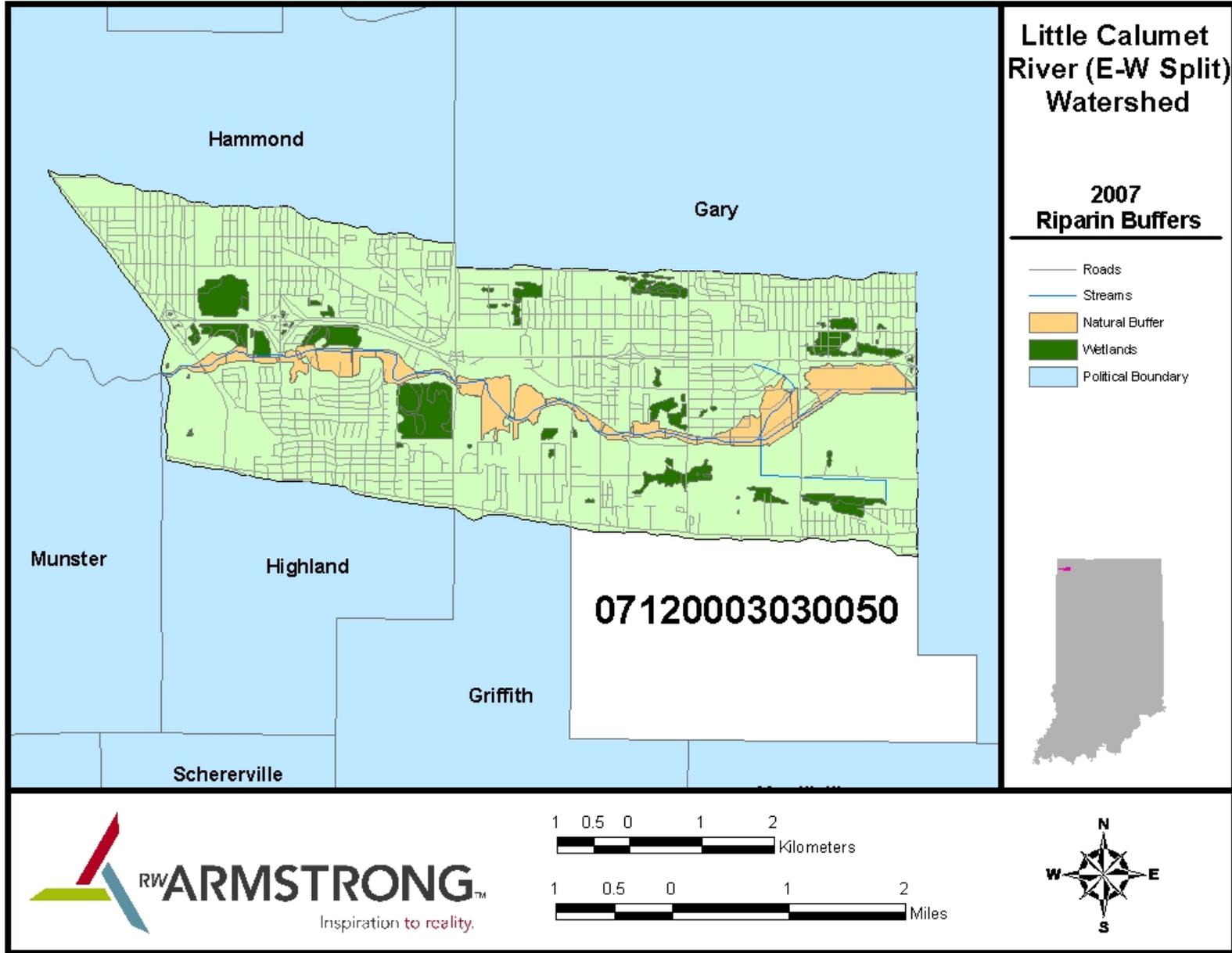


Figure 3.8: Riparian zones located along the Little Calumet River in the E-W Split Watershed, HUC 07120003030050.

