

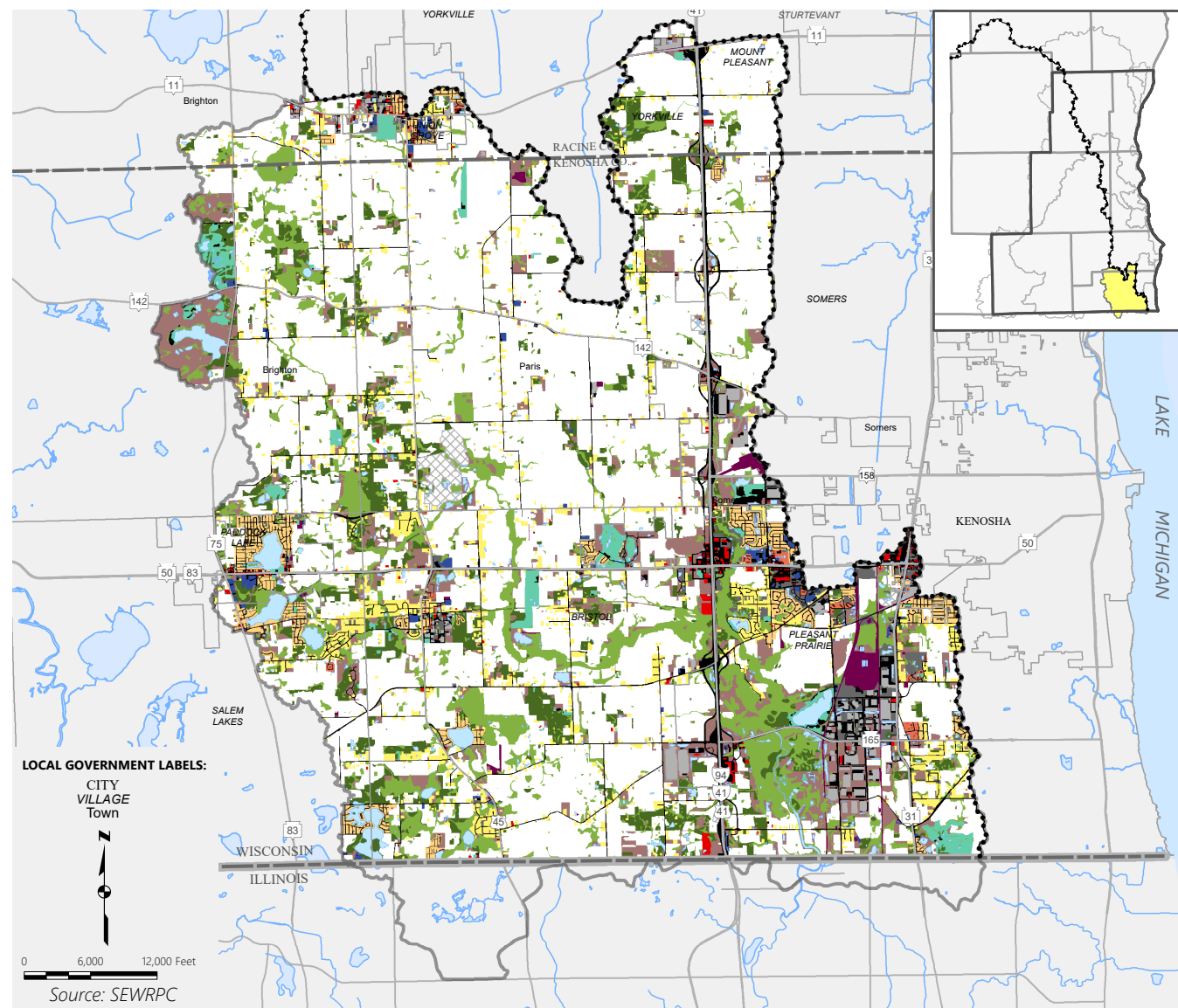
Technical Report No. 63

CHLORIDE CONDITIONS AND TRENDS IN SOUTHEASTERN WISCONSIN

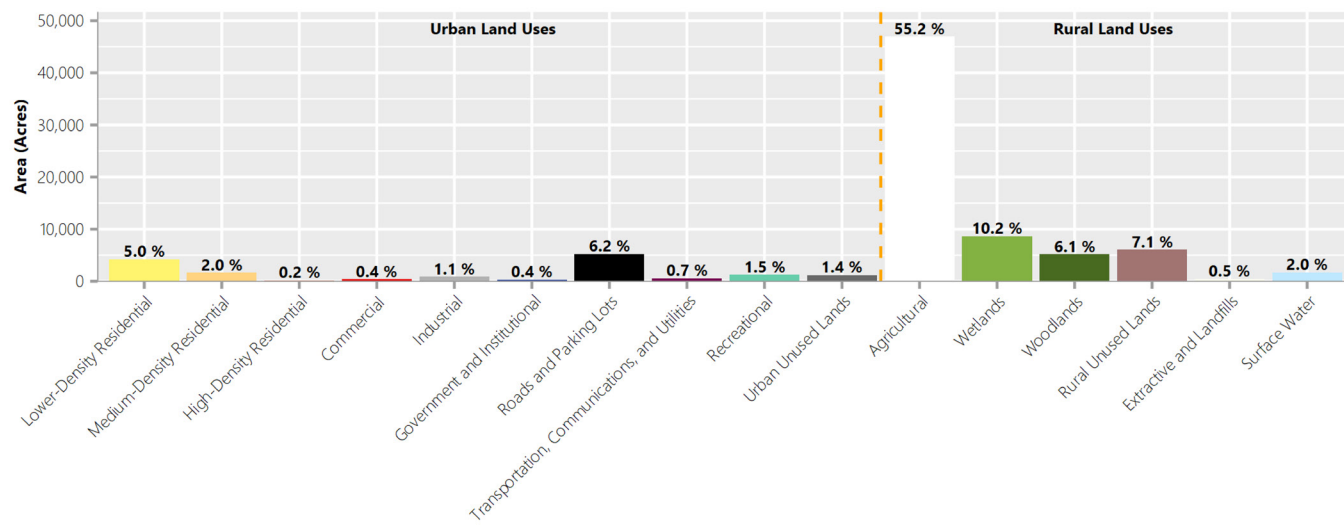
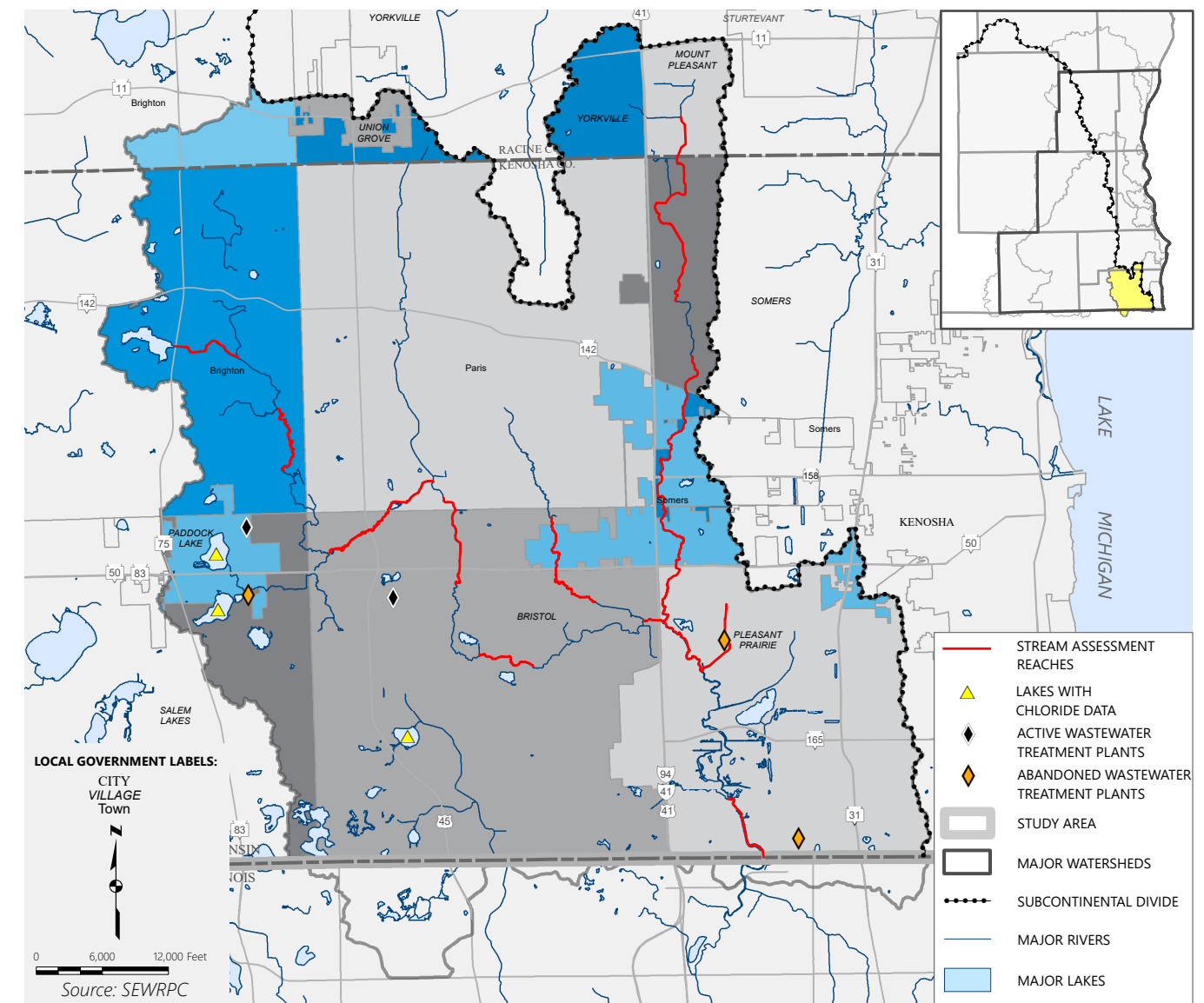
Appendix A

**CHARACTERISTICS OF MAJOR WATERSHEDS
IN THE STUDY AREA**

Map A.1
Existing Land Use in the Des Plaines River Watershed



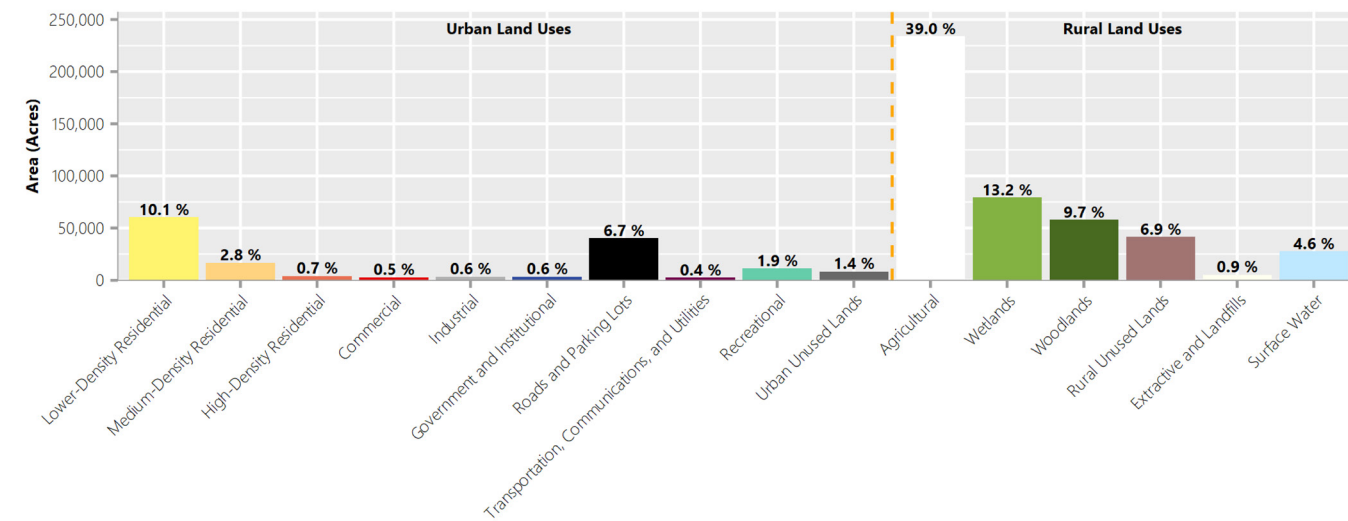
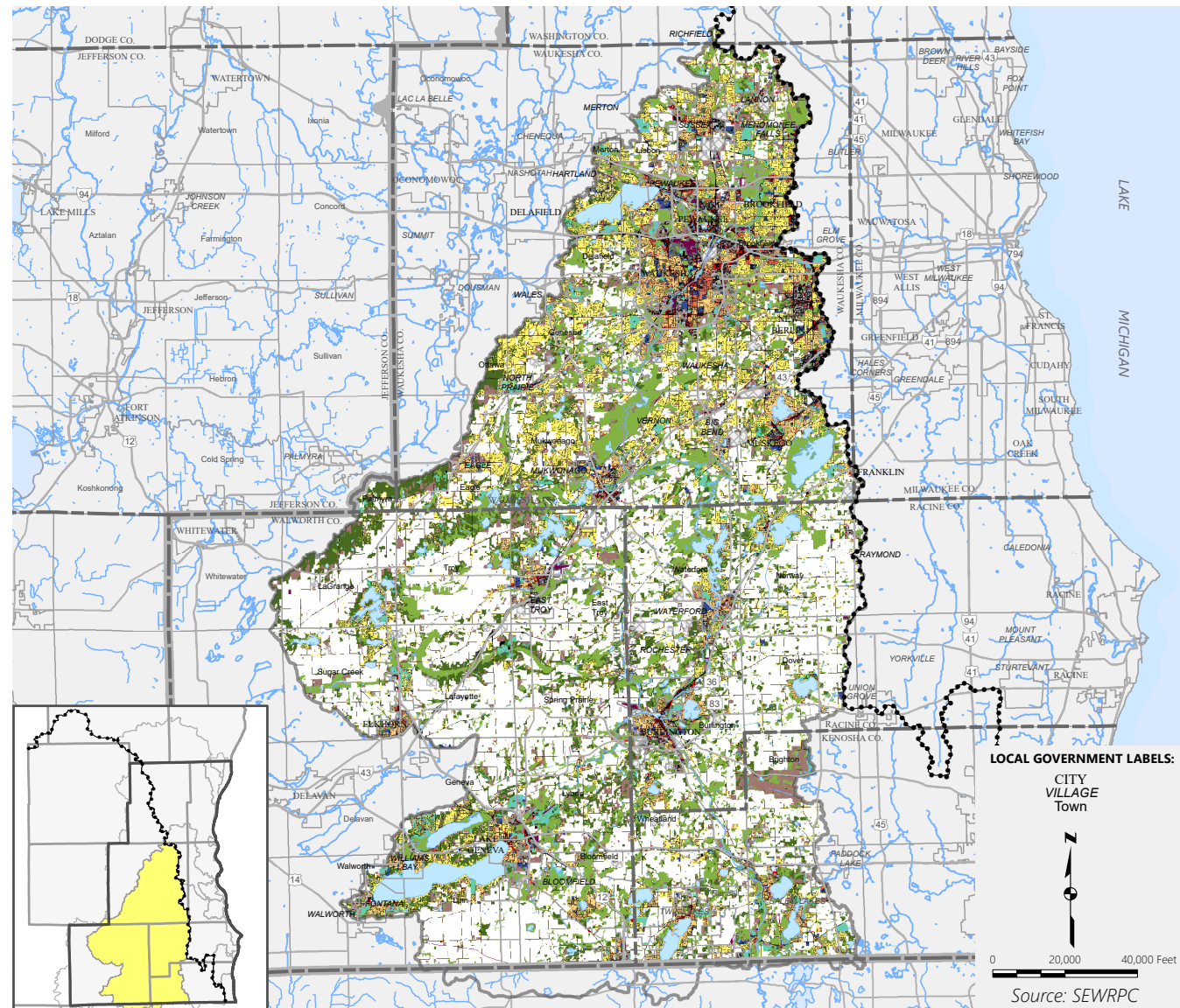
Map A.2
Characteristics of the Des Plaines River Watershed



