

MAP APPENDIX

AN EVALUATION OF TERRESTRIAL ECOSYSTEM RESTORATION OPTIONS FOR THE **CHIPPEWA RIVER ECOREGION** OF THE **UPPER MISSISSIPPI RIVER SYSTEM**

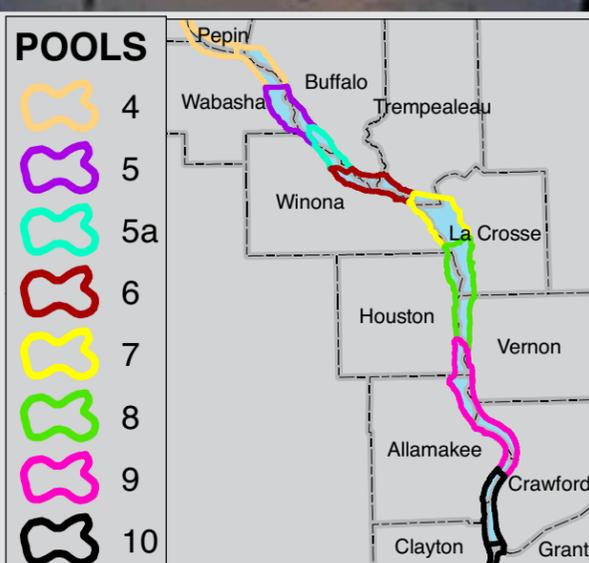
Prepared For:

**U. S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT
ST. PAUL, MINNESOTA**

Report 10-06

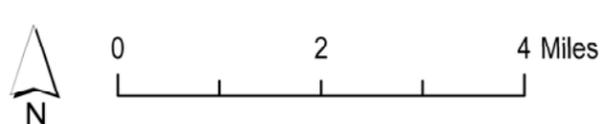
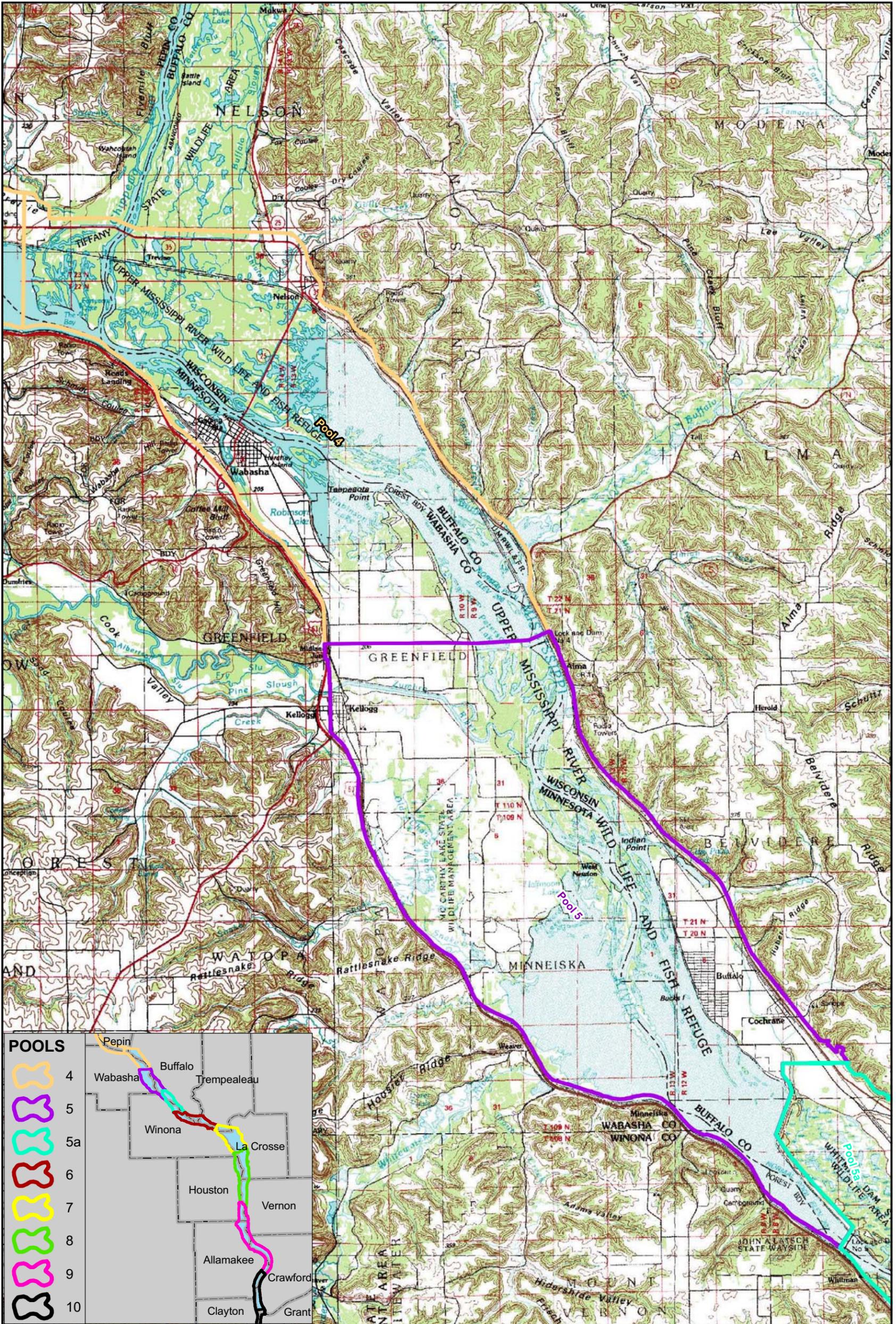
Mickey E. Heitmeyer

