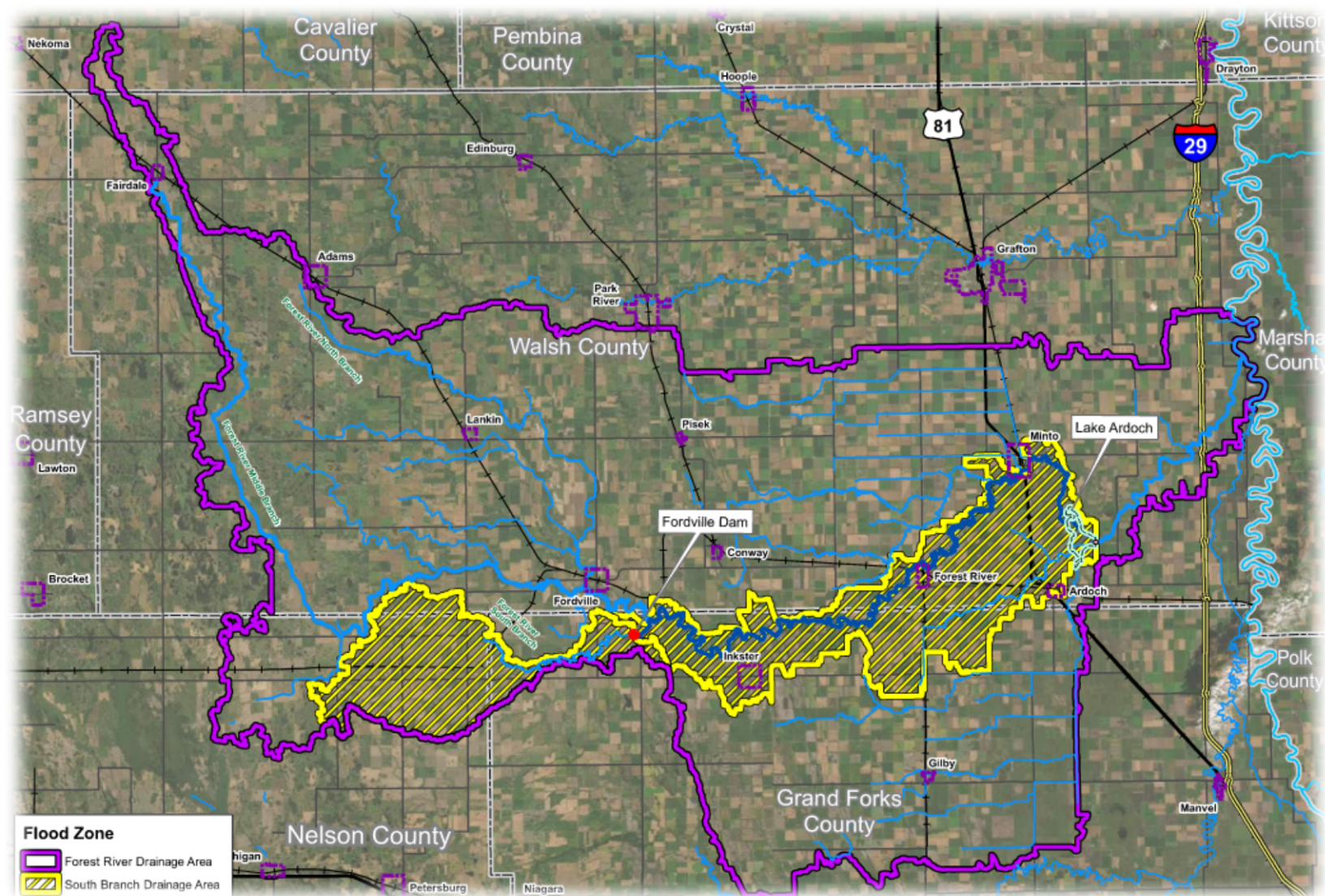




MIDDLE-SOUTH BRANCH FOREST RIVER DAM NO. 4 (FORDVILLE DAM)

FINAL FEASIBILITY REPORT AND PLAN OF WORK

MIDDLE-SOUTH BRANCH FOREST RIVER DAM NO. 4 (FORDVILLE DAM)

Final Feasibility Report and Plan of Work

July 1, 2020

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REQUEST FOR ASSISTANCE

The Walsh County Water Resource District (WCWRD) applied to the Natural Resources Conservation Service (NRCS) for the Watershed Rehabilitation Program for the Middle-South Branch Forest River Watershed Dam No. 4 (Fordville Dam). Fordville Dam was constructed in 1978 through funding and technical assistance provided by the NRCS Watershed Program and is currently owned and operated by the WCWRD. In 2018, the NRCS awarded the WCWRD \$572,110 of technical assistance funding through the Watershed Rehabilitation Program. The NRCS and the WCWRD entered into a Cooperative Agreement to complete a Watershed Plan-Environmental Assessment for the review of rehabilitation of Fordville Dam.



1 APPLICABLE AGENCY AUTHORITY

The Middle-South Branch Forest River Work Plan (1970) was prepared by US Department of Agriculture Soil Conservation Service, and works of improvement have been installed, under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) as amended. The rehabilitation of Middle-South Branch Forest River Watershed Dam No. 4 (Fordville Dam) is authorized under Public Law 83-566 (16 U.S.C. 1012), which authorizes financial assistance to local organizations to cover a portion of costs incurred for the rehabilitation of structural measures originally constructed as part of a project carried out under Public Law 83-566

1.1 PLANNING TEAM STRUCTURE

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1.2 COMPLIANCE WITH OTHER FEDERAL LAWS, REGULATIONS, EXECUTIVE ORDERS, OTHER AUTHORITIES

In addition to Public Law 83-566, several other federal laws, regulations, Executive Orders, and NRCS policies are directly related to the Watershed Planning effort and its anticipated outcomes. A comprehensive list is provided in the NRCS National Watershed Planning Manual, Part 500.32 (US Department of Agriculture Natural Resources Conservation Service 2014). All work undertaken in this planning effort, or to implement outcomes from this planning effort, will be in conformance with all applicable federal laws, regulations, Executive Orders, and NRCS policies. Other authorities will also include compliance with applicable state and local laws, policies, and regulations.

2 DRAFT PURPOSE AND NEED FOR ACTION

The purpose of the project is to bring Middle Branch Forest River Dam No. 4 (Fordville Dam) into compliance with current NRCS and North Dakota State Water Commission (SWC) dam performance, design, and safety standards while maintaining the current flood protection and recreational opportunities.

The need for the project is based on the following concerns:

- **Dam performance, design, and public safety:** Reducing the risk to public safety is necessary because Fordville Dam does not meet current performance and safety standards for a high hazard dam for either NRCS or the SWC. Fordville Dam was constructed in 1978 by a group of local sponsors, with technical and financial assistance from the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS). The dam was assessed against current dam safety requirements for a “High” hazard classification as part of the Dam Assessment Report (HDR/Kleinfelder 2015). The Dam Assessment Report indicated that approximately 140 structures are located within the inundation zone. Of those 140 structures, 57 are classified as inundated by more than a foot of water, including eight homes. A total of 23 commercial structures are inundated by more than a foot of water, including three of them by more than 14 feet. There are also 11 highways or roads inundated (HDR/Kleinfelder 2015).
- **Flood protection:** Flood protection along the Forest River downstream of Fordville Dam is needed because damages due to flooding occur to land, crops, buildings and facilities, and infrastructure. Flooding caused by spring snowmelt and heavy summer rainfall can lead to delayed planting or damage to crops. The Watershed Work Plan (1970) shows installation of Fordville Dam, along with two other flood retarding structures, reduces flood damages by 30 % (US Department of Agriculture Soil Conservation Service 1961).
- **Recreation:** Fordville Dam was constructed to provide habitat for fish and wildlife and recreational opportunities for area residents. Recreation is needed to enhance local opportunities for area residents to enjoy outdoor activities. Currently, the reservoir provides opportunities for tent camping, RV sites, a picnic area with a playground, a swimming beach, boating, and fishing (Grand Forks County Information Services 2014) Fordville Dam reservoir is only one of six available public fisheries in Grand Forks County, ND (North Dakota Game and Fish Department 2016a). There are three other fisheries within 18 miles of Fordville Dam, but generally recreation sites like this are uncommon in the region.

3 FORDVILLE DAM BACKGROUND INFORMATION

3.1 AS-BUILT DESIGN DATA

Table 1: Fordville Dam as-built design data

General Data		
Year Design	n/a	
Year Constructed	1978	
Purpose(s)	Flood Control, Wildlife, and Recreation	
Original Hazard Classification	Significant	
Current Hazard Classification	High	
Design Life	50 years	
Original Design Drainage Area	41.5 sq. mi.	
Revised Drainage Area	45.4 sq. mi.	
Dam Height	54.1 feet	
Embankment Length	1,875 feet	
Embankment Top Width	18 feet	
Embankment Upstream Slope	3.5 H:1 V	
Embankment Downstream Slope	2.5 H:1 V	
Critical Elevations	Elevation (MSL) ^[1]	
Top of Dam	1,129.1	
Auxiliary Spillway Crest	1,122.7	
Riser High-Stage Crest	1,116.5	
Permanent Pool	1,105.0	
Riser Low-Stage Crest	1,105.0	
PSC Invert at Riser	1,087.4	
PSC Downstream Invert	1,078.0	
Reference Point	Storage	Surface Area
Top of Dam	10,703 acre- feet	526 acres
Auxiliary Spillway Crest	7,532 acre - feet	434 acres
Permanent Pool	2,189 acre-feet	197 acres

[1] Add 1.20 feet to convert MSL vertical datum to NAVD 1988 vertical datum (approximate).

3.2 CURRENT DAM SAFETY INFORMATION

Fordville Dam was assessed against current dam safety requirements for a “High” hazard classification as part of the previously completed Dam Assessment Report (HDR/Kleinfelder 2015). Based on this assessment, the following deficiencies were identified:

- The dam is unable to store the entire principal spillway hydrograph (PSH) without activating the auxiliary spillway;
- The dam is unable to contain the freeboard hydrograph without overtopping;
- The velocity of flow through the auxiliary spillway exceeds design standards;
- The principal spillway is not capable of meeting NRCS drawdown requirements, which specify that 85 % or more of the maximum retarding volume be drawn down in 10-days or less;
- An auxiliary spillway integrity analysis indicated that a potential complete breach during the passage of the 24-hour duration freeboard hydrograph; and
- Trees were observed growing in riprap and on the embankment.

4 RESOURCE INFORMATION

Fordville Dam is located within the Forest River Watershed, which is in northeast North Dakota and is a tributary to the Red River Basin. The contributing watershed area to the Forest River is 896 square miles. The initial Watershed Work Plan (discussed in **Section 4.1**) included the Middle Branch and South Branch of the Forest River Watershed. This Feasibility Report describes the area local to Fordville Dam and its context on the landscape. This context is organized in this report as three layers of land area assessment as follows:

- **Forest River Watershed Drainage Area:** The largest area is the Forest River Watershed Drainage Area and describes the wider region surrounding Fordville Dam (**Exhibit 01.1**). The upper portion of the Forest River Watershed consists of three branches; the North Branch (154 square mile watershed), Middle Branch (147 square mile watershed), and South Branch (50 square mile watershed). The confluence of the North Branch and Middle Branch is located near the community of Fordville, ND. The South Branch confluence with the Forest River is further downstream approximately 8.9 river miles. A recently constructed flood control project (Michigan Spillway) provides a regulated outlet for approximately 172 square miles of the watershed. Flows are regulated through a pumping station with a maximum discharge of approximately 50 cubic feet per second. These discharges are pumped into a tributary that contributes to the Middle Branch Forest River between Whitman Dam and Matejcek Dam. Refer to **Section 4.3.9** for more details and maps.
- **Area of Interest (AOI):** The second layer of assessment is referred to as the AOI. This includes two sub-watersheds or parts of watersheds within the Forest River Drainage Area - Area 1 (upstream) and Area 2 (downstream). The characteristics of these areas are described in detail in this Feasibility Report, grouped together and also each separately. This information describes the environmental context of Fordville Dam. **Exhibit 01.2** shows the location of these sub-watersheds. More details are given in **Section 4.3.1**.
- **Area of Potential Effect (APE):** The third layer of assessment (Area 3) consists of two zones. The Dam Zone includes the dam site, the flood pool upstream from the dam, and short stretch of river immediately downstream from the dam. The River Zone includes the length of the river downstream to Lake Ardoch. This assessment layer is referred to as the APE and it is the land which may be directly affected by project activities. This specific area location is shown on **Exhibit 01.3** and more details are given in **Section 4.3.1**.

4.1 SUMMARY OF WATERSHED WORK PLAN

The initial Watershed Work Plan for the Middle-South Branch of the Forest River (US Department of Agriculture Soil Conservation Service 1961) was sponsored by Nelson County Soil Conservation District, Three Rivers Soil Conservation District, Walsh County Soil Conservation District, Eastern Grand Forks Soil Conservation District, and Walsh County Water Conservation and Flood Control District. The planning extents covered approximately 343 square miles of the Forest River Watershed.

The principal problem identified in the Watershed Work Plan is floodwater damage to land, crops, buildings and facilities, roads, bridges, and rural and urban property. Spring snowmelt and excessive rainfall events were cited as the primary cause of flooding in the Forest River Watershed. Spring snowmelt leads to delayed planting, and heavy summer rainfall events can damage to seeded and/or growing crops. The average annual floodwater damages were estimated to be \$120,272 with \$84,997 related to crop damages. Average annual erosion damage was estimated at \$2,039 in relation to floodplain scour, and indirect

average annual damages were estimated at \$12,231. This brought the annual damage total average to \$134,542 for the Forest River Watershed included in the planning extents. All monetary values discussed are in reference to the US dollar value in 1961.

The original Watershed Work Plan's preferred alternative included installation of land treatment measures, two floodwater retarding structures (Dam 4, Fordville Dam; Dam 6, Whitman Dam), one multipurpose structure (Dam 1, Matejcek Dam), and a floodway channel. Dams 1 and 6 are located on the Middle Branch of the Forest River, and Dam 4 is located on the South Branch of the Forest River. All three dams combined provide 13,408 acre-feet of floodwater detention and control a drainage area of 179.2 square miles of the upper Forest River Watershed. The floodway channel was proposed to be constructed just south of the Grand Forks/Walsh County line and would divert flows from the Forest River east into a natural coulee to bypass floodwaters from damage areas near the community of Forest River, ND.