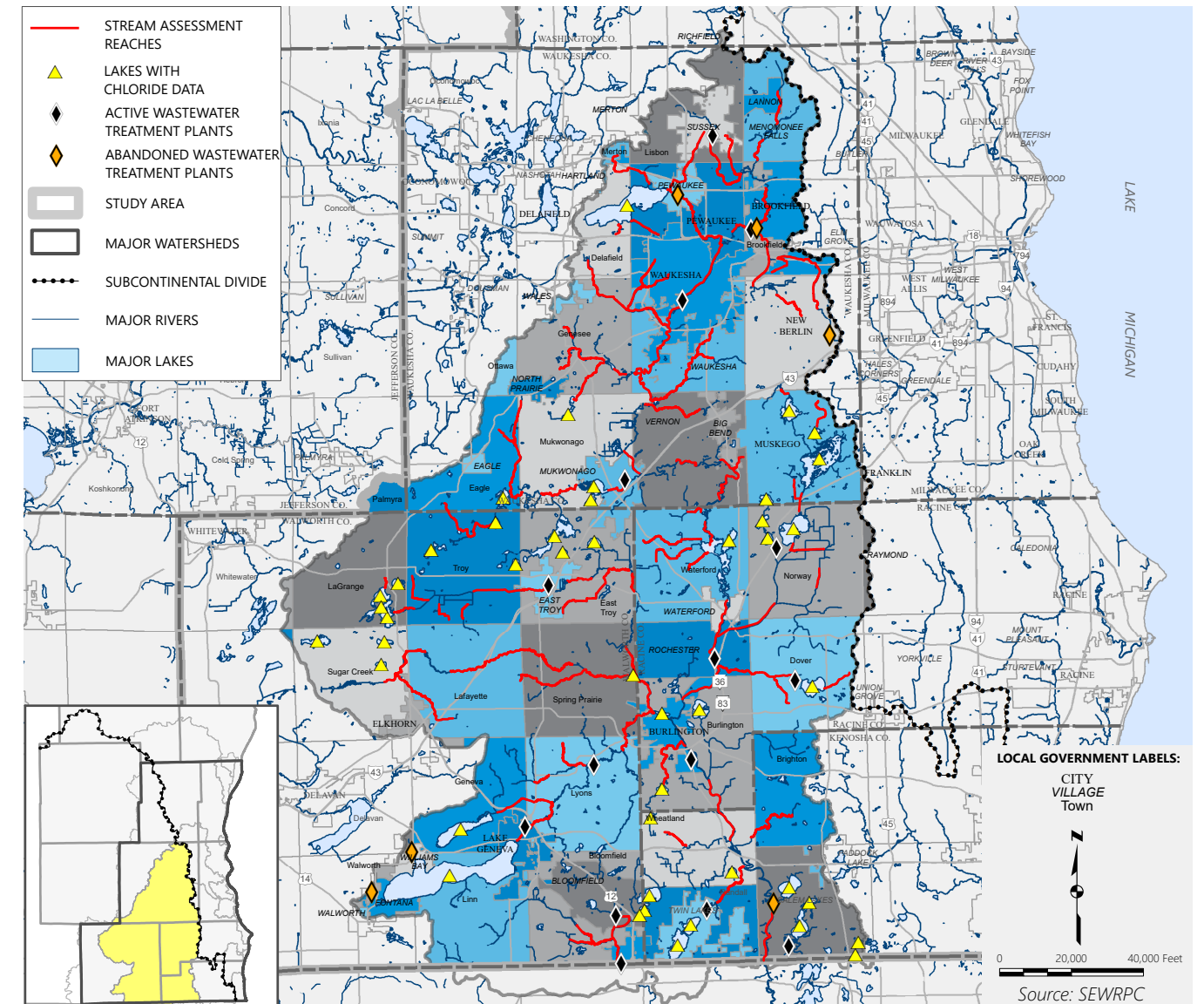
Facts at a Glance

- ▶ **Drainage Area Size:** 133 square miles
- ▶ **Existing Land Use:** Urban – 18.9%; Rural – 81.1%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 11.8%
- ▶ **Existing Roads and Parking Lots:** 6.2%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 3.1%
- ▶ **Active Wastewater Treatment Facilities:** Bristol and Paddock Lake
- ▶ **Abandoned Wastewater Treatment Facilities:** Hooker Lake, Pleasant Prairie Sanitary District No. 73-1, and Pleasant Prairie Sewer Utility District D
- ▶ **Estimated Population in 2010:** 31,480
- ▶ **Estimated Population Served by Sewer in 2010:** 24,600 (78%)
- ▶ **Estimated Households in 2010:** 11,550
- ▶ **Estimated Households Served in Sewer 2010:** 8,830
- ▶ **Water Supply Source:** Groundwater and Lake Michigan

Map A.3
Existing Land Use in the Fox River Watershed



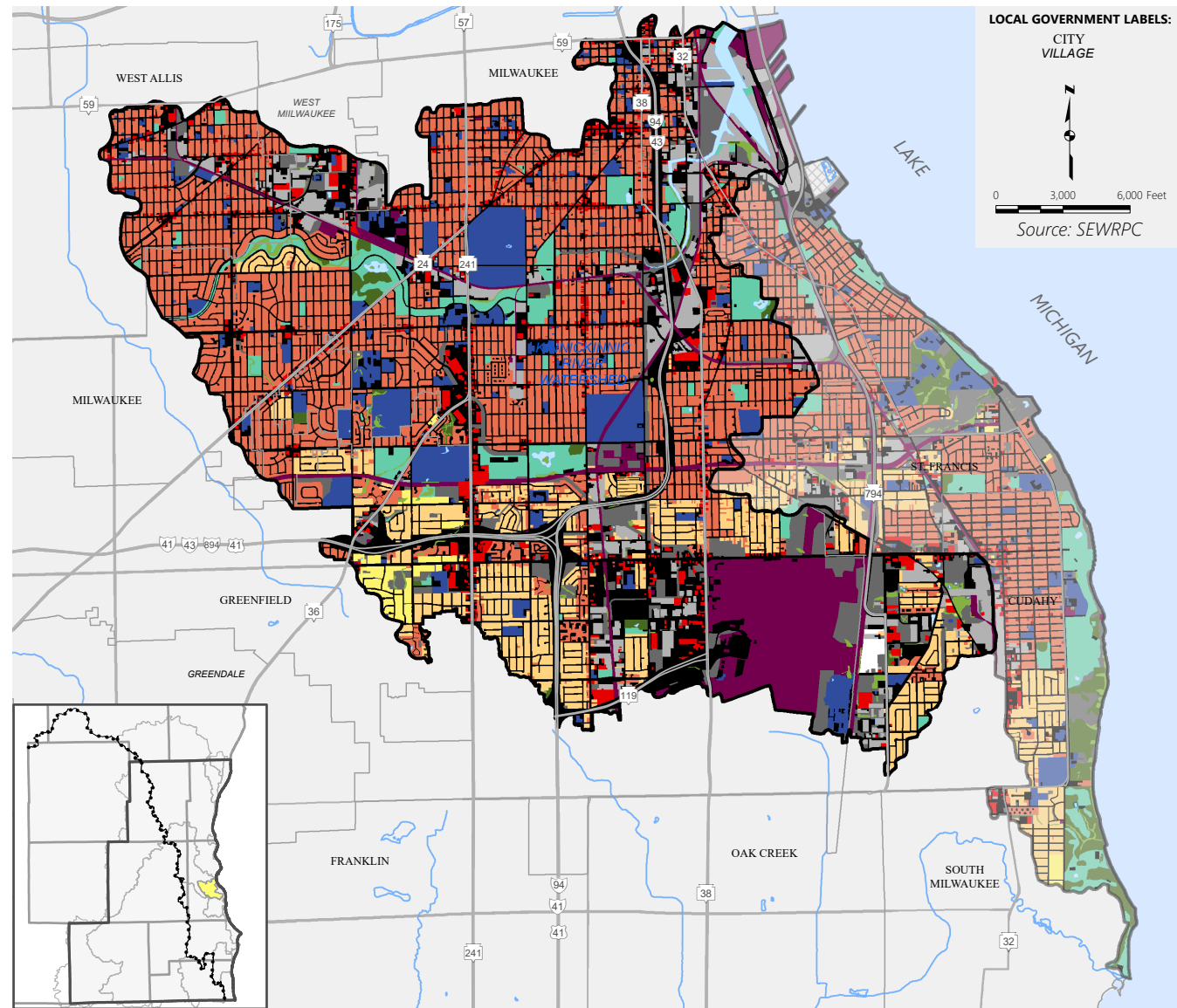
Map A.4
Characteristics of the Fox River Watershed



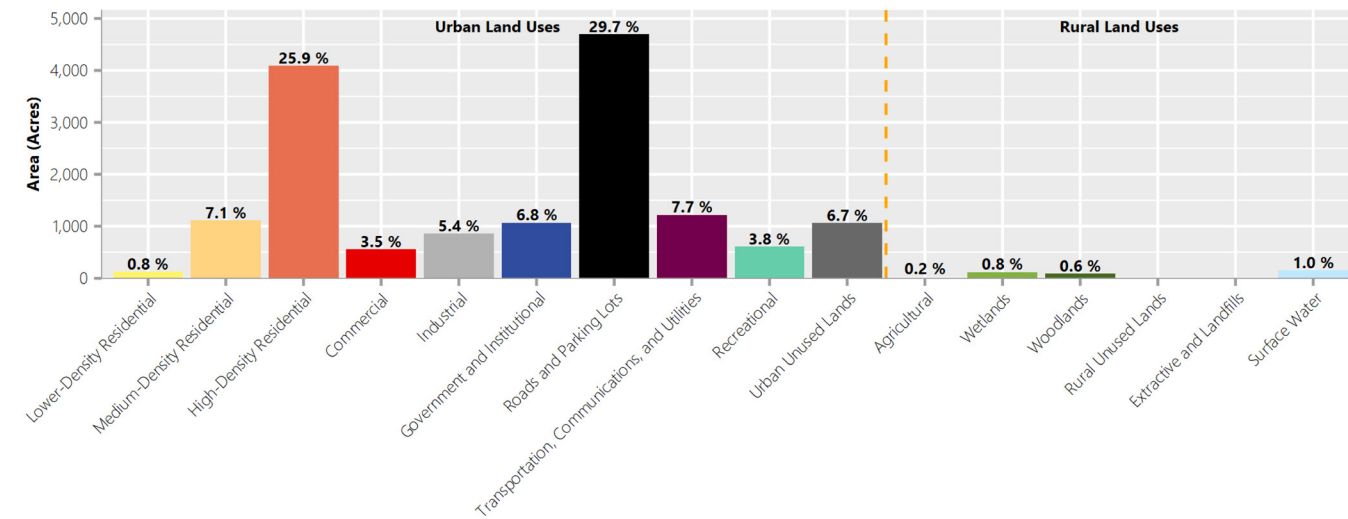
Facts at a Glance

- ▶ **Drainage Area Size:** 938 square miles
- ▶ **Existing Land Use:** Urban – 25.7%; Rural – 74.3%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 15.4%
- ▶ **Existing Roads and Parking Lots:** 6.7%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 3.7%
- ▶ **Active Wastewater Treatment Facilities:** Bloomfield, Burlington, Eagle Lake, East Troy, Fox River Water Pollution Control Center, Genoa City, Lake Geneva (discharges to groundwater through soil infiltration), Lyons, Mukwonago, Salem Lakes, Sussex, Town of Norway Sanitary District No. 1, Twin Lakes, Waukesha, and Western Racine County Sewerage District
- ▶ **Abandoned Wastewater Treatment Facilities:** Silver Lake, Brookfield, Fontana, Muskego-Big Muskego, New Berlin Regal Manor Greenridge Plant, Pewaukee, and Williams Bay
- ▶ **Estimated Population in 2010:** 365,070
- ▶ **Estimated Population Served by Sewer in 2010:** 268,050 (73%)
- ▶ **Estimated Households in 2010:** 142,610
- ▶ **Estimated Households Served by Sewer in 2010:** 107,120
- ▶ **Water Supply Source:** Groundwater and Lake Michigan (water supplied by the City of Waukesha was converted from groundwater to Lake Michigan supply in 2023)

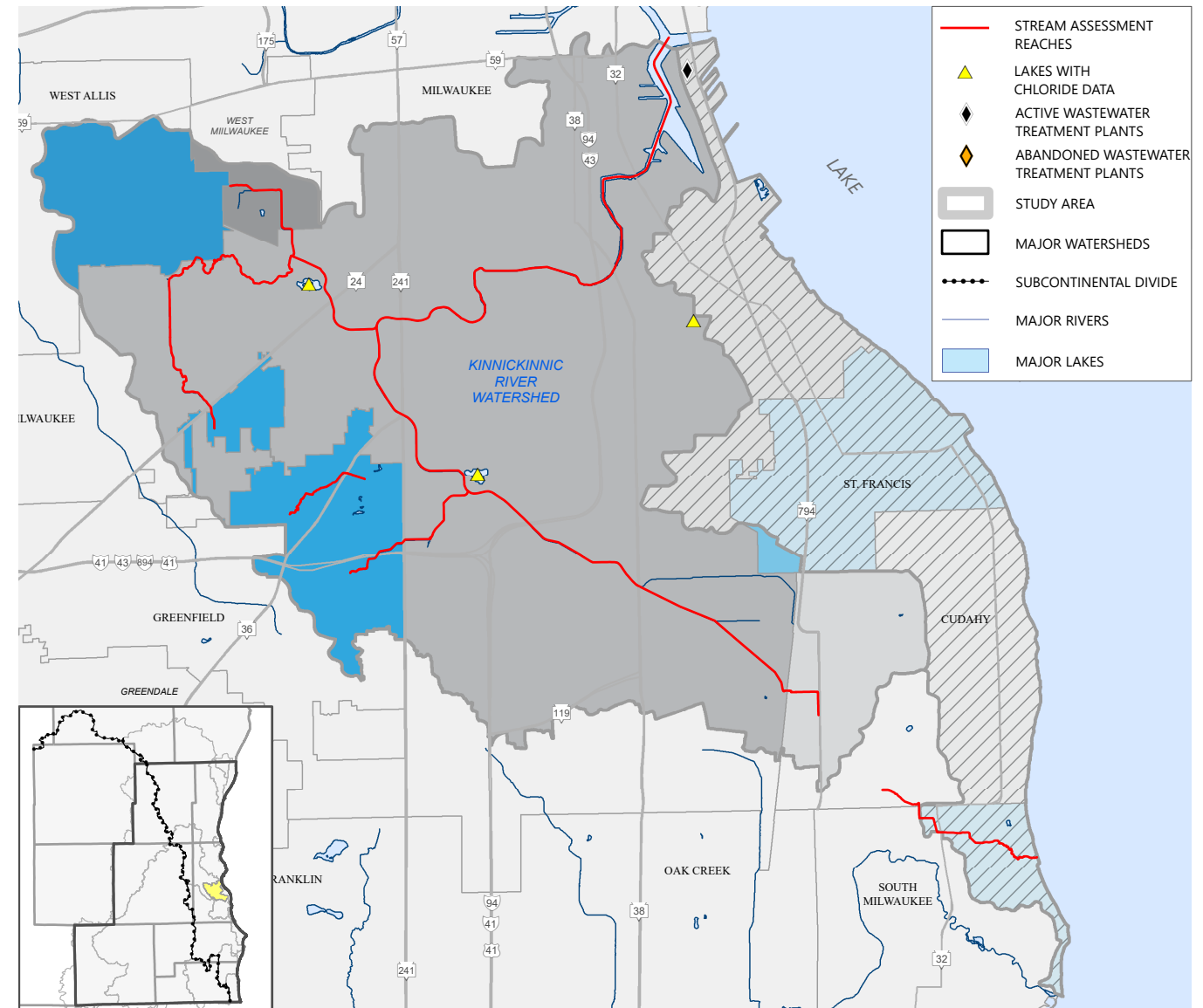
Map A.5
Existing Land Use in the Kinnickinnic River Watershed



Notes: Colors in the map above that are outside the Kinnickinnic River watershed boundary are reduced in intensity to show the adjacent extent and distribution of land use in the direct drainage area to Lake Michigan. The graph below summarizes land use within the Kinnickinnic River watershed only.