July 2010

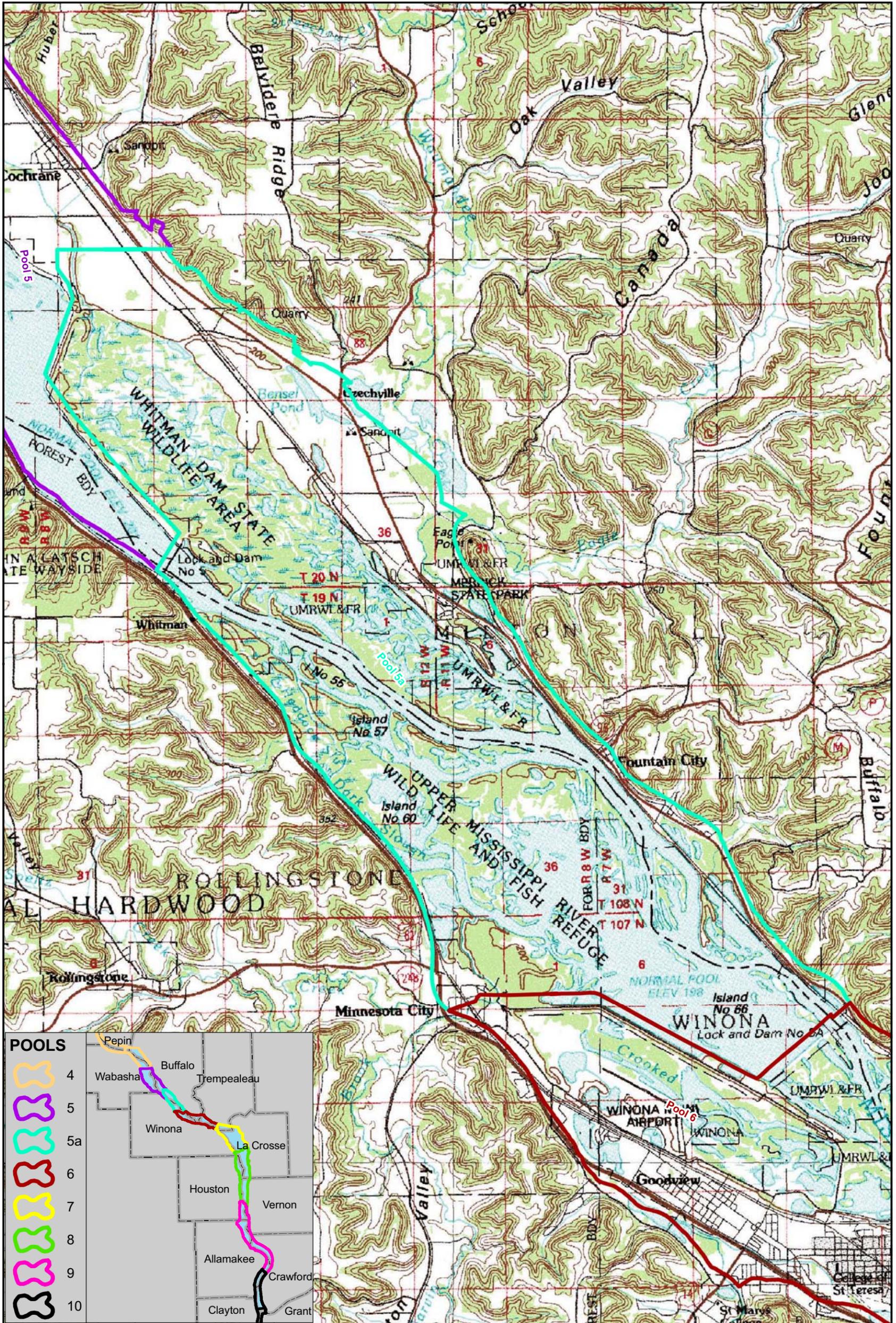


APPENDIX LEGENDS

- A. U.S. Geological Survey 1: 100,000 topographic maps showing major physical features of the Chippewa River Ecoregion.
- B. Geomorphology land sediment assemblages (LSA) of the Chippewa River Ecoregion (from Madigan et al. 1998).
- C. Approximate ages of LSA's in the Chippewa River Ecoregion (adapted from Madigan et al. 1998).
- D. Soils in the Chippewa River Ecoregion (from U.S. Department of Agriculture SSURGO data). Primary soils in Minor Channel Lateral Accretion LSA surfaces are Comfrey silt loam (code 1860), Shiloh silt loam (606), and Caneek silt loam (1490). Primary soils in Main Channel Lateral Accretion surfaces were sandy alluvial soils. Primary soils in Tributary fans were Caneek silt loam (490), Elon silt loam (843), Orthents loamy (5040), undifferentiated marsh (Ma), sandy alluvial land (Sa), Shandep loam (N649a), Newalbin silt loam (577), Minneiska fine sandy loam (271), Alganssee-Kalmarville complex (1658A), Palms muck (21A), Moundprairie silty clay loam (1888), and Comfrey silty clay loam (1860). Primary soils in Minor Channel Vertical Accretion surfaces were Shandep loam (N649a), loamy alluvial (Lv), Shiloh silt loam (606), Caneek silt loam (1490), and Orion silt loam (Or). Primary soils in Tributary Floodplain/Marsh surfaces were Shandep loam (N649a) and Palms muck (21A). Primary soils on Eolian Dunes over Terrace surfaces were Plainfield fine sand (Paab), Rasset sandy loam (413A), Finchford loamy sand (501A) and Chelsea fine sand (502c2). Primary soils on Glacial Terrace surfaces were Sparta sand (41B), Dakota sandy loam (DkA), Chaseburg silt loam (CaB), Arenzville silt loam (Ar), Sparta loamy sand (140B), Sparta loamy fine sand (Spa), Burkhardt sandy loam (BuA), Gotham loamy fine sand (Goc), Finchford loamy sand (501A), and Waukee loam (178B). Primary soils on Glacial Stream Channels and Scarps were Duelm fine sandy loam (Dv), Hubbard soils (Hua), and Newalbin silt loam (577). Primary soils on Colluvial Slope surfaces were Eleva-Boone complex soils (Enf). Primary soils in Main Channel Vertical Accretion surfaces were Comfrey silty clay loam (1860), Shiloh silty clay (606), and Caneek silt loam (1490).
- E. Digital elevation model (DEM) maps, in feet above mean sea level, of the Chippewa River Ecoregion (from U.S. Army Corps of Engineers, St. Paul District).
