RIVERS, STREAMS & WETLANDS TOPIC MEETING DATA

Introduction

The Kettle River & Upper St. Croix Watershed flows south from its headwaters in Carlton County to its confluence with the Snake River just south of St. Croix State Park. Although largely forested, the watershed is dotted with farmland and small cities including Moose Lake, Sandstone and Hinckley. This watershed is lucky to have abundant healthy natural resources including rivers, streams, lakes, wetlands, groundwater and forests.

The **Kettle River & Upper St. Croix One Watershed, One Plan** (1W1P) is a planning partnership between Pine SWCD, Pine County, Carlton SWCD, Carlton County and Kanabec SWCD. The goal of this partnership is to **prioritize** restoration and protection opportunities and **target** valuable resources. The result will be the development of a comprehensive watershed management plan with actions that make progress towards **measurable** goals.

The general 1W1P process is outlined in Figure 1. For the first step, which is to gather and prioritize opportunities/issues in the watershed, a series of five topic meetings will be held. The meeting topics include: 1) lakes, 2) forests, 3) rivers, streams & wetlands, 4) agriculture & groundwater and 5) stormwater.

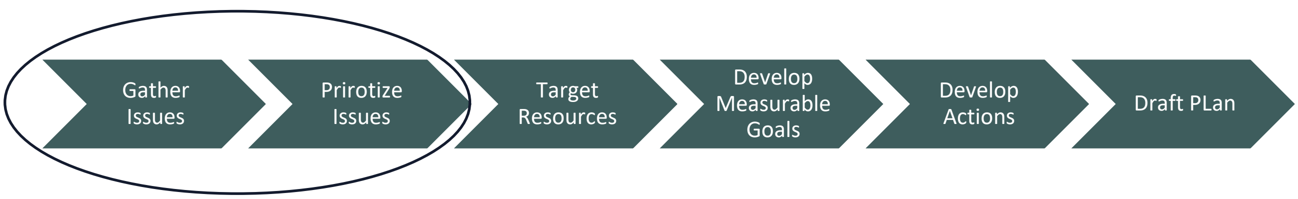

Figure 1. The 1W1P process is divided into six main steps. The topic meetings are the first step in the process (circled).

The 1W1P process is driven by local units of government, guided by an Advisory Committee made up of local stakeholders and state agencies. The decision-making body for the plan is a Policy Committee made up of elected officials from each County and SWCD.

Kettle River & Upper St. Croix Watershed Rivers & Streams

There are about 1700 miles of streams and rivers in the Kettle River & Upper St. Croix watershed. Most of these streams are in good condition, providing habitat for variety of rare and sensitive species including trout, river sturgeon and freshwater mussels. There are 115 miles of MN Department of Natural Resources designated trout streams. However, the Minnesota Pollution Control Agency found that 20 streams do not fully support aquatic recreation and/or aquatic life and are listed as impaired. Most of these impaired streams (16 reaches) are in the Kettle River Watershed.

Figure 2. The headwaters of the Kettle River are found in Carlton County and were historically ditched.

A MN DNR study found over 50 priority culverts that are barriers for fish passage. This means the culverts are either undersized, perched (meaning the culvert outlets above the stream) or placed in a way the impedes aquatic organisms from moving upstream. In addition, hundreds of miles of stream were altered during European settlement to facilitate logging and farming. Dams and ditched streams impact stream health.

High bacteria levels are a concern for some streams in the Kettle River Watershed, and there are 7 streams that are impaired for chronically high levels of bacteria. There is also one stream that is impaired for high levels of sediments in the Upper St. Croix Watershed (Sand Creek). Finally, thirteen streams do not support aquatic life, meaning the fish or invertebrate populations were not as healthy as expected.

Kettle River & Upper St. Croix Watershed Wetlands

Wetlands are the second highest land cover type in the Kettle River and Upper St. Croix Watershed. This watershed has emergent (open water), peatlands and forested wetlands. Many wetlands in the watershed are healthy, providing a variety of benefits such as habitat, protection from floods, groundwater recharge and water quality protection. However, according to the Bank Service Area 6 Compensation Planning Framework, some wetlands have been lost in the

Kettle River Watershed and Upper St. Croix River Watershed. These alterations can impact downstream resources.

Figure 3. Wetlands make up the second highest land use type in the Kettle River and Upper St. Croix Watershed.

According to the Bank Service Area 6 Compensation Planning Framework, there are almost 12,000 acres of ditched wetlands which equals over 5% of the total wetland acres in the Kettle River Watershed and 4,344 acres of ditched wetlands which equals almost 4% in the Upper St. Croix Watershed. The Watershed Restoration and Protection Strategy explains that ditched wetlands and peatlands are likely a major contributor to low dissolved oxygen levels in downstream streams, impacting aquatic life. In some parts of Minnesota, wetlands have been known to release phosphorous to downstream lakes, but it is not known whether this is the case for lakes in the Kettle River & Upper St. Croix Watershed.

HUC -10 Watershed	Stream Miles (WRAPS)	Altered Stream Miles (WRAPS)	Impaired Streams (WRAPS)	Trout Streams (DNR)	Stream Protection & Prioritization Tool Reaches, Miles (MPCA)	Stream Crossing Inventory & Prioritization (MN DNR)
Upper Kettle River	378 miles	**133 miles**	• Kettle River: Headwaters to West Branch Kettle River – **Fish Biology** • Split Rock River: Headwaters to Kettle River- **E. coli Bacteria** • Kettle River: West Branch Kettle River to Dead Moose River - **E. coli Bacteria**	None	• Priority B: 7 reaches (69 miles) • Priority C: 3 reaches (37 miles)	High Priority: 4 Medium Priority: 4 Low Priority: 2
Moose River	160 miles	12 miles	• None	15 Miles	• Priority A: 3 reaches (12 miles) • Priority B: 3 reaches (22 miles) • Priority C: 1 reach (11 miles)	High Priority: 1 barrier Medium Priority: 3 barriers Low Priority: 0 barriers
Willow River	114 miles	16 miles	• Hay Creek: Headwaters to Willow River – **Fish Biology**	3 miles	• Priority A: 1 reach (3 miles) • Priority B: 2 reaches (10 miles) • Priority C: 1 reach (24 miles)	High Priority: 3 barriers Medium Priority: 2 barriers Low Priority: 0 barriers
Pine River	170 miles	15 miles	• Pine River: Headwaters to Pine Lake – **E. coli bacteria** • Pine River: Big Pine Lake to Little Pine Creek – **Invertebrate Biology** • Pine River: Little Pine Creek to Bremen Creek – **Invertebrate Biology**	None	• Priority A: 2 reaches (15 miles) • Priority B: 3 reaches (69 miles) • Priority C: 0 reaches	High Priority: 1 barrier Medium Priority: 7 barriers Low Priority: 0 barriers
Grindstone River	77 miles	20 miles	• Grindstone River: Grindstone Reservoir to Kettle River – **E. coli** • Grindstone River, South Branch: Headwaters to Grindstone River – **E. coli bacteria and Fish Biology** • Judicial Ditch 1: Headwaters to South Branch Grindstone River – **E. coli bacteria** • Grindstone River, North Branch: Headwaters to Grindstone Lake – **E. coli bacteria** • Grindstone River, North Branch: T42 R21W S33, north line to Grindstone River – **E. coli bacteria** • Unnamed creek: Miller Lake to Grindstone Lake **– E. coli bacteria** • Spring Creek: Headwaters to Grindstone River – **E. coli bacteria and Fish Biology**	6 miles	• Priority A: 1 reach (7 miles) • Priority B: 1 reach (7 miles)	High Priority: 1 barrier Medium Priority: 5 barriers Low Priority: 2 barriers
Lower Kettle River	235 miles	61 miles	• Cane Creek: Headwaters to Kettle River – **Fish Biology, Invertebrate Biology** • Friesland Ditch: Railroad tracks to Kettle River **– Fish Biology, Invertebrate Biology** • Skunk Creek: Unnamed creek to Kettle River – **Fish Biology**	3 miles	• Priority A: 2 reaches (<1 mile) • Priority B: 5 reaches (27 miles) • Priority C: 1 reach (12 miles)	High Priority: 0 barriers Medium Priority: 8 barriers Low Priority: 2 barriers