After completion of the original Watershed Work Plan, several subsequent modifications were issued. Dam 6 (Whitman Dam) was modified to provide a fish and wildlife pool (US Department of Agriculture Soil Conservation Service 1962), Dam 1 (Matejcek Dam) was modified to increase the volume of the fish and wildlife pool (US Department of Agriculture Soil Conservation Service 1964), and Dam 4 (Fordville Dam) was later relocated and also converted to provide a fish and wildlife pool (US Department of Agriculture Soil Conservation Service 1969). An additional channel conveyance project referred to as the Fairdale Drain was added to the Watershed Work Plan in 1970 (US Department of Agriculture Soil Conservation Service 1970). This added component included 25.8 linear miles of channelization upstream of Dam 6. The final modification to the Watershed Work Plan removed this floodway channel due primarily to local opposition to the project alignment (US Department of Agriculture Soil Conservation Service 1988).

4.2 EXISTING DATA

Previous studies and investigations that are applicable to the Watershed Planning Effort were inventoried and reviewed. These publications are listed below and are also cited in the References section of this document:

- Middle-South Branch Forest River Watershed Work Plan for Watershed Protection and Flood Prevention (US Department of Agriculture Soil Conservation Service et al. 1961)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 1 (US Department of Agriculture Soil Conservation Service et al. 1962)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 2 (US Department of Agriculture Soil Conservation Service et al. 1964)
- Flood Retarding Fish and Wildlife Dam No. 1 As-Built Drawings (US Department of Agriculture Soil Conservation Service 1966)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 3 (US Department of Agriculture Soil Conservation Service et al. 1969)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 4 (US Department of Agriculture Soil Conservation Service et al. 1970)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 5 (US Department of Agriculture Soil Conservation Service et al. 1971)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 6 (US Department of Agriculture Soil Conservation Service et al. 1977)

- Reconnaissance Report: Red River of the North Basin, Forest River Subbasin (US Army Corps of Engineers 1980)
- ND State Water Commission 1983 Inspection Summary Letter (Sprynczynatyk 1985)
- Forest River Diversion Study (US Department of Agriculture Soil Conservation Service 1988)
- ND State Water Commission 1987 Inspection Summary Letter (Sprynczynatyk 1988)
- Middle-South Branch Forest River Watershed Supplemental Watershed Work Plan Agreement No. 7 (US Department of Agriculture Soil Conservation Service et al. 1988)
- Phase I Inspection Report National Dam Safety Program (US Army Corps of Engineers 1978)
- ND State Water Commission 1991 Inspection Summary Letter (Frink 1993)
- Forest River Flood Plain Management Study (US Department of Agriculture Natural Resources Conservation Service 1996)
- NRCS Dam Inspection Summary Letter (Benson and Thompson 2008)
- Matejcek Dam Emergency Action Plan (Walsh County Water Resource District 2008)
- Dam Assessment Report (HDR/Kleinfelder 2015)
- Forest River Watershed Comprehensive Detention Plan (Houston Engineering Inc. 2013)
- Red River of the North Hydrologic Modeling – Phase 2 (US Army Corps of Engineers 2013)
- Forest River Watershed Comprehensive Detention Plan (Red River Joint Water Resource District 2013)
- North Dakota 2018 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads (North Dakota Department of Health 2019).

4.3 GATHERED DATA

Information that has been gathered through review of publications cited in the previous section, in addition to available geospatial (GIS) data and field investigations, was used to provide background information for the Fordville Dam rehabilitation project. This information is summarized in the following sections.

4.3.1 AREA OF INTEREST

A specific Area of Interest (AOI) has been defined, consisting of two smaller watershed areas within the Forest River Drainage Area (see the beginning of **Section 4** for more details). The two watershed areas are defined based on anticipated impacts and planning requirements. Each of these, Area 1 and Area 2, are briefly described below and shown in **Exhibit 01.2**. The location of the project where there will be direct effects upon the environment (the Area of Potential Effect, APE), is identified below as Area 3 (**Exhibit 01.3**).

4.3.1.1 AREA 1: WATERSHED UPSTREAM OF FORDVILLE DAM

Area 1 is approximately 50 square miles and contains portions of Grand Forks, Nelson, and Walsh Counties. This is the directly contributing watershed upstream of Fordville Dam. Environmental concerns may include sediment and nutrient delivery, impacts to riparian corridors and forest resources, and land treatment.

4.3.1.2 AREA 2: WATERSHED DOWNSTREAM OF FORDVILLE DAM

Fordville Dam provides streamflow regulation downstream to the Forest River. Area 2 is extended downstream far enough to include flood-prone stretches between the communities of Forest River and Minto, ND. Area 2 is approximately 93 square miles and contains portions of Grand Forks and Walsh Counties.

4.3.1.3 AREA 3: FORDVILLE DAM AND ASSOCIATED FLOOD POOLS

Area 3 is the Area of Potential Effect (APE) for this project and includes two zones. The Dam Zone includes the dam, the flood pool, and a stretch of river immediately downstream of the dam. The River Zone includes the stretch of river from the dam downstream to Lake Ardoch. All alternatives are likely to have an impact on these zones, with more acute impacts in the Dam Zone and less acute impacts on the River Zone. The Dam Zone includes non-tilled regions of the Forest River Valley and is approximately 1,012 acres, entirely within Grand Forks County. The River Zone includes 62 miles of the Forest River and the adjacent floodplain. Area 3 overlaps with and is included in assessments of Area 1 and Area 2.

4.3.2 CLIMATE

The climate of North Dakota is a humid continental climate characteristic of fluctuating temperatures of hot summers and cold winters (Entz 2003). The lack of topographic barriers to the north and south of North Dakota allow air masses to easily travel over the state. The cold, dry air from the north and warm, humid air from the tropics results in almost continuous winds as well as daily temperature fluctuations. Temperatures in North Dakota are hottest in July and coldest in January. The average difference in temperatures between July and January is 65 °F in northeastern North Dakota. Rainfall across North Dakota ranges from 14 to 22 inches and snowfall ranges from 25 to 45 inches. The average growing season of the northeast region is 110 days.

Climate data recorded at the nearest weather station (Edmore, ND) summarizes the average temperature, rainfall, and snowfall (US Climate Data 2020). Temperatures near the dam ranges from 7°F below zero in

January to 80°F in July. An average 20 inches of annual rainfall and 35 inches of annual snowfall occur near the dam. The majority of the rainfall occurs during the month of June.

4.3.3 LANDFORMS AND TOPOGRAPHY

The AOI is located in two Level III Ecoregions: the western portion of the AOI is in the Northern Glaciated Plains and the eastern portion is in the Lake Agassiz Glacial Plain (North Dakota Game and Fish Department 2016b, North Dakota Information Technology Department 2020) (**Exhibit 02.1**).

The Northern Glaciated Plains ecoregion consists of transitional grasslands within a continental climate zone formed on recent glaciation (Bryce et al. 1998). The landforms range from drift plains, glacial lake basins, shallow river valleys, and deposits of rocks to sands. The drainage system is immature and supports numerous wetlands ranging from seasonal to permanent. Most of the land has been converted primarily to farmland, but historic vegetation ranged from tallgrass prairie to short grass prairie and wetland ecosystems. The watershed areas are located in a sub-region (Level IV Ecoregion) known as the Drift Plains. This sub-ecoregion was formed by retreating glaciers and the resulting undulating topography of thick glacial till. The sub-ecoregion supports large proportion of temporary and seasonal wetlands. The productivity of the Drift Plains soils has resulted in cultivation of the majority of the area.

The Lake Agassiz Glacial Plain is characterized by an extremely flat lake plain and gently rolling hills, the beach ridge, on the west and east sides of the lakebed. Historic vegetation included tallgrass prairie with many wetlands and shrubland and forests. The continental climate and the predominance of rich loamy soils supported tallgrass prairie until agriculture began to dominate from the mid-19th century. The valley rises 500 feet over a bedrock escarpment to mark the natural boundary of the Red River Valley (North Dakota Game and Fish Department 2016b). Most of the AOI is within the Glacial Lake Agassiz Basin, but some acres cover two smaller Level IV Ecoregions: Sand Deltas and Beach Ridges, and the Saline Area. The Glacial Lake Agassiz Basin is characterized by the poorly defined floodplain of the Red River of the North. This ecoregion is extremely productive for agriculture and thus most of the wetlands and natural areas have been cultivated. The Sand Deltas and Beach Ridges ecoregion has parallel ridges of sand gravel formed by Lake Agassiz. The Saline Area ecoregion is characterized by saline groundwater. This salinity negatively affects crop production and land in this ecoregion is more suitable for pasture or left natural. This area supports salt-tolerant species and many of the wetlands are brackish.

The Fordville Dam AOI is divided between the Level III ecoregions of Northern Glaciated Plains (33.7 %, 30,700 acres) and Lake Agassiz Plain (66.3 %, 60,400 acres). Area 1 of the AOI is divided between the Level III ecoregions of Northern Glaciated Plains (90.4 %, 27,700 acres) and Lake Agassiz Plain (9.6 %, 2,900 acres) (**Exhibit 02.1**). Area 1 is also divided into three Level IV ecoregions with 90.4 % of the land area in the Drift Plains (27,749 acres), 4.9 % within the Glacial Lake Agassiz Basin (1,500 acres), and 4.7 % within the Beach Ridges and Sand Deltas ecoregion (1,500 acres). Area 2 and 3 occur entirely within the Level III ecoregion of Lake Agassiz Plains. Area 3 is divided between the Level IV ecoregions of Glacial Lake Agassiz Basin (43.1 %, 440 acres) and the Beach Ridges and Sand Deltas ecoregion (56.9 %, 580 acres). Area 2 is also divided between the three Level IV ecoregions with 72.1% of the land area in the Glacial Lake Agassiz Basin (42,900 acres), 15.7 % within the Beach Ridges and Sand Deltas ecoregion (9,400 acres), and 12.1 % within the Saline Area ecoregion (7,200 acres).

The watershed is generally characterized by moderate slopes in the west (Nelson and western Walsh Counties), with slopes flattening in the east (Grand Forks and eastern Walsh Counties). In Area 1 upstream, the elevation change over the watershed is a maximum elevation of 1686 feet (NAVD1988) in the northwestern portion of the watershed, and an elevation of 1106 feet at Fordville Dam. The area

downstream of the dam (Area 2) consists of moderate slopes along the escarpment of the Red River Basin until approximately ND State Highway 18. From there, slopes gradually flatten to the east. Portions of the Forest River floodplain between the communities of Forest River and Minto, ND are “perched,” meaning the adjacent floodplain slopes away from the river channel. Elevations in the River Zone downstream of Fordville Dam range from 1106 feet at the Dam to 802 feet at the outlet of Lake Ardoch. **Exhibit 02.2** provides a visual depiction of elevation and **Exhibits 02.3** and **02.4** show landscape slope.

4.3.4 LAND USE

Land use is predominantly agricultural over the Forest River Watershed, but natural land, including open water, is also abundant in the area. Land use data are presented in **Exhibit 03.1** and in **Figure 1** below (US Department of Agriculture National Agricultural Statistics Service 2018). Human development in the watershed is low, at approximately 5 % in the AOI. Agriculture, as crops and hayland/pasture, covers 85 % of the area (77,700 acres) while natural land (wetlands, open water, forests) covers 10 % (8,900 acres). The predominant crops in the AOI are spring wheat (24 %) and soybeans (21 %). Area 2 has the highest area of crop production (85 %, 50,700 acres) dominated by spring wheat, soybeans, corn, and dry beans. Crops in Area 1 (covering 85 %, 27,000 acres) are dominated by spring wheat, soybeans, grass/pasture, soybeans, and canola. Area 2 leads with the largest area of natural land (9.5 %, 5,600 acres), followed by Area 1 (10 %, 3,300 acres). For natural land, herbaceous wetland is the dominant habitat in Area 1, but woody wetlands cover more acres in Area 2. Area 3 Dam Zone includes 45 % agricultural land (460 acres, row crops and pasture/hayland) and 48 % natural land including open water (480 acres) (**Exhibit 03.2**, **Figure 2**).

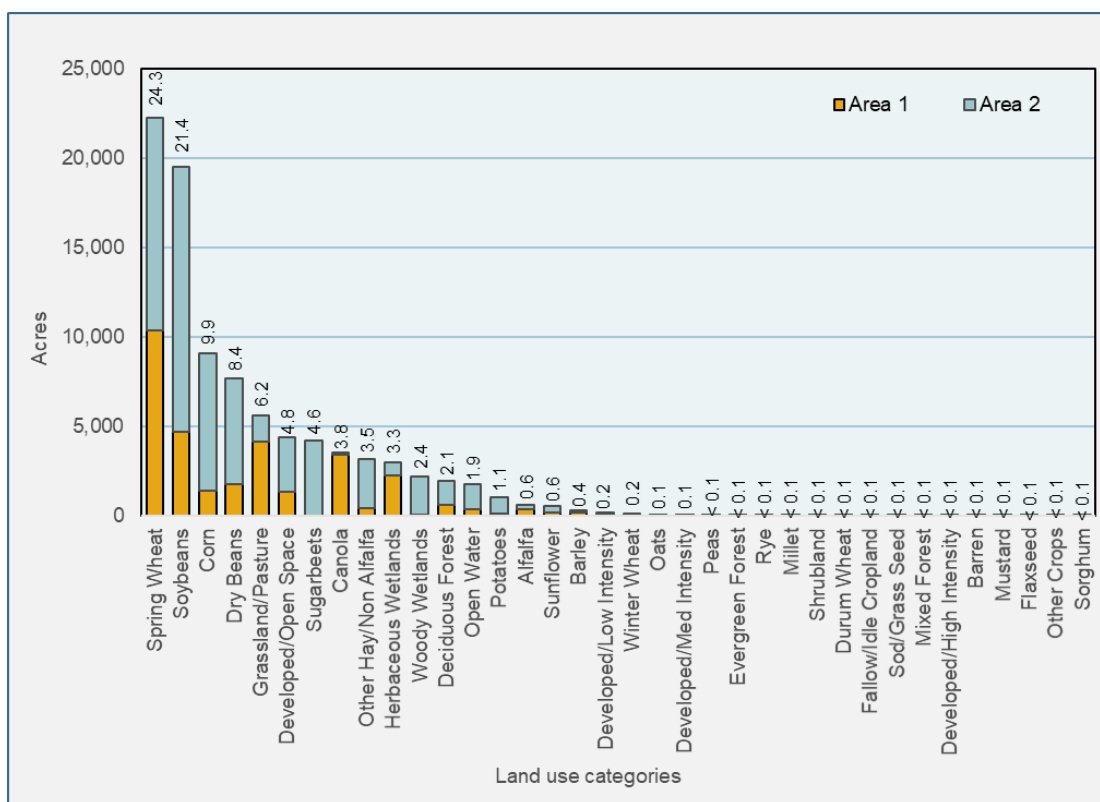


Figure 1: Land use in the Area of Interest (values above bars indicate percent covered for Area 1 and Area 2 combined).