- F. Bathymetry surface water depth of impounded and main permanent water areas in the Chippewa River Ecoregion (from U.S. Army Corps of Engineers, St. Paul District).
- G. Mississippi River Commission maps of the Chippewa River Ecoregion landscape in 1890
- H. 1930 Survey maps of the Chippewa River Ecoregion (from Brown 1931).
- I. 1929 aerial photographs of the Chippewa River Ecoregion.
- J. 2000 color aerial photographs of the Chippewa River Ecoregion.
- K. 2008 and 2009 National Agriculture Inventory Program (NAIP) aerial photographs of the Chippewa River Ecoregion.
- L. Vegetation recorded at section corners in the General Land Office survey of the Chippewa River Ecoregion (from General Land Office 1817-1860).
- M. Land cover in the Chippewa River Ecoregion adapted from Mississippi River Commission maps prepared in 1890 (prepared by U.S. Geological Survey Upper Midwest Environmental Sciences Center, La Crosse, WI).
- N. Land cover in the Chippewa River Ecoregion in 1989 overlain on 2008 and 2009 NAIP photographs (prepared by U.S. Geological Survey Upper Midwest Environmental Sciences Center, La Crosse, WI).
- O. Land cover in the Chippewa River Ecoregion in 2000 overlain on 2008 and 2009 NAIP photographs (prepared by U.S. Geological Survey Upper Midwest Environmental Sciences Center, La Crosse, WI).
- P. Map of potential restoration sites for major vegetation communities in the Chippewa River Ecoregion determined from HGM matrix correlations of communities with geomorphology, soils, topography, and hydrology (Table 1). Ridge-and-swale communities include a combination of riverfront forest in low elevation swales and floodplain forest in higher elevation ridges of lateral accretion geomorphic surfaces. Tributary fan communities include a combination of floodplain forest on high elevations with 2-5 year flood frequency and PEM/wet meadow communities in low elevations with semipermanent or seasonal water regimes, respectively. Winona Flats includes diverse mixed floodplain forest, PEM/wet meadow and possibly Prairie-Savanna (see text for discussion).
- Q. Map of potential restoration sites for major vegetation communities in the Chippewa River Ecoregion overlain on 2008 and 2009 NAIP photographs. See Appendix P for community descriptions.