HUC -10 Watershed	Stream Miles (WRAPS)	Altered Stream Miles (WRAPS)	Impaired Streams (WRAPS)	Trout Streams (DNR)	Stream Protection & Prioritization Tool Reaches, Miles (MPCA)	Stream Crossing Inventory & Prioritization (MN DNR)
Bear Creek	74 miles	28 miles	• None	2 miles	• Priority B: 1 reach (2 miles) • Priority C: 1 reach (40 miles)	No priority barriers
Sand Creek	143 miles	29 miles	• Sand Creek: Headwaters to T44 R18W S27, south line – **Total Suspended Solids** • Hay Creek: Headwaters to Lake Clayton – **Fish Biology, Invertebrate Biology** • Sand Creek: T44 R18W S34, north line to Unnamed Creek – **Fish Biology**	24 miles	• Priority A: 1 reach (6 miles) • Priority B: 2 reaches (12 miles) • Priority C: 4 reaches (30 miles)	3 priority barriers
Crooked Creek	97 miles	3 miles	• Wolf Creek: T43 R18W S32, north line to Crooked Creek – **Invertebrate Biology**	34 miles	• Priority A: 1 reach • Priority B: 4 reaches (16 miles) • Priority C: 1 reach (3 miles)	4 priority barriers
Lower Tamarack	178 miles	2 miles	• None	5 miles	• Priority B: 1 reach (6 miles) • Priority C: 6 reaches (81 miles)	1 priority barrier
Upper Tamarack	16 miles	<1 miles	• None	None	• Priority B: 1 reach (4 miles) • Priority C: 1 reach (4 miles)	No priority barriers
Chases Brook – St. Croix	62.7 miles	<1 miles	• None	1.3 miles	• Priority B: 2 reaches (10.3 miles) • Priority C: 1 reach (4.8 miles)	No priority barriers

HUC -10 Watershed	Wetlands (% of Subwatershed) WRAPS	Potentially Restorable Wetlands (NRRI & DNR)	Loss of Watershed Storage Score (High=Less loss, Low=More loss) (MN DNR WHAF)*
Upper Kettle River	45%	4240 acres	75
Moose River	40%	935 acres	93
Willow River	40%	932 acres	71
Pine River	35%	615 acres	92
Grindstone River	29%	1107 acres	72
Lower Kettle River	30%	1049 acres	81
Bear Creek	30%	519 acres	80
Sand Creek	32%	1485 acres	81
Crooked Creek	28%	704 acres	95
Lower Tamarack	41%	1334 acres	95
Upper Tamarack	26%	92 acres	84
Chases Brook – St. Croix	37.2%	606 acres	93

***The score is calculated by averaging the area of remaining presettlement surface water features normailized to the watershed area (includes hydric soils, representing wetlands, and open water) and the ratio of unaltered, meandering perennial stream miles, to total stream miles (altered + unaltered); indicates loss of channel storage.**

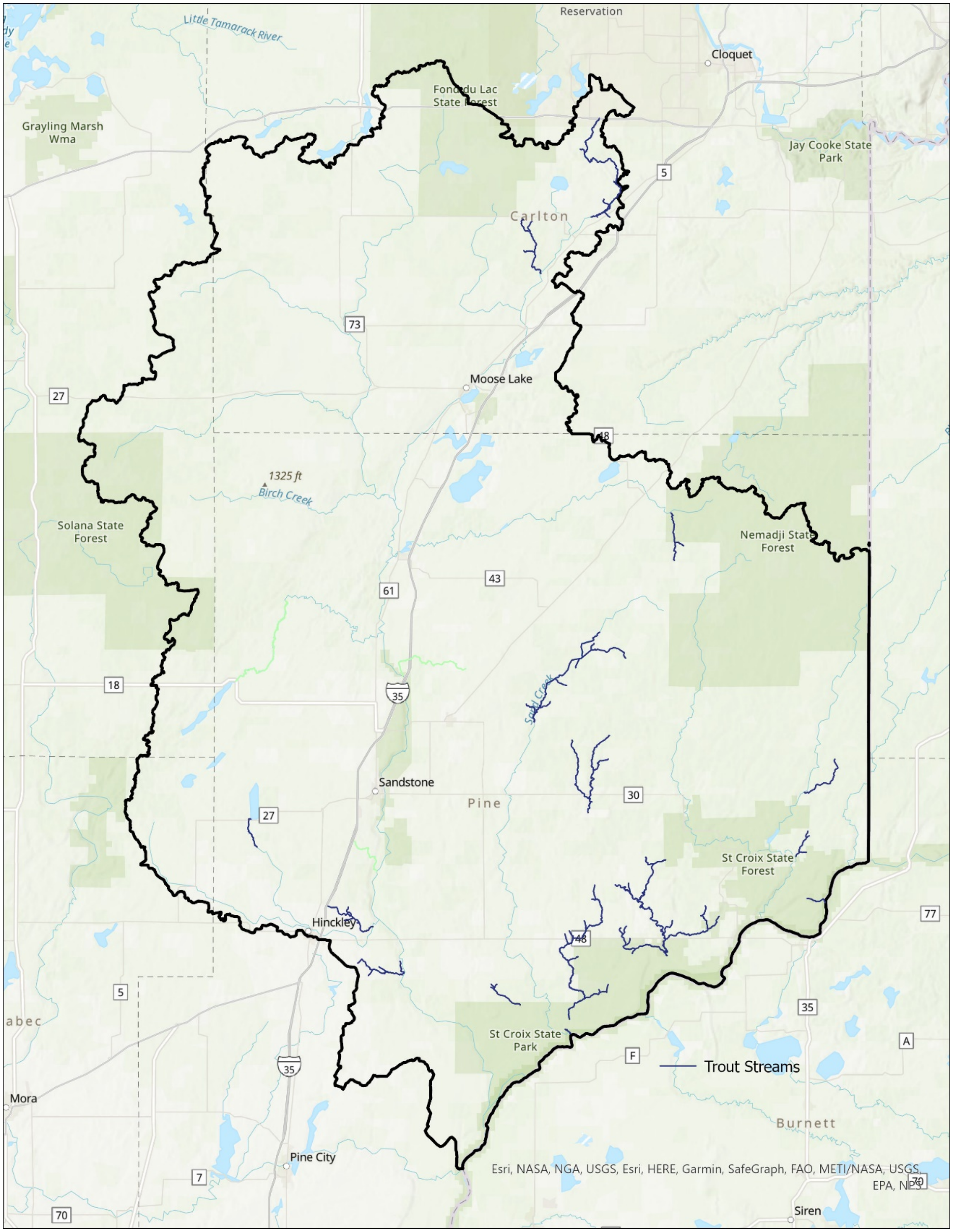

Figure 4. Trout streams in the Kettle River & Upper St. Croix Watershed (MN DNR Dataset).