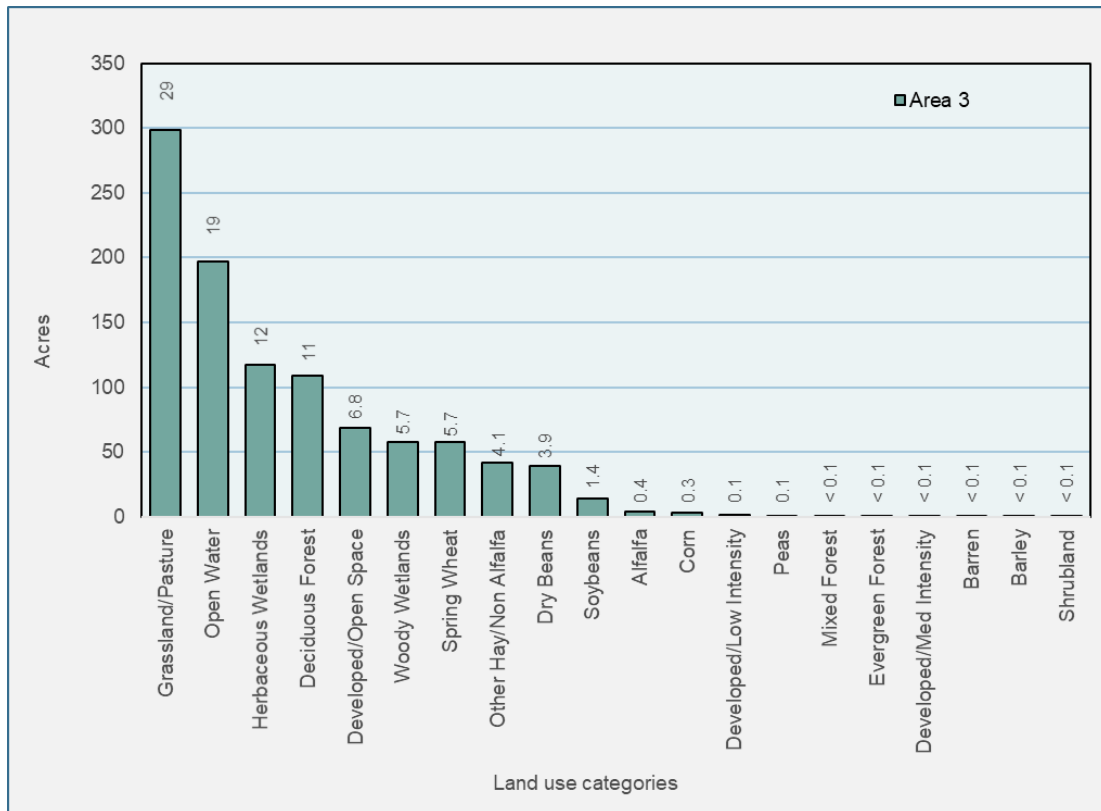


Figure 2: Land use in the Area of Potential Effect – Dam Zone (values above bars indicate percent).

4.3.5 STATE AND FEDERAL LANDS

Natural areas are sites in which land and water provide ecosystem services as natural conditions. These areas may be under private ownership or easement agreements and may be under the jurisdiction of the federal government and state governments. North Dakota also has a system for managing trust assets related to land and mineral acres.

The AOI has several areas set aside for wildlife, ecology research, and minerals (**Exhibit 04.1, Table 2**, (North Dakota Information Technology Department 2020). Area 1 has 1,240 acres (3.9 % of the total acreage) of Mineral Trust Lands. Area 2 has 2,600 acres (4.4 %) including Lake Ardoch National Wildlife Refuge (directly associated with the Forest River), the University of North Dakota Forest River Biology Station (designated as Wildlife Management on the map), and several Mineral Trust Lands. There are no federal or state lands in Area 3 Dam Zone.

Table 2: Federal and state lands in the Area of Interest (name and acres).

Land designation	Area 1	Area 2	Area 3
National Waterfowl Production Areas	-	-	-
National Wildlife Refuge	-	Ardoch, part (2,235)	-
State Wildlife Management Areas	-		-
Wildlife Management	-	Forest River Biology Station, UND (159)	-
State Trust Land Minerals	1,240	242	-
State Trust Land Surface	-	-	-
Total federal and state land	1,240	2,636	-

4.3.6 SURFACE GEOLOGY

Surficial geology of the region is characterized by sedimentary deposits resulting from glaciation. Nelson County and western Walsh County are located in the Drift Plains ecoregion where landforms are associated with glaciers and include moraines (Bryce et al. 1998). Northern Grand Forks County and the eastern two-thirds of Walsh County are located in the Red River Valley, below the Pembina Escarpment, and the landforms here are associated with the sub-regions Glacial Lake Agassiz and Beach Ridges/Sand Deltas (**Exhibit 02.1**). The Red River Valley ecoregion in Walsh County also contains the sub-region Saline Area.

Several geologic formations are present in the AOI and these consist of glacial till, cross-bedded sands or clays, and marine offshore shales (North Dakota Information Technology Department 2020, **Exhibit 05.1**). The Coleharbor formation, the most abundant in the AOI, is composed of lenses and beds of till, gravel, sand, silt, clay, and boulders and cobbles (Bluemle 1973). This formation has poorly integrated drainage, gentle slopes, potholes, and glacial outwash and lake plain areas. This formation makes up 74 % of the AOI (67,000 acres) (**Figure 3a**). The Oahe formation, comprised of clays, is formed from river sediments. This formation is less common over the AOI but is predominant in the APE. Area 1 is dominated by the Coleharbor formation (95 %, 3,000 acres) and Area 2 is a mix of Coleharbor (62 %, 37,000 acres) and Oahe (34 %, 20,400 acres). Area 3 is dominated by Oahe (59 %, 590 acres) and Coleharbor (41 %, 400 acres) (**Figure 3b**).

The surface geology in the area, being fine glacial sedimentary deposits, is highly erodible. This, in addition to the low-relief landscape, makes the area subject to highly meandering watercourses and substantial sediment movement to the Red River of the North.

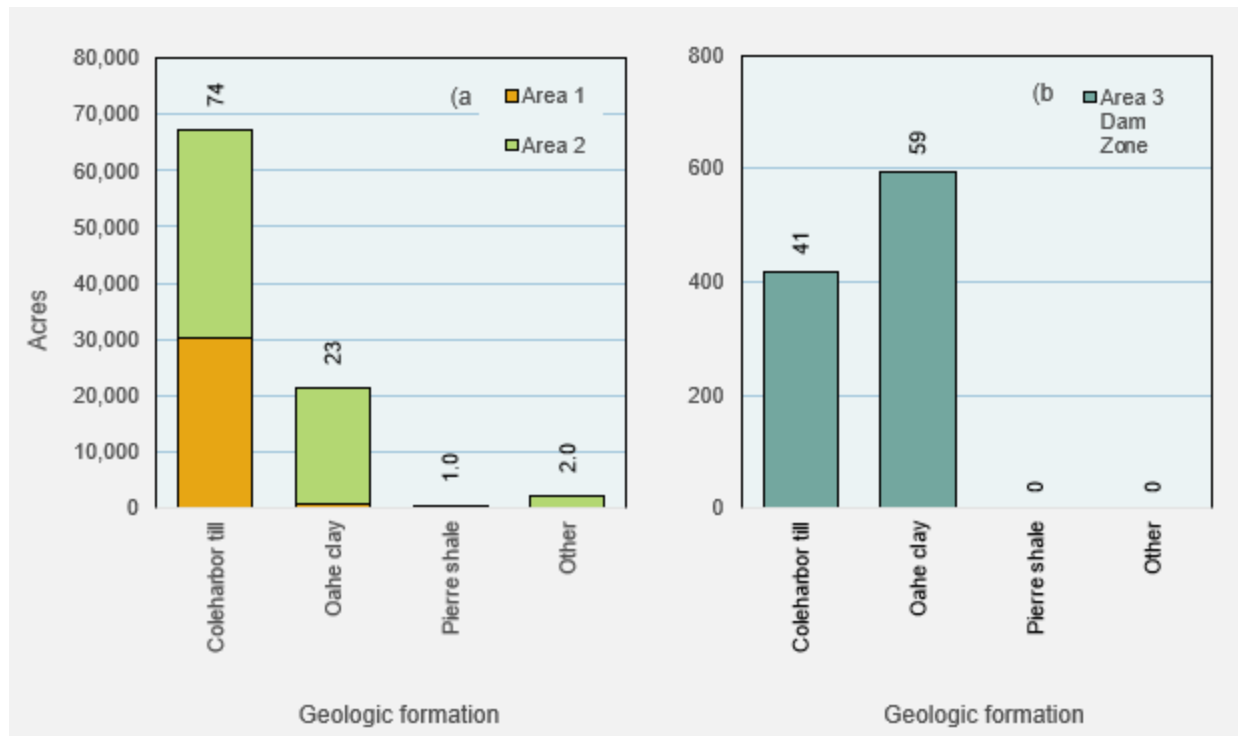


Figure 3: Surficial geology in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.7 SOILS

4.3.7.1 SOIL UNITS AND TEXTURES

Over the AOI there are 193 different mapped units (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). Soils are predominantly loamy textured (loam: 37 %, 33,400 acres) (mostly in Area 1) or silty soils (mostly in Area 2): silty loam (20 %, 18, 000 acres), silty clay loam (16 %, 14,300 acres), and silty clay (12 %, 10,900 acres) (**Figure 4a, Exhibit 05.2**). Area 2 includes some other soil types including 6 % fine sandy loam (5,800 acres). This reflects the underlying geologic units of glacial till interspersed with river sediments. Area 3 contains mostly silt loams (50 %, 507 acres) with also gravelly sandy loam, loam, and sandy loam (**Figure 4b**).

Table 3 lists the dominant soil units in the AOI (top 50 % land cover). Area 1 and Area 2 show very different soil units with little overlap of types within the sub-watersheds. The most common soil unit in Area 1 is Barnes-Buse loams (3 to 6 % slopes), which covers 22 % of the land area (6,900 acres). These are deep, well-drained soils formed in loamy till on till plains and moraines (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). The most common soil unit in Area 2 is Glyndon silt loam (0 to 2 % slopes), which covers 10 % of the land area (5,900 acres). The predominant mapped soil unit in Area 3 is LaDelle silt loam (0 to 2 % slopes, occasionally flooded) (50 %, 507 acres) (**Table 3**). The LaDelle series is very deep, moderately well-drained and moderately permeable soils on slopes from 0-9 %.

Table 3: Predominant soil units within the Area of Interest.

Soil Unit	Soil Name	Acres	%
Area 1 (total 98 mapped soil units)			Top 50 %
F144B	Barnes-Buse loams, 3 to 6 percent slopes	6,863	22
G144B	Barnes-Buse loams, 3 to 6 percent slopes	2,215	7
F122B	Barnes-Cresbard loams, 3 to 6 percent slopes	1,891	6
F12A	Vallers, saline-Parnell complex, 0 to 1 percent slopes	1,511	5
F143C	Barnes-Buse-Langhei loams, 6 to 9 percent slopes	1,427	5
F100A	Hamerly-Tonka complex, 0 to 3 percent slopes	1,346	4
F122A	Svea-Cresbard loams, 0 to 3 percent slopes	1,222	4
Area 2 (total 95 mapped soil units)			Top 50 %
I201A	Glyndon silt loam, 0 to 2 percent slopes	5,882	10
I229A	Fargo silty clay, 0 to 1 percent slopes	3,295	6
I130A	Hegne-Fargo silty clays, 0 to 2 percent slopes	3,081	5
I365B	Arvilla sandy loam, 0 to 6 percent slopes	2,972	5
I329A	Fairdale silt loam, 0 to 2 percent slopes, occasionally flooded	2,929	5
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	2,892	5
I383A	Overly silty clay loam, 0 to 2 percent slopes	2,439	4
I119A	Bearden silty clay loam, 0 to 1 percent slopes	2,150	4
I119A	Bearden silty clay loam, 0 to 2 percent slopes	2,018	3
I531A	Overly silty clay loam, 0 to 1 percent slopes, fans	1,892	3
Area 3 (ten mapped soil units)			Top 100 %
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	507	50
I463E	Sioux-Renshaw complex, 9 to 25 percent slopes	179	18
I422D	Sioux loam, 2 to 15 percent slopes	141	14
I365B	Arvilla sandy loam, 0 to 6 percent slopes	97	10
I146B	Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, freq. flooded	38	4
I163A	Inkster sandy loam, 0 to 2 percent slopes	28	3
I161A	Vang loam, 0 to 2 percent slopes	8	0.8
I422A	Renshaw loam, 0 to 2 percent slopes	8	0.7
I466B	Renshaw loam, 2 to 6 percent slopes	4	0.4
I162A	Walsh loam, 0 to 2 percent slopes	3	0.3