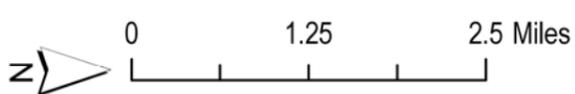
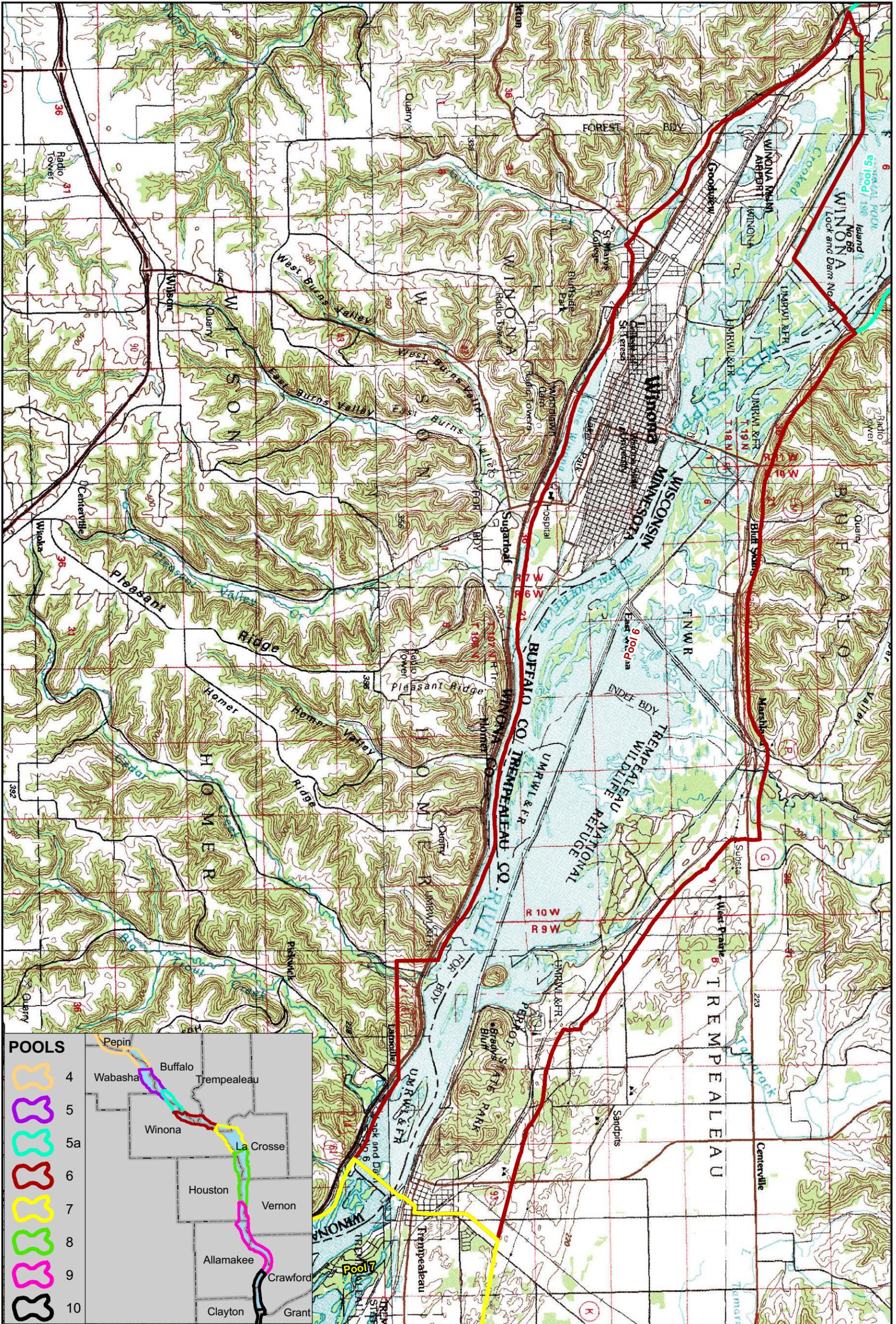