Map A.6
Characteristics of the Kinnickinnic River Watershed

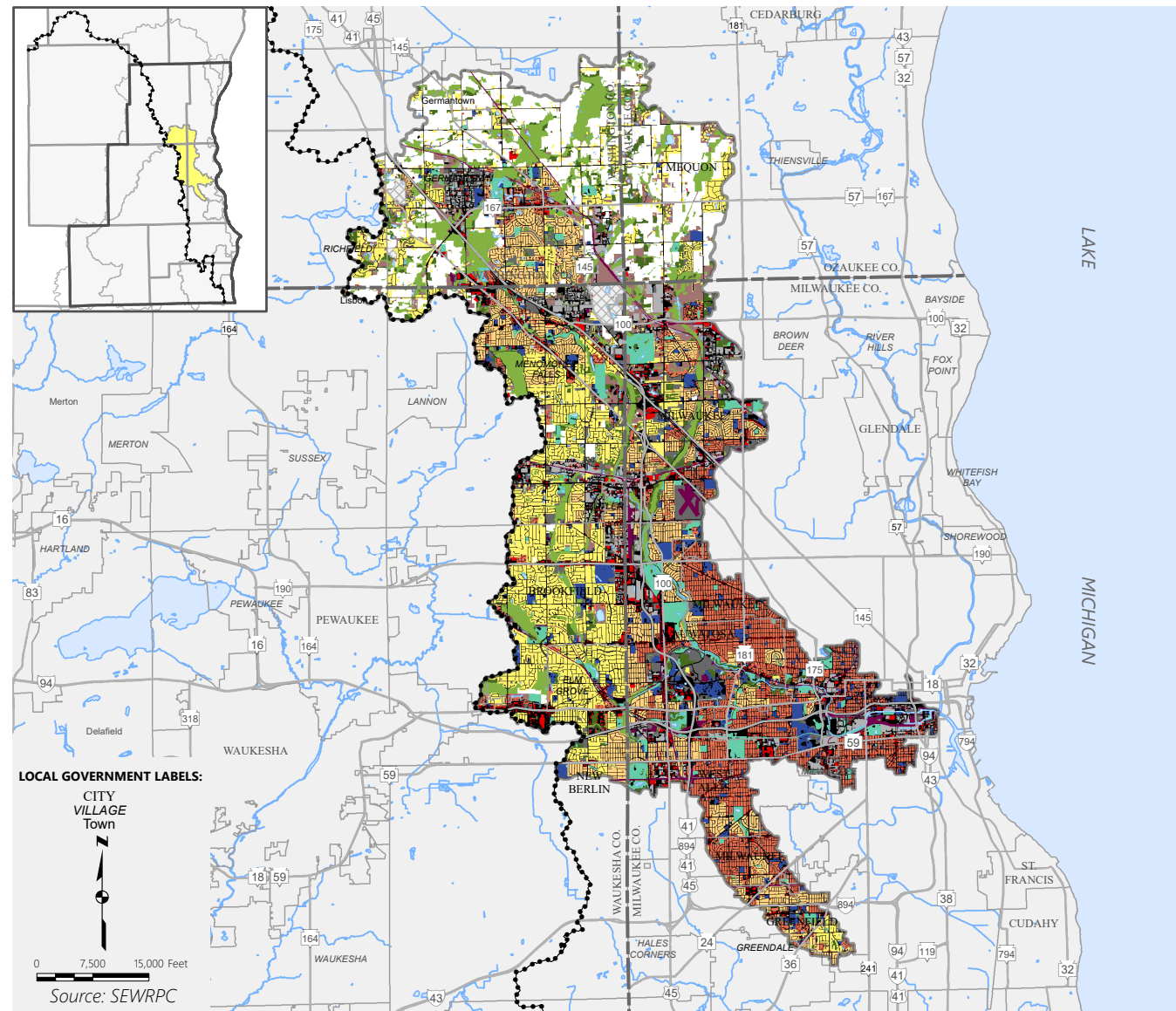


Notes: Colors in the map above that are outside the Kinnickinnic River watershed boundary are hatched and reduced in intensity to show the adjacent extent and distribution of civil divisions in the direct drainage area to Lake Michigan. The facts below summarize characteristics within the Kinnickinnic River watershed only. See Figure A.1 for land use and facts at a glance for the direct drainage area to Lake Michigan.

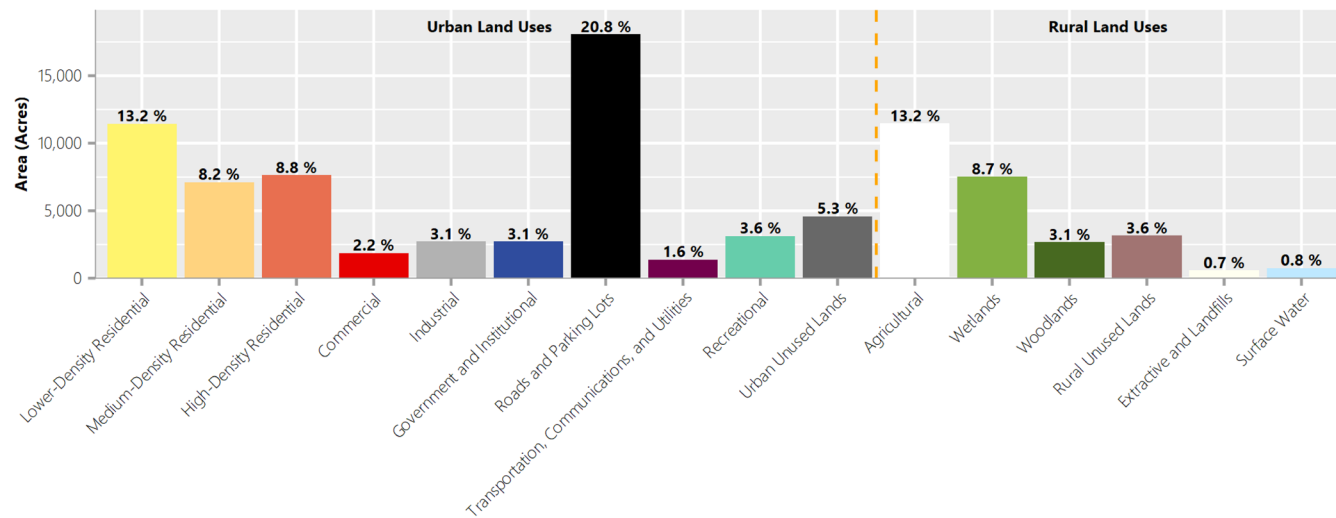
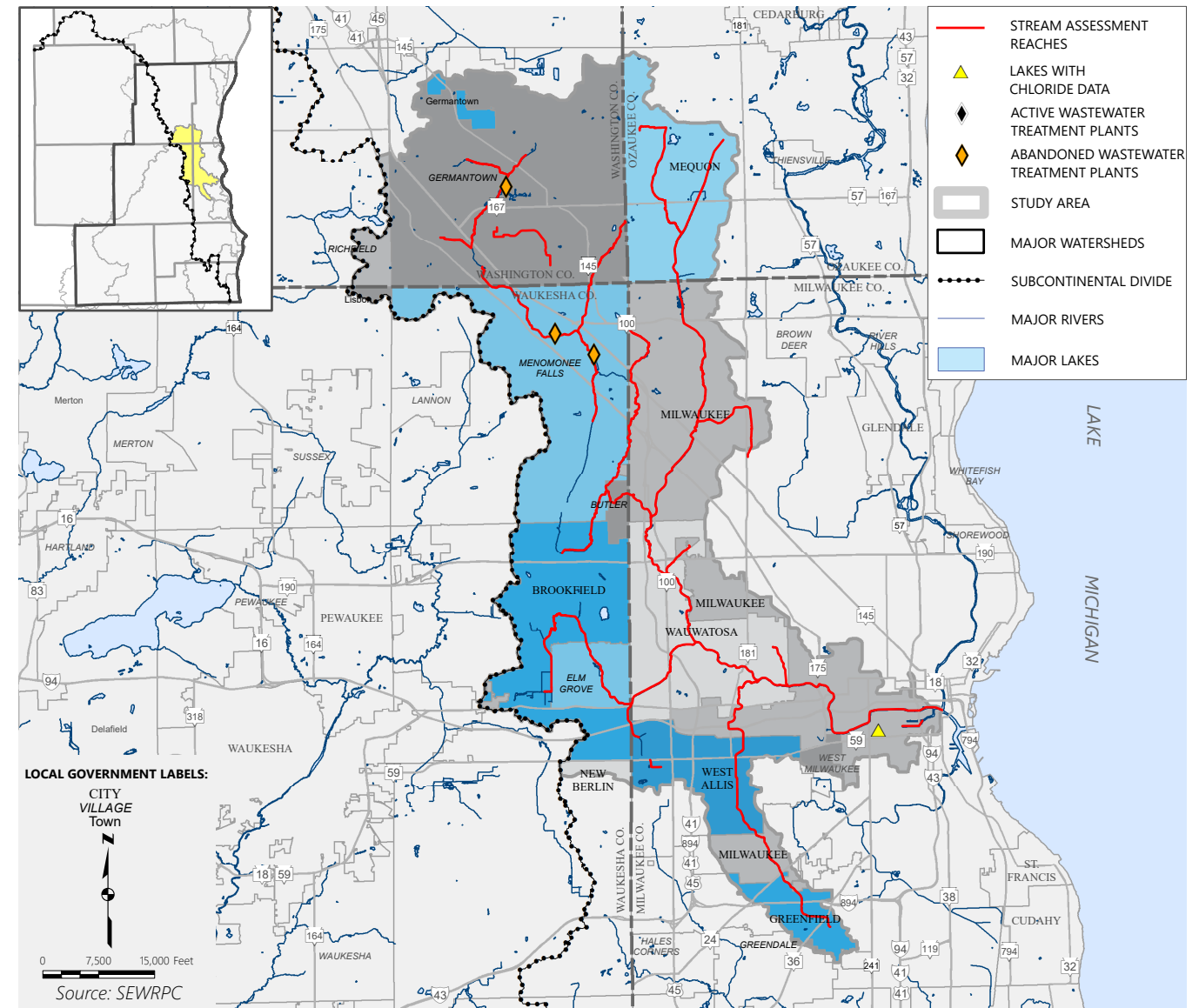
Facts at a Glance

- ▶ **Drainage Area Size:** 25 square miles
- ▶ **Existing Land Use:** Urban – 97.4%; Rural – 2.6%
- ▶ **Urban Land Use Increase Since 1963:** 2.6%
- ▶ **Existing Roads and Parking Lots:** 29.7%
- ▶ **Increase in Roads and Parking Lots Since 1963:** 9.4%
- ▶ **Active Wastewater Treatment Facilities:** None
- ▶ **Abandoned Wastewater Treatment Facilities:** None
- ▶ **Estimated Population in 2010:** 156,810
- ▶ **Estimated Population Served by Sewer in 2010:** 156,810 (100%)
- ▶ **Estimated Households in 2010:** 58,530
- ▶ **Estimated Households Served by Sewer in 2010:** 58,530
- ▶ **Water Supply Source:** Lake Michigan

Map A.7
Existing Land Use in the Menomonee River Watershed



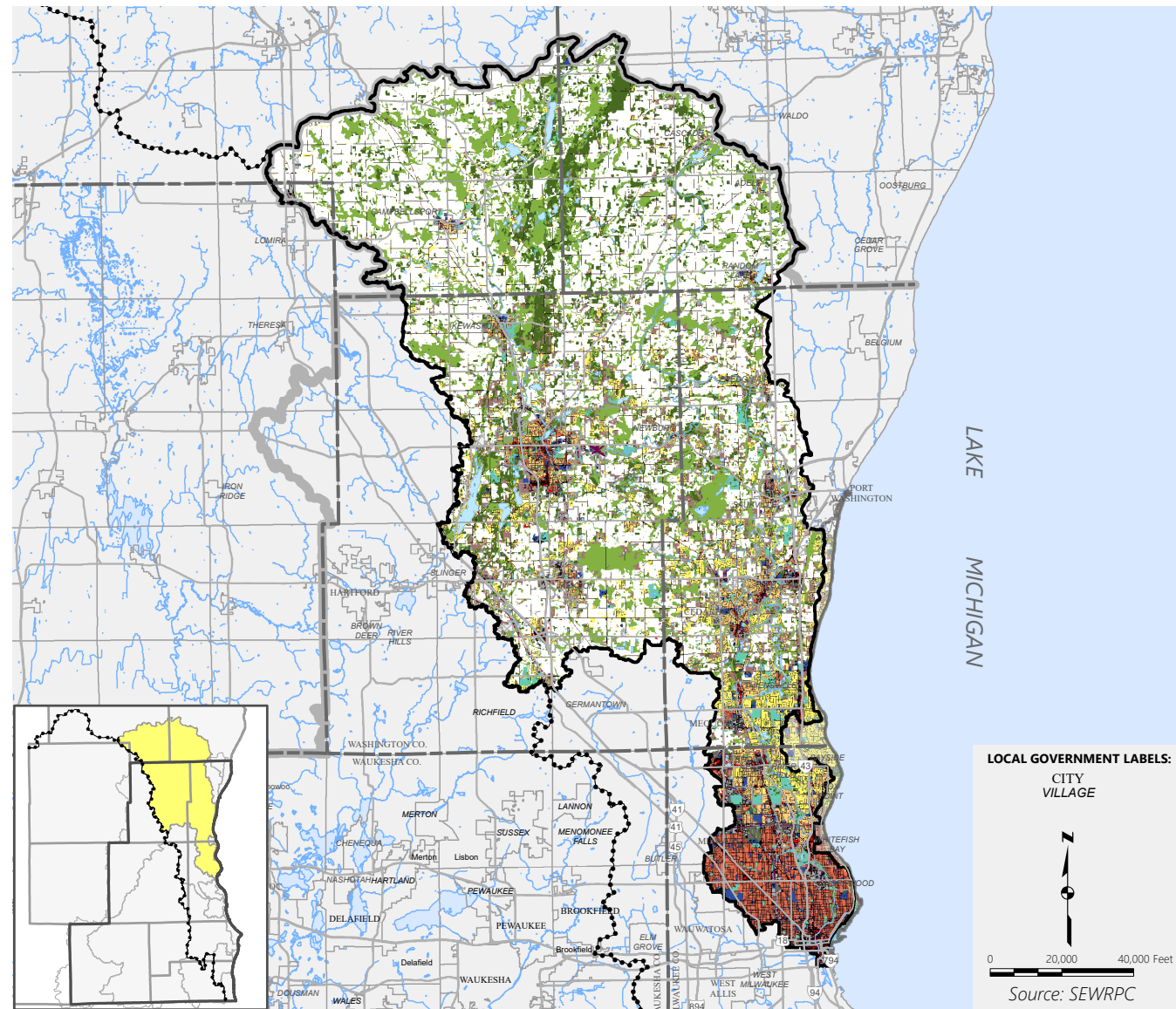
Map A.8
Characteristics of the Menomonee River Watershed



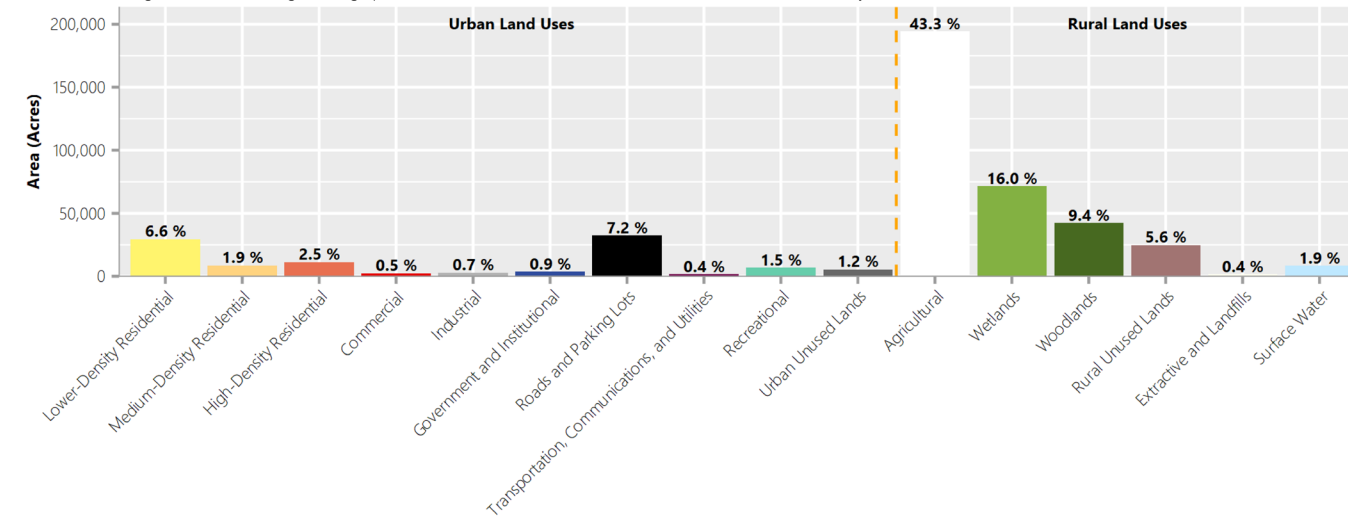
Facts at a Glance

- ▶ **Drainage Area Size:** 136 square miles
- ▶ **Existing Land Use:** Urban – 69.9%; Rural – 30.1%
- ▶ **Urban Land Use Increase Since 1963:** 17.1%
- ▶ **Existing Roads and Parking Lots:** 20.8%
- ▶ **Increase in Roads and Parking Lots Since 1963:** 9.3%
- ▶ **Active Wastewater Treatment Facilities:** None
- ▶ **Abandoned Wastewater Treatment Facilities:** Germantown, Menomonee Falls – Lilly Road, and Menomonee Falls – Pilgrim Road
- ▶ **Estimated Population in 2010:** 320,850
- ▶ **Estimated Population Served by Sewer in 2010:** 315,860 (98%)
- ▶ **Estimated Households in 2010:** 131,110
- ▶ **Estimated Households Served by Sewer in 2010:** 129,190
- ▶ **Water Supply Source:** Lake Michigan