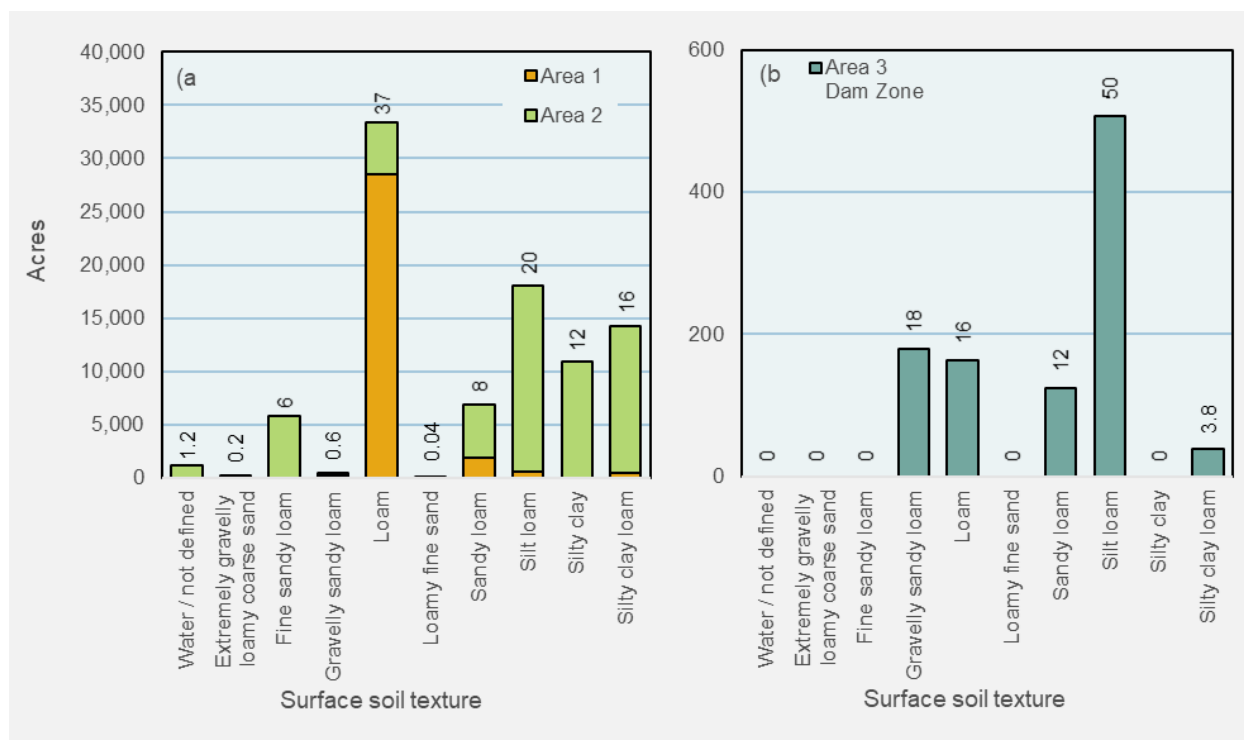


Figure 4: Surface soil texture in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.7.2 HYDRIC SOIL RATINGS

In their natural, undrained condition, hydric soils are saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation (US Army Corps of Engineers Environmental Laboratory 1987). Approximately 81% (73,900 acres) of the AOI (including open water, i.e. Lake Ardoch) is comprised of non-hydric soils, soils with zero or low hydric ratings (0-32 % hydric rating) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020), **Exhibit 05.3, Figure 5a**. Of the remaining soils, 14% of the soils are moderately to highly hydric (33-99 % hydric rating) (13,000 acres); and 5 % of the soils are classified as 100 % hydric (4,300 acres). The soils in Area 1 are predominantly non-hydric to slightly hydric with 82 % of the soils having a hydric rating between 0-32 % (26,000 acres), and no highly hydric soils (100 % rating). This area does have 5,600 acres of moderately hydric soils (33-99 % hydric rating, 18 % of the land area). Area 2 is dominated by soils with low hydric ratings (0-32 % hydric rating, 80 %, 47,800 acres), but this area does have 10,000 acres of highly hydric soils (17 % of the land area). These results correspond to Area 2 being composed of glacial Lake Agassiz silty clay soils.

Most of the land in the APE (Area 3) (83 %, 680 acres), including open water, has soils with a low hydric rating of 1-32 % (**Figure 5b**). Soils with a hydric rating of 0 % cover 36 % of the land (295 acres) and soils with a high hydric rating of 66-99 % cover only 5 % of the land (38 acres). There are no soils with hydric ratings of 33-65 or 100 %,

The one soil unit with a hydric rating range of 66-99 is listed as Lamoure-Fluvaquents, channeled complex, 0-6 % slopes, frequently flooded. This soil type is located, according to the Web Soil Survey (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020), in a small area

within the reservoir pool as well as within the wetland complex upstream from the reservoir, between the pool and 45th St. NE.

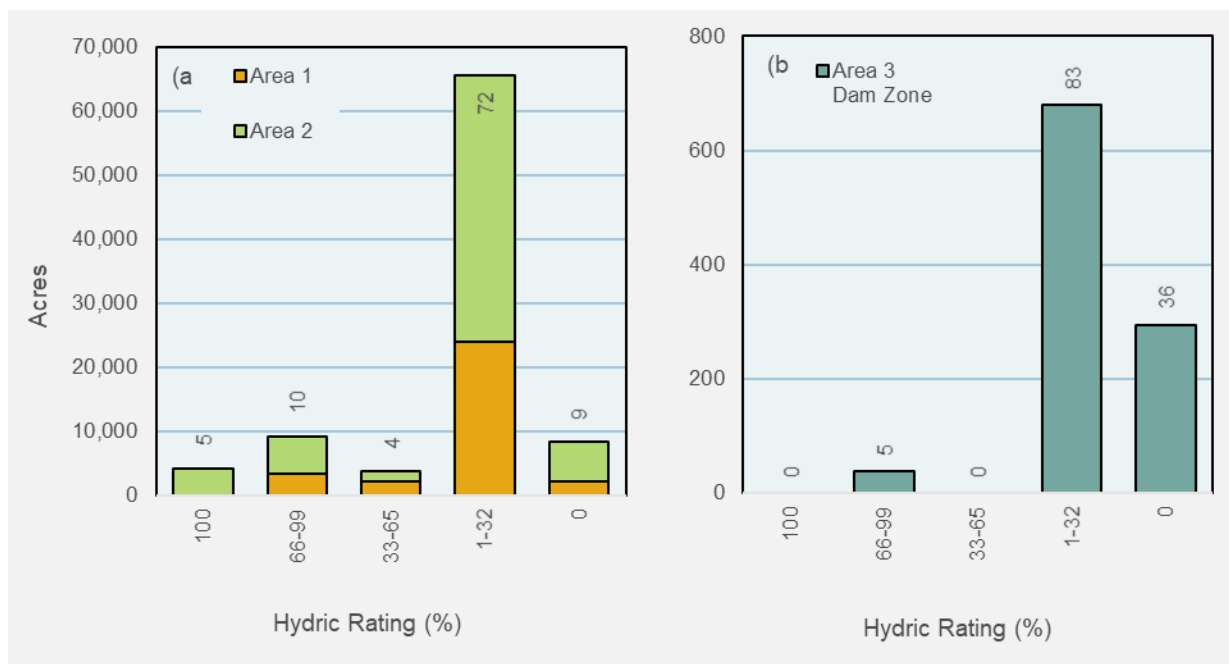


Figure 5: Soil hydric rating in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.7.3 EROSION: K-FACTOR

The K-factor of a soil is an index of relative susceptibility to erosion (US Department of Agriculture RUSLE Development Team 2001). The index values range between 0.02 to 0.64, with higher erosion potential at the higher values. High-clay soils and sandy soils tend to have low K-values, fine sandy loams typically have moderate values, and high-silt soils are the most erodible. The K-values for the AOI range from 0.02 to 0.49 (**Figure 6a, Exhibit 05.4**) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). Areas 1 and 2 are dominated by soils with K-values between 0.2 and 0.3 (Area 1: 42 %, 24,000 acres; Area 2: 72 %, 24,000 acres). Area 1 also has a high proportion of soils with K-values between 0.1 and 0.2 (27 %, 15,800 acres) and between 0.3 and 0.4 (29 %, 16,900 acres). These patterns reflect the soil textures where the silty soils in Area 2 are more susceptible to erosion. Area 3 has the highest proportion of soils that are moderately- to highly erodible, with 68 % of the soils having K-values of 0.3-0.4 (680 acres) (**Figure 6b**).

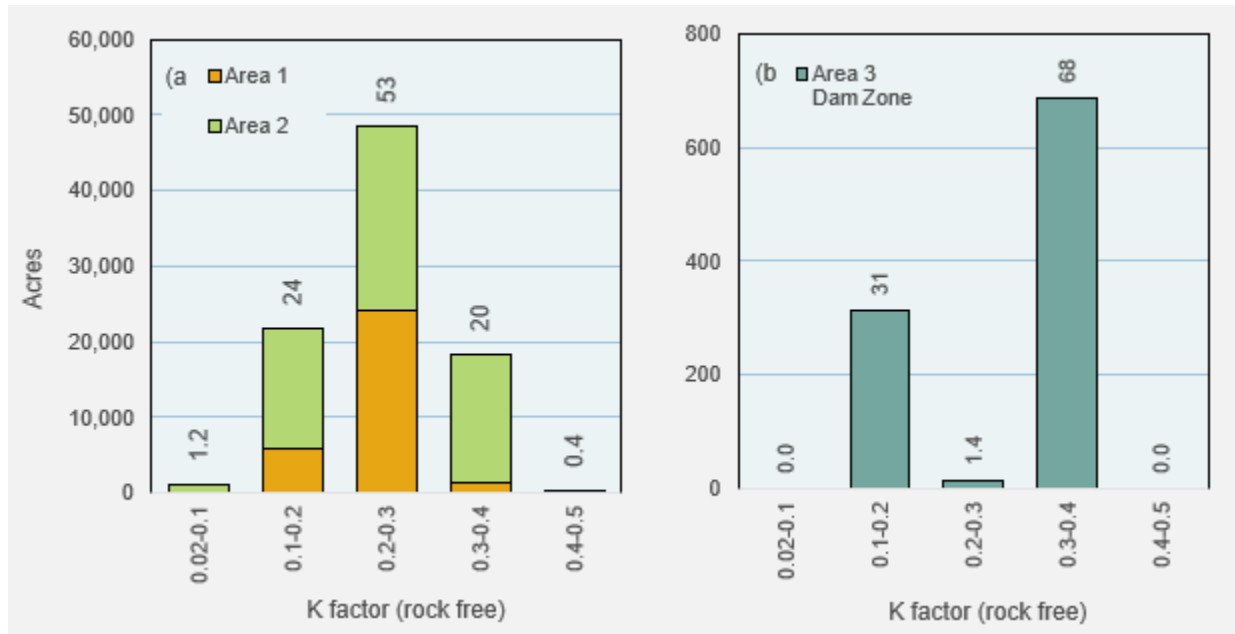


Figure 6: Soil K-factor (rock free) in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.7.4 EROSION: K-FACTOR OF TILLED SOILS

To estimate the potential for erosion of the soils in the region, the data for tilled land in the Forest River Watershed (US Department of Agriculture National Agricultural Statistics Service 2018) were compared with the soil K-factor (the index of relative susceptibility to erosion, US Department of Agriculture RUSLE Development Team 2001). High-clay soils and sandy soils tend to have low K-values, fine sandy loams typically have moderate values, and high-silt soils are the most erodible (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). The index values in the AOI range between 0.02 and 0.49, but the majority of the tilled soils fall within the moderately-erodible category (index values between 0.2 and 0.3, 54 %) (**Figure 7a, Exhibit 05.5**). Area 1 has the highest proportion of soils within the 0.2 and 0.3 indices (80 %, 17,900 acres) while most tilled soils within Area 2 range between 0.1 and 0.4 (98 %, 45,300 acres). Within the Area 3, near the dam, approximately half of the tilled soils are somewhat erodible (index 0.1-0.2, 49 %, 58 acres) and approximately half are less erodible (index 0.3-0.4, 48 %, 57 acres) (**Figure 7b**). These results indicate the Fordville reservoir is moderately susceptible to potential sediment transport from erosion due to tilling.

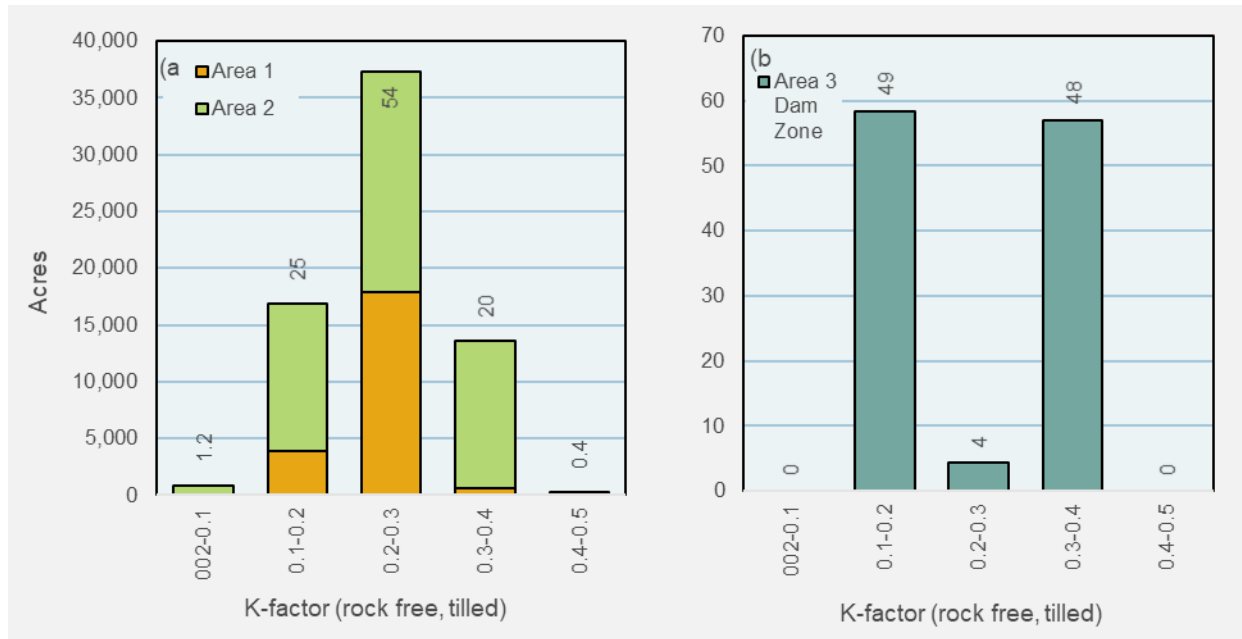


Figure 7: Tilled cropland and relative susceptibility to erosion (K-factor rock free) in a) the Forest River Watershed (Area of Interest) and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each K-factor index increment out of the total tilled land in the area.