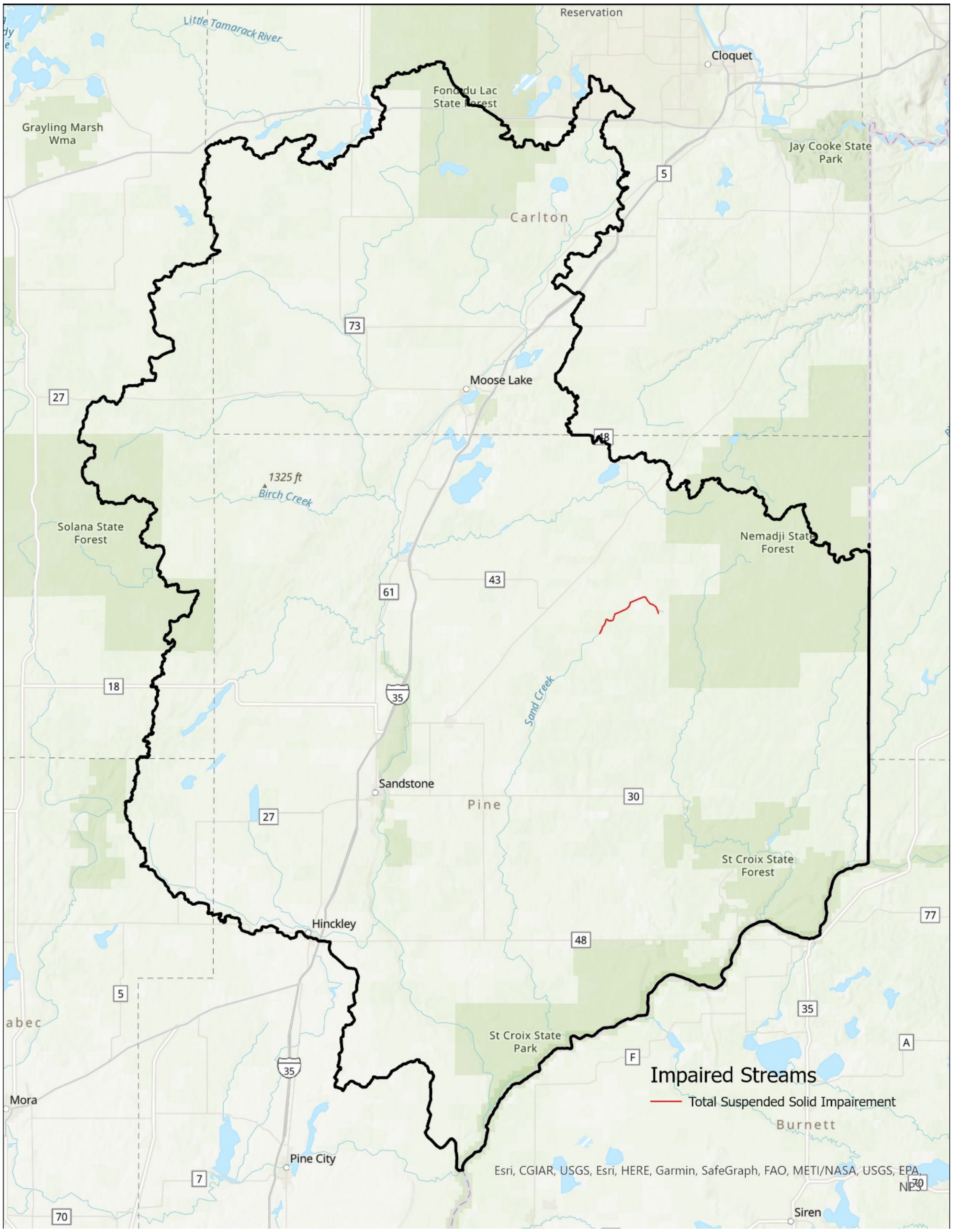

Figure 5. Streams impaired for total suspended soilids in the Kettle River & Upper St. Croix Watershed (MPCA dataset).

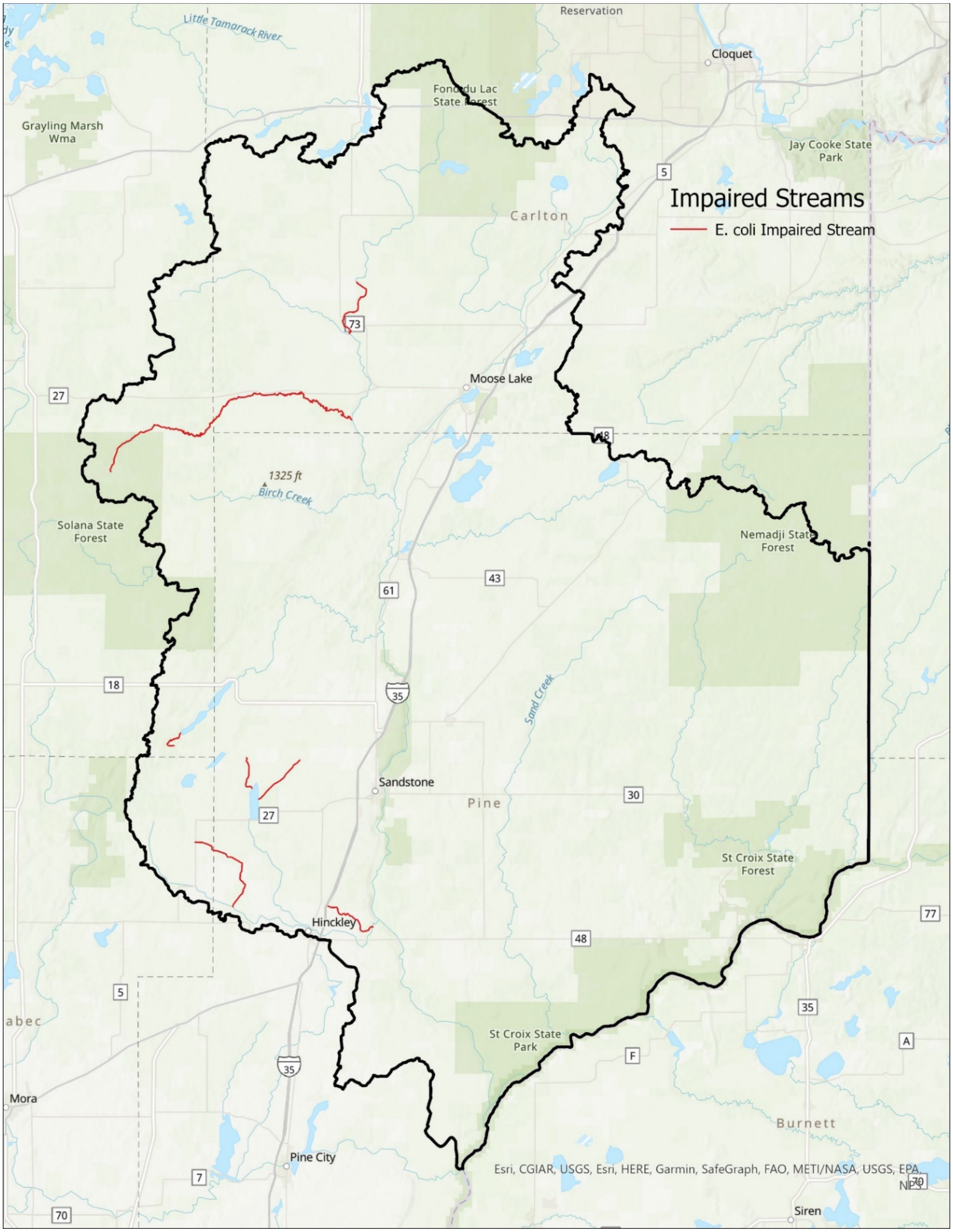

Figure 6. Streams impaired for bacteria (E. coli) in the Kettle River &Upper St. Croix watershed (MPCA Dataset).