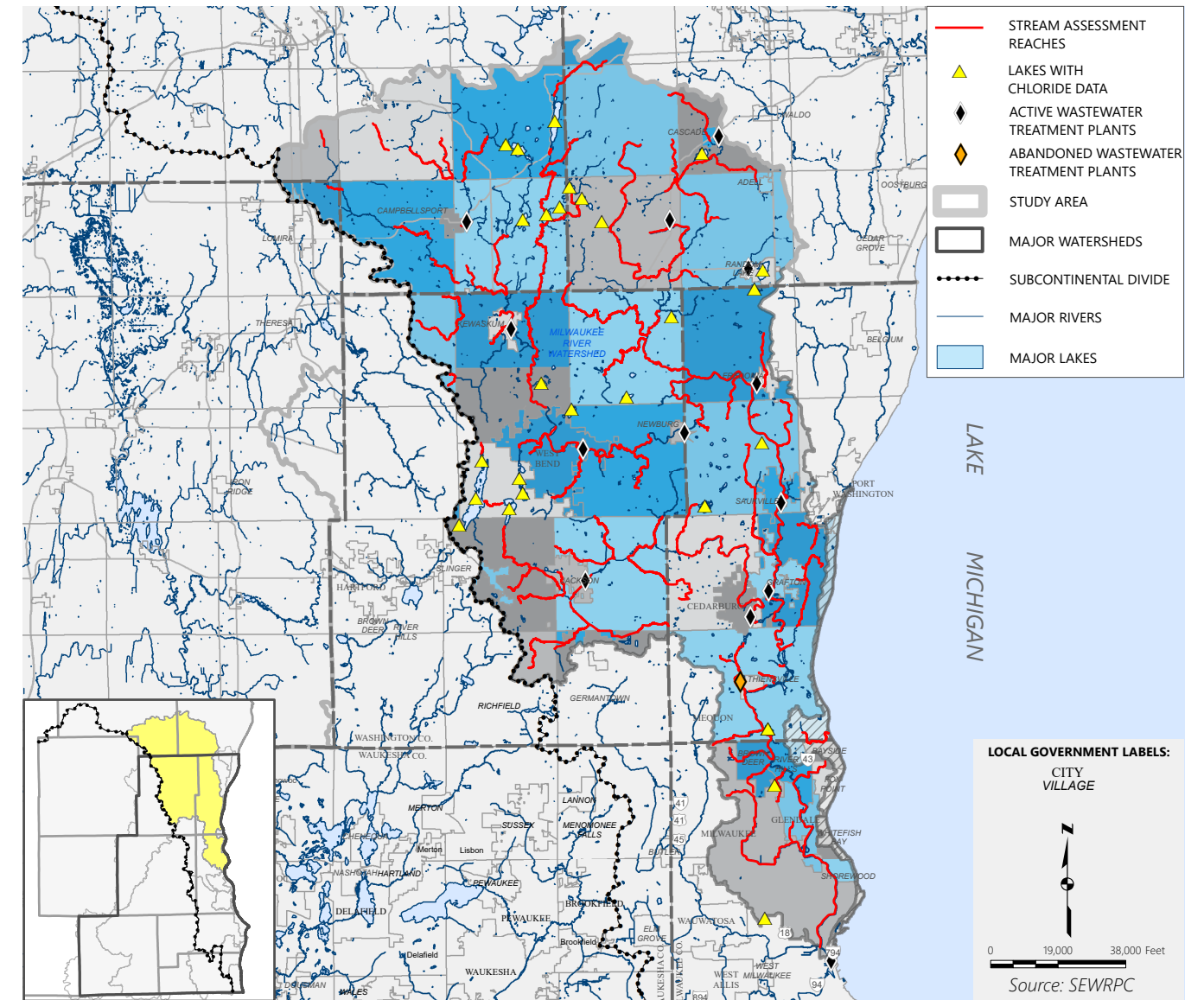
Map A.9
Existing Land Use in the Milwaukee River Watershed



Notes: Colors in the map above that are outside the Milwaukee River watershed boundary are reduced in intensity to show the adjacent extent and distribution of land use in the direct drainage area to Lake Michigan. The graph below summarizes land use within the Milwaukee River watershed only.



Map A.10
Characteristics of the Milwaukee River Watershed

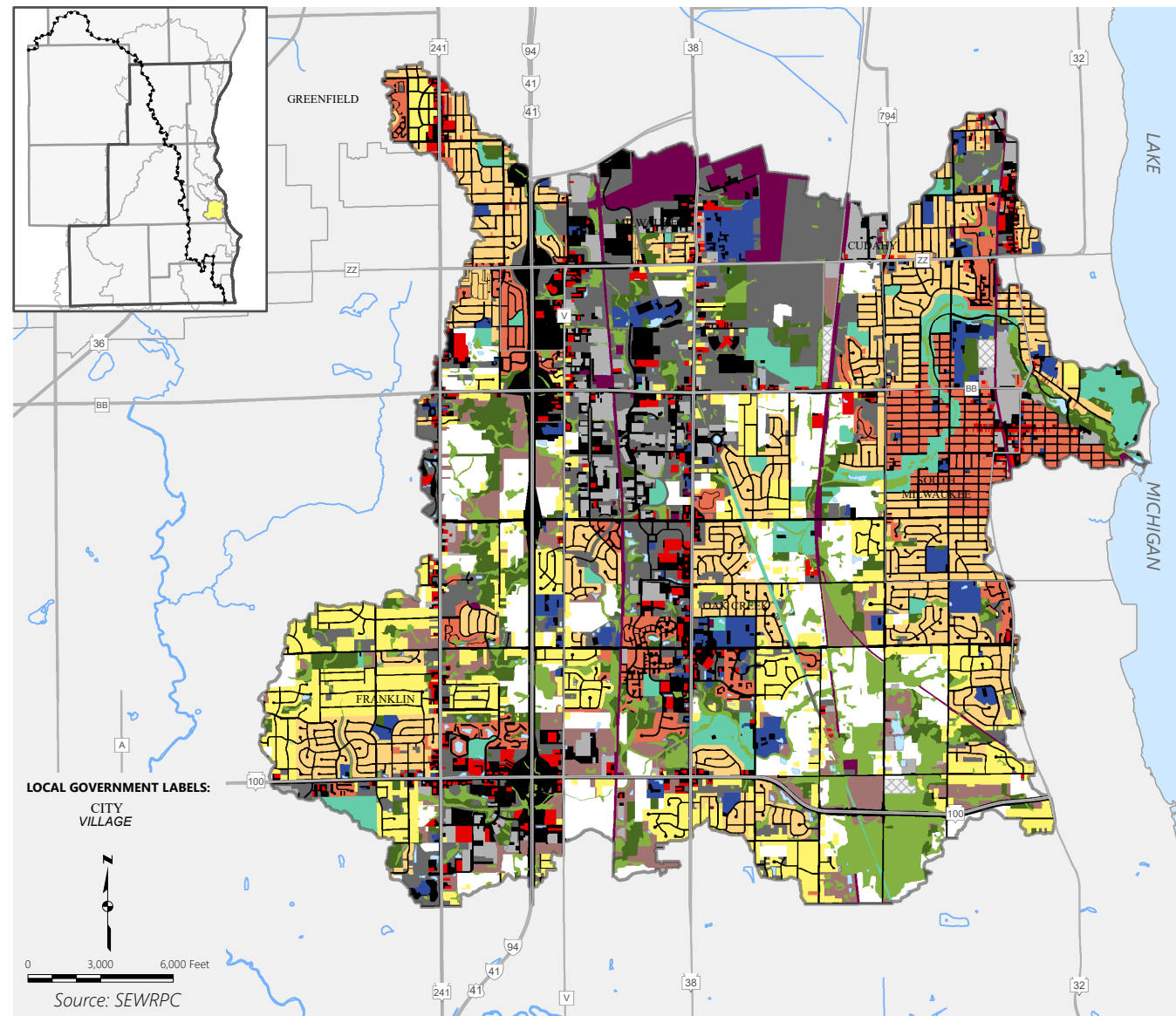


Notes: Colors in the map above that are outside the Milwaukee River watershed boundary are hatched and reduced in intensity to show the adjacent extent and distribution of civil divisions in the direct drainage area to Lake Michigan. The facts below summarize characteristics within the Milwaukee River watershed only. See Figure A.1 for land use and facts at a glance for the direct drainage area to Lake Michigan.

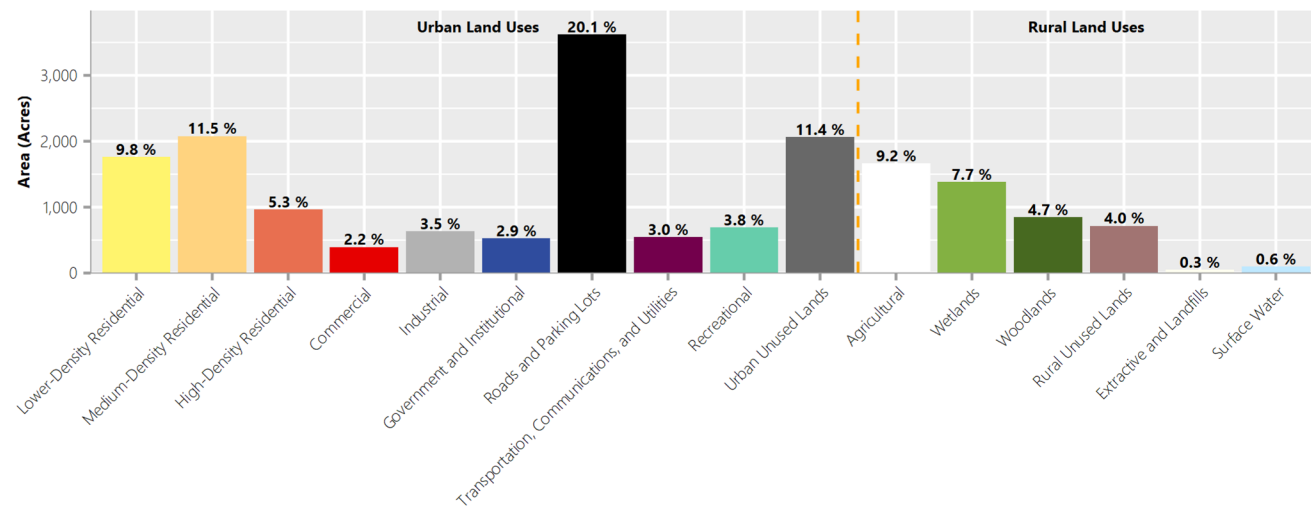
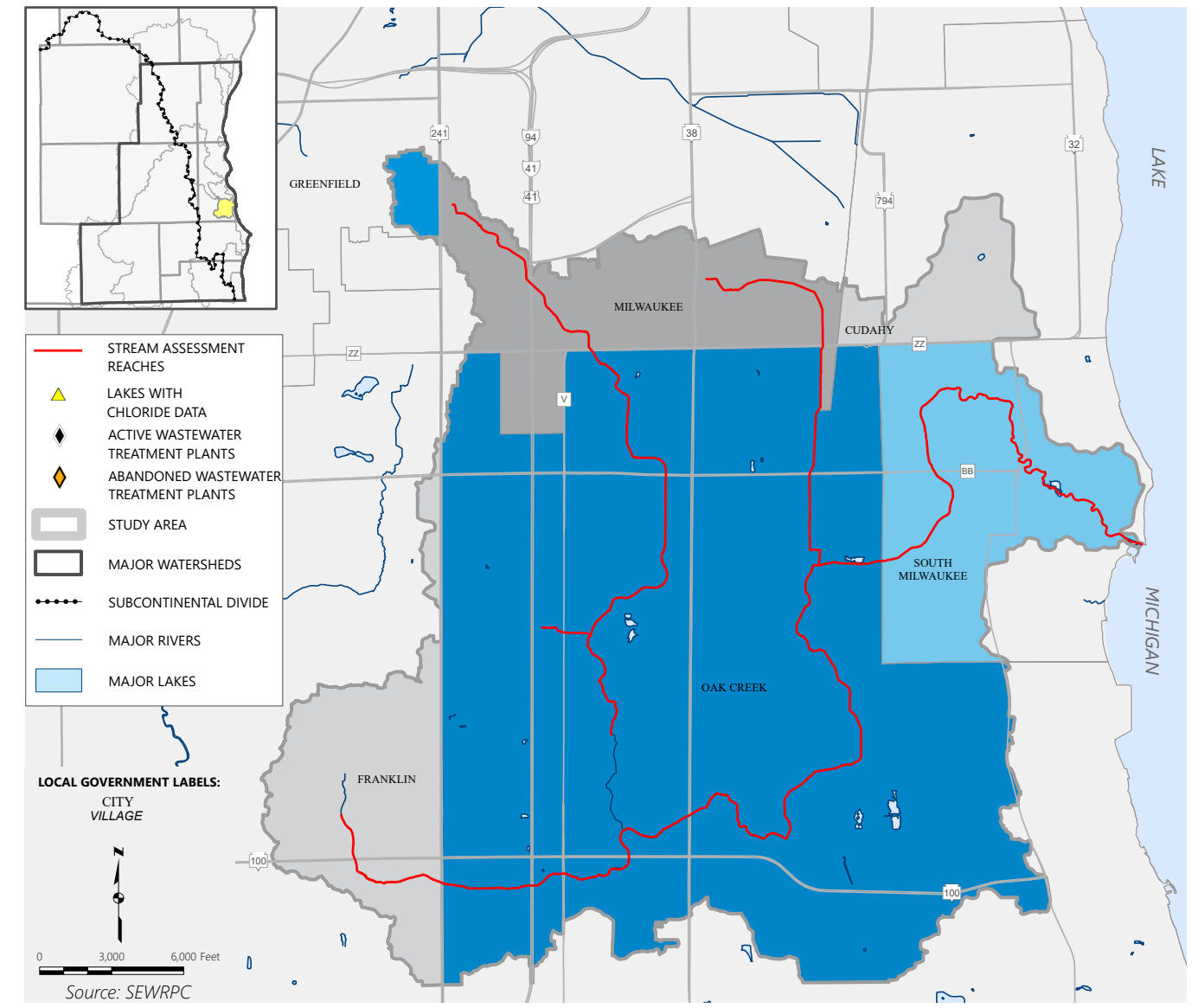
Facts at a Glance

- ▶ **Drainage Area Size:** 701 square miles
- ▶ **Existing Land Use:** Urban – 23.4%; Rural – 76.6%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 14.2%
- ▶ **Existing Roads and Parking Lots:** 7.2%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 4.0%
- ▶ **Active Wastewater Treatment Facilities:** Campbellsport, Cascade, Cedarburg, Fredonia, Grafton, Jackson, Kewaskum, Newburg, Random Lake, Saukville, Scott (discharges to groundwater through soil infiltration), and West Bend
- ▶ **Abandoned Wastewater Treatment Facilities:** Thiensville
- ▶ **Estimated Population in 2010:** 493,200
- ▶ **Estimated Population Served by Sewer in 2010:** 441,050 (89%)
- ▶ **Estimated Households in 2010:** 196,580
- ▶ **Estimated Households Served by Sewer in 2010:** 177,540
- ▶ **Water Supply Source:** Lake Michigan and Groundwater

Map A.11
Existing Land Use in the Oak Creek Watershed



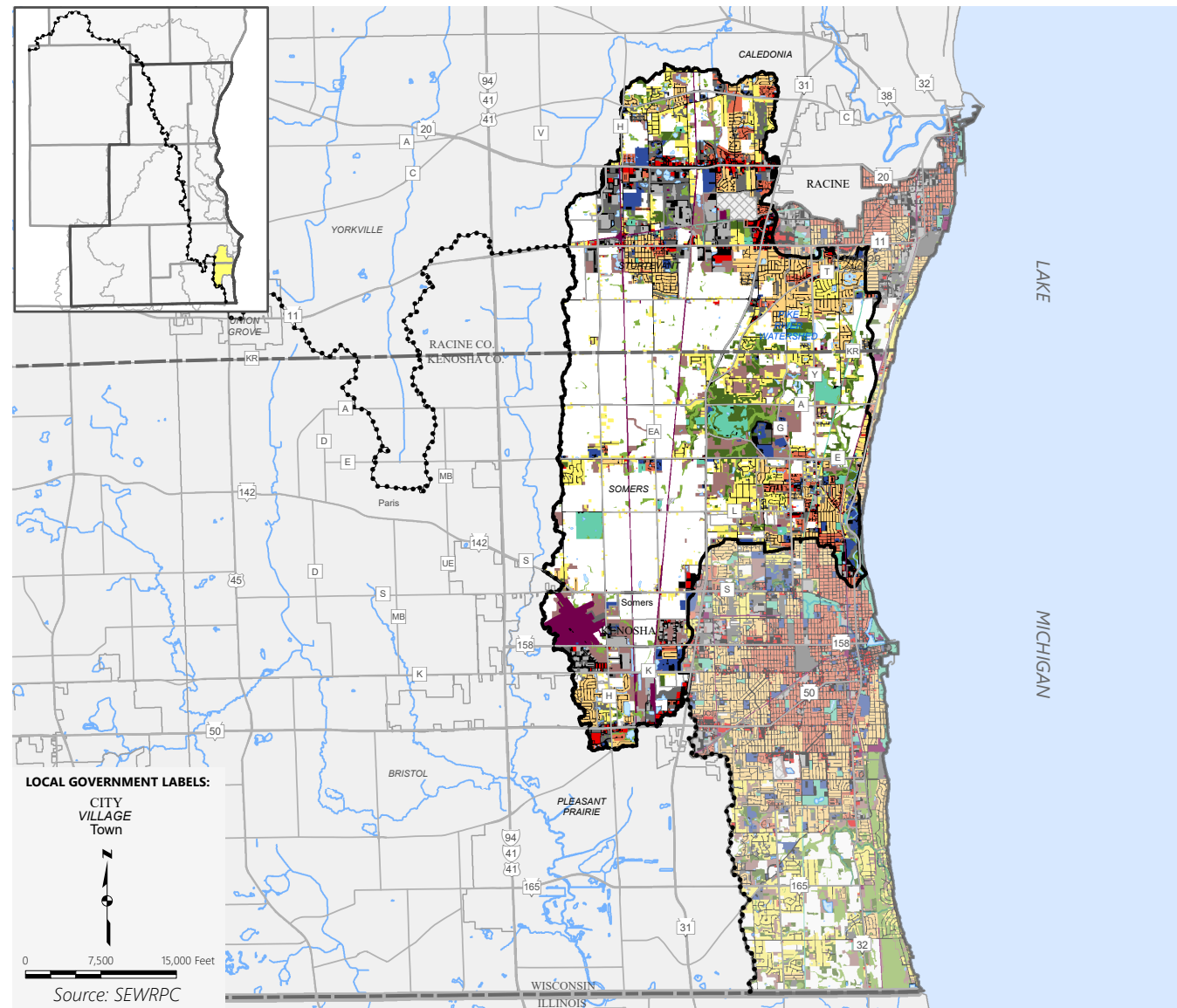
Map A.12
Characteristics of the Oak Creek Watershed