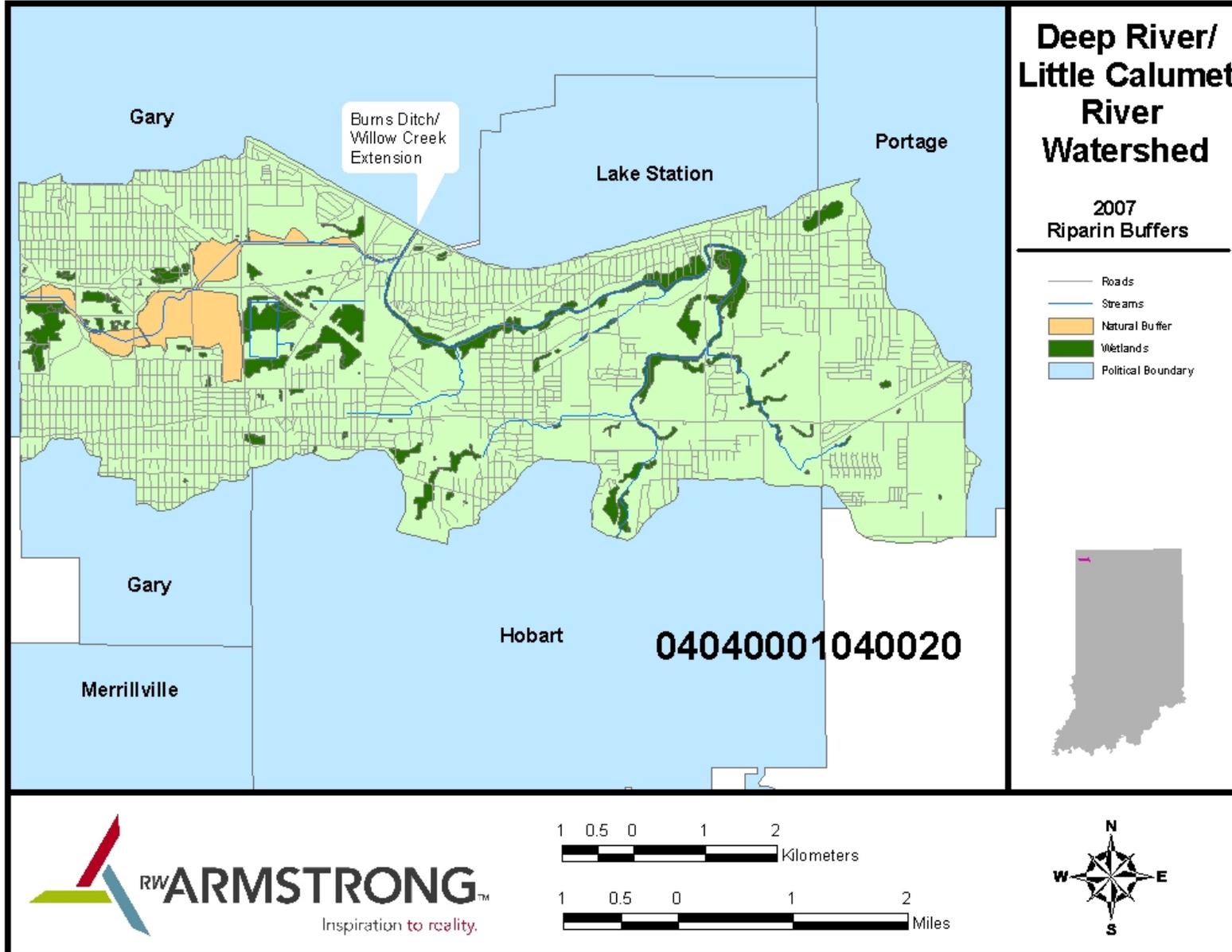


Figure 3.9: Riparian zones located along the Little Calumet River in the Little Calumet & Deep River Watershed, HUC 04040001040020.