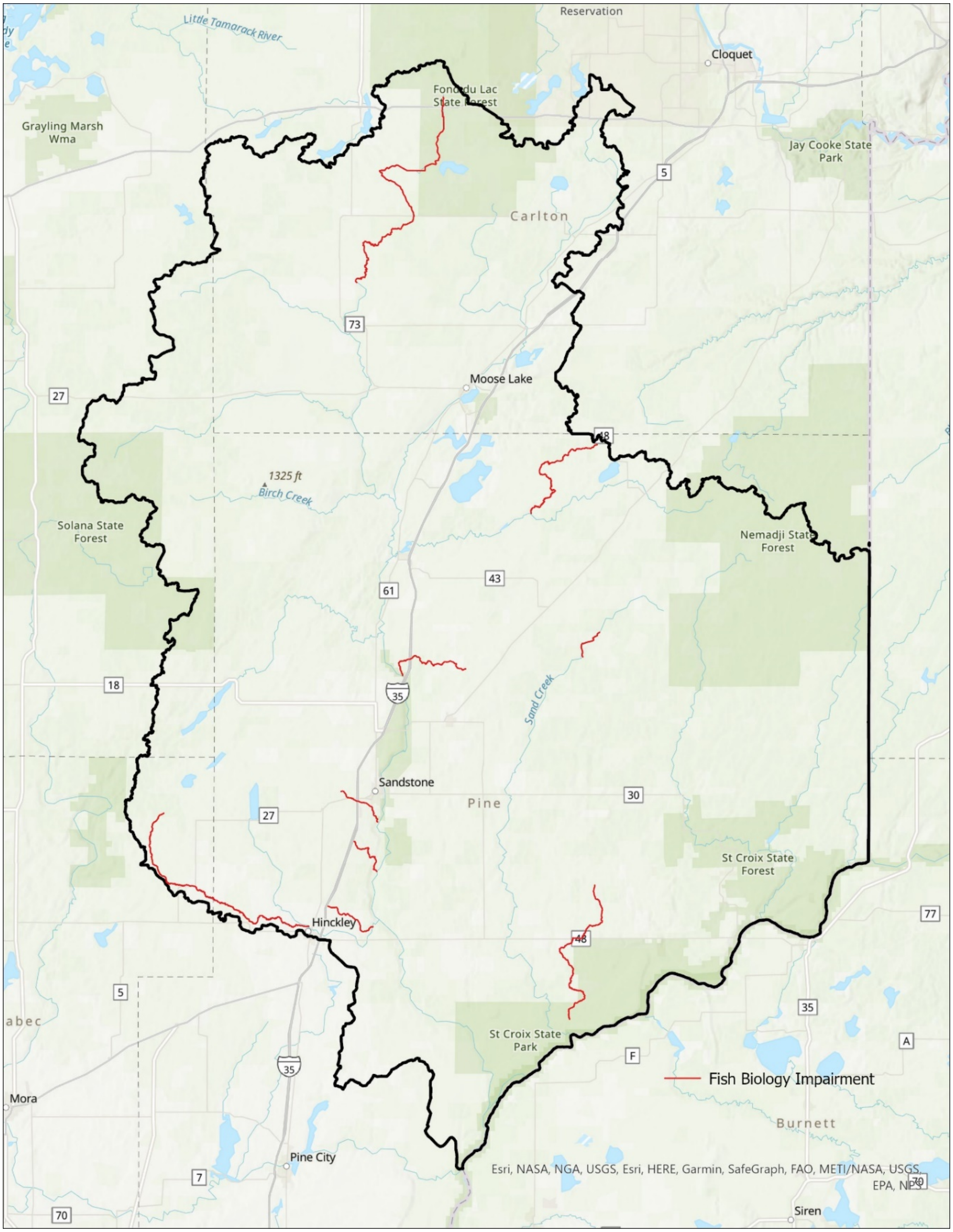

Figure 7. Impaired streams for fish biology in the Kettle River & Upper St. Croix watershed (MPCA dataset).