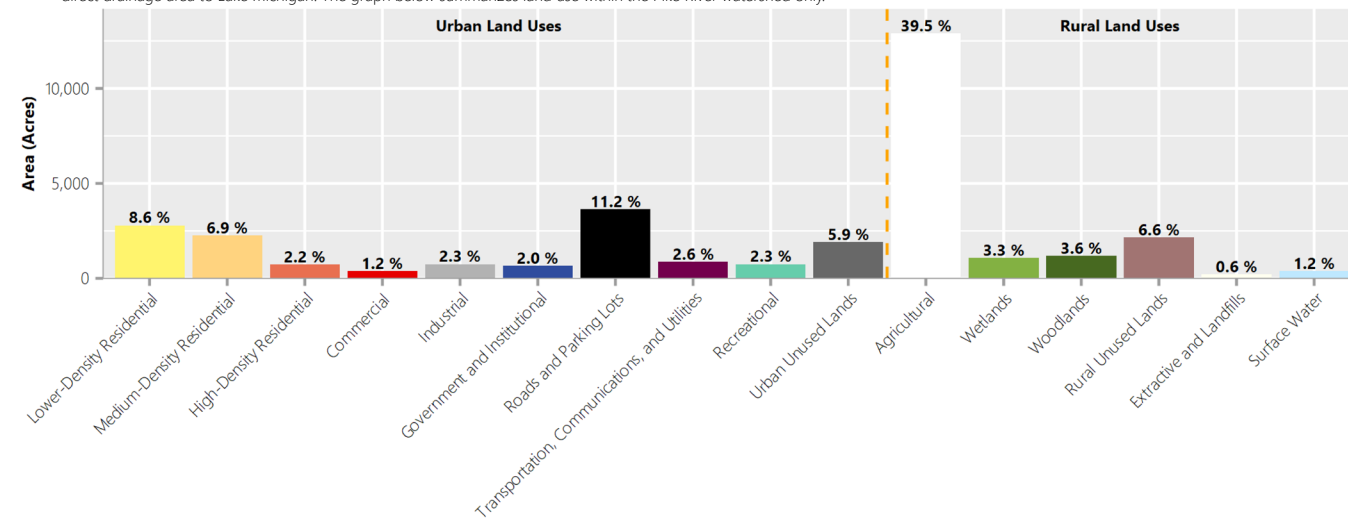
Facts at a Glance

- ▶ **Drainage Area Size:** 28 square miles
- ▶ **Existing Land Use:** Urban – 73.5%; Rural – 26.5%
- ▶ **Urban Land Use Increase Since 1963:** 36.3%
- ▶ **Existing Roads and Parking Lots:** 20.1%
- ▶ **Increase in Roads and Parking Lots Since 1963:** 13.1%
- ▶ **Active Wastewater Treatment Facilities:** None
- ▶ **Abandoned Wastewater Treatment Facilities:** None
- ▶ **Estimated Population in 2010:** 56,580
- ▶ **Estimated Population Served by Sewer in 2010:** 56,580 (100%)
- ▶ **Estimated Households in 2010:** 24,230
- ▶ **Estimated Households Served by Sewer in 2010:** 24,230
- ▶ **Water Supply Source:** Lake Michigan

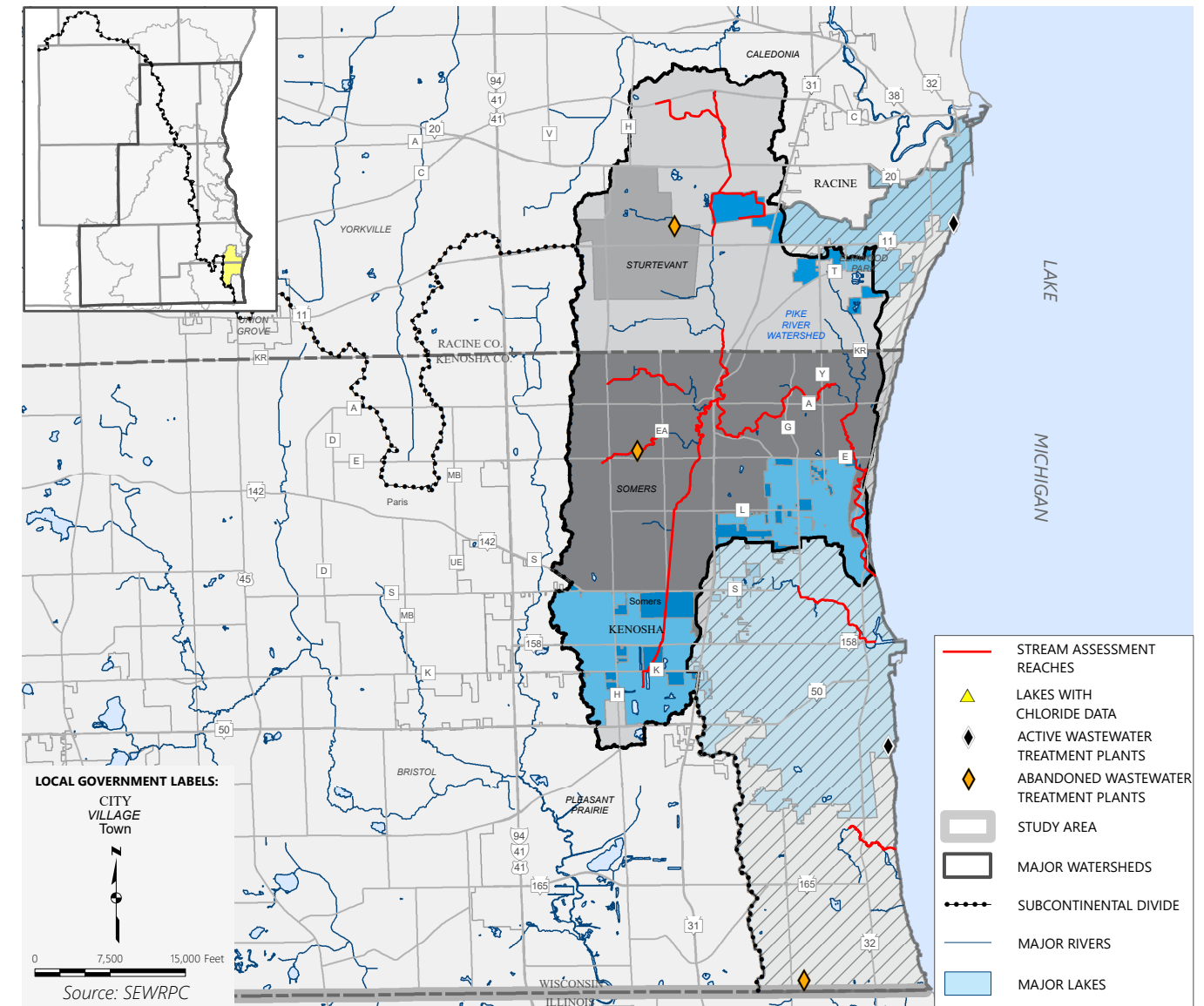
Map A.13
Existing Land Use in the Pike River Watershed



Notes: Colors in the map above that are outside the Pike River watershed boundary are reduced in intensity to show the adjacent extent and distribution of land use in the direct drainage area to Lake Michigan. The graph below summarizes land use within the Pike River watershed only.



Map A.14
Characteristics of the Pike River Watershed

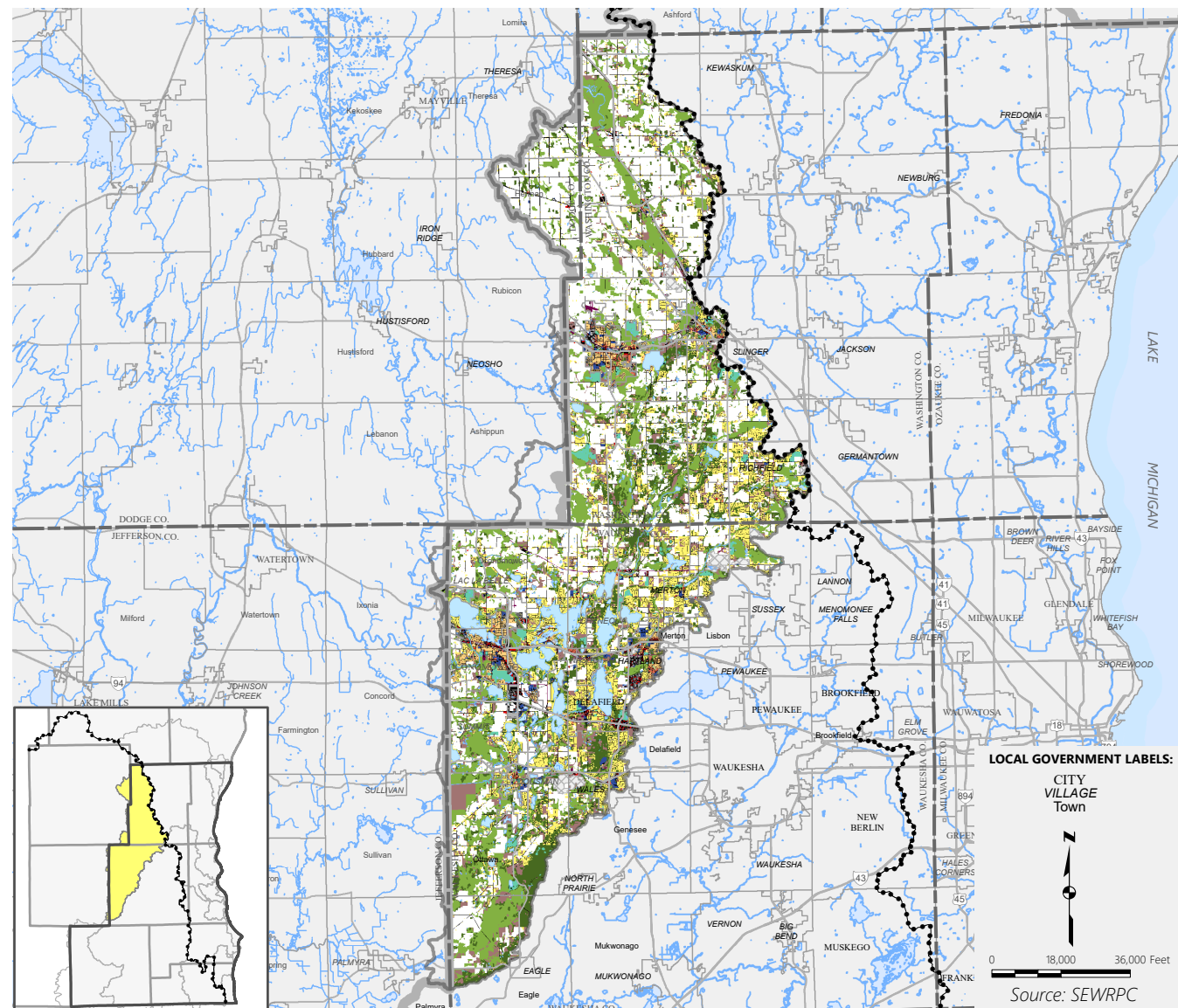


Notes: Colors in the map above that are outside the Pike River watershed boundary are hatched and reduced in intensity to show the adjacent extent and distribution of civil divisions in the direct drainage area to Lake Michigan. The facts below summarize characteristics within the Pike River watershed only. See Figure A.1 for land use and facts at a glance for the direct drainage area to Lake Michigan.

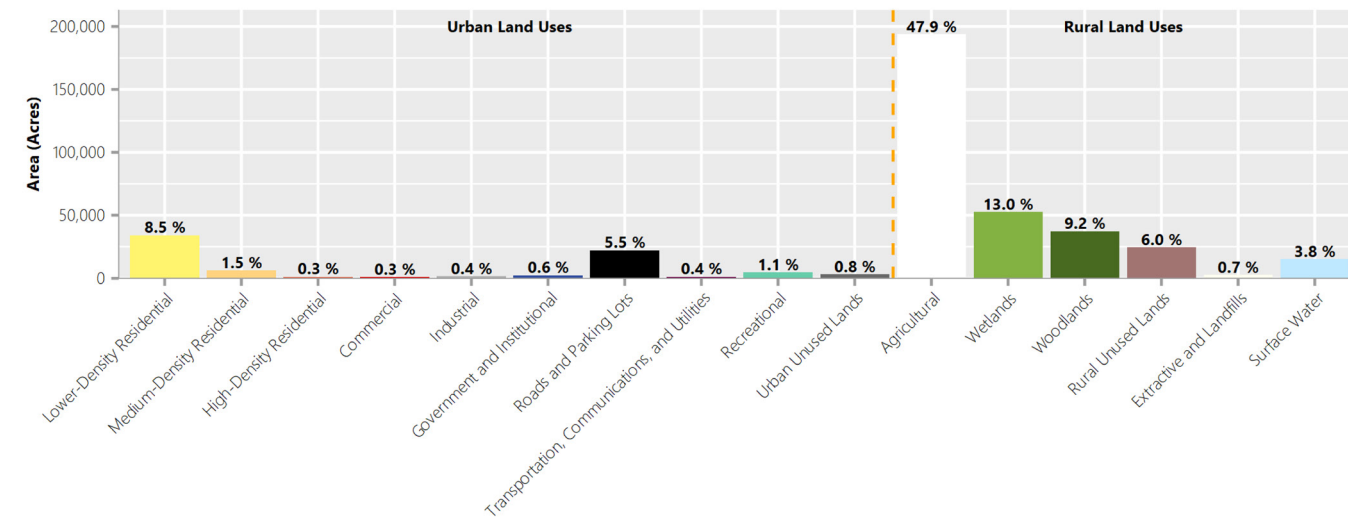
Facts at a Glance

- ▶ **Drainage Area Size:** 51 square miles
- ▶ **Existing Land Use:** Urban – 45.2%; Rural – 54.8%
- ▶ **Urban Land Use Increase Since 1963:** 24.0%
- ▶ **Existing Roads and Parking Lots:** 11.2%
- ▶ **Increase in Roads and Parking Lots Since 1963:** 7.5%
- ▶ **Active Wastewater Treatment Facilities:** None
- ▶ **Abandoned Wastewater Treatment Facilities:** Sommers and Sturtevant
- ▶ **Estimated Population in 2010:** 51,610
- ▶ **Estimated Population Served by Sewer in 2010:** 50,350 (98%)
- ▶ **Estimated Households in 2010:** 20,060
- ▶ **Estimated Households Served by Sewer in 2010:** 19,560
- ▶ **Water Supply Source:** Lake Michigan

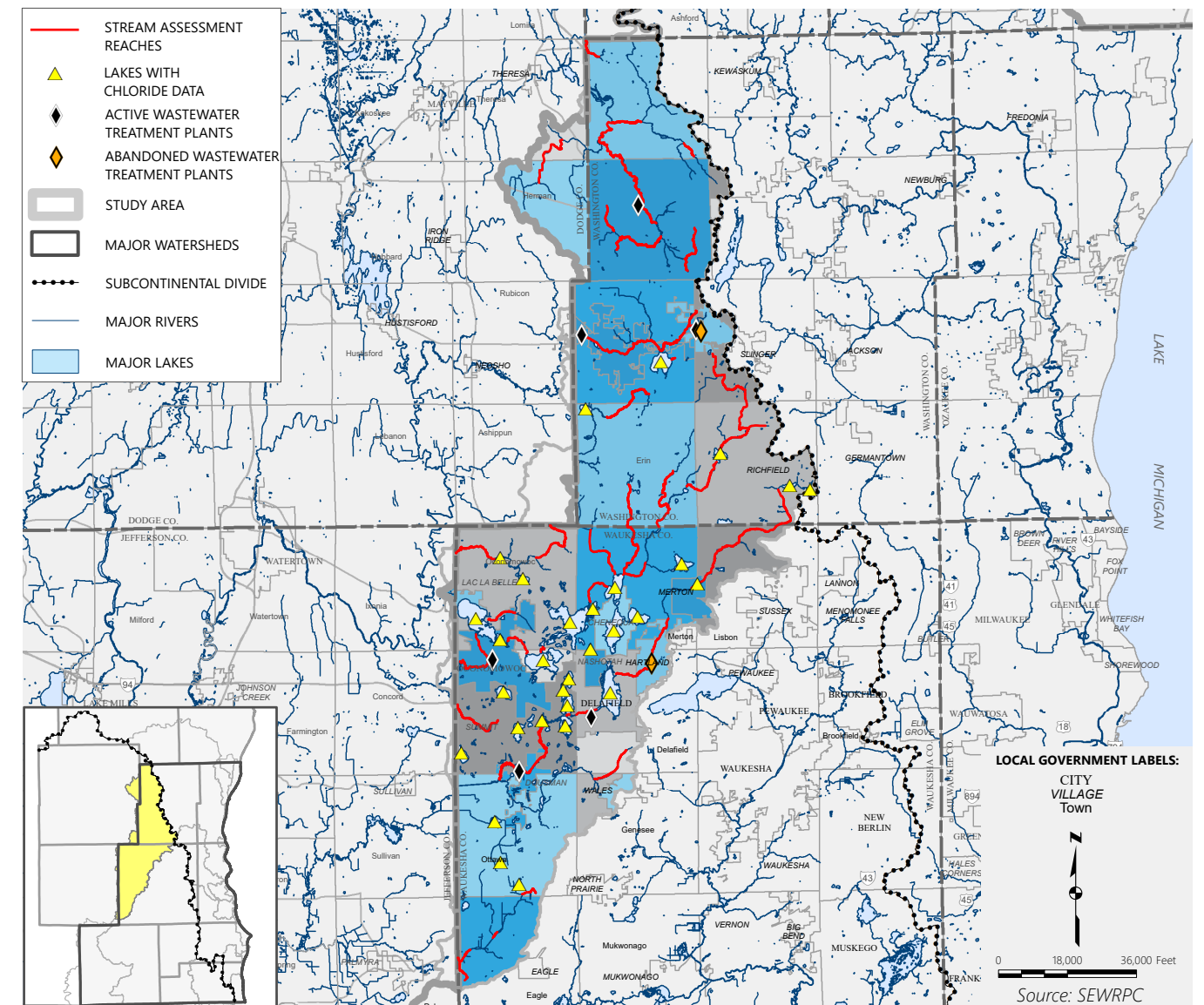
Map A.15
Existing Land Use in the Rock River Watershed (North)