4.3.7.5 EROSION: PTMAPP MODELING

The Prioritize, Target, and Measure Application (PTMApp, Houston Engineering, Inc. 2016) data for the Forest River Watershed were provided in November of 2019 from the International Water Institute. Sediment yields were estimated based on the implementation of the Revised Universal Soil Loss Equation (RUSLE) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). Nutrient annual yields for total phosphorus and total nitrogen leaving the landscape were estimated using an empirical approach with land use export coefficients (US Department of Agriculture National Agricultural Statistics Service 2018). The PTMApp data illustrated below shows major nutrient or sediment sources within the watershed upstream of Fordville Dam (Area 1). The data were used to gain a better understanding of sediment delivery into the project area and sediment storage for the design of the dam and potential water quality mitigation efforts moving forward.

The figures below show the areas contributing overland sediment (**Figure 8**), total nitrogen (**Figure 9**), and total phosphorus (**Figure 10**). The blank areas within Area 1 represent the non-contributing areas (those that do not drain into downstream resources during a 10-yr 24-hr rainfall event). Areas shown as red indicate high contributions for sediment and nutrient delivery to Fordville Dam. For overland sediment delivery, areas adjacent to the South Branch Forest River seem to be the largest contributors of sediment deposits. Based on the data provided by PTMApp, the catchment with the highest amount of sediment delivery produces in excess of 40 tons of sediment annually. Areas with high contributions for total phosphorus and nitrogen are more distributed, with higher contributing areas located generally in the upper part of the drainage area. In Figure 9, the red areas represent total nitrogen amounts in excess of 600 lbs yr⁻¹. In **Figure 10** the red and dark orange areas represent total phosphorus amounts in excess of 25 lbs yr⁻¹. A summation of the predicted total overland sediment, total nitrogen, and total phosphorus delivered to Fordville Dam annually is displayed in **Table 4**.

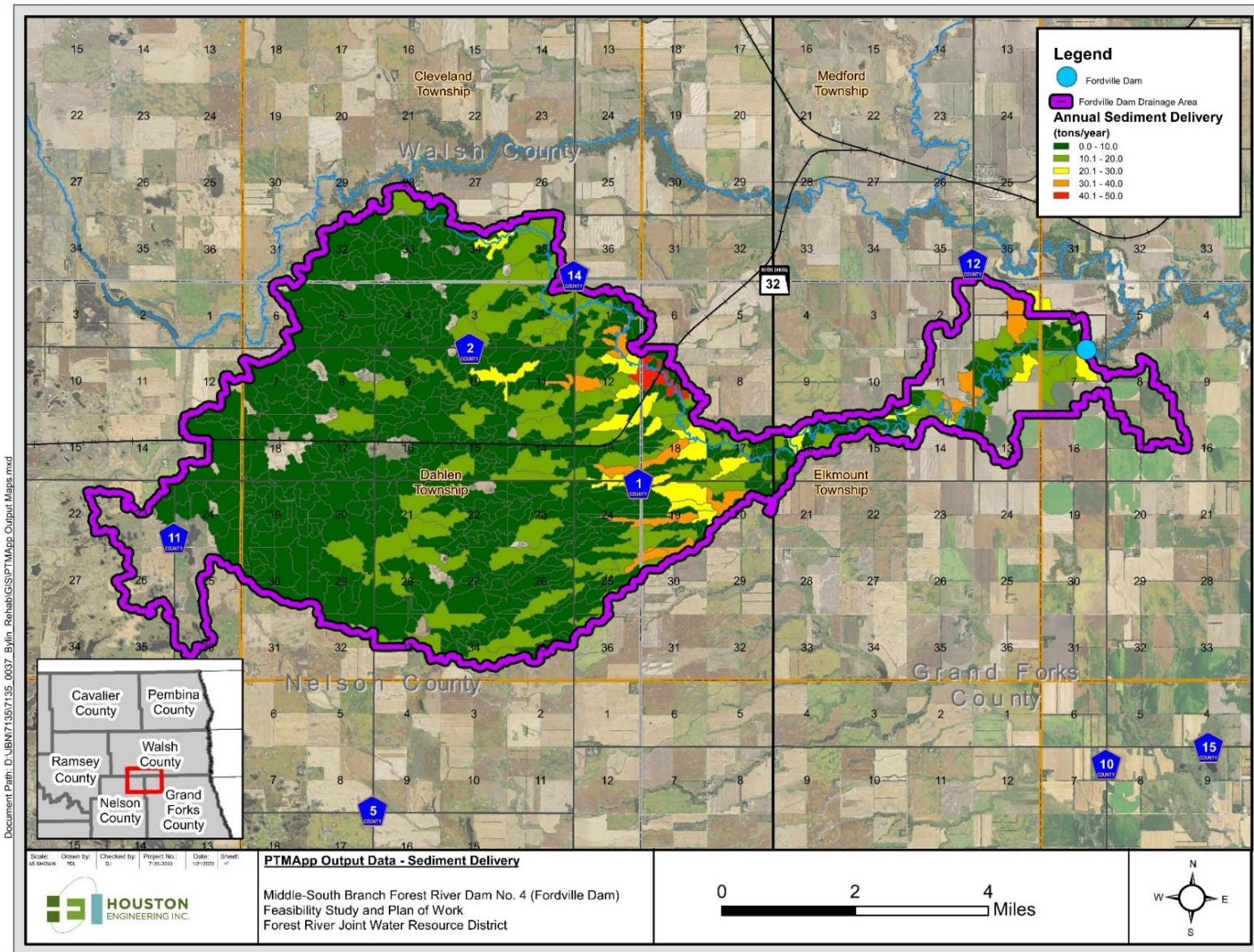


Figure 8: PTMApp Output Data – Sediment Delivery

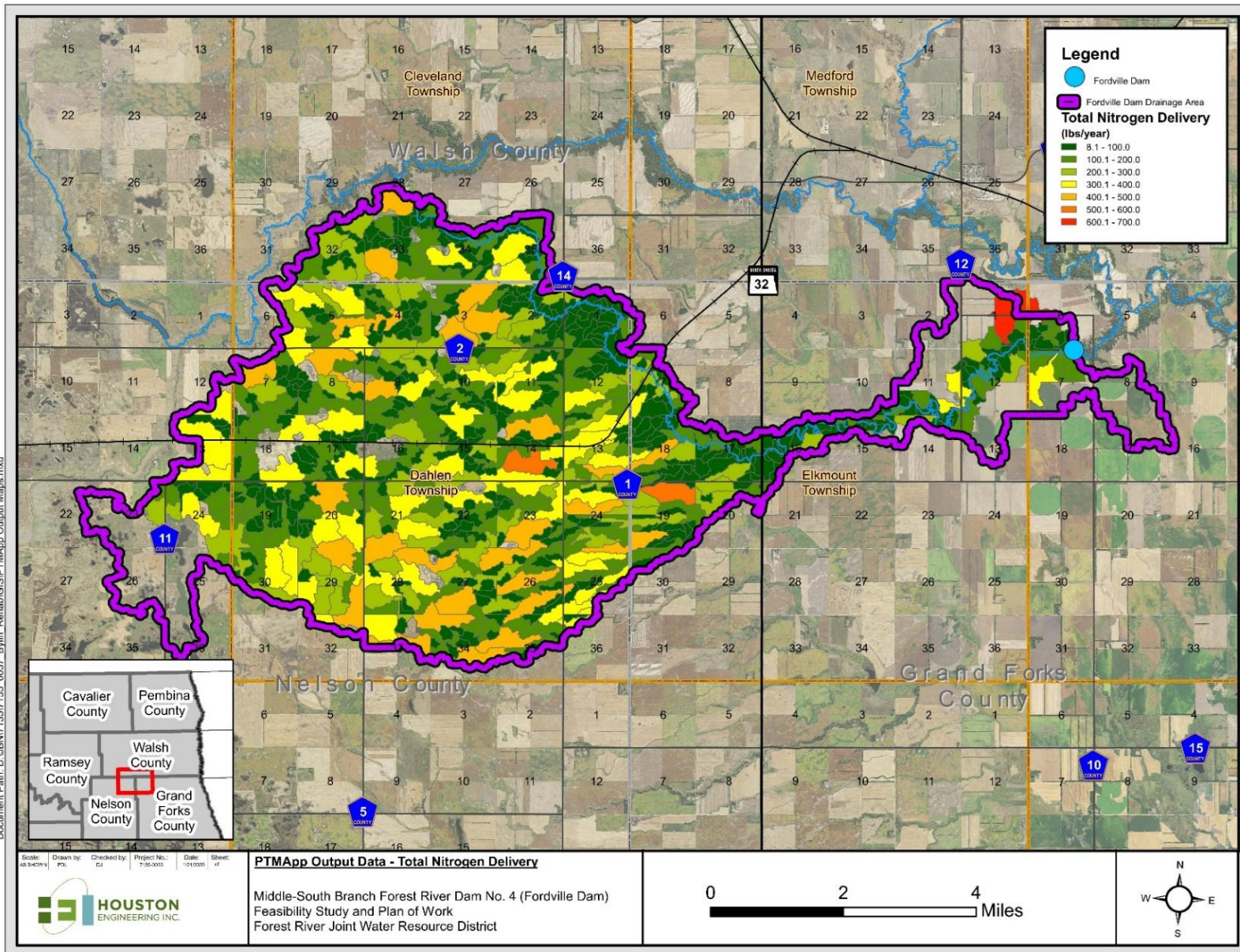


Figure 9: PTMAApp Output Data - Total Nitrogen Delivery

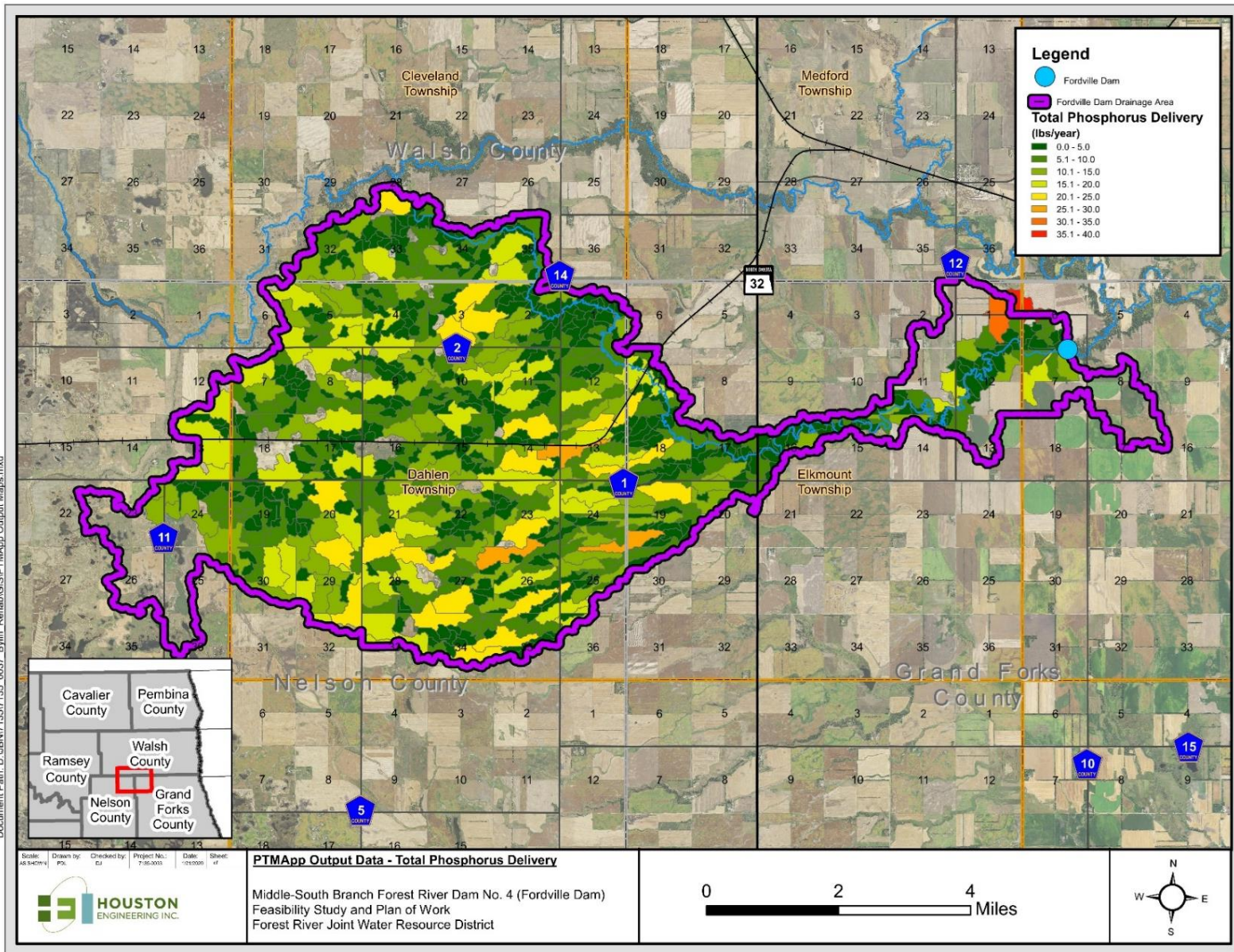


Figure 10: PTMApp Output Data - Total Phosphorus Delivery

Table 4: Overland sediment and nutrient totals from Area 1 (upstream) to Fordville Dam.

Parameter	Total Load	
	US customary units	Metric units
Overland sediment	4,112 tons yr ⁻¹	3,730 tonnes yr ⁻¹
Overland total nitrogen	89,329 lb yr ⁻¹	40,519 kg yr ⁻¹
Overland total phosphorus	4,432 lb yr ⁻¹	2,010 yr ⁻¹

4.3.8 AGRICULTURAL PRODUCTIVITY

4.3.8.1 FARMLAND CLASSIFICATIONS

Protection for important farmland, rangeland, and forest land is established in the Farmland Protection Policy Act (FPPA), US Department of Agriculture regulations implementing the FPPA (7 CFR Part 658), and USDA DR No. 9500-3, Land Use Policy. Section 658.5 of the FPPA defines criteria for federal agencies to consider when identifying the potential adverse effects of federal programs on farmland. Federal agencies are to consider actions that could reduce adverse effects on farmland and assure that federal programs, to the extent practicable, are compatible with state, local government, and private programs.

