

# Section 2

## Watershed Characteristics

### 2.1 General Watershed Description

Figure 2.1.1 shows the municipal boundaries and the major streams within the Little Calumet River Watershed. Figure 2.1.1 also shows the subwatershed divides for the major streams within the Little Calumet River Watershed. Table 2.1.1 lists the municipalities within the Little Calumet River Watershed. Table 2.1.2 lists the major streams tributary to the Little Calumet River and their lengths. Each stream is briefly described in the following subsection.

**Table 2.1.1: Municipalities in the Little Calumet River Watershed**

Municipality	% of Municipality Area within Little Calumet River Watershed	% of Little Calumet River Watershed Area by Municipality	Municipality	% of Municipality Area within Little Calumet River Watershed	% of Little Calumet River Watershed Area by Municipality
Blue Island	29	0.75	Matteson	100	4.08
Calumet City	34	1.59	Midlothian	82	1.43
Calumet Park	< 1	0.00	Oak Forest	74	2.50
Chicago Heights	100	5.65	Olympia Fields	100	1.79
Country Club Hills	100	2.88	Orland Hills	19	0.13
Crestwood	5	0.09	Orland Park	8	0.64
Dixmoor	100	0.78	Park Forest	100	2.41
Dolton	50	1.46	Phoenix	100	0.28
East Hazel Crest	100	0.48	Posen	100	0.71
Flossmoor	100	2.14	Richton Park	100	1.79
Ford Heights	100	0.65	Riverdale	51	1.20
Frankfort Square	100	0.00	Robbins	78	0.71
Glenwood	100	1.38	Sauk Village	100	1.63
Harvey	100	3.87	South Chicago Heights	100	0.97
Hazel Crest	100	2.12	South Holland	100	4.56
Homewood	100	3.29	Steger	100	0.40
Lansing	100	4.10	Thornton	100	1.50
Lynwood	100	2.69	Tinley Park	94	5.58
Markham	100	3.26	University Park	100	0.07

**Table 2.1.2: Little Calumet River Watershed Open Channel Stream Lengths**

Channel Name	Length (miles)	Channel Name	Length (miles)
Butterfield Creek	24.4	Midlothian Creek	23
Cady Marsh	6.8	North Creek	23
Calumet-Union Drainage Ditch	24.5	Plum Creek	3
Deer Creek	15.1	Thorn Creek	27.0
Hart Ditch	6	Little Calumet River	45.3
		<b>Total</b>	<b>198.1</b>

Table 2.1.3 lists the subwatersheds each municipality drains to, with subwatersheds listed in decreasing order based upon the area within the municipality. Although municipalities contribute stormwater to the listed subwatersheds, the actual stream may not be included within the municipality's boundaries.

**Table 2.1.3: Municipalities and Their Subwatershed Tributary Drainage Areas**

Municipality	Subwatershed	Tributary Drainage Area (sq mi)
Blue Island	Midlothian Creek	0.74
	Little Calumet River	0.16
Calumet City	Little Calumet River	2.48
	Thorn Creek	<0.01
Calumet Park	Little Calumet River	<0.01
Chicago Heights	Butterfield Creek	0.91
	Deer Creek	1.10
	Thorn Creek	7.03
Country Club Hills	Butterfield Creek	0.28
	Cal-Union Drainage Ditch	3.38
	Midlothian Creek	0.50
Crestwood	Midlothian Creek	0.07
Dixmoor	Little Calumet River	1.24
	Midlothian Creek	<0.01
Dolton	Little Calumet River	2.43
East Hazel Crest	Cal-Union Drainage Ditch	0.72
	Thorn Creek	0.05
Flossmoor	Butterfield Creek	2.27
	Cal-Union Drainage Ditch	1.08
	Thorn Creek	0.07
Ford Heights	Deer Creek	1.04
	North Creek	<0.01
Frankfort Square	Butterfield Creek	<0.01
	Little Calumet River	<0.01
	Thorn Creek	<0.01

**Table 2.1.3: Municipalities and Their Subwatershed Tributary Drainage Areas**

<b>Municipality</b>	<b>Subwatershed</b>	<b>Tributary Drainage Area (sq mi)</b>
Glenwood	Butterfield Creek	0.56
	Deer Creek	0.04
	North Creek	0.65
	Thorn Creek	0.96
Harvey	Cal-Union Drainage Ditch	1.84
	Little Calumet River	4.35
Hazel Crest	Cal-Union Drainage Ditch	3.39
Homewood	Butterfield Creek	1.61
	Cal-Union Drainage Ditch	3.48
	Thorn Creek	0.17
Lansing	Little Calumet River	6.56
	North Creek	1.95
	Thorn Creek	2.21
Lynwood	Deer Creek	<0.01
	Hart Ditch	<0.01
	North Creek	4.29
Markham	Cal-Union Drainage Ditch	2.96
	Little Calumet River	2.25
Matteson	Butterfield Creek	6.07
	Thorn Creek	0.28
Midlothian	Midlothian Creek	1.42
	Natalie Creek	0.37
Oak Forest	Cal-Union Drainage Ditch	0.07
	Little Calumet River	2.10
	Midlothian Creek	1.58
	Natalie Creek	1.63
Olympia Fields	Butterfield Creek	2.79
	Thorn Creek	0.07
Orland Hills	Midlothian Creek	0.20
Orland Park	Midlothian Creek	0.93
Park Forest	Butterfield Creek	0.46
	Thorn Creek	3.39
Phoenix	Cal-Union Drainage Ditch	0.02
	Little Calumet River	0.43
Posen	Little Calumet River	0.16
	Midlothian Creek	0.97
Richton Park	Butterfield Creek	2.31
	Thorn Creek	0.34
Riverdale	Little Calumet River	2.07
Robbins	Midlothian Creek	0.75

**Table 2.1.3: Municipalities and Their Subwatershed Tributary Drainage Areas**

Municipality	Subwatershed	Tributary Drainage Area (sq mi)
Sauk Village	Deer Creek	0.14
	North Creek	2.47
	Plum Creek	<0.01
South Chicago Heights	Deer Creek	0.24
	Thorn Creek	1.32
South Holland	Cal-Union Drainage Ditch	2.11
	Little Calumet River IL	4.20
	Thorn Creek	0.99
Steger	Deer Creek	0.02
	Thorn Creek	0.61
Thornton	Cal-Union Drainage Ditch	0.29
	Thorn Creek	2.10
Tinley Park	Midlothian Creek	5.47
	Natalie Creek	0.05
University Park	Butterfield Creek	0.11
Unincorporated and Forest Preserve	Butterfield Creek	6.57
	Cal-Union Drainage Ditch	1.19
	Deer Creek	0.60
	Little Calumet River IL	2.51
	Midlothian Creek	3.61
	Natalie Creek	0.79
	North Creek	4.59
Thorn Creek	2.97	