Note: The map above shows only the northern portion of the Rock River watershed that is within the study area. The graph below summarizes the land use distribution for the entire portion of the Rock River watershed that is within the study area (North and South portions combined)



Map A.16
Characteristics of the Rock River Watershed (North)

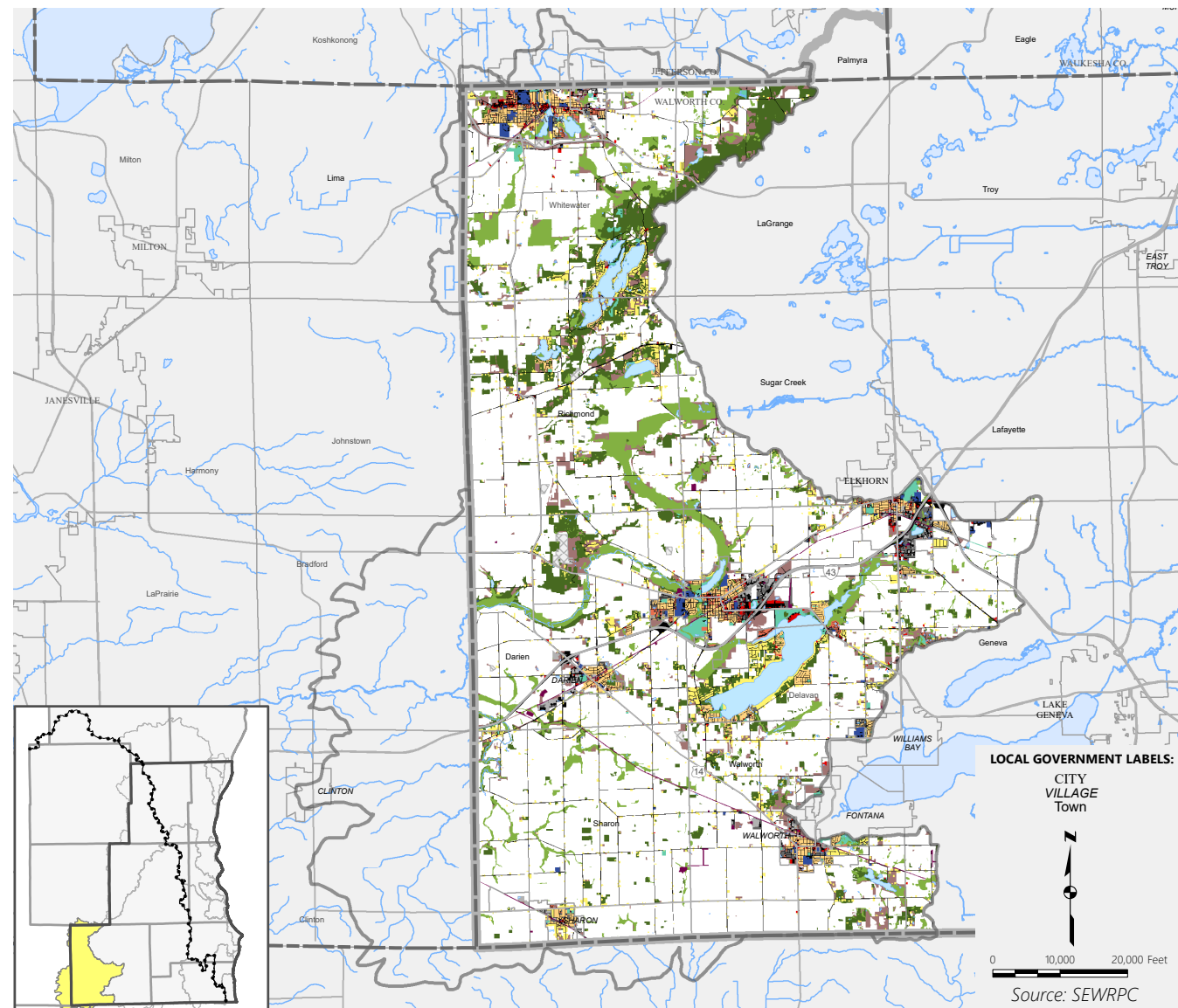


Note: The map above shows only the northern portion of the Rock River watershed that is within the study area. The facts below summarize the characteristics of the entire portion of the Rock River watershed that is within the study area (North and South portions combined)

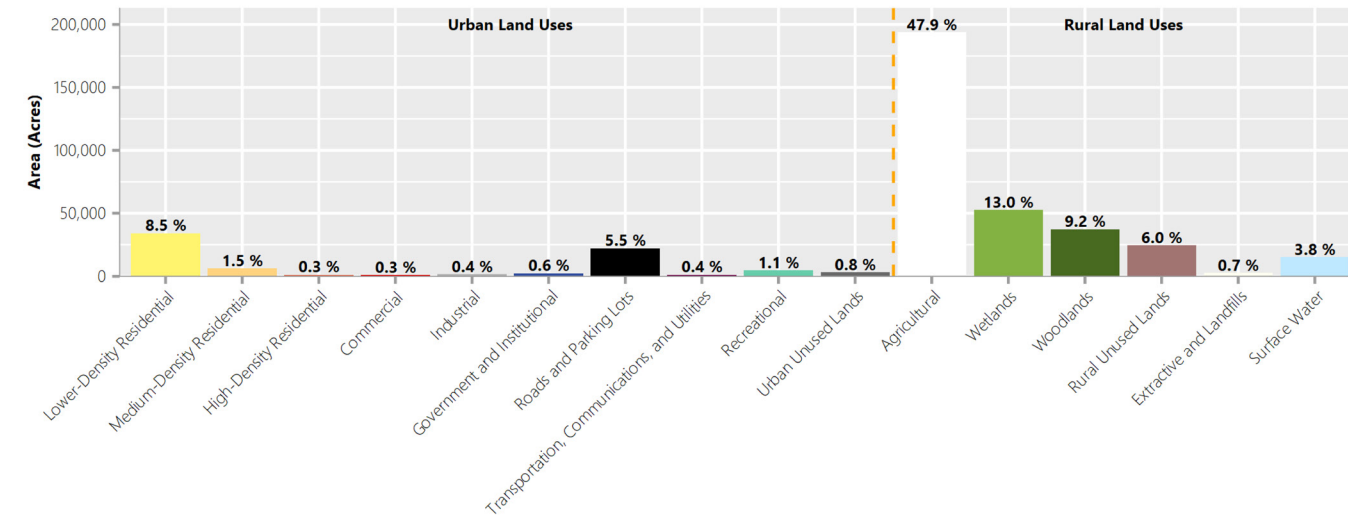
Facts at a Glance

- ▶ **Drainage Area Size:** 632 square miles
- ▶ **Existing Land Use:** Urban – 19.4%; Rural – 80.6%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 12.0%
- ▶ **Existing Roads and Parking Lots:** 5.5%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 2.6%
- ▶ **Active Wastewater Treatment Facilities:** Allenton, Delafield – Hartland (effluent from this facility is pumped and discharged to the Bark River approximately 4 miles southwest of facility), Dousman, Fontana – Walworth County Metropolitan Sewerage District, and Whitewater
- ▶ **Abandoned Wastewater Treatment Facilities:** Darien, Delavan, Elkhorn, Hartland, Slinger (former facility), and Walworth
- ▶ **Estimated Population in 2010:** 155,440
- ▶ **Estimated Population Served by Sewer in 2010:** 94,710 (61%)
- ▶ **Estimated Households in 2010:** 59,090
- ▶ **Estimated Households Served by Sewer in 2010:** 37,270
- ▶ **Water Supply Source:** Groundwater

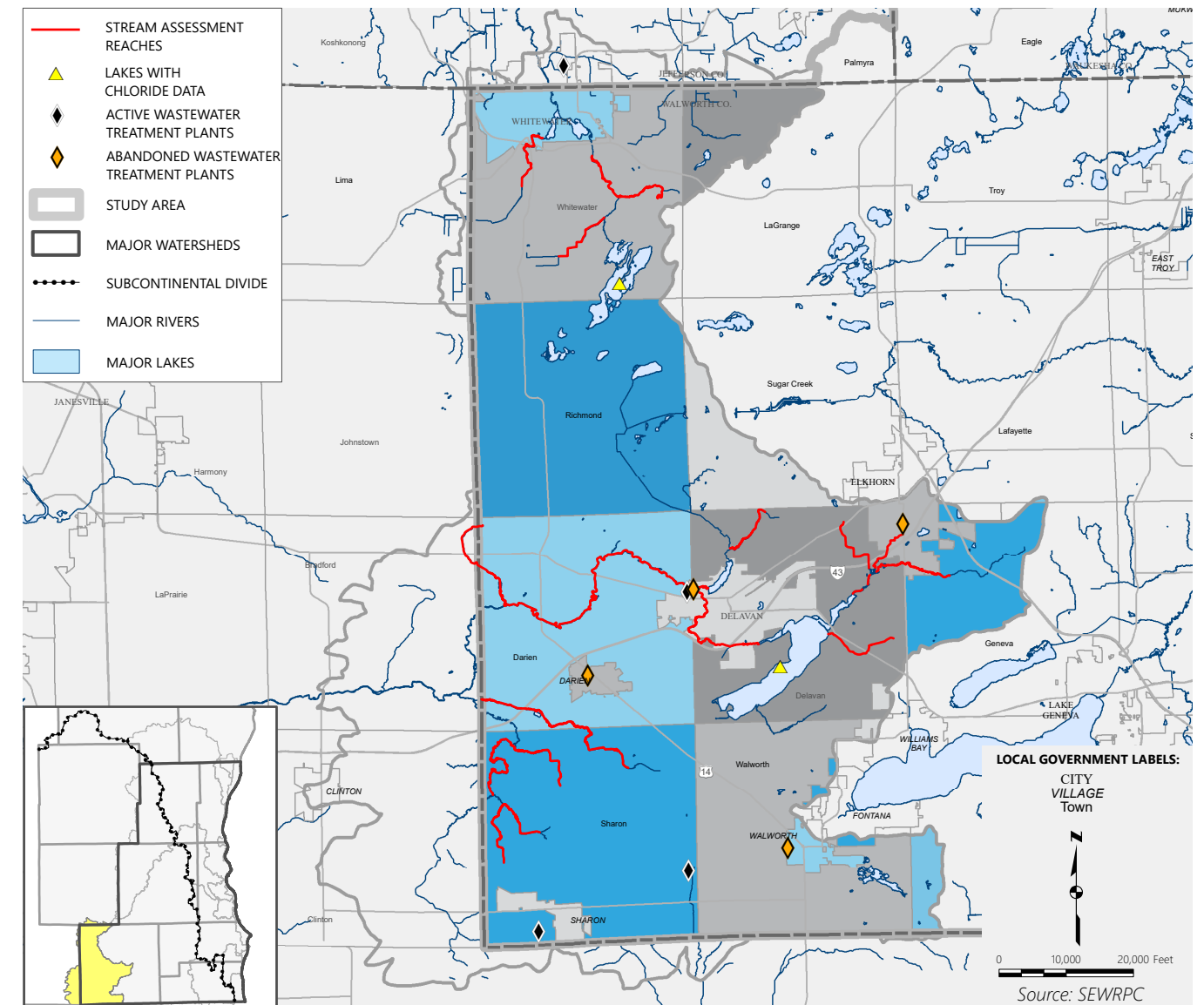
Map A.17
Existing Land Use Rock River Watershed (South)



Note: The map above shows only the southern portion of the Rock River watershed that is within the study area. The graph below summarizes the land use distribution for the entire portion of the Rock River watershed that is within the study area (North and South portions combined)



Map A.18
Characteristics of the Rock River Watershed (South)

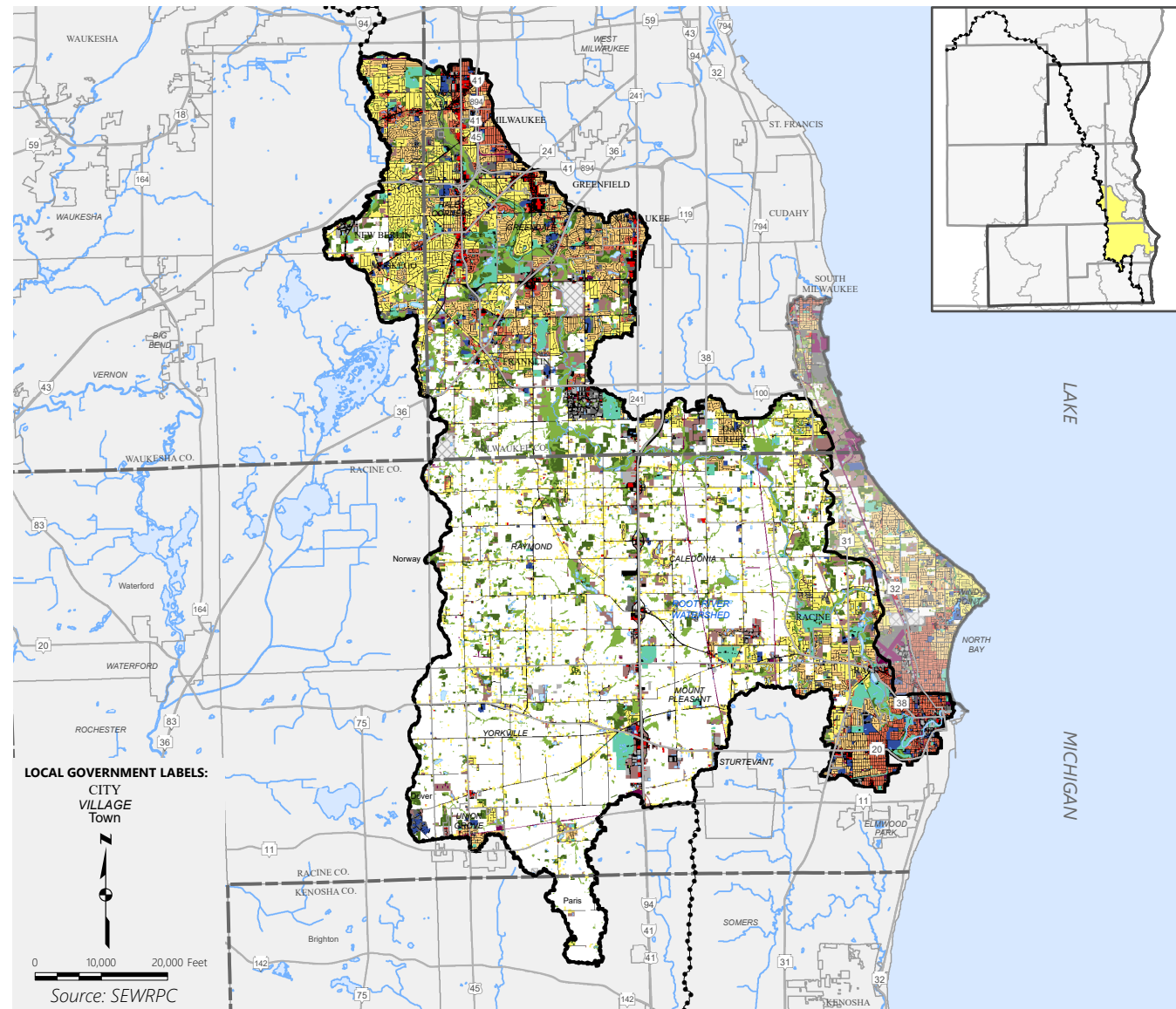


Note: The map above shows only the southern portion of the Rock River watershed that is within the study area. The facts below summarize the characteristics of the entire portion of the Rock River watershed that is within the study area (North and South portions combined)