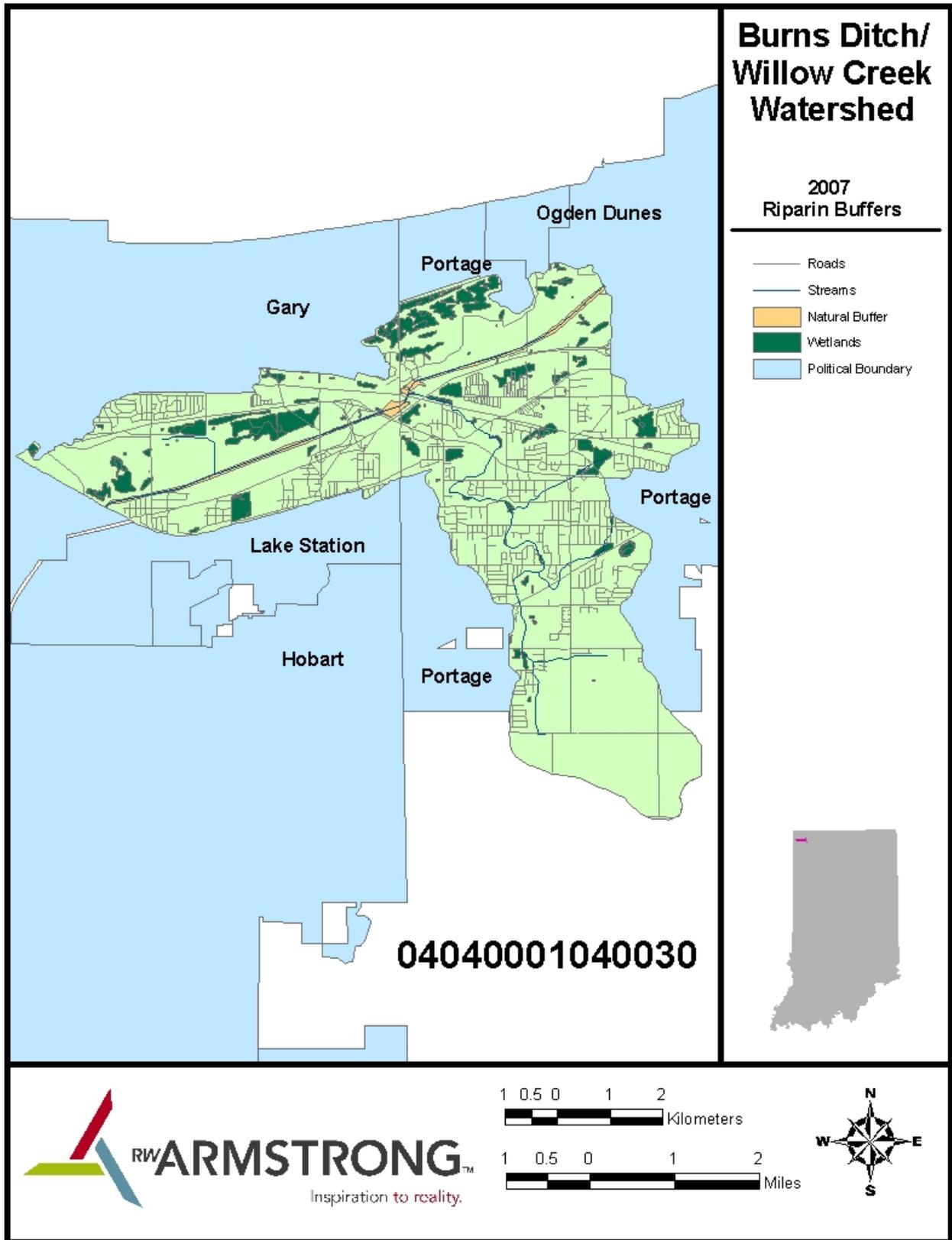


Figure 3.10: Riparian zones located along the Little Calumet River in the Burns River and Willow Creek watershed.