## 2.2 Stormwater Problem Data

To support DWP development, the District solicited input from stakeholders within the watershed. Municipalities, townships, countywide, statewide, and national agencies such as Cook County Highway Department (CCHD), Illinois Department of Natural Resources (IDNR), Illinois Department of Transportation (IDOT), Federal Emergency Management Agency (FEMA) and the USACE, for example, were asked to fill out two forms with information to support DWP development. Organizations such as ecosystem partnerships were also contacted by the District as part of this information-gathering effort. Form A included questions on stormwater data and regulations, Form B included questions on known flooding, erosion, and stream maintenance problem areas. In addition to problem areas reported by municipalities, townships, public agencies and other stakeholders, results from H&H modeling performed as a part of DWP development was used to identify stormwater problem areas. The H&H modeling process is described in general in **Section 1.3** and specifically for each modeled tributary in **Section 3**.

**Figure 2.2.1** and **Table 2.2.1** summarize the responses to Form B questions about flooding, erosion, and stream maintenance problem areas. As noted, the scope of the DWP addresses regional problems along open channel intercommunity waterways. The definition of regional problems is provided in **Section 1**.

**Table 2.2.1: Summary of Responses to Form B Questionnaire**

<b>Problem ID</b>	<b>Municipality</b>	<b>Problem as Reported by Local Agency</b>	<b>Location</b>	<b>Problem Description</b>	<b>Local/Regional</b>	<b>Reason for Classification</b>
BL01	Bloom Township	Storm sewer flow restriction, other	Steger Road from Wallace Avenue to Indiana State Line	Storm sewer flow restriction	Local	5
BL02	Bloom Township	Storm sewer flow restriction, other	Sauk Trail Road from Western Avenue to Torrence Avenue	Partially related to local storm sewer system; maintenance issue and overbank flooding near State Street	Local	5
BL03	Bloom Township	Vegetation and drifting of creek	26 <sup>th</sup> Street from East End Avenue to State Street	Culvert and channel blockage	Local	6
BL04	Bloom Township	Storm sewer flow restriction	Glenwood Lansing Road from Glenwood Dyer Road to Indiana State Line	Undersized trunk storm sewer	Local	5
BL05	Bloom Township	Storm sewer flow restriction, other	State Street from Sauk Trail Road to Main Street	Local drainage issue	Local	5
BL06	Bloom Township	Siltation and stream migrating	Cottage Grove Avenue from Steger Road to 183 <sup>rd</sup> Street	Siltation and stream migrating	Local	6
BL07	Bloom Township	Silt and debris accumulating under the bridge	Stony Island Avenue from Joe Orr Road to 183 <sup>rd</sup> Street	Silt and debris accumulating under the bridge	Local	6
BL08	Bloom Township	Storm sewer flow restriction	Torrence Avenue from Steger Road to Sauk Trail	Undersized storm sewer, high water level at outfall	Local	5
BL09	Bloom Township	Overbank Flooding	West side of Torrence Avenue, south of Katz Corner Road (223 <sup>rd</sup> Street)	Flooding due to roadway overtopping of Katz Corner and backflow to Torrence Avenue	Regional	1
BLI1	Blue Island	Flooding due to culvert blockages	Western Avenue and 139 <sup>th</sup> Street	Stream maintenance	Local	6
BRE1	Bremen Township	Storm sewer flow restriction	175 <sup>th</sup> Street from Oak Park Avenue to Argyle Avenue	Siltation	Local	5
BRE2	Bremen Township	Storm sewer flow restriction	167 <sup>th</sup> Street from Harlem Avenue to Cicero Avenue	Stream maintenance	Local	5
BRE3	Bremen Township	Debris at the upstream end of culvert	167 <sup>th</sup> Street from Kilbourn Avenue to Western Avenue	Stream maintenance	Local	6
BRE6	Bremen Township	Storm sewer flow restriction	Central Avenue from 183 <sup>rd</sup> Street to Midlothian Turnpike	Stream maintenance	Local	5
BRE7	Bremen Township	Storm sewer flow restriction	Ridgeland Avenue from 147 <sup>th</sup> Street to 135 <sup>th</sup> Street	Stream maintenance	Local	5

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BRE8	Bremen Township	Storm sewer flow restriction	Kedzie Avenue from 183 <sup>rd</sup> Street to 135 <sup>th</sup> Street	Debris, siltation, storm sewer restriction	Local	5
CAC1	Calumet City	Basement flooding, ponding	East State Street to 4 blocks south, between Calhoun Avenue and Hoxle Avenue	Storm sewer flow restriction	Local	5
CAC2	Calumet City	Basement flooding, ponding, storm sewer flow restriction	10 blocks centered at Wilson Avenue and Manistee Avenue	Storm sewer flow restriction	Local	5
CAC3	Calumet City	Basement flooding, ponding, storm sewer flow restriction	154 <sup>th</sup> Place to 155 <sup>th</sup> Street by Price Street to Freeland Avenue	Storm sewer flow restriction	Local	5
CAC4	Calumet City	Pavement flooding	Route 6 from I-94 to Torrence Avenue	IDOT reported pavement flooding, storm sewer flow restriction	Local	5
CAC5	Calumet City	Pavement flooding	Route 83 at Torrence Avenue	IDOT reported pavement flooding, storm sewer flow restriction	Local	5
CAC6	Calumet City	Bank erosion and sedimentation	160 <sup>th</sup> Street and Torrence Avenue	Bank erosion and sedimentation	Local	8
CAC7	Calumet City	Wetlands and riparian areas at risk	Wenworth Avenue and River Oaks Drive	Water quality problems from wetland and riparian areas	Local	8
CAP1	Calumet Park	Basement flooding, ponding	North half of town (near Ashland Avenue; and 127 <sup>th</sup> Street to 123 <sup>rd</sup> Street)	Basement flooding, ponding	Local	5
CCU1	Unincorporated Cook County	Pavement flooding	Steger Road between Burnham Avenue and Indiana border	Cook County Highway Department reported pavement flooding	Local	2
CHT1	Chicago Heights	Overbank flooding, basement flooding	Miller Avenue (Chicago, Route 1) to Jackson – railroad tracks	Problem is due to local drainage issues.	Local	5
CHT2	Chicago Heights	Overbank flooding	26 <sup>th</sup> Street and Chicago Vincennes Road	Problem is due to local drainage issues.	Local	5
CHT3	Chicago Heights	Pavement flooding	Route 30 at Cottage Grove Avenue	Roadway flooding at US 30; properties flooded north of US 30	Local	2