Appendix A - Pools 4 & 5
 Hydrogeomorphic Modeling Analysis
 Evaluation of Geomorphic Reach 3 (Chippewa River)
 Upper Mississippi River System Floodplain
 USGS Topographic Map
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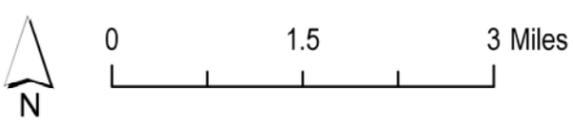
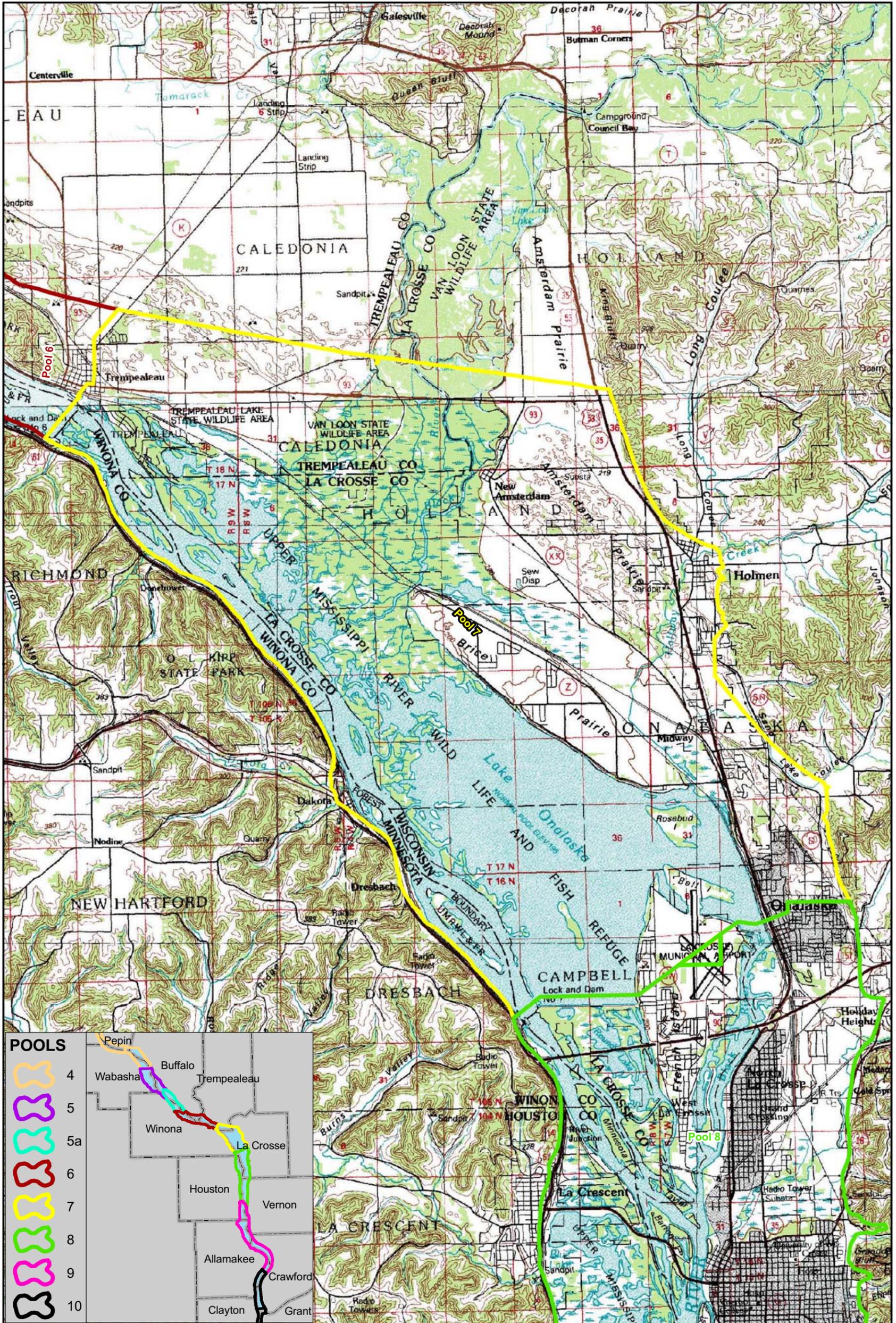