The AOI is classified as predominately “prime farmland” (55 %, 50,500 acres), but another 23 % of the area is classified as “not prime farmland” (21,300 acres) (**Figure 11a, Exhibit 06.1**) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). Only 9 % is noted as “farmland of statewide importance” (7,800 acres) and 13 % is designated as “prime farmland if drained” (11,600 acres). The latter indicates most of the wetlands with farming potential have already been drained or otherwise altered. Area 1 is composed of 46 % (14,600 acres) “prime farmland” and 31 % (9,800) “not prime farmland.” In the AOI, Area 1 has a higher proportion of “farmland of statewide importance” compared with Area 2, while Area 2 has a higher proportion of “prime farmland” (60 %). Area 2 has the highest proportion of “prime farmland if drained” (17 %). This reflects the characteristic of Area 2 having a greater proportion of wetlands. Area 3 is comprised of approximately equal portions of “prime farmland” (54 %, 560 acres) and “not prime farmland” (46 %, 470 acres) (**Figure 11b**).

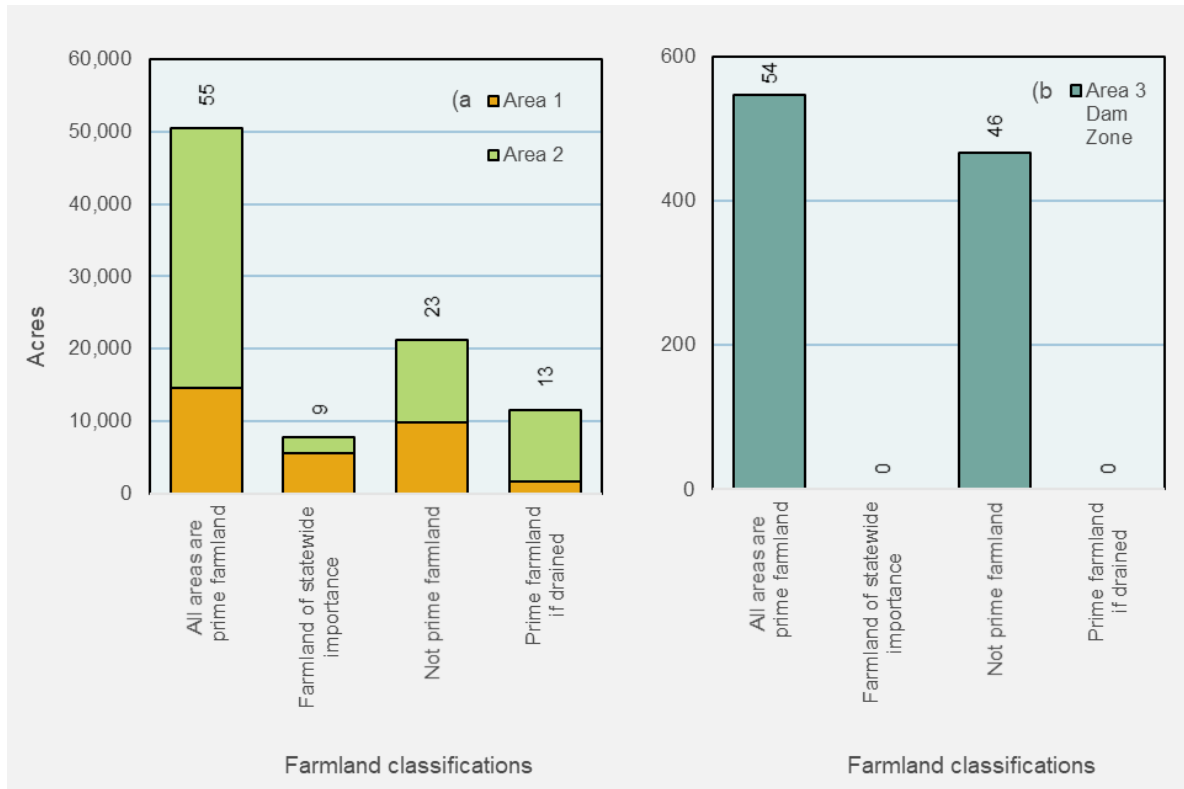


Figure 11: Farmland classification in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.8.2 CROP PRODUCTIVITY

The Natural Resources Conservation Service Crop Productivity Index (CPI) is a relative ranking of soil units based on their crop production potential. These rankings were developed to enable comparison of the potential yield of various soils over time. The ranking was developed based on physical and chemical properties of the soils (water capacity, pH, slope, soil moisture status, cation-exchange capacity, organic matter content, salinity, and surface fragments) in addition to flooding or ponding potential. The data include several assumptions including implementation of artificial drainage where needed, natural weather conditions but not climactic conditions, and the index was designed for the production of corn.

The Crop Productivity Index data for the AOI show 42 % of the total acres with an index value of 81-100 (38,6000 acres) (**Figure 12a, Exhibit 06.2**) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). The index bracket of 61-80 covers 31 % of the area (28,000 acres), and the remaining 27 % of the acres are comprised of the lower productivity index brackets. Area 1 shows the highest proportion of land in the 61-80 index bracket (61 %, 19,000 acres) while Area 2 shows most land in the 81-100 bracket (62 %, 36,800 acres). This indicates Area 2 has better potential crop productivity compared with Area 1, likely due to a higher proportion of nutrient-rich soils originating from the glacial Lake Agassiz silty clay loams and silty clays. Area 3 has 50 % of the land area (510 acres) in the index bracket 81-100, indicating high potential crop productivity (**Figure 12b**).

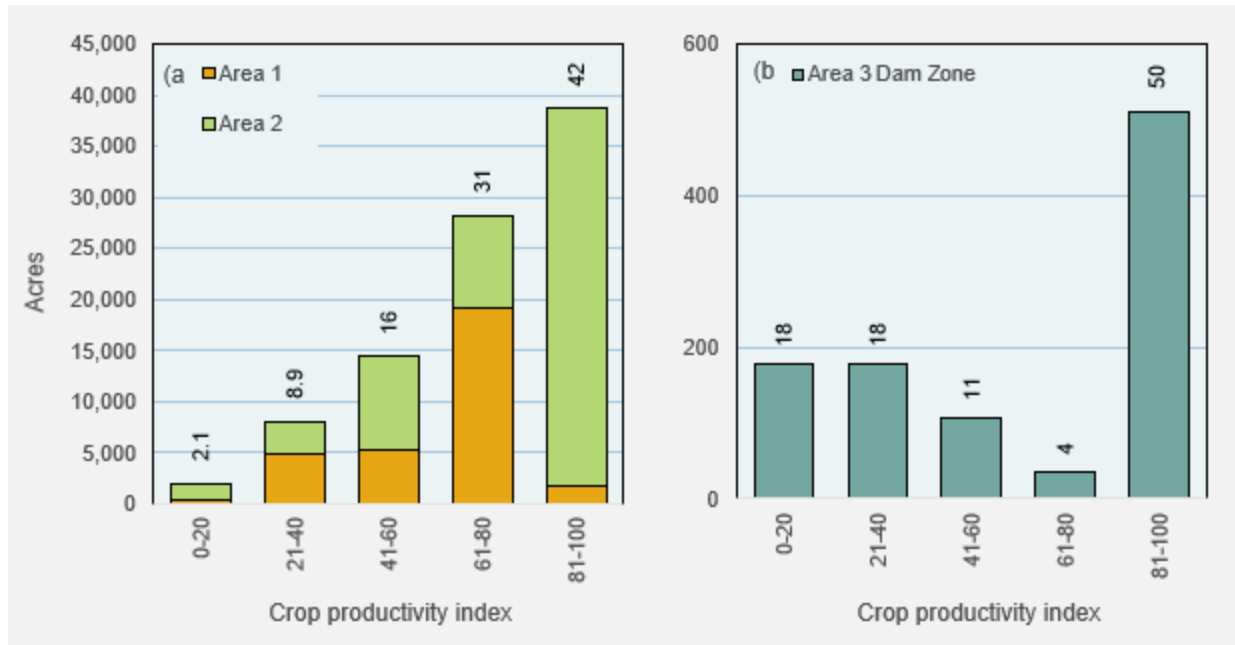


Figure 12: Crop Productivity Index in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.8.3 NORMAL YEAR RANGE PRODUCTION

Normal year range production is a measure of the amount of vegetation expected annually in an area that is well managed and supports or potentially supports the natural plant community. When normalized against topography and climate, this metric can describe the type and amount of vegetation on rangeland and is based on the soil type, regardless of the current vegetation (i.e. does not describe only current grazing land). This measure enables landowners to estimate the number of grazing animals the land can support.

Over the AOI, 96 % of the total acres can support between 2,001-5,000 lbs/acre/year (89,200 acres), with the greatest proportion of this (44 %) growing 4,001-5,000 lbs./acre/year (**Figure 13a, Exhibit 06.3**) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). For Area 1 the highest proportion of land falls into the 2,001-3,000 production bracket (69 %, 21,900 acres) while Area 2 the highest proportion falls within the 4,001-5,000 production bracket (58 %, 35,700 acres). The land in Area 2 shows greater potential range production. Area 3 shows 97 % of the land can support 1,001-4,000 lbs/acre/year (980 acres), with the majority of the area within the 3,001-4,000 production bracket (56 %, 560 acres) (**Figure 13b**).

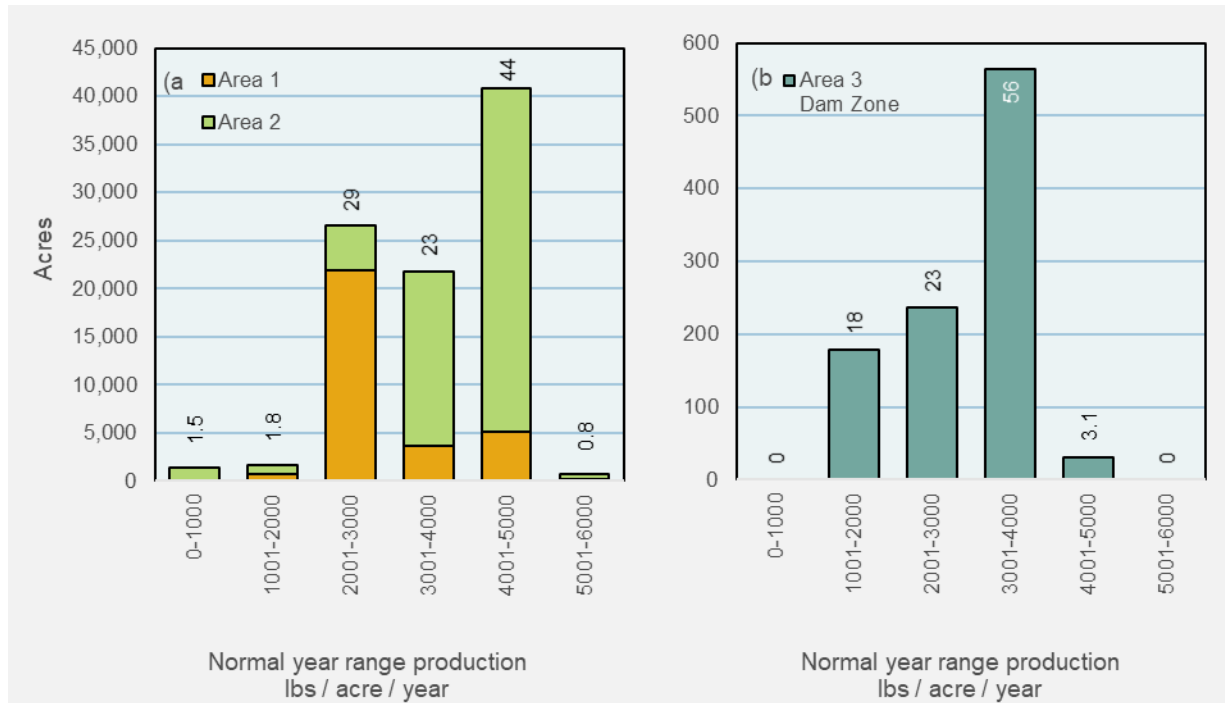


Figure 13: Normal year range production in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.9 AQUATIC RESOURCES

Aquatic resources in the area consist of wetlands, open water (lakes), and a network of rivers. All of these are protected to varying degrees under the Clean Water Act and other legislation. When federal funding is used for construction and improvement projects, Executive Order 11990 requires federal agencies to preserve, enhance, or minimize degradation and losses to wetlands. NRCS policy for implementing the executive order can be found at 190-GM, Part 410, Subpart B, Section 410.26. The Clean Water Act Section 404 requires permitting from the US Army Corps of Engineers (USACE) for activities that impact wetlands and “other waters” of the US. The NRCS floodplain management policy requires review of activities in wetlands that occur within the 50-year floodplain (190-GM Section 510.25). Rivers, in addition to regulation under the USACE, may fall under the National Wild and Scenic Rivers Act of 1968 (Public Law 90-542).

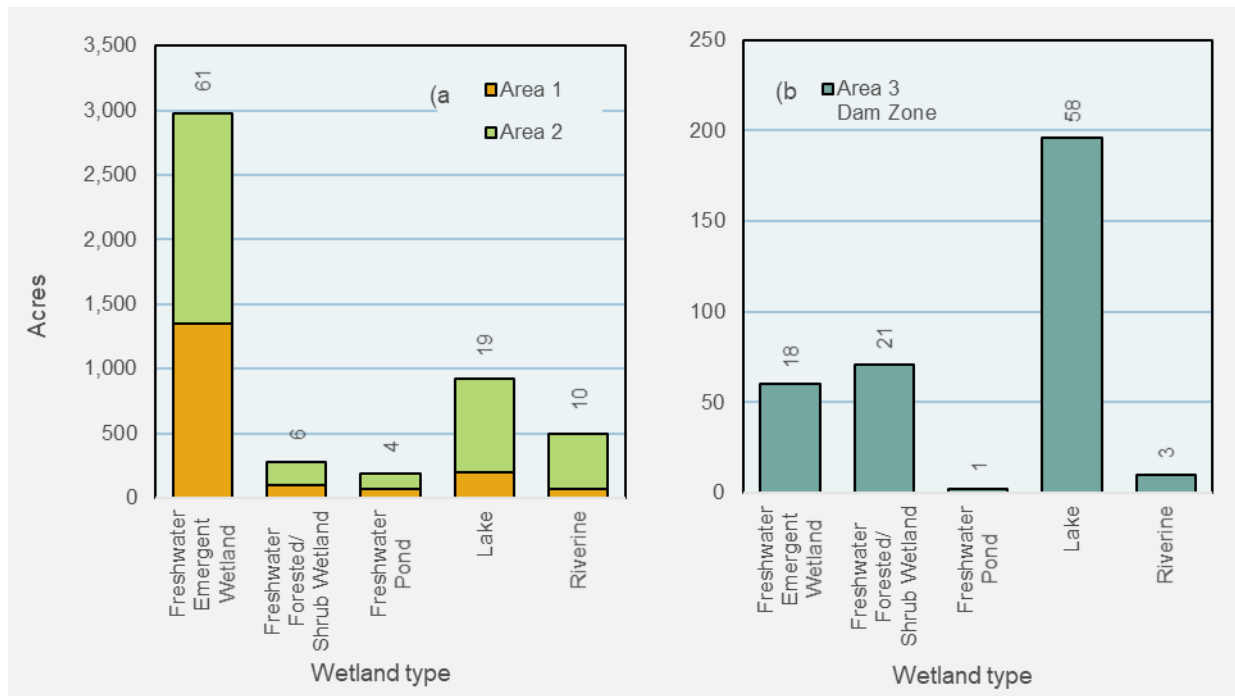


Figure 14: Wetlands and open water in a) Area 1 and Area 2 - the Area of Interest, and b) Area 3 – the Area of Potential Effect. The values above the bars indicate the proportion of each increment out of the total area.