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CHT4	Chicago Heights	Pavement flooding	Route 30 at Orchard Street	IDOT reported pavement flooding, storm sewer flow restriction	Local	5
CHT5	Chicago Heights	Pavement flooding	Route 30 at Halsted Street	Problem is due to local drainage issues	Local	5
CHT6	Chicago Heights	Pavement flooding	Route 30 at State and East End Avenue	Problem is due to local drainage issues	Local	5
CHT7	Chicago Heights	Overbank flooding	Chicago Vincennes Road and South of Flossmoor Road	Problem is due to local drainage issues	Local	5
CHT8	Chicago Heights	Ponding, water quality and bank erosion and sedimentation	12 <sup>th</sup> Street and Halsted Avenue	Problem is due to local drainage issues	Local	5
CHT9	Chicago Heights	Pavement flooding	Center Street/Illinois Central/Canadian National Railroad Ditch	Cook County Highway Department reported pavement flooding	Local	2
COU1	Country Club Hills	Ponding	NE corner of Pulaski Road and 175 <sup>th</sup> Street	Ponding	Local	5
COU2	Country Club Hills	Pavement flooding	Route 50 at 189 <sup>th</sup> Street	IDOT reported pavement flooding, storm sewer flow restriction	Local	2
DIX1	Dixmoor	Pavement flooding	Wood Street at Thornton Road	IDOT reported pavement flooding, storm sewer flow restriction	Local	5
DOL1	Dolton	Ponding	Between Main Street and 146 <sup>th</sup> Street and Ingleside Avenue and Dante Avenue	Ponding	Local	5
DOL2	Dolton	Ponding	Park Avenue from Main Street to Lincoln Avenue	Ponding	Local	5
DOL3	Dolton	Ponding	144 <sup>th</sup> Street from Indiana Avenue to Jackson Street	Ponding	Local	5
DOL4	Dolton	Ponding	Between State Street and Indiana Avenue from 146 <sup>th</sup> Street to village limits south of 149 <sup>th</sup> Street	Ponding	Local	5



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DOL5	Dolton	Pavement flooding	Indiana Avenue between 146 <sup>th</sup> to 147 <sup>th</sup> Streets	IDOT reported pavement flooding	Local	2
EHC1	East Hazel Crest	Pavement flooding	171 <sup>st</sup> Street between Ashland Avenue and South Park Avenue	Cook County Highway Department reported pavement flooding	Local	2
FLO1	Flossmoor	Overbank flooding, basement flooding, storm sewer flow restriction	Intersection of Kathleen Lane and Alexander Crescent	Storm sewer flow restriction	Local	5
FLO2	Flossmoor	Overbank flooding, basement flooding, storm sewer flow restriction	Dartmouth Road and Flossmoor Road	Overbank flooding	Regional	1
FLO3	Flossmoor	Overbank flooding, basement flooding, storm sewer flow restriction	Dartmouth Road and Flossmoor Road	Overbank flooding	Regional	1
FLO4	Flossmoor	Overbank flooding, basement flooding, storm sewer flow restriction	Brockwood Road/Butterfield Road	Overbank flooding	Regional	1
FLO5	Flossmoor	Pavement flooding	Dixie Highway at Flossmoor Road	Pavement flooding	Local	5
FLO6	Flossmoor	Pavement flooding	Dixie Highway at Holbrook Road to Vollmer Road	Pavement flooding	Local	5
FLO7	Flossmoor	Pavement flooding	Western Avenue between Vollmer Road and Flossmoor Road	Pavement flooding	Local	5
FLO8	Flossmoor	Pavement flooding	Vollmer Road at Butterfield Creek	IDOT reported pavement flooding	Local	2
FHT1	Ford Heights	New reservoir not in service	Woodlawn Avenue and 17th Street	Overbank flooding South of US HWY 30	Regional	1
GLW1	Glenwood	Overbank flooding	187 <sup>th</sup> Street/193 <sup>rd</sup> Street/193 <sup>rd</sup> Place/194 <sup>th</sup> Street/Minerva Avenue and Jane Street	Flooding within local subdivision. Located on local tributary to North Creek	Local	5
GLW2	Glenwood	Overbank flooding, basement flooding	187 <sup>th</sup> Street and Glenwood-Chicago Heights Road	Low lying residential area and Boy's school is inundated from overbank flooding from Thorn and Butterfield Creek	Regional	1

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GLW3	Glenwood	Prone to beaver dams	Deer Creek/Thorn Creek confluence	Local drainage issue	Local	6
GLW4	Glenwood	Bank erosion and sedimentation, storm sewer restriction, water quality, wetland/riparian areas at risk	Cottage Grove Avenue and Glenwood Lansing Road	Local channel and storm sewer backups	Local	5
HAR1	Harvey	Basement flooding, ponding	Entire village	Local drainage causing basement and street flooding	Local	5
HAR2	Harvey	Pavement flooding	Route 1 at 151 <sup>st</sup> Street	Local channel and storm sewer backups	Local	5
HAR3	Harvey	Pavement flooding	Route 6 at Park Avenue (River Oaks Golf Course)	Local drainage may be causing basement and street flooding. Modeling shows flooding due to CUDD overtopping during the 100 year event	Local	5
HAR4	Harvey	Pavement flooding	Route 6 between Park Avenue and Center Street	IDOT reported pavement flooding	Local	2
HAR5	Harvey	Pavement flooding	Route 83 at Clinton Street	IDOT reported pavement flooding	Local	2
HAR6	Harvey	Pavement flooding	Route 83 at Illinois Route 1	Local drainage problem at this underpass	Local	2
HAR7	Harvey	Pavement flooding	Route 83 at Illinois Central Railroad	IDOT reported pavement flooding	Local	2
HAR8	Harvey	Siltation and vegetation	Lathrop Avenue and 161 <sup>st</sup> Street	Siltation and vegetation	Local	6
HCT1	Hazel Crest	Siltation pond needs regular dredging	172 <sup>nd</sup> Street and Palmer Avenue	Siltation pond needs regular dredging	Local	6
HWD1	Homewood	Pavement flooding	Route 1 at 183 <sup>rd</sup> Street to 195 <sup>th</sup> Street	IDOT reported pavement flooding	Local	2
LAN1	Lansing	Overbank flooding	South of 188 <sup>th</sup> Street and Torrence Avenue to north of 188 <sup>th</sup> Place and Park Avenue	Overbank flooding in topographically flat area causes overtopping of local roads and flooding on residential properties	Regional	1