Appendix A - Pool 5a
 Hydrogeomorphic Modeling Analysis
 Evaluation of Geomorphic Reach 3 (Chippewa River)
 Upper Mississippi River System Floodplain
 USGS Topographic Map
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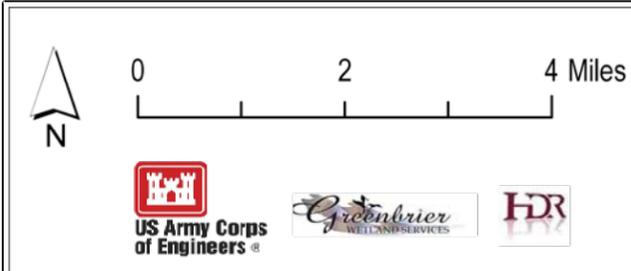
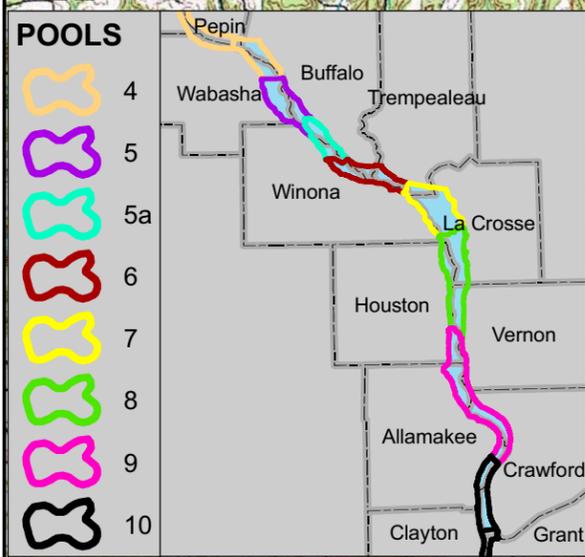
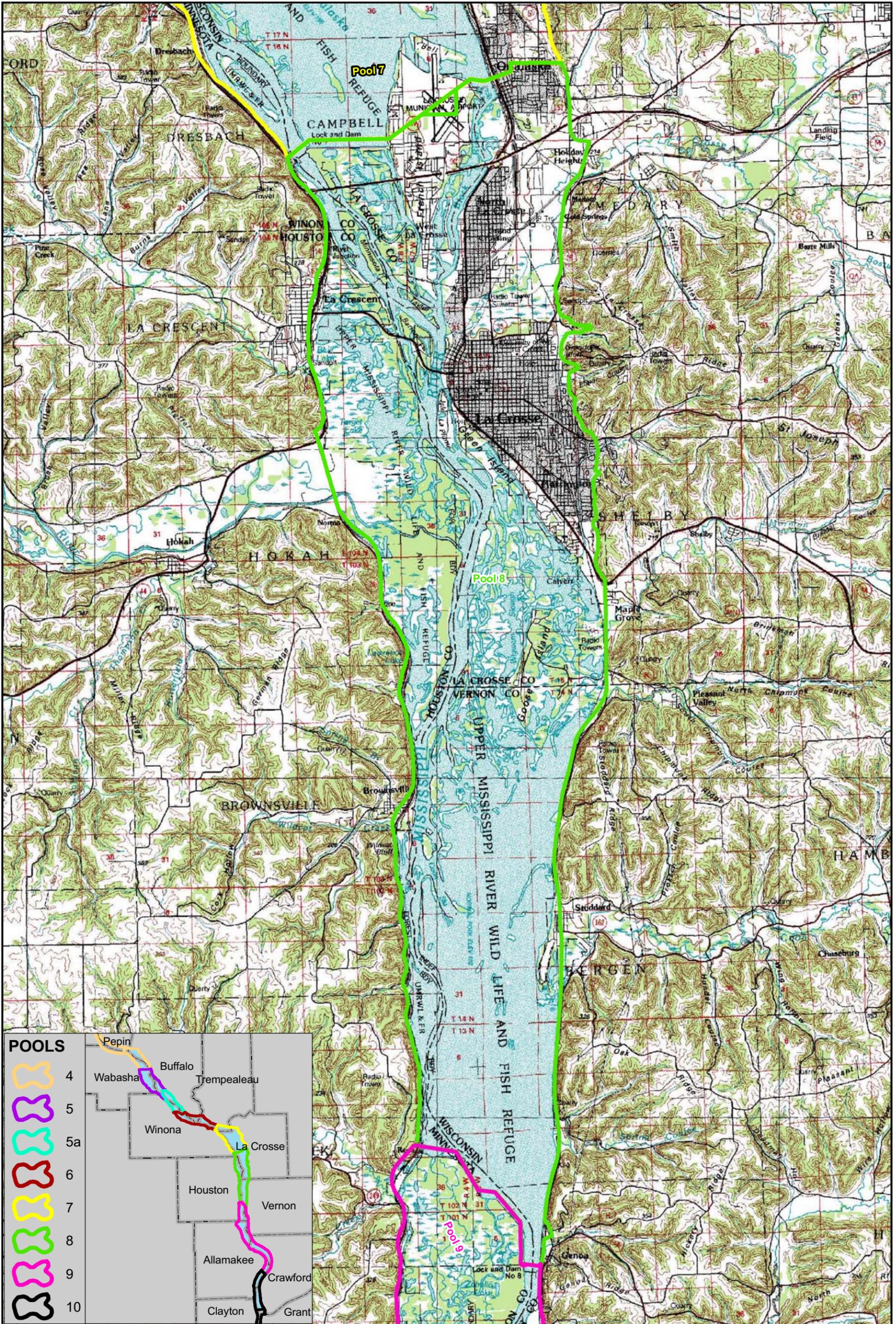