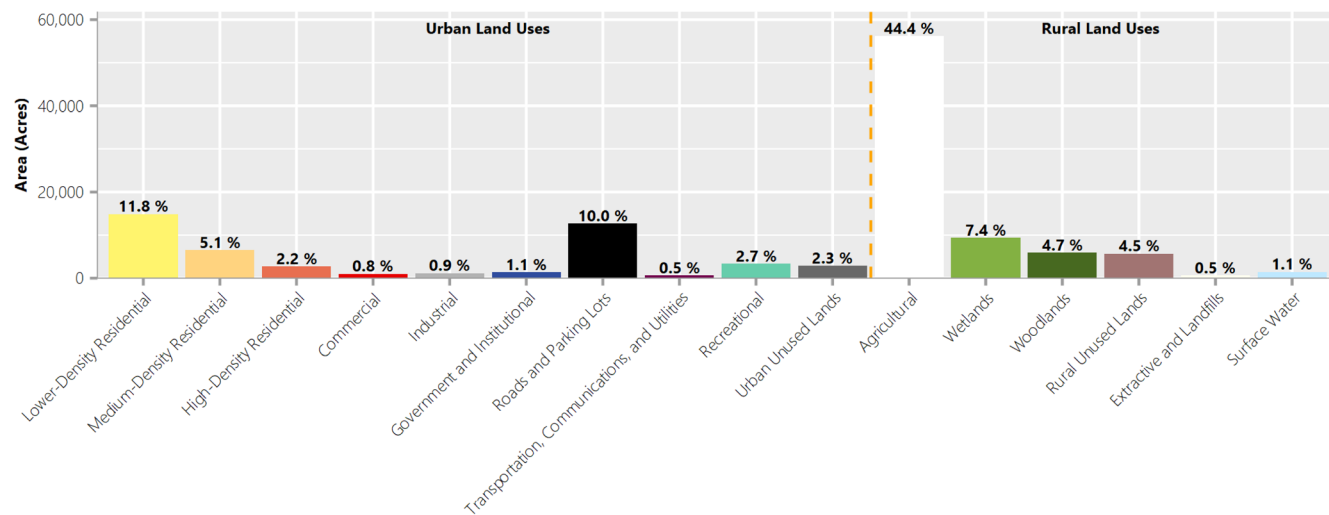
Facts at a Glance

- ▶ **Drainage Area Size:** 632 square miles
- ▶ **Existing Land Use:** Urban – 19.4%; Rural – 80.6%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 12.0%
- ▶ **Existing Roads and Parking Lots:** 5.5%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 2.6%
- ▶ **Active Wastewater Treatment Facilities:** Allenton, Delafield – Hartland (effluent from this facility is pumped and discharged to the Bark River approximately 4 miles southwest of facility), Dousman, Fontana – Walworth County Metropolitan Sewerage District, and Whitewater
- ▶ **Abandoned Wastewater Treatment Facilities:** Darien, Delavan, Elkhorn, Hartland, Slinger (former facility), and Walworth
- ▶ **Estimated Population in 2010:** 155,440
- ▶ **Estimated Population Served by Sewer in 2010:** 94,710 (61%)
- ▶ **Estimated Households in 2010:** 59,090
- ▶ **Estimated Households Served by Sewer in 2010:** 37,270
- ▶ **Water Supply Source:** Groundwater

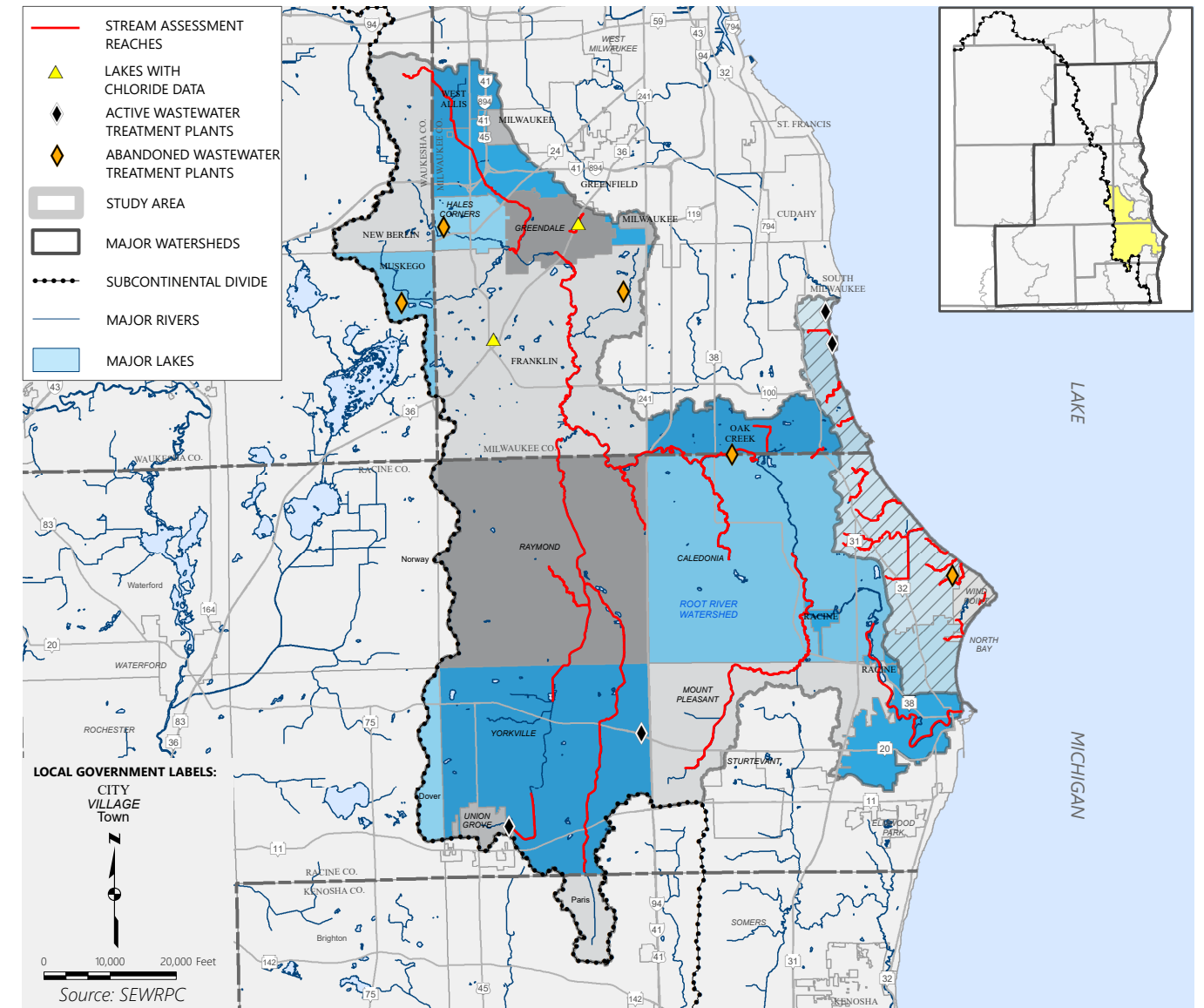
Map A.19
Existing Land Use in the Root River Watershed



Notes: Colors in the map above that are outside the Root River watershed boundary are reduced in intensity to show the adjacent extent and distribution of land use in the direct drainage area to Lake Michigan. The graph below summarizes land use within the Root River watershed only.



Map A.20
Characteristics of the Root River Watershed

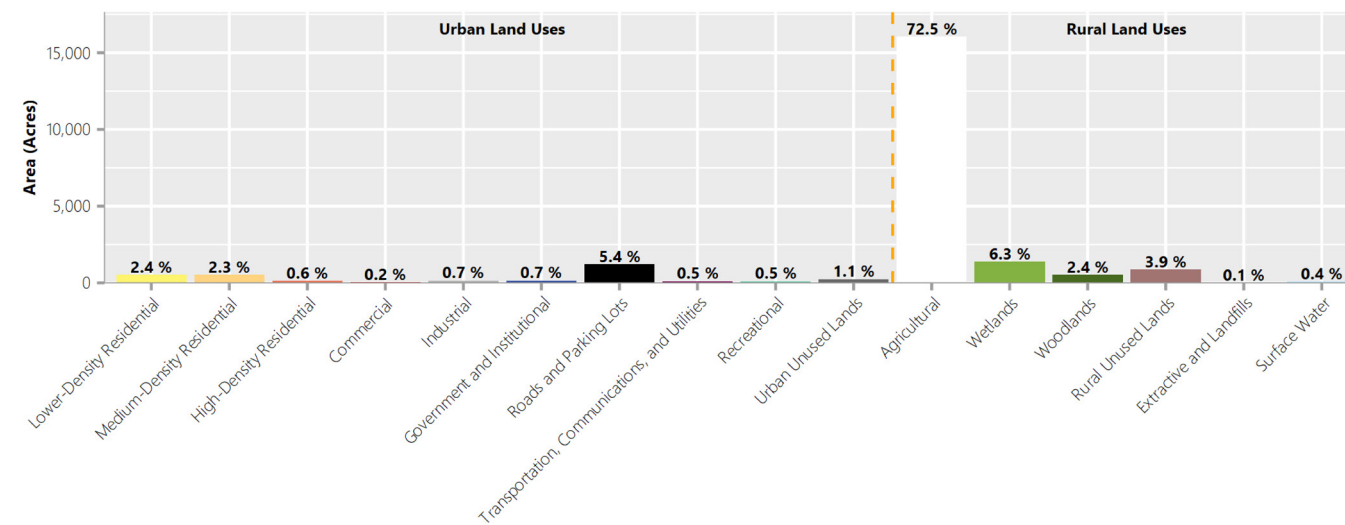
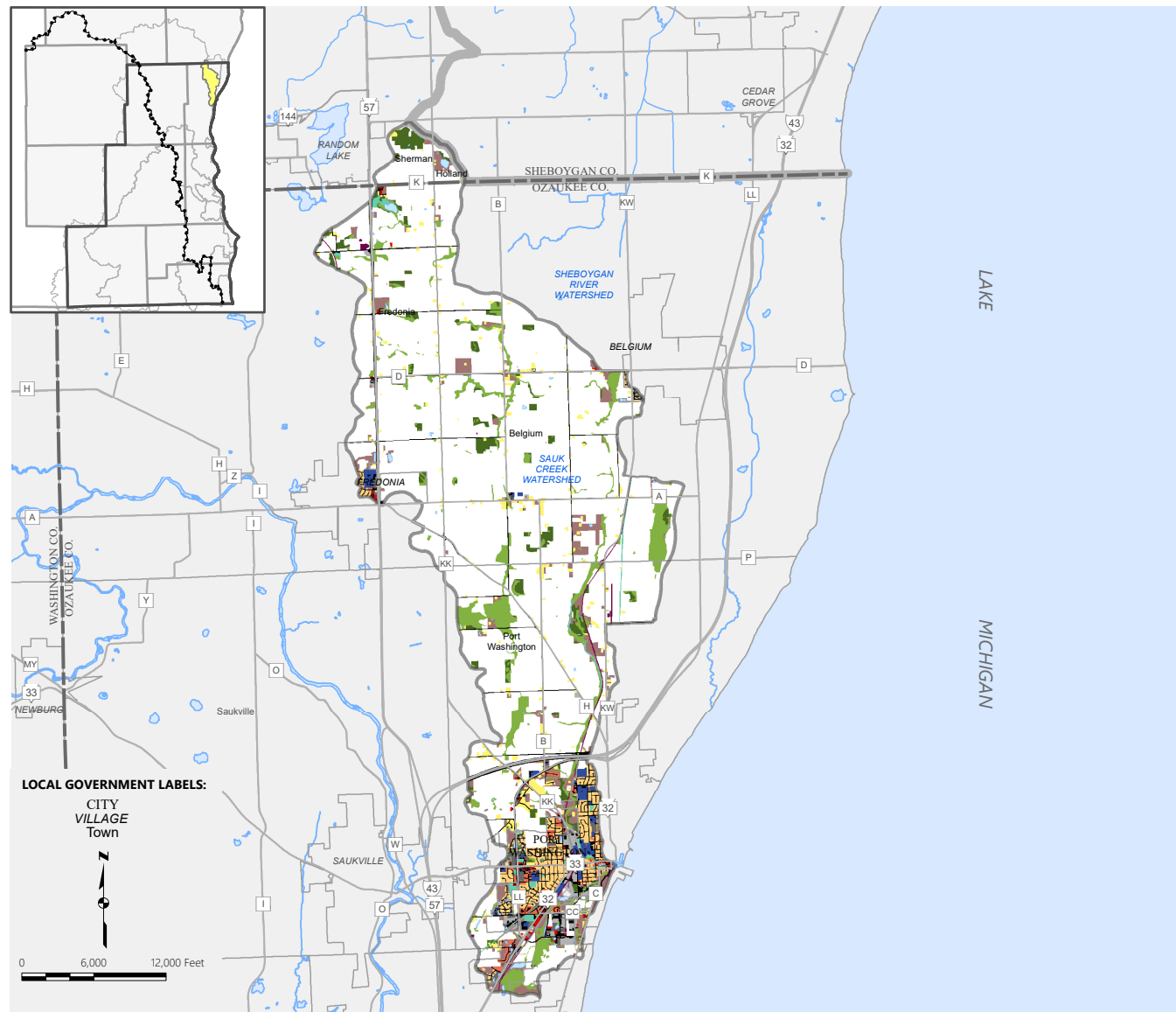


Notes: Colors in the map above that are outside the Root River watershed boundary are hatched and reduced in intensity to show the adjacent extent and distribution of civil divisions in the direct drainage area to Lake Michigan. The facts below summarize characteristics within the Root River watershed only. See Figure A.1 for land use and facts at a glance for the direct drainage area to Lake Michigan.

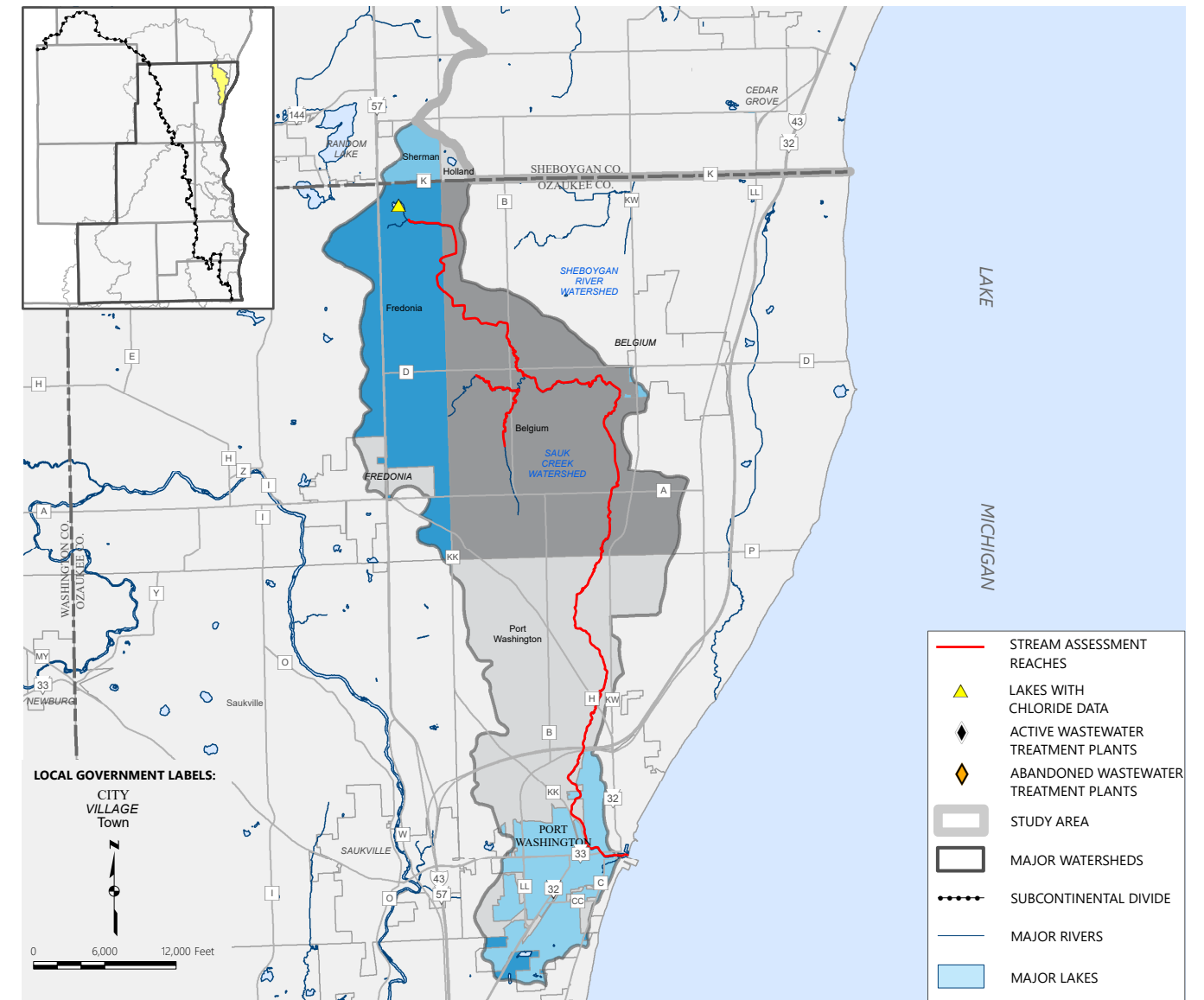
Facts at a Glance

- ▶ **Drainage Area Size:** 198 square miles
- ▶ **Existing Land Use:** Urban – 37.4%; Rural – 62.6%
- ▶ **Urban Land Use Increase Since 1963:** 15.6%
- ▶ **Existing Roads and Parking Lots:** 10.0%
- ▶ **Increase in Roads and Parking Lots Since 1963:** 4.8%
- ▶ **Active Wastewater Treatment Facilities:** Union Grove and Yorkville
- ▶ **Abandoned Wastewater Treatment Facilities:** Caddy Vista (Caledonia), Hales Corners, Muskego – Northeast District, and Rawson Homes Sewer and Water Trust (Greendale)
- ▶ **Estimated Population in 2010:** 179,010
- ▶ **Estimated Population Served by Sewer in 2010:** 168,430 (94%)
- ▶ **Estimated Households in 2010:** 71,730
- ▶ **Estimated Households Served by Sewer in 2010:** 67,690
- ▶ **Water Supply Source:** Lake Michigan and Groundwater