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LAN2	Lansing	Basement flooding	Between Wildwood Avenue and Greenbay Avenue, and North Creek and 190 <sup>th</sup> Street	Basement backups caused by high water level at outfall for local sewer system	Local	5
LAN3	Lansing	Basement flooding	South Manor Drive to Otto Street, and Burnham Avenue to Wentworth Avenue	Basement backups caused by high water level at outfall for local sewer system and water entering homes via overland flooding	Local	5
LAN4	Lansing	Pavement flooding	Burnham Avenue at 170 <sup>th</sup> Street (at river)	Road overtop from Little Calumet River	Regional	3
LAN5	Lansing	Pavement flooding	I-80 at Torrence Avenue	IDOT reported pavement flooding	Local	2
LAN6	Lansing	Bank erosion and sedimentation	Torrence Avenue to Stony Island Avenue	Beaver dams in North Creek	Local	8
LAN7	Lansing	Bank erosion and sedimentation	Lake Wampum Forest Preserve	Erosion along the banks of Forest Preserve Lake. Appeared that problem had been resolved during field inspection	Regional	9
LAN8	Lansing	Pavement flooding	Wenworth Avenue at North Creek	Cook County Highway Department reported pavement flooding	Local	2
LYN1	Lynwood	Overbank flooding, ponding, storm sewer flow restriction, bank erosion and sedimentation	202 <sup>nd</sup> Street to 203 <sup>rd</sup> Street and Burnham Avenue	Widespread flooding due to overbank flooding of Lansing Ditch and Lynwood Tributary, undersized hydraulic openings of crossings	Regional	1
LYN2	Lynwood	Overbank flooding, basement flooding, ponding, storm sewer flow restriction, bank erosion and sedimentation	Joe Orr Road and Bluestem Parkway	Flooding due to local storm sewer system backups and local detention pond performance	Local	5
LYN3	Lynwood	Overbank flooding, basement flooding, ponding, storm sewer flow restriction, bank erosion and sedimentation	Lincoln Lansing Drainage Ditch and Lake Lynwood	Lack of channel conveyance capacity and undersized hydraulic structures at crossings causing overbank flooding	Regional	1

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LYN4	Lynwood	Heavy siltation	Lincoln Highway and Sauk Trail Road	Heavy siltation	Local	6
LYN5	Lynwood	Silt and sedimentation	Near Glenwood Lansing Road and Burnham Avenue	Sedimentation at cross culvert under roadway	Local	6
MAT1	Matteson	Channel blockages	Route 30 and Governors Highway	Stream maintenance	Local	6
MAT12	Matteson	Overbank flooding	Chicago Vincennes Road and South of Flossmoor Road	Pavement flooding	Local	5
MAT2	Matteson	Storm sewer flow restriction	Cicero Avenue and Vollmer Road	Stormsewer flow restriction	Local	5
MAT3	Matteson	Storm sewer flow restriction	Route 30 and Ridgeland Avenue	Storm sewer flow restriction	Local	5
MAT4	Matteson	Storm sewer flow restriction	Lindenwood - Rose Lane	Storm sewer flow restriction	Local	5
MAT5	Matteson	Storm sewer flow restriction	1/4 to 1/2 mile south of Route 30 and Kostner Avenue	Storm sewer flow restriction	Local	5
MAT6	Matteson	Pavement flooding	Crawford Avenue at 216 <sup>th</sup> and 219 <sup>th</sup> Streets	IDOT reported pavement flooding	Regional	1
MAT7	Matteson	Pavement flooding	Crawford Avenue at 221 <sup>st</sup> Street (North of Sauk Trail Road)	IDOT reported pavement flooding	Regional	1
MAT8	Matteson	Pavement flooding	Governors Highway at E, J, and E Railroad tracks viaduct (North of 219 <sup>th</sup> Street)	IDOT reported pavement flooding	Regional	1
MAT9	Matteson	Pavement flooding	Governors Highway from Route 30 to 216 <sup>th</sup> Street	Pavement flooding	Local	5
MAT10	Matteson	Pavement flooding	Route 30 at Central Avenue to Ridgeland Avenue	IDOT reported pavement flooding	Local	5
MAT11	Matteson	Pavement flooding	Route 30 at Illinois Route 50 (Cicero Avenue)	IDOT reported pavement flooding	Local	5
MID1	Midlothian	Overbank flooding, ponding, storm sewer flow restriction	149 <sup>th</sup> Street and Kilpatrick Avenue	Natalie Creek Overbank flooding	Regional	1
MID2	Midlothian	Overbank FLOODING, PONDING	149 <sup>th</sup> Street and Kenton Avenue	Natalie Creek Overbank flooding	Regional	1
MID3	Midlothian	Overbank flooding, basement flooding, ponding	147 <sup>th</sup> Street and Kolmar Avenue	Natalie Creek Overbank flooding	Regional	1

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MID4	Midlothian	Overbank flooding	147 <sup>th</sup> Street and Kilbourn Avenue	Natalie Creek Overbank flooding	Regional	1
MID5	Midlothian	Overbank flooding, basement flooding, ponding, storm sewer flow restriction	146 <sup>th</sup> Street and Keeler Avenue	Natalie Creek Overbank flooding	Regional	1
MID6	Midlothian	Overbank flooding, basement flooding, ponding, storm sewer flow restriction	146 <sup>th</sup> Street and Karlov Avenue	Natalie Creek Overbank flooding	Regional	1
MID7	Midlothian	Overbank flooding, ponding	146 <sup>th</sup> Street and Keystone Avenue	Natalie Creek Overbank flooding	Regional	1
MID8	Midlothian	Basement flooding, ponding and storm sewer flow restriction	151 <sup>st</sup> Street and Ridgeway Avenue	Basement Flooding, Ponding and Storm Sewer Flow Restriction	Local	5
MID9	Midlothian	Pavement flooding	Route 50 at 151 <sup>st</sup> Street	Natalie Creek overbank flooding	Regional	1
MID10	Midlothian	Pavement flooding	Route 6 at Crawford Avenue to Cicero Avenue	Overbank flooding	Regional	1
MID11	Midlothian	Pavement flooding	Route 83 at Kostner Avenue	Natalie Creek overbank flooding	Regional	1
MID12	Midlothian	Restriction from intersection to drainage ditch system	151 <sup>st</sup> Street and Kilbourn Avenue	Natalie Creek overbank flooding	Regional	1
MID13	Midlothian	Lack of proper grade to Calumet Union Drainage Ditch	153 <sup>rd</sup> Street and Lawndale Avenue	Storm sewer flow restriction	Local	5
MRK1	Markham	Overbank flooding	Arthur Terrace and Blackstone Avenue/Lawndale Avenue	Lack of channel conveyance capacity and undersized hydraulic strictures at crossings causing overbank flooding.	Regional	1
MRK2	Markham	Ponding	Dixie Highway and Western Avenue/159 <sup>th</sup> Street and 156 <sup>th</sup> Place	Local flooding due to local drainage problems, not overbank flooding from CUDD or Belaire Creek	Local	5
MRK3	Markham	Overbank flooding, ponding	Dixie Highway and Park Avenue/167 <sup>th</sup> and 161 <sup>st</sup> Streets	Overbank flooding from CUDD and additional basement flooding due to local drainage problems	Regional	1