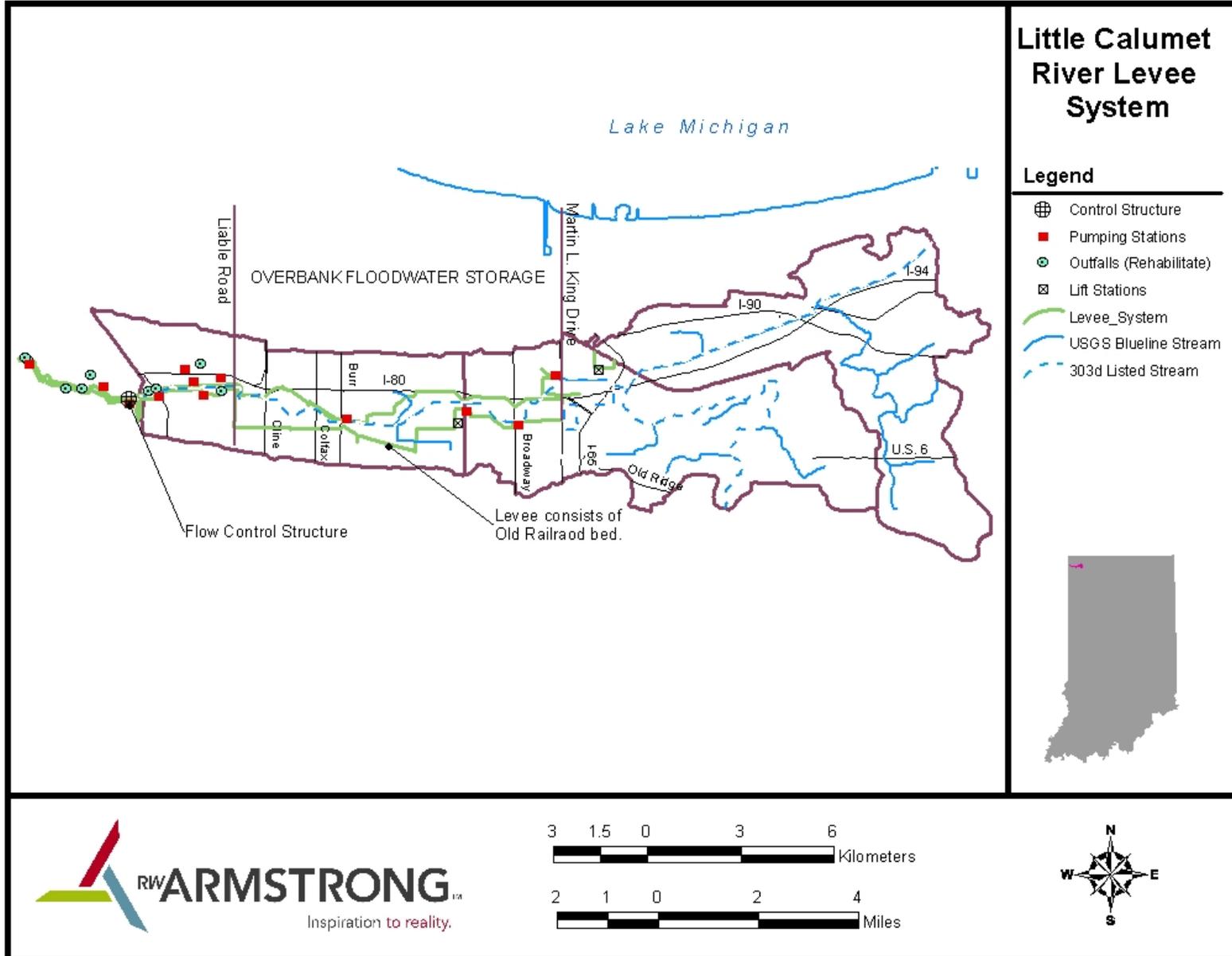


Figure 3.11: ACOE levee system currently being constructed for completion in 2013.