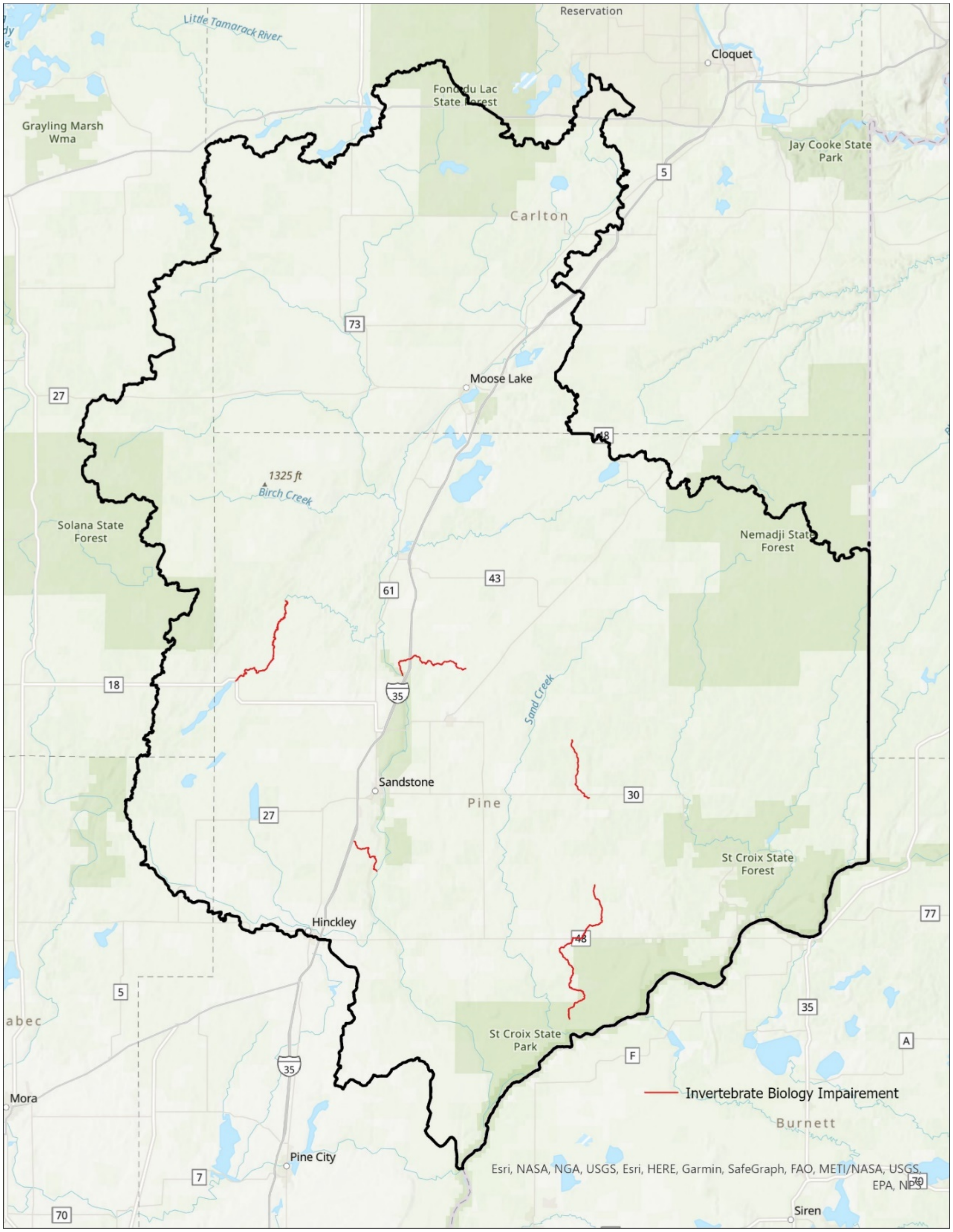

Figure 8. Impaired streams for invetebrete biology in the Kettle River & Upper St. Croix watershed (MPCA dataset).

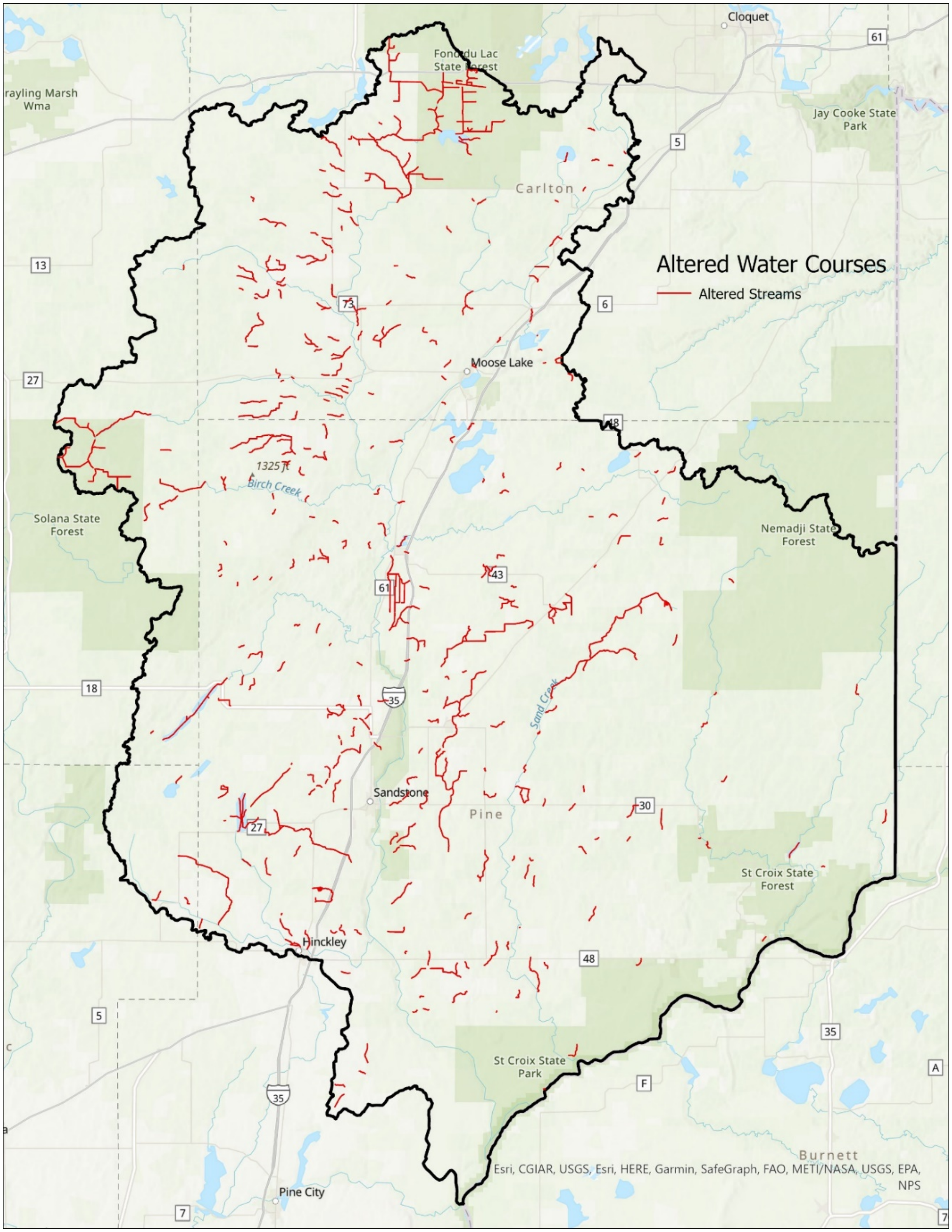

Figure 9. Altered streams in the Kettle River & Upper St. Corix watershed (DNR dataset).

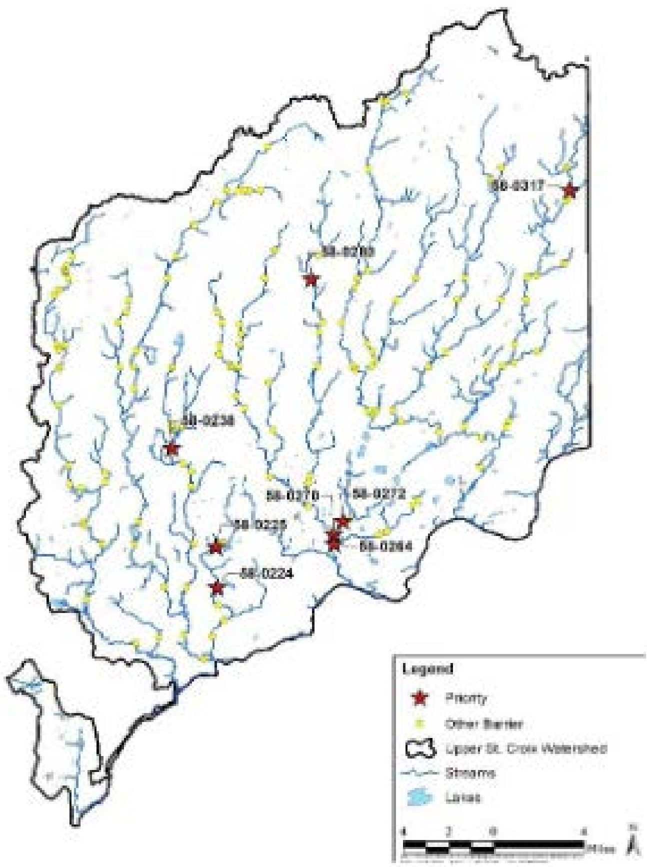

Figure 10. Priority barries in the Upper St. Croix River Watershed (MN DNR datasource, MPCA WRAPS map).