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MRK4	Markham	Overbank flooding, ponding	Lincoln Highway and Parkside Avenue/California and Lincoln Highway	Overbank flooding from Belaire Creek with additional basement flooding likely due to local drainage problems	Regional	1
MRK5	Markham	Storm sewer flow restriction	Lawndale Avenue and 167 <sup>th</sup> Street	Basement flooding due to local drainage problems	Local	5
MRK6	Markham	Ponding	Oxford Drive and Richmond Avenue/2800 Circle Drive	Storm sewer flow restriction	Local	5
MRK7	Markham	Ponding	Magnolia Drive and Alta Road	Ponding	Local	5
MRK8	Markham	Ponding	155 <sup>th</sup> Street and Lawndale Avenue	Ponding	Local	5
MRK9	Markham	Basement flooding, ponding	West to Rockwell Avenue and 162 <sup>nd</sup> to 159 <sup>th</sup> Streets	Basement flooding, ponding	Regional	1
MRK10	Markham	Ponding, storm sewer flow restriction	154 <sup>th</sup> Street to 155 <sup>th</sup> Street/Crawford Avenue to Hamlin Avenue	Ponding, storm sewer flow restriction	Local	5
MRK11	Markham	Pavement flooding	Route 6 at 6000 West	IDOT reported pavement flooding	Local	2
OKF1	Oak Forest	Ponding	151 <sup>st</sup> Street and Boca Rio Drive	Ponding	Local	5
OKF2	Oak Forest	Overbank flooding, basement flooding, ponding, storm sewer flow restriction, bank erosion and sedimentation , wetland/riparian at risk	Natalie Creek, 159 <sup>th</sup> Street to 151 <sup>st</sup> Street	Overbank flooding	Regional	1
OKF3	Oak Forest	Pavement flooding	Route 50 at 158 <sup>th</sup> Street (Metra viaduct)	IDOT reported pavement flooding	Local	2
OKF4	Oak Forest	Pavement flooding	Route 6 at Central Avenue to Oak Park Avenue	IDOT reported pavement flooding	Local	2
OKF5	Oak Forest	Bank erosion and sedimentation	North of 155 <sup>th</sup> Street and Long Avenue	Culverts in need of maintenance	Local	6
OLY1	Olympia Fields	Basement flooding and public areas	Suburban Woods Subdivision (near 207 <sup>th</sup> Street and Olympian Way)	Basement flooding and ponding	Local	5

**Table 2.2.1: Summary of Responses to Form B Questionnaire**

<b>Problem ID</b>	<b>Municipality</b>	<b>Problem as Reported by Local Agency</b>	<b>Location</b>	<b>Problem Description</b>	<b>Local/Regional</b>	<b>Reason for Classification</b>
OLY2	Olympia Fields	Basement flooding and public areas	Fairway Estates/Olympia Woods Subdivision (near Promethian Way and Chariot Lane)	Storm sewer flow restriction and ponding	Local	5
OLY3	Olympia Fields	Basement flooding and public areas	Graymoor Subdivision (near Western Avenue and Vollmer Road)	Storm sewer flow restriction and ponding	Local	5
OLY4	Olympia Fields	Intersection flooding	Vollmer Road and Crawford Avenue	Storm sewer flow restriction and ponding	Local	5
OLY5	Olympia Fields	Inadequate viaduct capacity	Vollmer Road Metra Viaduct (near Kedzie Avenue)	Stormsewer flow restriction and ponding	Local	5
OLY6	Olympia Fields	Inadequate capacity at intersection inlet	US Route 30 at Western Avenue	IDOT reported pavement flooding	Local	5
OLY7	Olympia Fields	Inadequate capacity at intersection inlet	Orchard Drive and US Route 30	Storm sewer flow restriction and ponding	Local	5
OLY8	Olympia Fields	Inadequate capacity at intersection inlet	203 <sup>rd</sup> Street east of Crawford Avenue in front of St. James Hospital and Health Center	Storm sewer flow restriction and ponding	Local	5
OLY9	Olympia Fields	Basement flooding and public areas	Sparta Court off of Brockwood Drive	Storm sewer flow restriction and ponding	Local	5
OLY10	Olympia Fields	Pavement flooding	Governors Highway at Pulaski Road	IDOT reported pavement flooding	Local	2
OLY11	Olympia Fields	Pavement flooding	US Route 30 at Western Avenue	IDOT reported pavement flooding	Local	2
OLY12	Olympia Fields	Pavement flooding	Route 30 at railroad bridge (viaduct) w/o Olympian Way	IDOT reported pavement flooding	Local	2
ORH2	Orland Hills	Overbank flooding, ponding, bank erosion and sedimentation, wetland/riparian areas at risk	88 <sup>th</sup> Court Detention Pond (near 167 <sup>th</sup> Street and 88 <sup>th</sup> Avenue)	Problem is due to local drainage issues. Appears to the same problem as OLY6	Local	5
ORP5	Orland Park	Overbank flooding, bank erosion and sedimentation	167 <sup>th</sup> Street and 88 <sup>th</sup> Avenue	Stream maintenance	Local	6
ORT2	Orland Township	Storm sewer flow restriction, bank erosion and sedimentation	80 <sup>th</sup> Avenue from 183 <sup>rd</sup> Street to 151 <sup>st</sup> Street	Stream maintenance	Local	6