Map A.21
Existing Land Use in the Sauk Creek Watershed



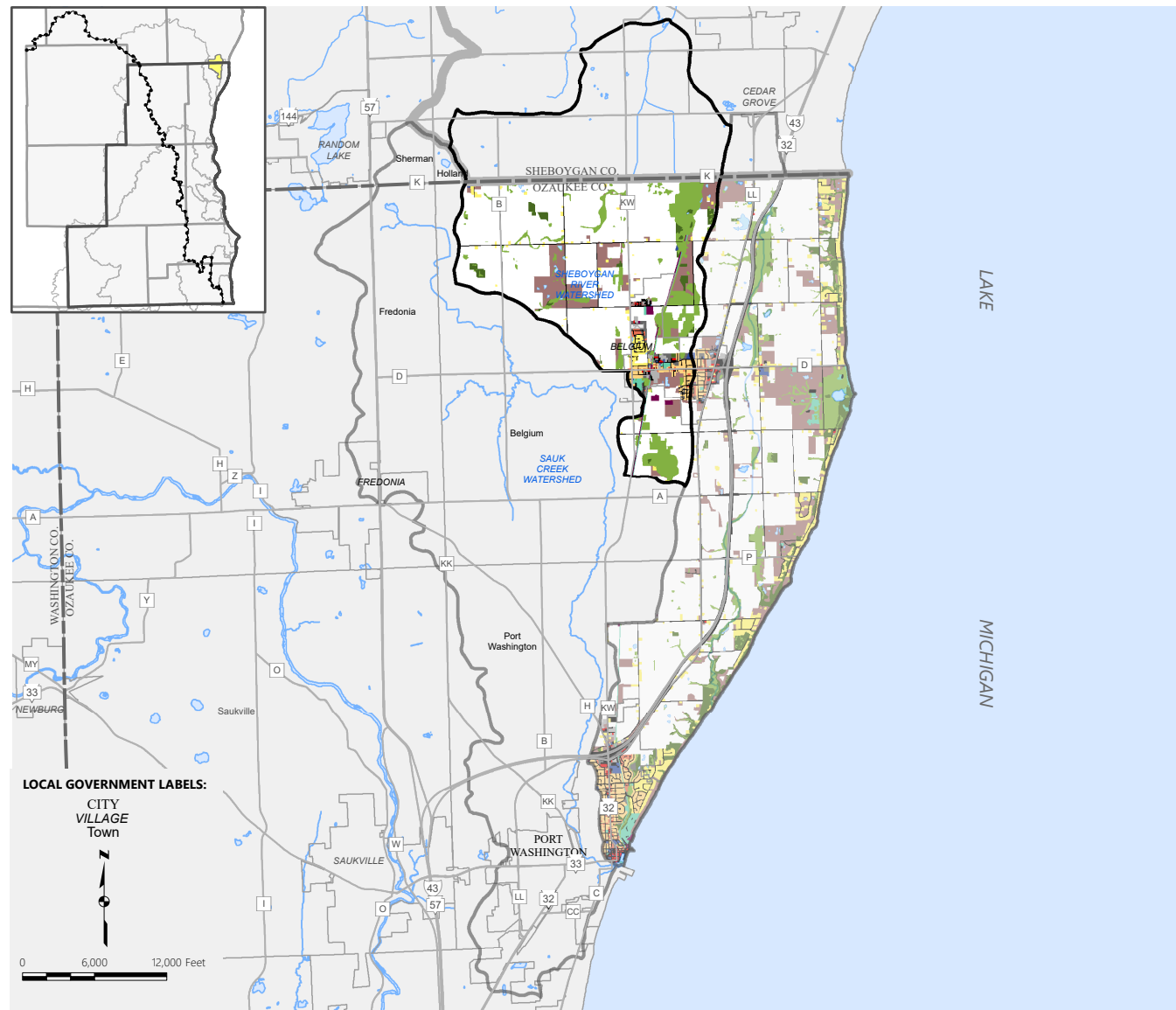
Map A.22
Characteristics of the Sauk Creek Watershed



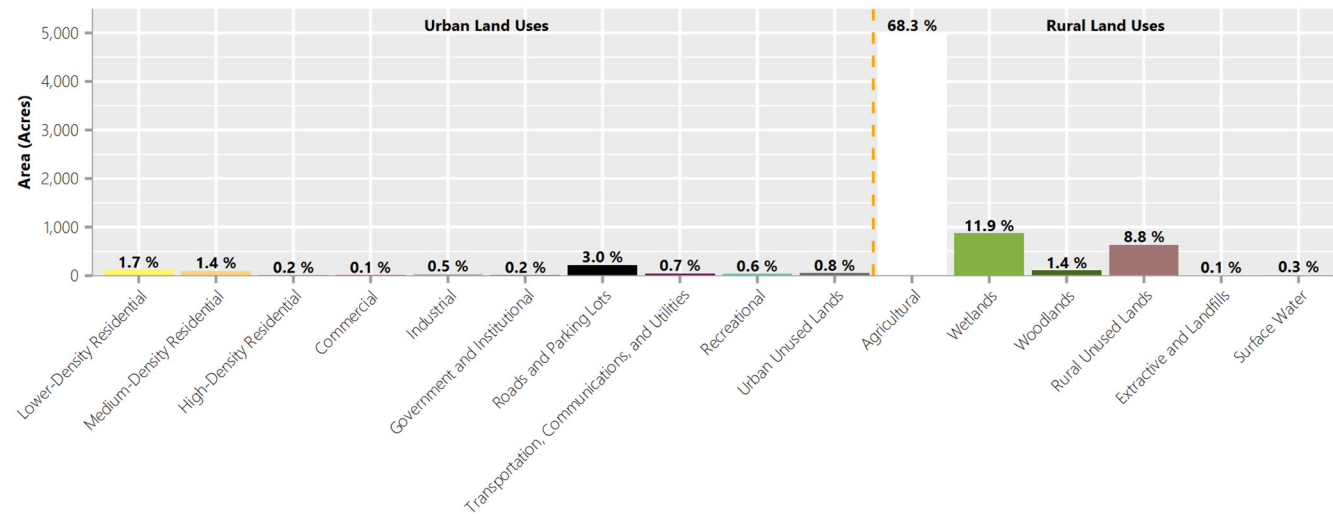
Facts at a Glance

- ▶ **Drainage Area Size:** 35 square miles
- ▶ **Existing Land Use:** Urban – 14.4%; Rural – 85.6%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 7.3%
- ▶ **Existing Roads and Parking Lots:** 5.4%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 2.2%
- ▶ **Active Wastewater Treatment Facilities:** None
- ▶ **Abandoned Wastewater Treatment Facilities:** None
- ▶ **Estimated Population in 2010:** 9,730
- ▶ **Estimated Population Served by Sewer in 2010:** 8,580 (88%)
- ▶ **Estimated Households in 2010:** 3,960
- ▶ **Estimated Households Served by Sewer in 2010:** 3,510
- ▶ **Water Supply Source:** Lake Michigan and Groundwater

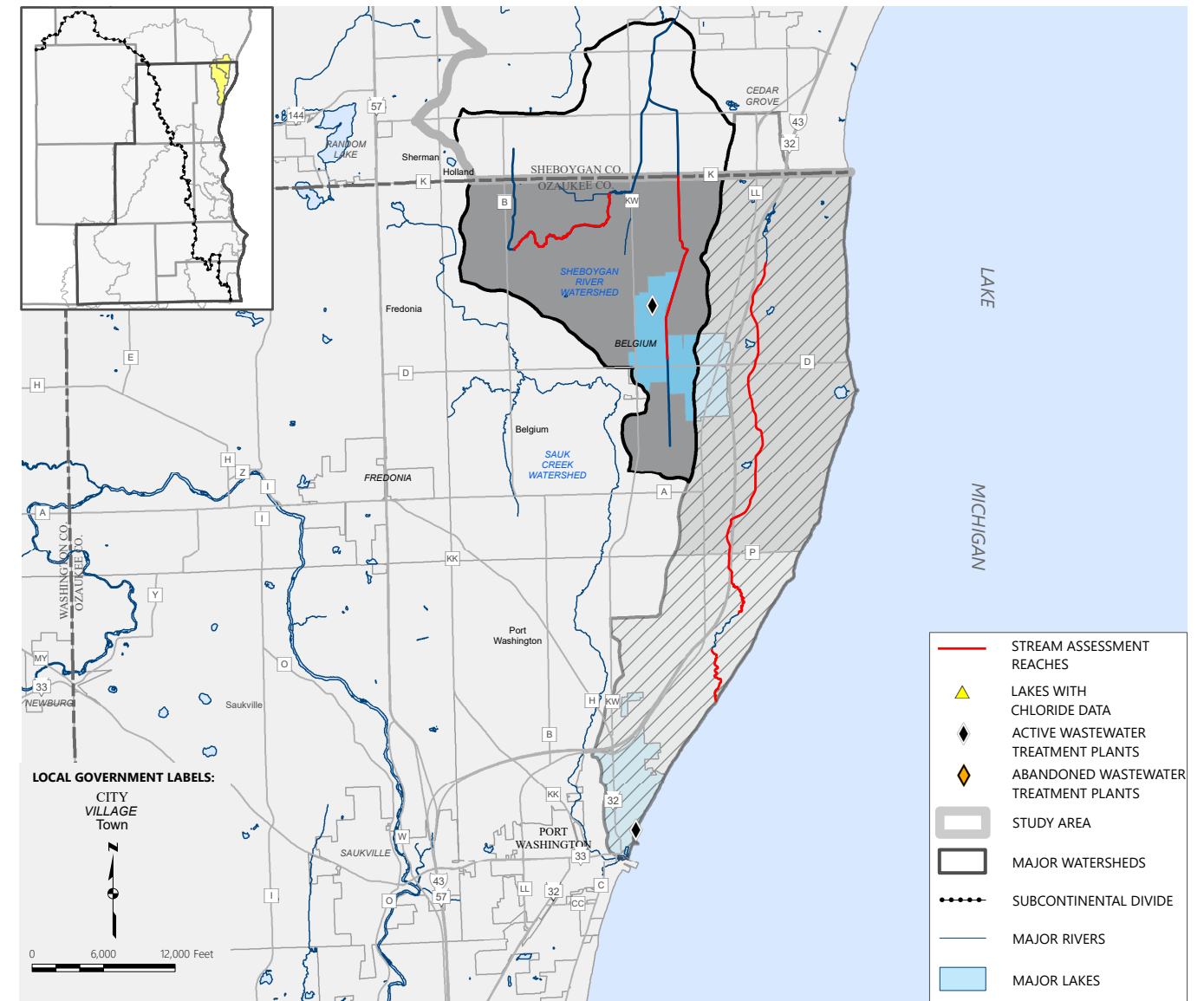
Map A.23
Existing Land Use in the Sheboygan River Watershed



Notes: Colors in the map above that are outside the Sheboygan River watershed boundary are reduced in intensity to show the adjacent extent and distribution of land use in the direct drainage area to Lake Michigan. The map above and the graph below only represent land use within the portion of the Sheboygan River watershed that is within the study area.



Map A.24
Characteristics of the Sheboygan River Watershed

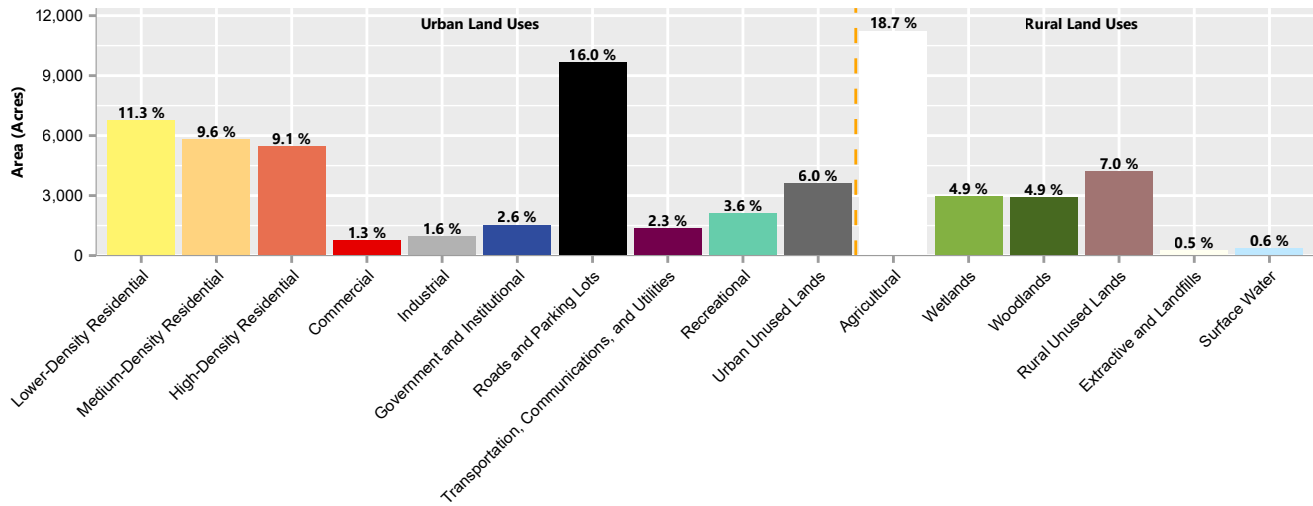


Notes: Colors that are outside the Sheboygan River watershed boundary are hatched and reduced in intensity to show the adjacent extent and distribution of civil divisions in the direct drainage area to Lake Michigan. The facts below summarize characteristics within the portion of the Sheboygan River watershed within the study area only. See Figure A.1 for land use and facts at a glance for the direct drainage area to Lake Michigan.

Facts at a Glance

- ▶ **Drainage Area Size:** 11 square miles
- ▶ **Existing Land Use:** Urban – 9.2%; Rural – 90.8%
- ▶ **Urban Land Use Increase Since 1963 (Region Only):** 3.9%
- ▶ **Existing Roads and Parking Lots:** 3.0%
- ▶ **Increase in Roads and Parking Lots Since 1963 (Region Only):** 0.8%
- ▶ **Active Wastewater Treatment Facilities:** Belgium
- ▶ **Abandoned Wastewater Treatment Facilities:** None
- ▶ **Estimated Population in 2010:** 1,550
- ▶ **Estimated Population Served by Sewer in 2010:** 1,350 (87%)
- ▶ **Estimated Households in 2010:** 560
- ▶ **Estimated Households Served by Sewer in 2010:** 490
- ▶ **Water Supply Source:** Groundwater

Figure A.1
Land Use and Facts at a Glance for the Direct Drainage Area to Lake Michigan



Facts at a Glance

- ▶ **Drainage Area Size:** 94 square miles
- ▶ **Existing Land Use:** Urban – 63.4%; Rural – 36.6%
- ▶ **Urban Land Use Increase Since 1963:** 19.0%
- ▶ **Existing Roads and Parking Lots:** 16.0%
- ▶ **Increase in Roads and Parking Lots Since 1963:** 6.0%
- ▶ **Active Wastewater Treatment Facilities:** Kenosha, MMSD Jones Island, MMSD South Shore, Port Washington, Racine, and South Milwaukee
- ▶ **Abandoned Wastewater Treatment Facilities:** North Park (Wind Point) and Pleasant Park Utility Company (Kenosha)
- ▶ **Estimated Population in 2010:** 217,570
- ▶ **Estimated Population Served by Sewer in 2010:** 215,060 (99%)
- ▶ **Estimated Households in 2010:** 87,040
- ▶ **Estimated Households Served by Sewer in 2010:** 86,050
- ▶ **Water Supply Source:** Lake Michigan

Note: For mapped land use of the direct drainage area to Lake Michigan see Maps A.5, A.9, A.13, A.19, and A.23. For locations of active and abandoned wastewater treatment plants, lakes with chloride data, and stream assessment reaches, see Maps A.6, A.10, A.14, A.20, and A.24.

Source: SEWRPC