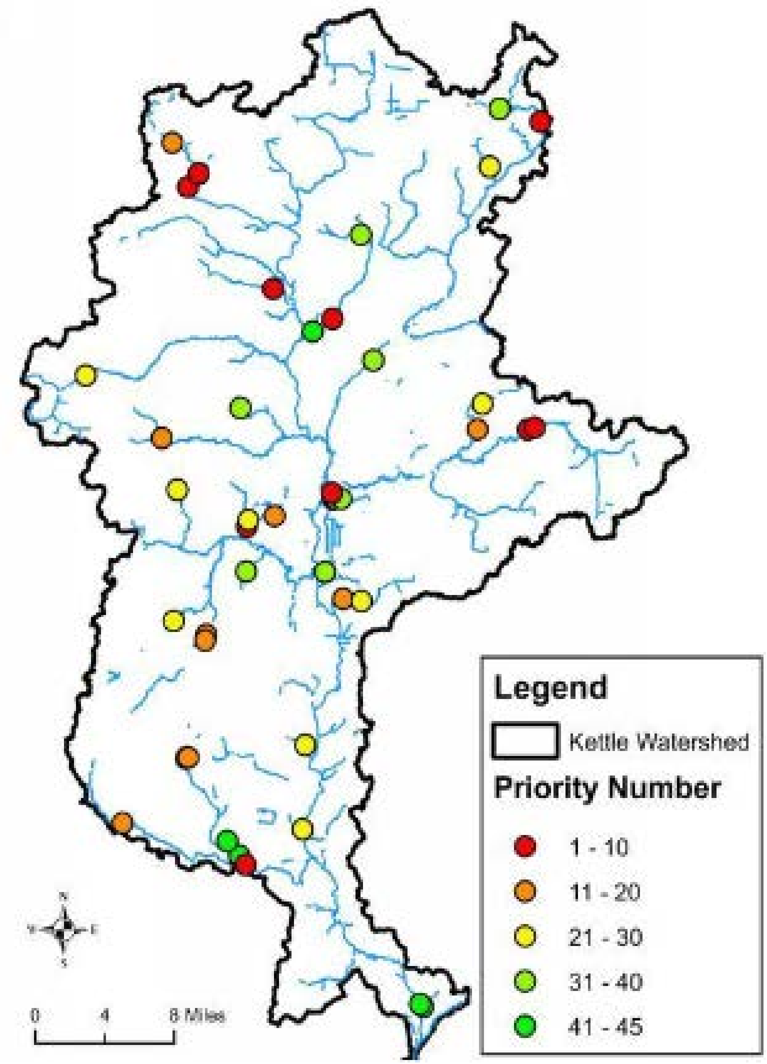

Figure 11. priority barriers in the Kettle River Watershed (DNR dataset, MPCA WRAPS map).

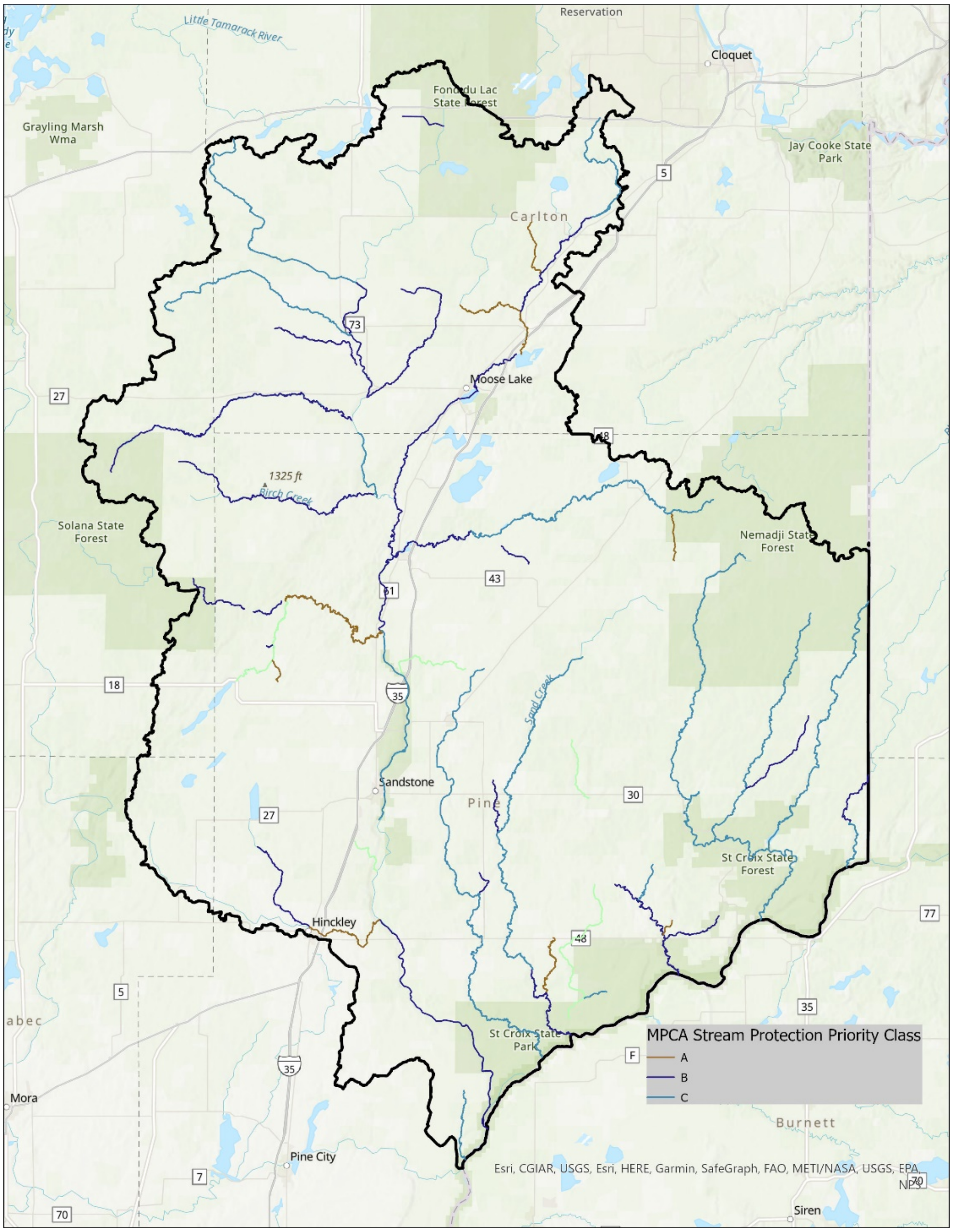

Figure 12. MPCA Stream Protection Priority by class, with A being the highest and C being the lowest (MPCA Dataset)