**Table 2.2.1: Summary of Responses to Form B Questionnaire**

<b>Problem ID</b>	<b>Municipality</b>	<b>Problem as Reported by Local Agency</b>	<b>Location</b>	<b>Problem Description</b>	<b>Local/Regional</b>	<b>Reason for Classification</b>
PAR1	Park Forest	During large rain events, drainageway becomes flooded and ponds. Water levels rise into backyards of residents that reside adjacent to this drainageway	East Rocket Circle/West Rocket Circle (near Lakewood Boulevard/Orchard Drive)	Residences ponding from Thorn Creek Tributary D due to undersized culverts	Regional	1
PAR2	Park Forest	Stormwater flow restriction at twin culvert pipes crossing under Western Avenue	Western Avenue and EJ&E Railroad (South Street)	Local drainage obstructions	Local	5
PAR3	Park Forest	Pavement flooding	26 <sup>th</sup> Street at Euclid Avenue to Western Avenue	IDOT reported pavement flooding	Regional	3
PAR4	Park Forest	Pavement flooding	Western Avenue at Route 30 to 26 <sup>th</sup> Parkway	Flooding due to local drainage issues	Local	2
RIT2	Rich Township	Siltation and vegetation	Sauk Trail Road from Harlem Avenue to Western Avenue	Siltation and vegetation	Local	6
RIT3	Rich Township	Debris in channel	Vollmer Road from Harlem Avenue to Western Avenue	Debris in channel	Local	6
RIT4	Rich Township	Siltation	Flossmoor Road from Ridgeland Avenue to Governors Highway	Siltation	Local	6
RIT6	Rich Township	Siltation and debris	Ridgeland Avenue from Steger Road to 183 <sup>rd</sup> Street	Siltation and debris	Local	6
RIC1	Richton Park	Overbank flooding and street flooding	North of Maple Avenue, west of Governors Highway, along Butterfield Creek	Overbank flooding from Butterfield Creek	Regional	1
RIC2	Richton Park	Flooding due to beaver dams	North of Poplar Avenue, along Butterfield Creek Tributary	Local drainage issue	Local	6
RIC3	Richton Park	Flooding on tributary upstream of Lake George	North of Steger Road, west of Lakeshore Drive	Problem is due to local drainage issues	Local	5
RIC4	Richton park	Flooding on Hickory Creek	Northwest corner of Sauk Trail Road and Central Avenue	Flooding on Hickory Creek	Outside Watershed	9
RIC5	Richton Park	Flooding occurs at two locations along this tributary. The flooding takes place primarily with rain events of 1-inch or more	Tributary crossing with Central Park Avenue	Undersized culverts	Local	2



**Table 2.2.1: Summary of Responses to Form B Questionnaire**

<b>Problem ID</b>	<b>Municipality</b>	<b>Problem as Reported by Local Agency</b>	<b>Location</b>	<b>Problem Description</b>	<b>Local/Regional</b>	<b>Reason for Classification</b>
RIC6	Richton Park	Pavement flooding	Governors Highway at Sauk Trail Road	Overbank flooding	Regional	1
RVD1	Riverdale	Pavement flooding	Ashland Avenue at near 138 <sup>th</sup> Street	IDOT reported pavement flooding	Local	2
RVD2	Riverdale	Pavement flooding	Ashland Avenue at 134 <sup>th</sup> Street Crossing	IDOT reported pavement flooding	Local	2
RVD3	Riverdale	Pavement flooding	Ashland Avenue at 142 <sup>nd</sup> Street Crossing	IDOT reported pavement flooding	Local	2
ROB1	Robbins	Overbank flooding	137 <sup>th</sup> Street and 139 <sup>th</sup> Street from Kedzie Avenue 3 blocks east	Overbank flooding	Regional	1
ROB2	Robbins	Overbank flooding	Kedzie Avenue and 139 <sup>th</sup> Street	Overbank flooding	Regional	1
SKV1	Sauk Village	Pavement flooding	Route 30 at Torrence Avenue	Pavement flooding due to undersized culvert	Local	2
SKV2	Sauk Village	Overbank flooding	Torrence Avenue and 223 <sup>rd</sup> Street/Katz Corner Road	Pavement flooding due to undersized culvert	Regional	1
SHO1	South Holland	Overbank flooding	Little Calumet River throughout South Holland	Pavement flooding due to undersized culvert	Regional	1
SHO2	South Holland	Pavement flooding	I-94 at 159 <sup>th</sup> Street (to I.80)	Flooding of highway. Residents stated that problem no longer exists since Thornton Transitional Quarry came online. No flooding shown in model	Regional	9
SHO3	South Holland	Pavement flooding	I-94 at 170 <sup>th</sup> Street	Overtopping of major roadway	Regional	3
STE1	Steger	Pavement flooding	State Street at 227 <sup>th</sup> Place	Overtopping of major roadway	Regional	1
TRN1	Thornton	Basement flooding, ponding	400 East Margaret Street (Brownell)	Overbank flooding from Thorn Creek tributary	Regional	1
THO1	Thornton Township	Bank erosion and sedimentation	Thornton Road from Dixie Highway (Chatham) to Wood Street	Bank Erosion and Sedimentation	Local	5
THO2	Thornton Township	Storm sewer flow restriction	171 <sup>st</sup> Street from Robey Street to Halsted Street	Other (siltation, storm sewer flow restriction)	Local	5

**Table 2.2.1: Summary of Responses to Form B Questionnaire**

Problem ID	Municipality	Problem as Reported by Local Agency	Location	Problem Description	Local/Regional	Reason for Classification
THO3	Thornton Township	Storm sewer flow restriction	Center Street from 175 <sup>th</sup> Street to 159 <sup>th</sup> Street	Other (debris)	Local	2
TIN1	Tinley Park	Bank erosion and sedimentation	Near Central Avenue and 167 <sup>th</sup> Street	Erosion on 2.7 miles of Midlothian Creek. Building structures are 30 ft away from the erosion	Local	8
TIN2	Tinley Park	Basement flooding, ponding	Oak Park Avenue and 167 <sup>th</sup> Street	Ponding and basement flooding	Local	5
TIN3	Tinley Park	Pavement flooding	Illinois Route 43 at 159 <sup>th</sup> Street to 165 <sup>th</sup> Street	IDOT reported pavement flooding	Local	2
TIN4	Tinley Park	Pavement flooding	Illinois Route 43 at 175 <sup>th</sup> Street railroad underpass	IDOT reported pavement flooding	Local	2
TIN5	Tinley Park	Pavement flooding	Route 6 at Illinois Route 43 (Harlem Avenue)	IDOT reported pavement flooding	Local	2
TIN6	Tinley Park	Pavement flooding	Illinois Route 43 at Rock Island Railroad	IDOT reported pavement flooding	Local	2
TIN7	Tinley Park	Ponding	Ridgeland Avenue and 167 <sup>th</sup> Street	Ponding	Local	5
TIN8	Tinley Park	Ponding	Oak Park Avenue on the west, 179 <sup>th</sup> Street to the north, 183 <sup>rd</sup> Street to the south and 1/4 mi east of Ridgeland Avenue	Ponding	Local	5
TIN9	Tinley Park	Streambank erosion	17251 66 <sup>th</sup> Court	Streambank erosion	Regional	7
TIN10	Tinley Park	Streambank erosion	17147 South Oak Park Avenue	Streambank erosion	Regional	7