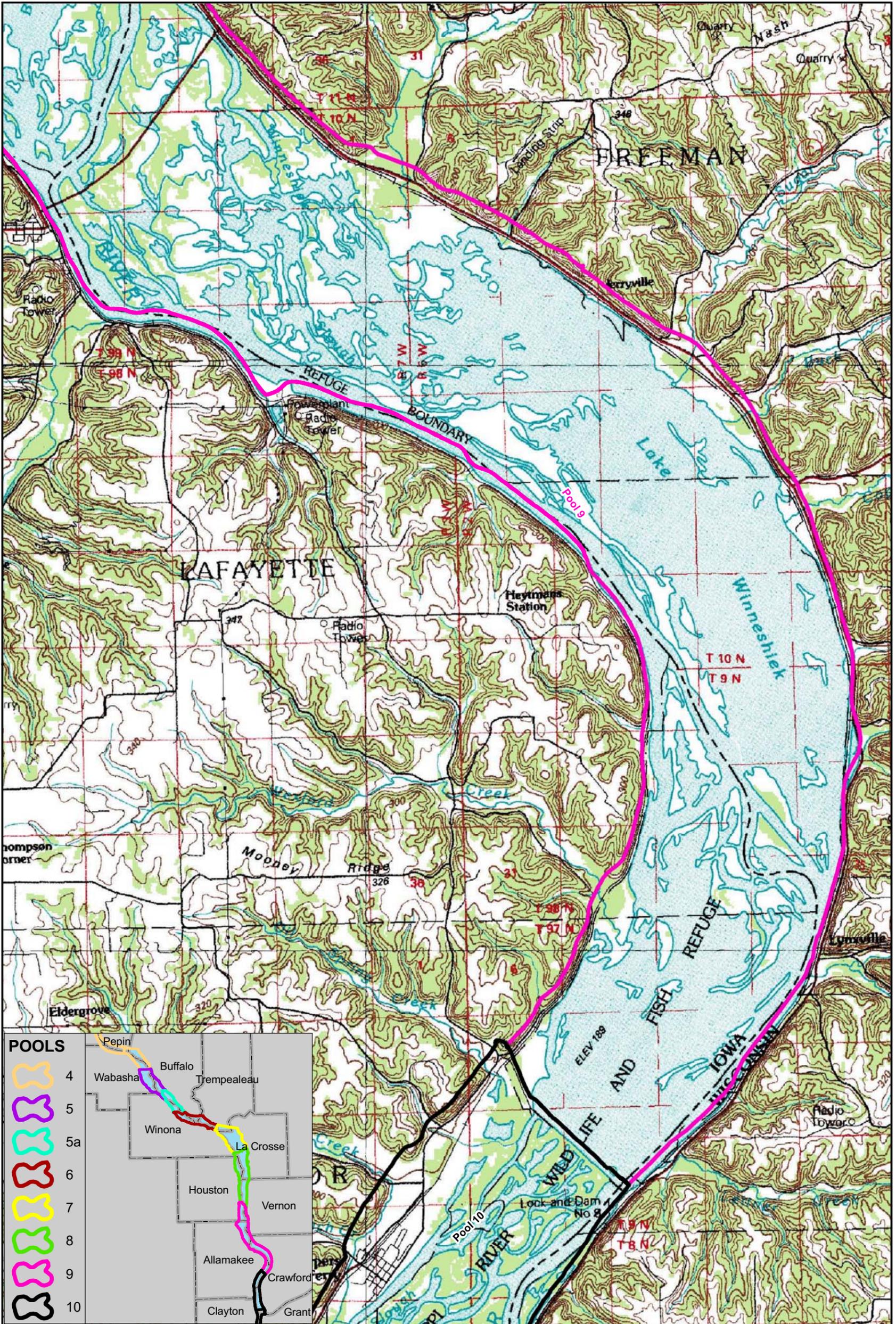
Appendix A - Pool 6
Hydrogeomorphic Modeling Analysis
Evaluation of Geomorphic Reach 3 (Chippewa River)
Upper Mississippi River System Floodplain
USGS Topographic Map
1:100,000



Appendix A - Pool 7
 Hydrogeomorphic Modeling Analysis
 Evaluation of Geomorphic Reach 3 (Chippewa River)
 Upper Mississippi River System Floodplain
 USGS Topographic Map
 1:100,000