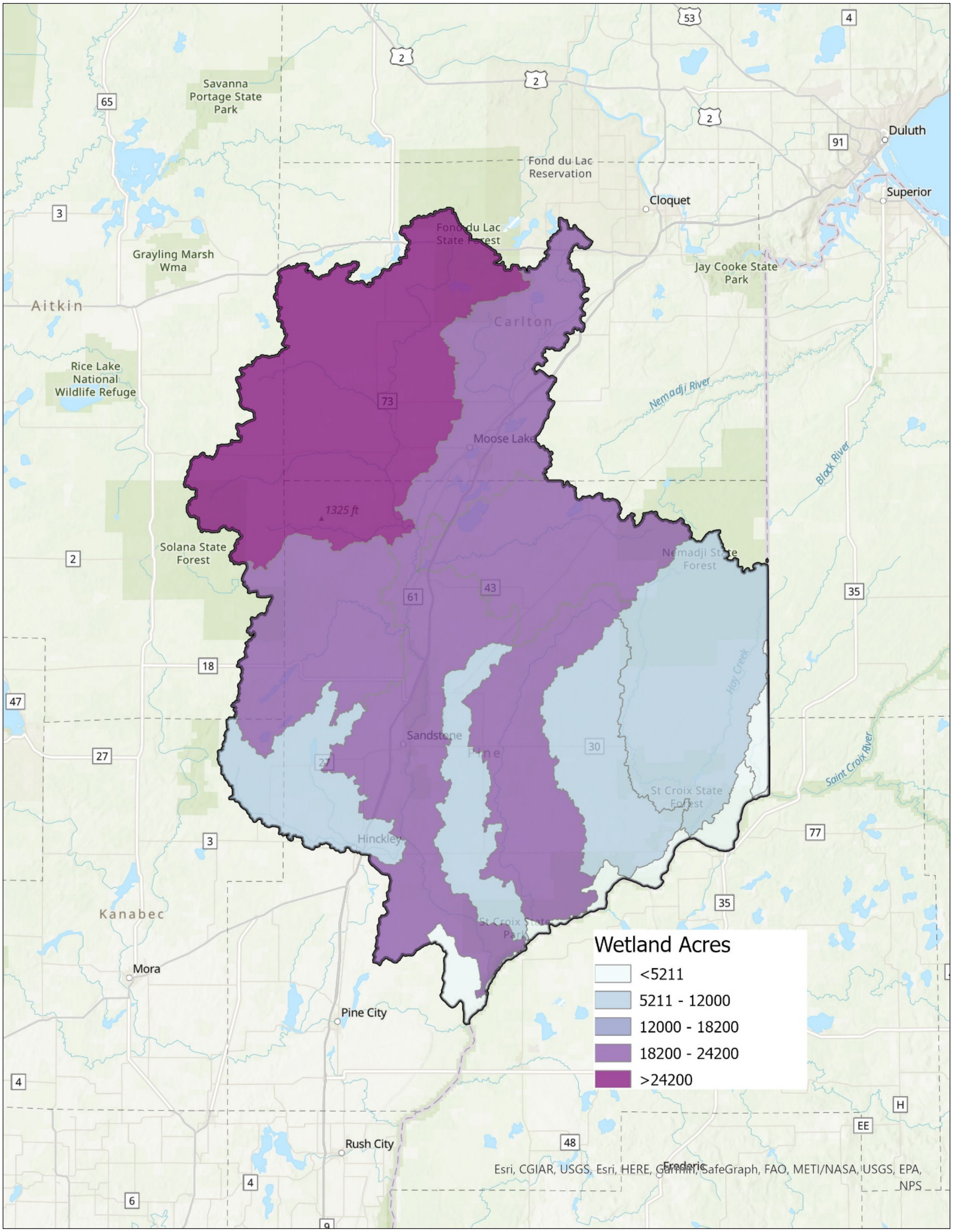

Figure 13. Wetland acres of the Kettle River & Upper St. Croix watershed. Note the high number of acres in the headwaters of the Kettle River. Data based on a 2020 analysis by GIS Specialist for MASWCD TSA8.

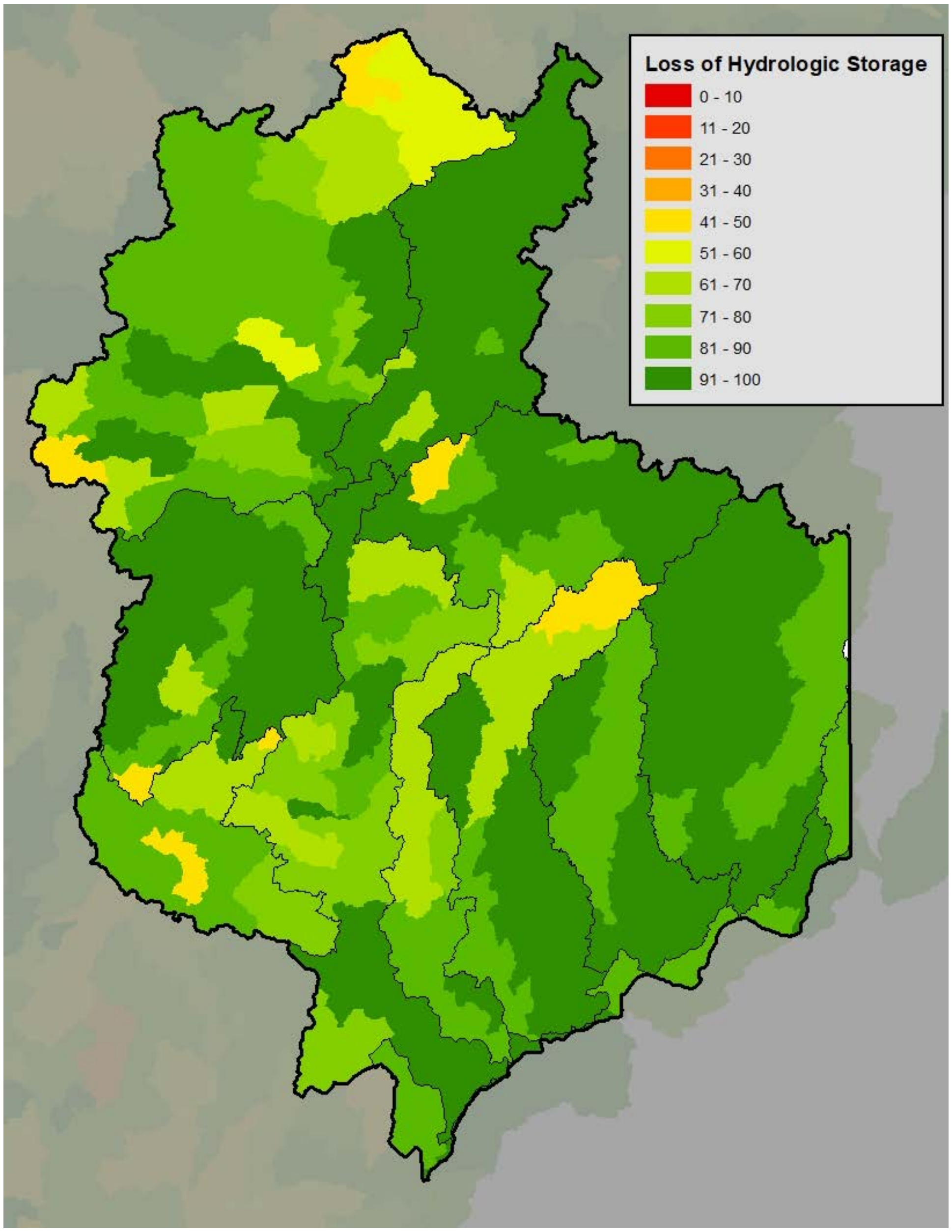

Figure 14. Loss of hydraulic storage by catchment. The score is calculated by averaging the area of remaining presettlement surface water features normailized to the watershed area (includes hydric soils, representing wetlands, and open water) and the ratio of unaltered, meandering perennial stream miles, to total stream miles (altered + unaltered); indicates loss of channel storage (MN DNR Watershed Health Framework Assessment).