**Reasons for Regional/Local Classifications:**

- 1- Located on an open channel intercommunity waterway with greater than 0.5 square mile drainage area
- 2- Roadway culvert (two-lane road)
- 3- Roadway culvert (greater than two-lane road)
- 4- Located in headwater area (less than 0.5 square mile drainage area)
- 5- Located within local storm sewer system (regardless of drainage area)
- 6- Local stream maintenance problem
- 7- Streambank erosion on intercommunity waterways, structures within 30 ft of active erosion
- 8- Streambank erosion on Intra-community (local) waterways
- 9- Flooding problems not studied in the DWP. Problems are already addressed or located outside of the watershed

## 2.3 Watershed Analysis Data

### 2.3.1 Monitoring Data

#### 2.3.1.1 USGS Gage Data

Stage and flow data from 10 USGS stream gages within the Little Calumet River watershed in Cook County, IL and Lake County, IN were used for DWP development. The 15 minute flow and stage data, when available, were used in the calibration of the HEC-HMS and HEC-RAS models. A summary of the gages is shown in **Table 2.3.1** and **Figure 2.3.1** shows the locations these gages.

**Table 2.3.1: Stream Gage Locations**

Gage	Gage No.	Drainage Area (sq mi)	Period of Record	Maximum Flow (cfs)	Maximum Stage (ft)
Hart Ditch at Dyer, IN	USGS 05536179	37.6	2005 - present	3,010	15.69
Hart Ditch at Munster, IN	USGS 05536190	70.7	1942 - present	3,260	8.72
Little Calumet River at Munster, IN	USGS 05536195	90	1958 - present	1,510	17.03
Deer Creek near Chicago Heights, IL	USGS 05536235	23.1	1948 - present	1,380	12.37
Butterfield Creek at Flossmoor, IL	USGS 05536255	23.5	1948 - present	2,640	13.08
Thorn Creek at Thornton, IL	USGS 05536275	104	1948 - present	4,700	17.06
Midlothian Creek at Oak Forest, IL	USGS 05536340	12.6	1950 - present	382	6.15
Little Calumet River at South Holland, IL	USGS 05536290	208	1947 - present	4,760	20.50
Lansing Ditch at Lansing, IL	USGS 05536265	8.84	1948 - present	208	9.52
Thorn Creek at Glenwood, IL	USGS 05536215	24.7	1949 - present	2,600	11.26

#### 2.3.1.2 Rainfall Data

The Illinois State Water Survey (ISWS) owns and maintains 25 rain gages in Cook County. There are 7 ISWS rain gages (Alsip, Tinley Park, Harvey, Lansing, Matteson, Chicago Heights and Wolf Lake) that cover the Little Calumet River Watershed. Rainfall is recorded continuously at 10-minute intervals, processed by the ISWS to ensure quality, and available for purchase. ISWS rainfall data was obtained for these gages for the calibration storms listed in **Section 1.3.2** to support calibration of the Little Calumet River Watershed models. In addition to the ISWS gages, National Weather Service gages at Crete, Monee Reservoir, Crown Point, La Porte, Indiana Dunes, and Valparaiso, USGS rain gages at Chicago Heights, Dyer, Gary, Hobart, Taft, and South Holland and the Community Collaborative Rain, Hail, and Snow Network (CoCoRAHS) daily rainfall totals for various locations were used in the HEC-HMS model for calibration. The NWS, USGS, and CoCoRAHS gages used

varied by storm depending on which gages were available. **Figure 2.3.1** shows the locations of the rain gages used for the Little Calumet River DWP.

### 2.3.2 Subwatershed Delineation

Subbasins were delineated in the Little Calumet River Watershed as described in **Section 1.3.2.1**. Within the watershed, 431 subbasins were delineated ranging in size from 0.005 to 17.8 square miles. The delineation was based on Cook County topographic data, Indiana 5-foot grid cell DEM's, and USGS National Elevation Dataset information for Will County. The subbasin boundaries for the Little Calumet River watershed are shown in **Figure 2.3.2.1**. The subbasin boundaries in Cook County are shown in **Figure 2.3.2.2**.

### 2.3.3 Drainage Network

The principal waterways of the Little Calumet River Watershed were defined during Phase A of DWP development. Initial identification of the stream centerline was made using planimetric data obtained from Cook County. Stream centerlines were reviewed against aerial photography and Cook County contour data at a 1:500 scale, and modified to best represent existing conditions. These stream lines were included in the topographic model of the Little Calumet River Watershed (see **Section 2.3.4**), and collect runoff from upland drainage areas. Secondary drainageways were identified based upon review of contour data. In flat, heavily sewerred areas, consultation of sewer atlases and discussion with community representatives helped to identify significant drainage paths. This identified secondary drainageways were used to define flow paths in the hydrologic models for individual tributaries. **Figure 2.3.3** shows the major drainageways within the Little Calumet River Watershed superimposed upon an elevation map of the watershed.

### 2.3.4 Topography and Benchmarks

Topographic data for the Little Calumet River watershed was developed from Cook County light detection and ranging (LiDAR) data generated from a 2003 LiDAR mission (Cook County, 2003). The LiDAR data was obtained along with break lines from Cook County. A digital elevation model (DEM) was developed for the Little Calumet River watershed model based upon a subset of filtered elevation points. **Figure 2.3.3** shows elevations within the watershed.

Stream channel cross section and stream crossing structure (such as bridge and culvert) topographic data was collected during field survey work conducted primarily between December 2007 and May 2008 to support the DWP. Some additional field survey work was performed during 2009.

The reference benchmarks created during the Cook County aerial mapping project completed in 2003 were used to establish first-order control for field survey work. One hundred thirty-five control points were established during the mapping project. Of those, 25 are National Geodetic Survey (NGS)/High Accuracy Reference Network (HARN) control stations within Cook County and Environs. The remaining points were either existing or new points identified as photo control specifically for the

mapping project. NGS monuments within the region surrounding the Little Calumet River watershed were observed, referenced to HARN, and used to establish first-order control, meeting the horizontal and vertical accuracy standards specified in FEMA’s Guidelines and Specifications for Flood Hazard Mapping, “Guidance for Aerial Mapping” (FEMA 2003). The horizontal ground control was established by GPS technology, and horizontal positioning accuracy met the specifications of the Federal Geodetic Control Subcommittee (FGCS) Second Order Class One.