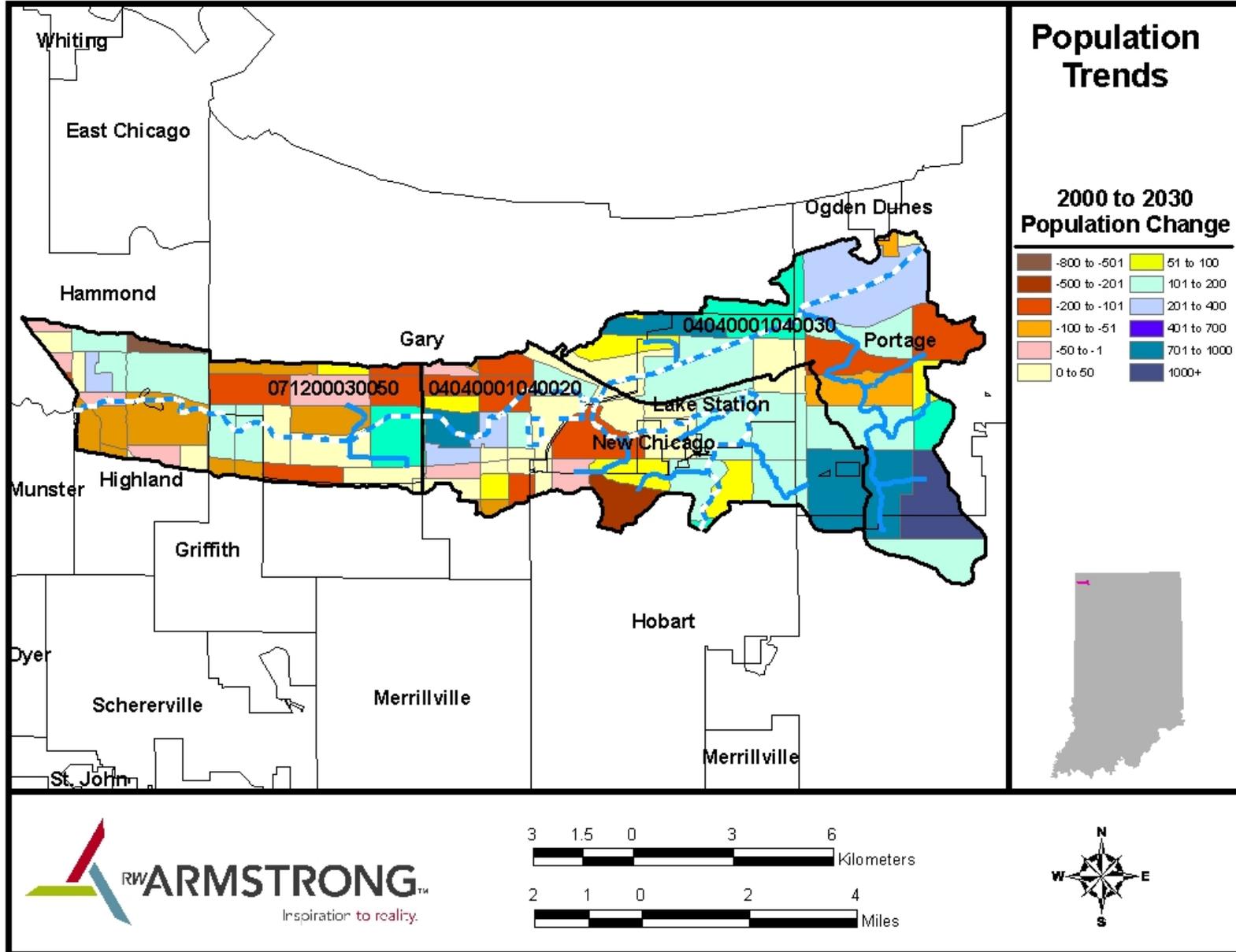


Figure 3.12: Population trends according to 2030 projections from the Northern Indiana Regional Planning Commission.

out to be growing at more than 741 people per square mile. These two areas encompass approximately 3,500 acres and development into Medium Density Urban will result in an increase of nearly 2,000 impervious acres; according to the impervious area factors used for the two land use categories. This development would not only increase the impervious area greatly but would also decrease the agricultural land use in the study area by approximately 50%.

Further development is expected around the interchanges of the Borman Expressway (I-80/I-94) due to the completion of the line of protection of the levee system. It is expected that this will be mostly in the form of commercial property. Other future development includes the current site of the Woodmar Country Club within the City of Hammond which is being developed as commercial property.

An increase in impervious area due to development has the possibility of creating higher total suspended solids (TSS) readings. Increases in development and population lower the pervious area in the watershed; the result of this will be greater water velocities in the Little Calumet River and its tributaries. This increase in water velocity will be due to more runoff entering the water bodies as less will be capable of entering the soil. Increased water velocities are a leading cause of increased TSS readings, as is the effluent produced from wastewater treatment plants which will also be increased due to larger loads being taken to the plants.

### **Porter and Lake County Legal Drains**

All of the Little Calumet River within the three 14- digit HUC watersheds in this study is a legal/regulated drain in Lake and Porter Counties. However, portions of the tributary system, especially Deep River and Willow Creek, are not legal/regulated drains. Figure 3.13 show the legal/regulated drains according to information received from Lake and Porter counties.

### **Waterbody Use**

The 2003 Recreational Use Surveys conducted by GSD as part of their CSO Long Term Control Plan indicated that residents currently access the river at several sites within the city for fishing.