4.3.9.1 RIVERS AND STREAMS

The region is covered by a network of streams and rivers all flowing from the higher elevations of the Drift Plains eventually to the Red River of the North (US Department of Interior 2019, North Dakota Information Technology Department 2020, US Fish and Wildlife Service 2020a). The Red River of the North is a navigable river, and, by definition, the Forest River and tributaries would be considered “Waters of the US” and under the jurisdiction of the USACE. Neither the Forest River nor its tributaries are included in the list of rivers designated as Wild and Scenic Rivers (US Fish and Wildlife Service 2020a).

There are several dams upstream from the main branch Forest River, mainly associated with the Middle Branch and the North Branch of the river (**Exhibit 07.1**). Area 1 contains 3.7 miles of the South Branch of the Forest River upstream from the reservoir. The streams here are listed by the NWI (using nomenclature from Cowardin et al. 1979, see **Table 5** for codes) as wetlands of the types PEM1C and PSSA.

Area 2 contains 17.1 miles of river between Fordville dam and the confluence of the South Branch and the mainstem of the Forest River. From this confluence there are 61.4 miles of the main branch of the Forest River downstream to Lake Ardoch. The North Dakota Department of Environmental Quality (NDDEQ, formerly North Dakota Department of Health (NDDH)), in the Standards of Quality for Water of the State, lists the Forest River as a Class II waterway (see water quality criteria in **Section 4.3.11**).

Area 3 Dam Zone includes 10 acres of rivers and streams (3 % of the total aquatic resources, 0.01 % of the total land area). Here there are 1.6 miles of tributary from the western end of the APE to the normal pool of the reservoir, but the NWI lists the tributaries as wetlands of the types PEM1C, PFOA, PABFh, and R4SBC (**Exhibit B-07.2**). Area 3 includes 4.5 miles of the Middle Branch Forest River downstream of the dam and this is identified as a river (R4SBC and R2UBG). From aerial photographs, the upstream streams are well defined with areas scattered areas of forested/scrub-shrub wetlands.

Table 5: National Wetland Inventory aquatic resources in the Area of Interest (Cowardin et al. (1979) wetland codes).

Cowardin code	aquatic resource description
L1UBHh	Lacustrine, limnetic, unconsolidated bottom, permanently flooded, impounded
L2ABGh	Lacustrine, littoral, aquatic bed, intermittently exposed, impounded
L2UBGh	Lacustrine, littoral, unconsolidated bottom, intermittently exposed, impounded
PEM1F PEM1Fh	Palustrine, emergent, persistent, semi-permanently flooded Impounded
PABF PABFh	Palustrine, aquatic bed, semi-permanently flooded Impounded
PEM1A PEM1Ah	Palustrine, emergent, persistent, temporarily flooded Impounded
PEM1C PEM1Ch	Palustrine, emergent, persistent, seasonally flooded Impounded
PFOA PFOAh	Palustrine, forested, temporarily flooded Impounded
PFO/SSA	Palustrine, forested, scrub-shrub, temporarily flooded
PSSA	Palustrine, scrub-shrub, temporarily flooded
PSS/EM1Ch	Palustrine, scrub-shrub, emergent, persistent, seasonally flooded, impounded
R4SBC	Riverine, intermittent, streambed, seasonally flooded
R4SBA	Riverine, intermittent, streambed, temporarily flooded
R2USA	Riverine, lower perennial, unconsolidated shore, temporary flooded
R2UBG	Riverine, lower perennial, unconsolidated bottom, intermittently exposed

4.3.9.2 WETLANDS

The US Fish and Wildlife Service's National Wetland Inventory (NWI) maps all wetlands within the AOI (US Fish and Wildlife Service 2020a). The AOI includes wetlands classified in riverine, lacustrine (lakes), and palustrine systems (freshwater wetlands) (Cowardin et al. 1979). Classifications further break down into several additional categories. Out of the total acres in the AOI, 5 % are wetlands (4,800 acres). Of these, the most frequent wetland type is freshwater emergent wetlands (61 %, 3,000 acres) (**Exhibit 07.2, Figure 14a**). The other wetland types are less frequent and include lakes (19 %), riverine wetlands (10 %), freshwater forested/shrub wetlands (6 %), and freshwater ponds (4 %). Both Area 1 and Area 2 have more freshwater emergent wetlands than any other type (Area 1 has 1,350 acres and Area 2 has 1,600 acres). Area 2 has more lakes and rivers than Area 1.

For Area 3 the NWI data show 340 acres of wetlands classified in riverine, lacustrine (lakes), and palustrine systems (freshwater wetlands) (34 % of the total area) (**Exhibit 07.3, Figure 14b**). The majority of these

are lakes (the reservoir, 196 acres, 58 % of aquatic resources, 19 % of total land area), followed by freshwater forested/shrub wetlands (71 acres, 21 % of aquatic resources, 7 % of total land area) and freshwater emergent wetlands (60 acres, 18 % of aquatic resources, 6 % of total land area). From a brief offsite review of the area, it appears most or all of the area along the upstream tributary is composed of a complex of riparian forest and shallow marsh and wet meadow wetlands (freshwater emergent wetlands) and together may cover an additional 30 acres. A full field aquatic resource delineation is needed to thoroughly map the wetland boundaries.

4.3.9.3 OPEN WATER - LAKES

The dominant wetland type within Area 3 is the open water pools of Fordville Dam. These are listed by NWI as lacustrine, limnetic, unconsolidated bottom, intermittently exposed, and diked/impounded (L1UBGh). The Fordville Dam is 30 feet deep at the deepest part but is 11 feet deep on average (**Figure 15**) (North Dakota Game and Fish Department, 2018a). Other wetlands in Area 3 are listed by the NWI as PEM1C/PEM1A (palustrine, emergent, persistent, seasonally/temporarily flooded) and PSSC (palustrine, scrub-shrub, seasonally flooded).

Fordville Dam is a reservoir providing recreational opportunities in addition to flood storage. The surface area is approximately 185 acres with an estimated six miles of shoreline. The deepest part of the lake is approximately 30 feet with isolated sites reaching greater than 30 feet, but on average the reservoir is eleven feet deep (North Dakota Game and Fish Department 2018a, **Figure 15**). The NDDEQ categorizes the reservoir as a Class II cool water fishery (North Dakota Department of Health 2019, see **Section 4.3.11**). This indicates the lake is capable of supporting cool water fishes, including northern pike and walleye, and aquatic biota associated with cool waters. There can also be marginal growth and survival of cold-water species. This classification is based on the lake's geophysical characteristics. These fisheries can be affected by natural conditions including seasonal or climactic variability.

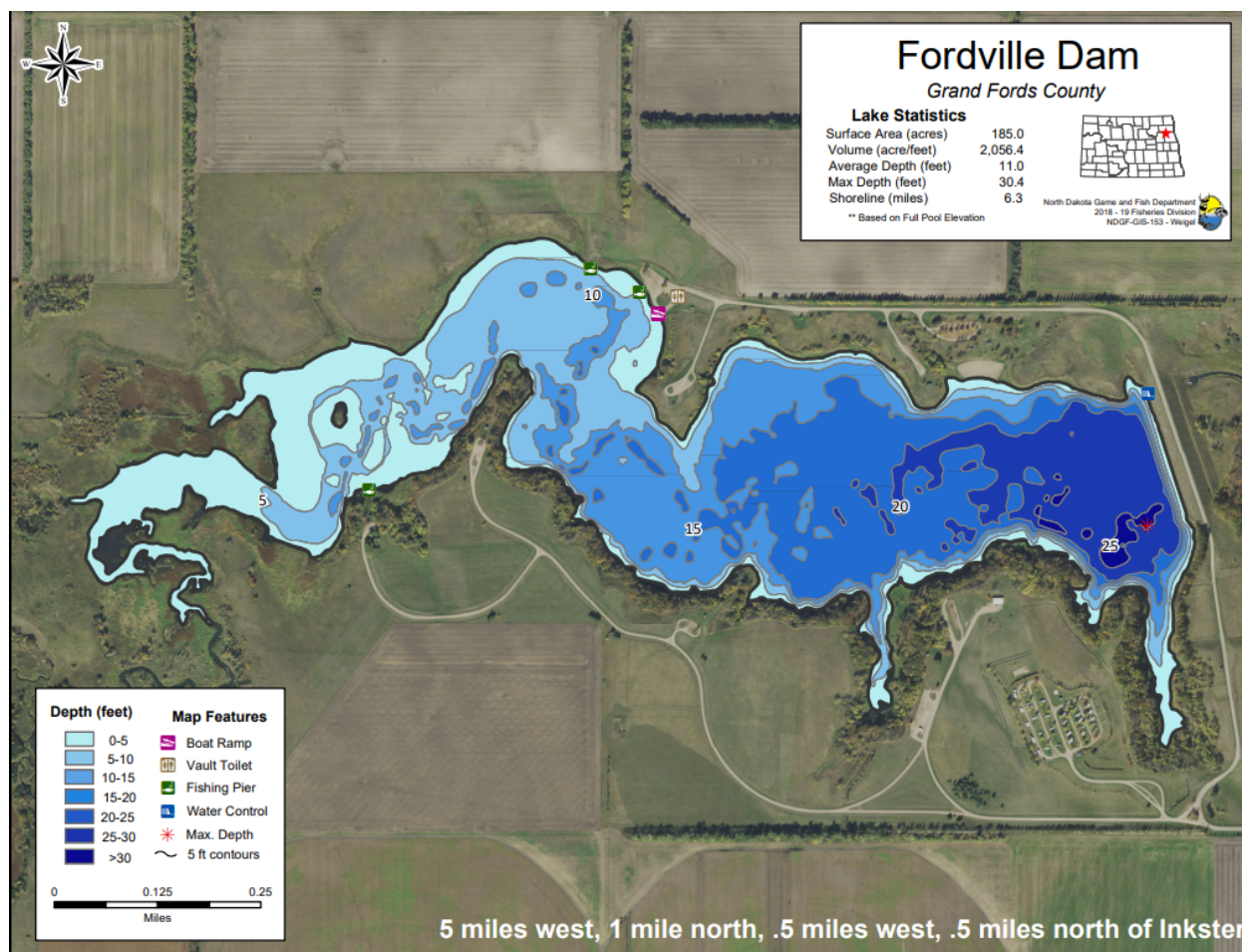


Figure 15: Fordville Dam, Grand Fords [sic] County, North Dakota (from North Dakota Game and Fish Department 2018a).

4.3.10 HYDROLOGY AND WATER MANAGEMENT

The Forest River Watershed is an 896 square mile watershed contributing to the Red River Basin. The upper portion of the Forest River Watershed consists of three branches; the North Branch (154 square mile watershed), Middle Branch (147 square mile watershed), and South Branch (50 square mile watershed). The North Branch and Middle Branch join near the community of Fordville, ND. The South Branch confluence with the Forest River is further downstream approximately 8.9 river miles. In addition to the three branches, a recently constructed flood control project (Michigan Spillway) now provides a regulated outlet for a watershed area of approximately 172 square miles. Flows are regulated through a pumping station with a maximum discharge of approximately 50 cubic feet per second. These discharges are pumped into a tributary that contributes to the Middle Branch Forest River between Whitman Dam and Matejcek Dam (**Exhibit 07.1**).

Further downstream, lower reaches of the Forest River flow through the Glacial Lake Plain, which is characterized by flat streambed and landscape slopes. This results in a more attenuated flood hydrograph and expansive flooding. The Forest River between the communities of Forest River and Minto, ND is a “perched” channel, meaning that the adjacent floodplain slopes away from Forest River bank. During high

flows, this can result in flows breaking out to the north and to the east away from the Forest River. These breakouts, when combined with localized hydrology, have resulted in flooding west and south of Minto.

4.3.10.1 AQUIFERS AND GROUNDWATER RESOURCES

A sole source aquifer, as defined by the US Environmental Protection Agency (USEPA), is an aquifer which supplies at least 50 % of the drinking water for the service area where there are no reasonably available alternative drinking water sources (US Environmental Protection Agency 2018). According to the USEPA there are no sole source aquifers within the study area. Sources of groundwater within the AOI include the Medford, Elk Valley, and Inskter aquifers (**Exhibit 08.1**) (North Dakota Information Technology Department 2020), which are considered “shallow”, major glacial-drift aquifers. Area 1 covers portions of Elk Valley and Medford aquifers, while Area 2 covers portions of only the Inkster aquifer.

4.3.10.2 FLOOD CONTROL

Flows in the AOI are regulated by several small flood control dams scattered throughout the upper watershed over the North Branch, Middle Branch, and South Branch Forest River sub-watersheds (**Exhibit 07.1, Table 6**). Additionally, drainage improvements have been constructed both privately and publicly throughout the watershed to enhance agricultural production. Further downstream, a mainstem dam provides a fish and wildlife pool at Lake Ardoch National Wildlife Refuge. This structure submerges during severe flooding, resulting in low flood attenuation at this location.