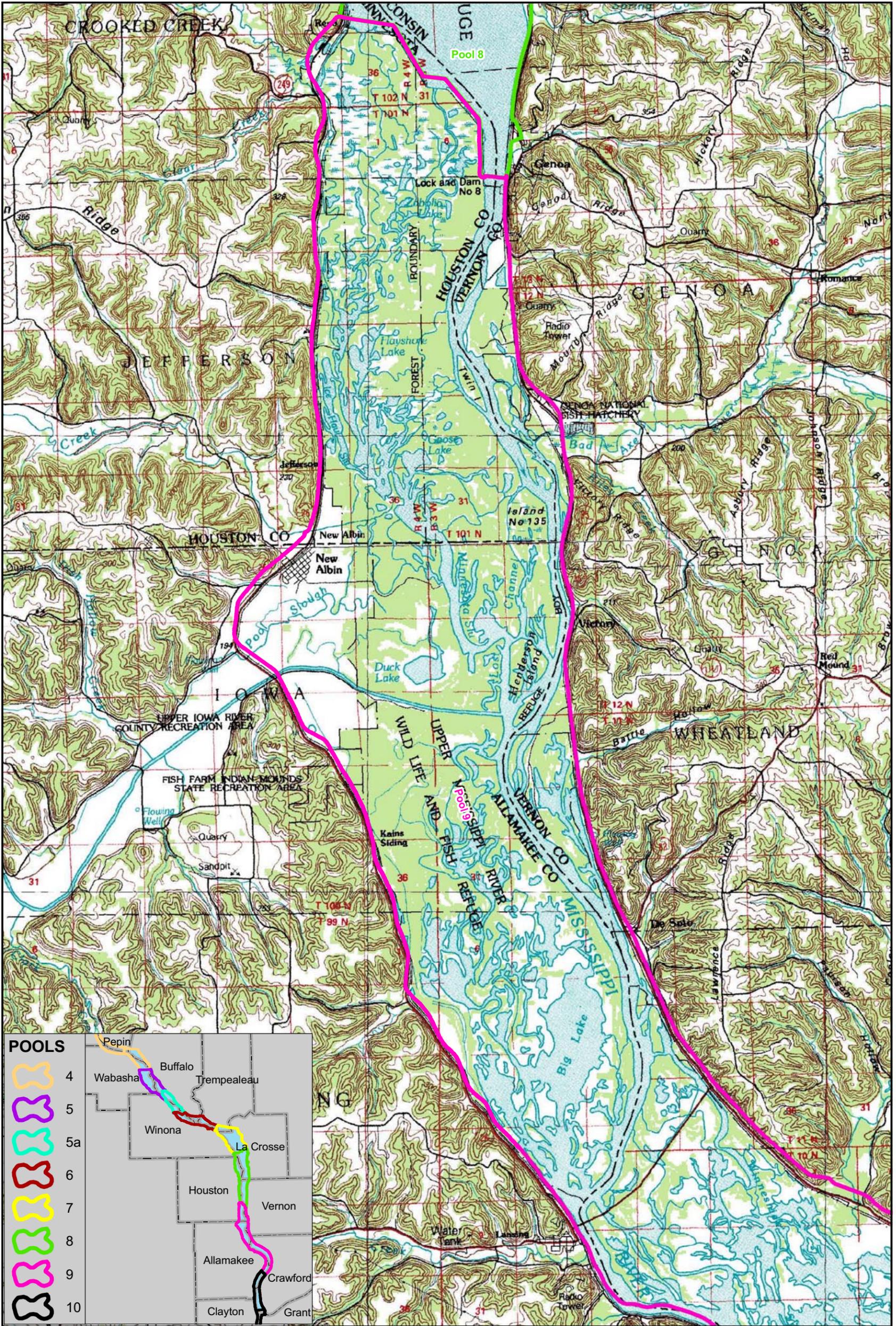
Appendix A - Pool 8
 Hydrogeomorphic Modeling Analysis
 Evaluation of Geomorphic Reach 3 (Chippewa River)
 Upper Mississippi River System Floodplain
 USGS Topographic Map
 1:100,000



Appendix A - Pool 9 (Lower)

Hydrogeomorphic Modeling Analysis
 Evaluation of Geomorphic Reach 3 (Chippewa River)
 Upper Mississippi River System Floodplain
 USGS Topographic Map
 1:100,000





Appendix A - Pool 9 (Upper)
 Hydrogeomorphic Modeling Analysis
 Evaluation of Geomorphic Reach 3 (Chippewa River)
 Upper Mississippi River System Floodplain
 USGS Topographic Map
 1:100,000