As part of the Little Calumet River Flood Control Project, the U.S. Army Corp of Engineers has constructed trails, canoe ramps, and fishing piers along the Little Calumet River. Figure 3.4 shows the features to be included in the ACOE and LCRBDC project. Other publicly controlled lands in the watershed study area can be seen in Figure 3.5 to 3.7.

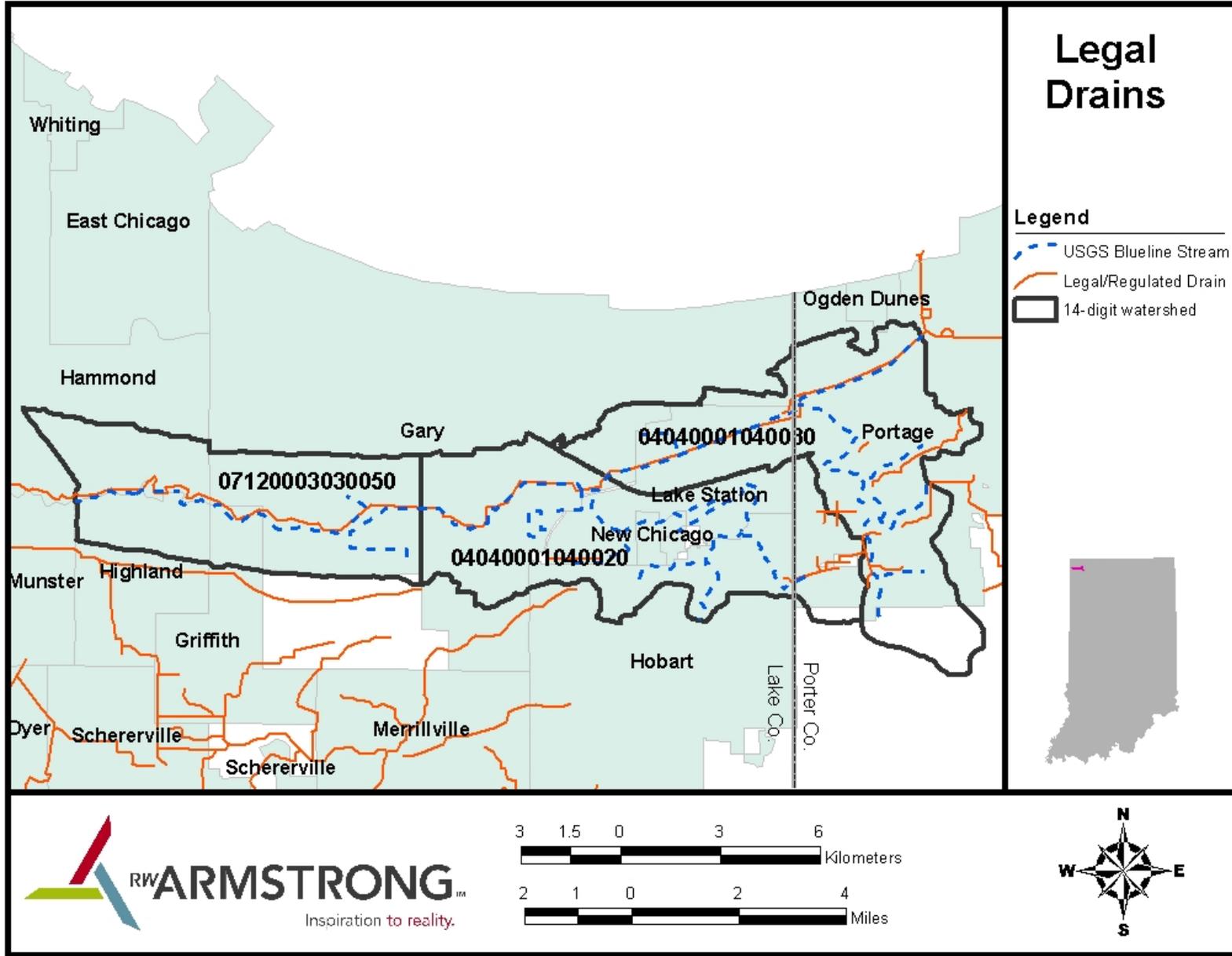


Figure 3.13: Legal/Regulated drains in Lake and Porter Counties.