### 2.3.5 Soil Classifications

NRCS soil data representative of 2005 conditions was obtained for Cook and Will Counties in Illinois and Lake, Porter, and La Porte Counties in Indiana. There are several unmapped areas which include the City of Chicago and some portions of nearby communities that consist primarily of urban land forms. These urban land forms were assumed to be Hydrologic Soil Group C.

The NRCS soil data includes the hydrologic soil group, representing the minimum infiltration rate of the soil after wetting. **Table 2.3.2** summarizes the hydrologic soil groups.

**Table 2.3.2: Hydrologic Soil Groups**

Hydrologic Soil Group	Description	Texture	Infiltration Rates (in/hr)
A	Low runoff potential and high infiltration rates even when wetted	Sand, loamy sand, or sandy loam	> 0.30
B	Moderate infiltration rates when wetted	Silt loam or loam	0.15 - 0.30
C	Low infiltration rates when wetted	Sandy clay loam	0.05 - 0.15
D	High runoff potential and very low infiltration when wetted	Clay loam, silty clay loam, sandy clay, silty clay, or clay	0 - 0.05

All data from *Technical Release 55, Urban Hydrology for Small Watersheds*, NRCS, June 1986

Soil groups with drainage characteristics affected by a high water table are indicated with a “/D” designation, where the letter preceding the slash indicates the hydrologic group of the soil under drained conditions. Thus, an “A/D” indicates that the soil has characteristics of the A soil group if drained but the D group if not. Because of the difficulty of establishing the extent of drainage of these soils for each mapped soil polygon, it was assumed that 50 percent (by area) of the soil types are drained. **Table 2.3.3** summarizes the distribution of hydrologic soil type throughout the Little Calumet River watershed. **Figure 2.3.4** shows the distribution of soil types throughout the watershed.

**Table 2.3.3: Hydrologic Soil Group Distribution**

Hydrologic Soil Group	% of Little Calumet River Watershed
Unmapped	15.7
A	9.1
A/D	0.2
B	21.0
B/D	5.1
C	42.7
C/D	2.0
D	4.2

### 2.3.6 Land Use

Land use has a significant effect on basin hydrology, affecting the volume of runoff produced by a given area and the speed of runoff delivered to the receiving system. Impervious areas restrict infiltration and produce more runoff, which is often delivered to receiving systems more rapidly through storm sewer networks. Land use was one of two principal inputs into the calculation of CN for the Little Calumet River watershed, detailed more extensively in **Section 1.3.2**.

**Table 2.3.4: Land Use Distribution for Little Calumet River Watershed Within Cook County**

Land Use Type	Area (acres)	Percentage of Watershed (%)
Residential	38,996	30.7
Forest/Open Land	22,815	29.5
Commercial/Industrial	11,482	4.6
Water/Wetland	1,997	1.7
Agricultural	9,151	30.9
Transportation/Utility	4,469	1.3
Institutional	4,048	1.2

A 2001 land use inventory for the Chicago metropolitan area was received from CMAP in GIS format. The data was used to characterize existing conditions land use within the Little Calumet River watershed. The data include 49 land use classifications, grouped into seven general categories for summarizing land use within the DWP. **Table 2.3.4** summarizes the land use distribution within the Little Calumet River watershed. **Figure 2.3.5** shows the distribution of general land use categories throughout the watershed.

### 2.3.7 Anticipated Development and Future Conditions

Anticipated development within the Little Calumet River watershed was analyzed using population projection data. Projected future conditions land use data for the Little Calumet River watershed are unavailable from CMAP or other regional agencies. Projected 2030 population data for Cook County was obtained from CMAP. Population data was overlaid upon subwatershed boundaries to identify the potential for increases in subwatershed populations. **Table 2.3.5** shows subwatersheds with a projected population increase from the year 2000 population. Projected increases in population along with current subwatershed land use conditions make it likely that there will also be a corresponding increase in impervious surface area. This potential change in impervious surface area could contribute to higher flow rates and volumes of stormwater runoff drained by those tributaries.

**Table 2.3.5: Projected Populations for Little Calumet River Watershed**

Name	2000 Population	2030 Population	Population Change	% Change
Butterfield Creek	44,333	85,752	41,419	93
Cal Union Drainage Ditch	67,054	72,882	5,828	9
Deer Creek	6,965	9,526	2,561	37
Little Calumet River	119,853	128,344	8,491	7
Midlothian Creek	59,829	72,583	12,754	21
North Creek	10,075	11,852	1,777	18
Thorn Creek	65,873	76,769	10,896	17
Plum Creek	219	383	164	7

Management of future development may be regulated through both local ordinances and the WMO as described below in **Section 2.3.9**. This regulation would be an effort to prevent an increase in peak flows via the construction of site-specific stormwater controls. The impact of the modified hydrologic and hydraulic characteristics of the subwatersheds due to changing land use over time may require the recommended projects to be re-evaluated under the conditions at the time of implementation to refine the details of the final design. To accomplish this, it is recommended that at the time projects are implemented, the H&H models be rerun incorporating any new or updated land use and topographic information.

### **2.3.8 Wetland and Riparian Areas**

Wetland areas within the Little Calumet River watershed were identified using National Wetlands Inventory (NWI) mapping. NWI data includes approximately 5.7 square miles of wetland areas in the Little Calumet River watershed. Riparian areas are defined as vegetated areas between aquatic and upland ecosystems adjacent to a waterway or body of water that provide flood management, habitat, and water quality enhancement. Identified riparian areas defined as part of the DWP offer potential opportunities for restoration. **Figures 2.3.6** and **2.3.7** contain mapping of wetland and riparian areas in the Little Calumet River watershed.

### **2.3.9 Management of Future Conditions Through the Regulations of Site Stormwater Management**

The District regulates the discharge of stormwater runoff from development projects located within separate sewer areas within the District’s corporate boundaries through its Sewer Permit Ordinance. Currently, development projects meeting certain thresholds must provide stormwater detention in an effort to restrict the post-development flow rate to the pre-development flow rate. A number of communities enforce standards beyond the District’s currently required standards and thresholds. This DWP supports the continued regulation of future development through countywide stormwater management.

The Cook County Watershed Management Ordinance (WMO) is under development and is proposed to provide uniform minimum countywide standards for site stormwater runoff for events up to and including the 100-year event that are appropriate for Cook County. This effort seeks to prevent post-development flows from exceeding pre-development conditions. The WMO is proposed to be a comprehensive ordinance addressing site runoff, floodplains, floodways, wetlands, soil erosion and sedimentation, water quality, and riparian environments.