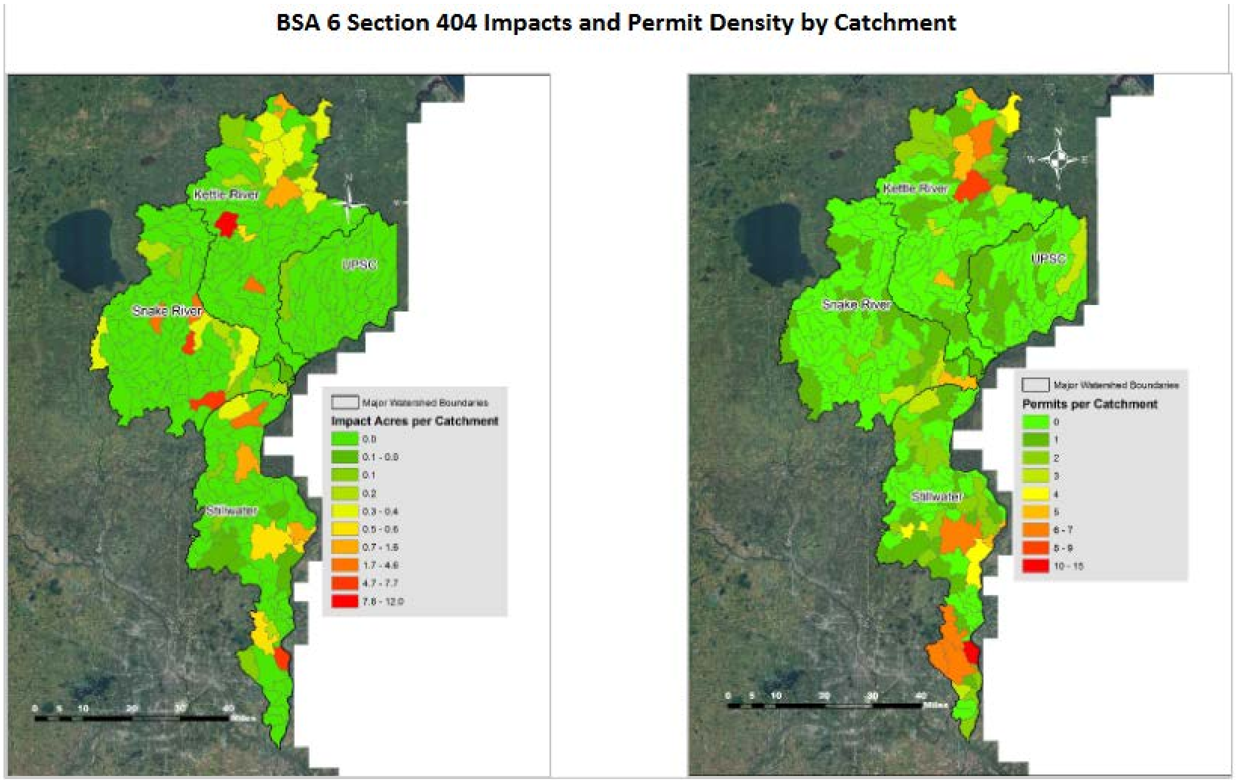

Figure 15. Section 404 wetland impacts per catchment and permit density (maps from BWSR Bank Service Area 6 Compensation Planning Framework)

Distribution of Ditched Wetlands by Catchment

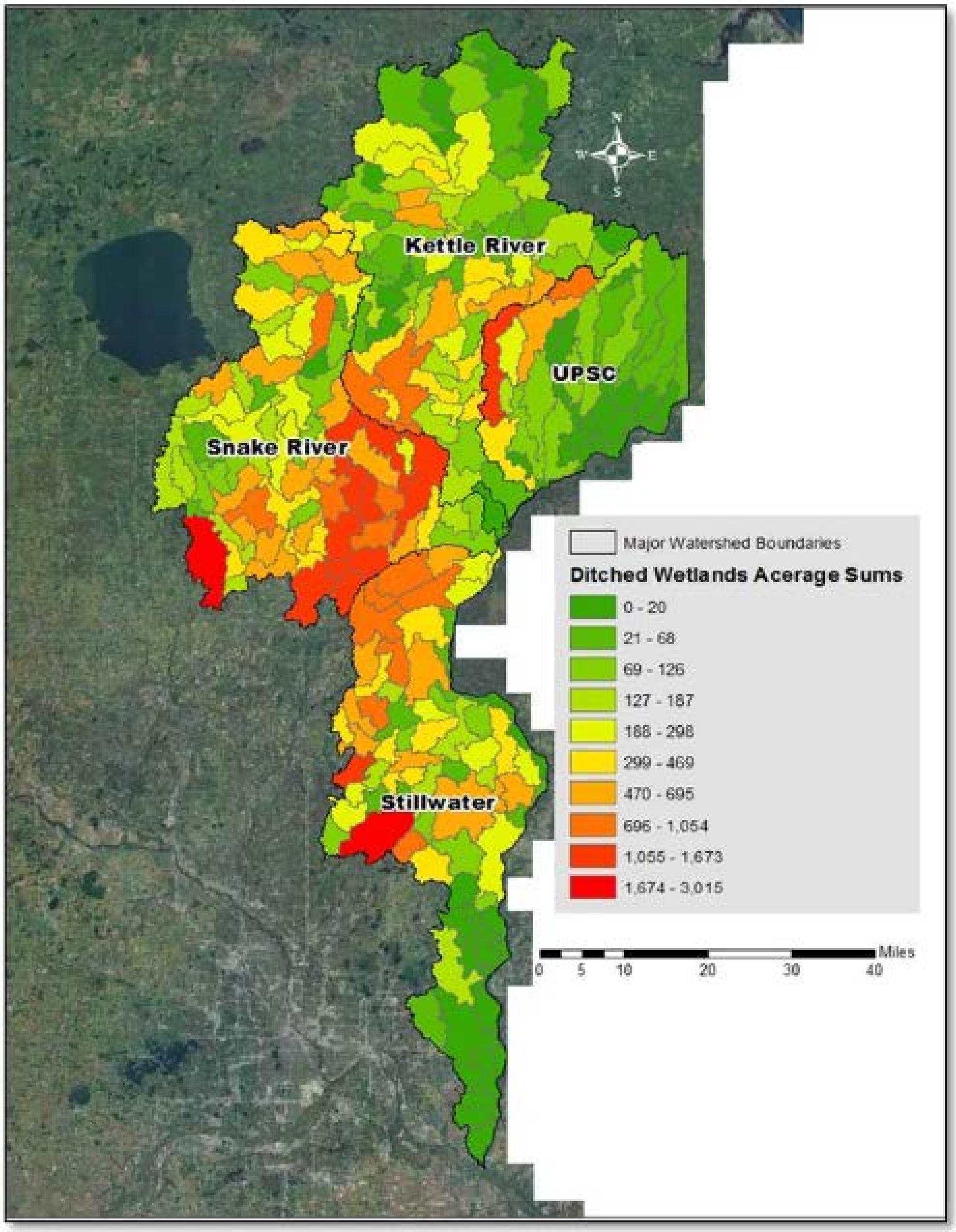

Figure 16. Distribution of ditched wetlands by catchment (BWSR Bank Service Area 6 Compensation Planning Framework)