The AOI contains several flood-retarding dams, some of which were constructed by the NRCS through Public Law 83-566. These dams are located primarily in the upper portions of the North Branch, Middle Branch, and South Branch Forest River of the watershed (**Table 6, Exhibit 07.1**) (North Dakota State Water Commission 2019). Included within the APE, Fordville Dam is within the Dam Zone, while the River Zone includes the South Branch Forest River to its confluence with the Forest River and continues along the Forest River to Lake Ardoch.

Table 6: Dams in the vicinity of Fordville Dam

Area name	Dam name	Primary Purpose	Year Built	Drainage Area (mi. ²)	Maximum Volume (acre-feet)	Normal Pool surface area (acres)	Linear distance from Fordville Dam (miles)
Forest River Drainage Area	Dougherty	Recreation	1935	55	no data	no data	18
	Bylin (NB FR Dam 1)	Flood control	1964	22.1	5,850	60	17
	Kratochvil (NB FR Dam 3)	Flood control	1962	12.6	2,837	32	15.5
	Soukup (NB FR Dam 5)	Flood control	1962	3.3	1,116	33	12.5
	Chyle (NB FR Dam 6)	Flood control	1966	5.9	1,470	12	9.5
	Matejcek Dam (MSB FR Dam 1)	Flood control, wildlife, recreation	1966	45.9	9,144	134	8
	Whitman Dam (MSB FR Dam 6)	Flood control	1965	84.7	9,364	143	13
	Sarnia Dam	Flood control	1936	26.6	1,610	no data	14.5
Area 1 (Upstream)	-	-	-	-	-	-	-
Area 2 (Downstream)	Lake Ardoch	Fish and wildlife	1934	793	13,630	996	22
Area 3	Fordville (MSB FR Dam 4)	Flood control	1978	41.5	10,703	197	-
Other significant dams in region outside Forest River Drainage Area	Homme Reservoir (Park River)	Flood control	1951	229	6,700	194	15.5
	Niagara 1	Water supply	1905	2.9	170	17	13
	Niagara 2	Recreation	1935	2.9	243	16	13
	Kolding	Flood control	1972	11.2	1,983	9.8	15

4.3.10.3 RUNOFF POTENTIAL

Land use data were combined with hydrologic soils data to estimate the runoff potential throughout the AOI by estimating the NRCS 24-hour Curve Number (US Department of Agriculture Natural Resources Conservation Service 2004). The metric depends on properties of water infiltration for bare soils after prolonged wetting (of a maximum 24-hour during rainfall) and includes land cover characteristics. Curve Number values provide a relative likelihood of runoff on a scale of 0-100. A high Curve Number value of 100 would indicate an impervious condition, which means all rainfall becomes runoff. Therefore, the higher the Curve Number value, the higher the runoff potential. The NRCS Runoff Curve Number values were estimated and generated in GIS through a previous hydrologic modeling effort (US Army Corps of Engineers 2013).

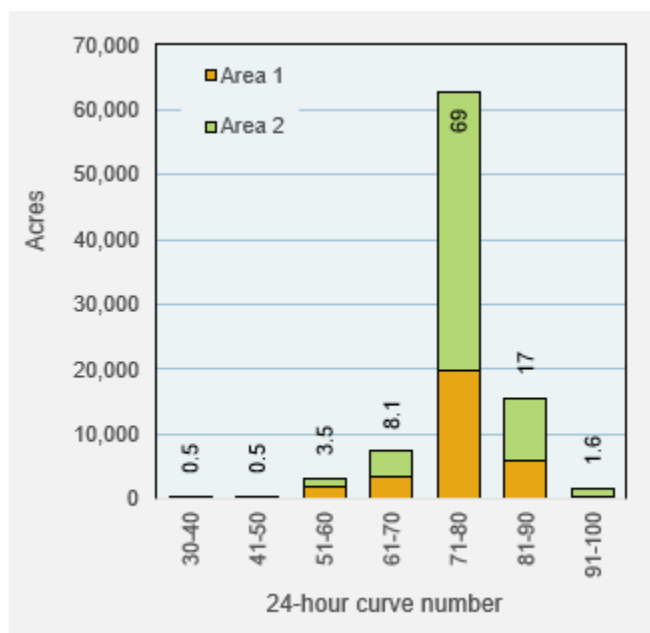
Several modeling efforts have been completed or are currently underway for other projects in the Forest River Watershed. In 2011, the United States Army Corps of Engineers (USACE) along with local sponsors began work on the development of hydrologic models from Halstad, MN, to the international border (including the Forest River Watershed) using HEC-HMS (V.3.5) as part of the Red River of the North Hydrologic Modeling – Phase 2 report (US Army Corps of Engineers 2013). Methods developed as part of the Phase 2 study were aimed at developing a consistent method to analyze hydrology within the Red River Basin while still accounting for unique characteristics within each sub-watershed.

Further development of the hydrologic model was done through the Forest River Watershed Comprehensive Detention Plan (Red River Joint Water Resource District 2013). This effort focused on the development of potential storage sites in the watershed. Through the study, detail was added to the hydrologic model and input parameters were refined through calibration efforts beyond the Phase 2 report.

Additionally, ongoing efforts towards a watershed plan through the Regional Conservation Partnership Program (RCPP) have enabled further refinement of the hydrologic model for the Forest River Watershed. The development of a detailed hydraulic model using the HEC-RAS software was also included as part of the RCPP effort. The hydraulic model is used to generate water surface profiles by hydraulically routing runoff hydrographs by the hydrologic model. The HEC-RAS model extends from Matejcek Dam to the Forest River crossing with US Interstate 29 upstream of the confluence with the Red River of the North.

Review of these Curve Number values indicates for the AOI the majority of soils are within the range of higher than median runoff (87 % of the total land area) and the bracket with the highest proportion of land is numbers between 71-80 % (Area 1: 62%, 19,800 acres; Area 2: 72 %, 43,000 acres; Area 2: 69 %, 78,000 acres) (**Figure 16**) (US Department of Agriculture Natural Resources Conservation Service Soil Survey Staff 2020). This indicates a high proportion of rainfall is converted to surface runoff (**Exhibit 08.2**). Runoff in Area 3 is relatively evenly distributed over the entire range of curve number brackets.

Figure 16: NRCS 24-hour runoff curve number (%) in the Area of Interest (values above bars indicate combined percent).



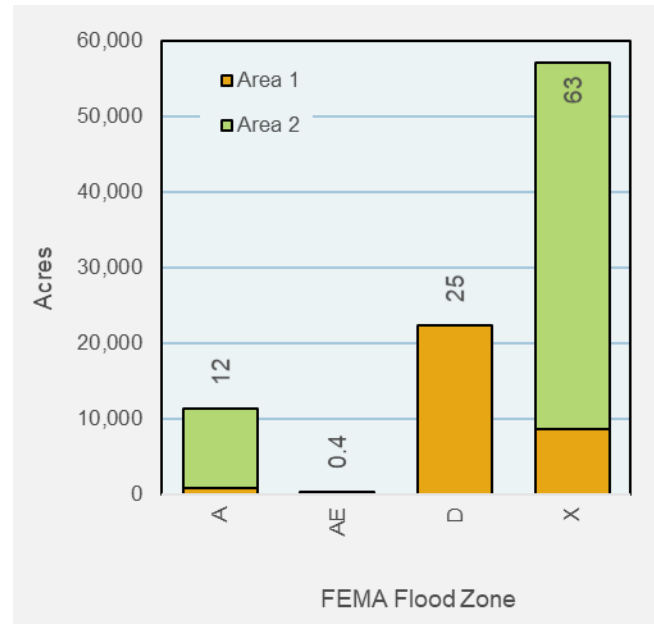
4.3.10.4 FLOODPLAIN MANAGEMENT

Floodplain maps and designations are developed by the Federal Emergency Management Agency (FEMA) for the National Flood Insurance Program (NFIP). The current Flood Insurance Rate Map (FIRM) identifies Special Flood Hazard Areas. The areas subject to inundations by the 1% annual chance flood are designated by zones A, AE, AH, AO AR, A99, V, and VE (Federal Emergency Management Agency 2007). The base flood elevation is the water-surface elevation of the 1% chance flood. Zones are defined by FEMA as follows:

- Zone A: High risk: Areas subject to inundation by the 1 % annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
- Zone AE: High risk: Areas subject to inundation by the 1 % annual-chance flood event determined by detailed methods. BFEs are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
- Zone AH: Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from one to three feet. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
- Zone AO: River or stream flood hazard areas, and areas with a 1 % or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from one to three feet. Average flood depths derived from detailed analyses are shown within these zones.
- Zone AR: Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
- Zone A99: Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
- 0.2% Annual Chance of Flood Hazard: The 0.2 % annual-chance of flood hazard represent areas inundated by a 500-year flood.
- Zones V and VE: These are coastal zones and are not relevant to the AOI.
- Zone D: Undetermined risk: Areas of possible flooding but flood hazard analysis has not been conducted.
- Zone X: Low risk: Areas outside the 100-year flood zone or protected by a levee for a 100-year flood

Over the AOI, most of the land is designated as low risk (Zone X, 63 %) and the next largest category is Zone D, undetermined (25 %) (**Figure 17, Exhibit 08.3**) (FEMA Flood Map Service Center 2012). Areas designated as high risk (Zones A and AE) cover 12 % of the land (5,850 acres). Area 1A has 3 % of land in Zones A/AE (830 acres), Area 2 has 19 % of land in Zones A/AE (5,400 acres). Approximately half of the land in Area 3 is high risk (Zone A, 49 %) but another 51 % is categorized as low risk (Zone X, 520 acres).

Figure 17: FEMA Flood Zone in the Area of Interest (values above bars indicate combined percent).



4.3.11 WATER QUALITY

The Clean Water Act (Section 303(d)) requires states to monitor and evaluate their waters to determine if they meet water quality standards. Waters that do not meet their designated uses due to water quality standard violations are listed as impaired. States are required to monitor total maximum daily load (TMDL) studies and to submit an updated list of impaired waters to the USEPA every two years.

4.3.11.1 NARRATIVE WATER QUALITY STANDARDS

The North Dakota Department of Environmental Quality (NDDEQ) has set narrative water quality standards that apply to all surface waters in the state (NDCC 33-16-02.1-08). The narrative standards pertaining to nutrient impairments are listed below:

- “All waters of the state shall be free from substances attributable to municipal, industrial, or other discharges or agricultural practices in concentrations or combinations which are toxic or harmful to humans, animals, plants, or resident aquatic biota. (NDCC 33-16-02.1-08-1(a) (4)).
- No discharge of pollutants, which alone or in combination with other substances shall:
 - Cause a public health hazard or injury to environmental resources;
 - Impair existing or reasonable beneficial uses of the receiving waters; or
 - Directly or indirectly cause concentrations of pollutants to exceed applicable standards of the receiving waters. (NDCC 33-16-02.1-08-1(e)).”

In addition to the narrative standards, the NDDEQ has set a biological goal for all surface waters in the state. The goal states, “the biological condition of surface waters shall be similar to that of sites or waterbodies determined by the department to be regional reference sites (NDCC 33-16-02.1-08-2(a)).”

4.3.11.2 NUMERIC WATER QUALITY STANDARDS

All lakes classified under the legislative rule in North Dakota are assigned aquatic life, recreation, irrigation, livestock watering, and wildlife beneficial uses (NDCC 33-16-02.1-09, 3.g.(1.) and 3.e.). The ND State Water Quality Standards state that listed lakes and all stream classes use the Class I stream numeric criteria, unless adjusted depending upon the stream class or site-specific requirements. Class I criteria include standards for aluminum, ammonia (total as N), barium, boron, chloride (total), chlorine (residual), dissolved oxygen, nitrate as N^2 , nitrite as N, *E. coli*, pH, phenols, sodium, sulfates (as total SO_4), temperature, radioactivity, and 142 other substances including trace elements and organics. Wetlands and lakes that are not listed use criteria for Class III streams minus the requirements for dissolved oxygen and temperature.

The aquatic resources in the AOI include that are monitored by NDDEQ are the South Branch Forest River, Forest River, Fordville reservoir, and Lake Ardoch (**Exhibit 09.1**). The Forest River is listed as a Class II stream, South Branch Forest River is not listed (and thus follows Class III stream criteria), Fordville Dam reservoir is listed as a Class II lake, and Lake Ardoch is not listed (and thus follows Class IV lake criteria). Selected standards for these are listed in **Table 7** and **Table 8**. Chlorophyll-a is used as an indicator of lake and reservoir water quality during the growing season. The standard for dissolved oxygen is listed as 5.0 mg L^{-1} . This concentration is based on the premise that DO is a measure of the amount of oxygen dissolved in an aqueous solution (water) and aquatic life requires oxygen to respire and support life. The lower the available DO, the less oxygen available and the greater the stress on aquatic life. Prolonged exposure to low DO can cause fish kills, loss of aquatic life, and thus persistent ecosystem degradation. State standards also stipulate this daily minimum does not apply to the hypolimnion of Class III and IV lakes and reservoirs during periods of thermal stratification. The standard for dissolved nitrate as N is 1.0 mg L^{-1} , where up to 10 % of samples may exceed the 1.0 mg L^{-1} . The pH standard stipulates up to 10 % of samples collected during a 3-year period may exceed the range as long as lethal conditions are not present. The sulfate standard is a maximum 450 mg L^{-1} for Forest River and 750 mg L^{-1} for the lakes. The maximum temperature of the water is set at 29.44°C (85°F), or if warmer cannot exceed 2.78°C above background conditions.

Table 7: Numeric standards (selected) applicable for aquatic resources monitored by NDDEQ in the Fordville AOI.

State Water Quality Standard	Forest River	South Branch Forest River	Fordville reservoir	Lake Ardoch
Chlorophyll-a (guideline) April – November	n/a	n/a	$20 \mu\text{g L}^{-1}$	$20 \mu\text{g L}^{-1}$
Dissolved oxygen daily minimum	5.0 mg L^{-1}	n/a	5.0 mg L^{-1}	5.0 mg L^{-1*}
Nitrates (as N^2 or N) maximum	1.0 mg L^{-1}	1.0 mg L^{-1}	1.0 mg L^{-1}	1.0 mg L^{-1}
pH	6.0-9.0	6.0-9.0	7.0-9.0	6.0-9.0
Sulfate (SO_4) 30-day arithmetic average	450 mg L^{-1}	750 mg L^{-1}	250 mg L^{-1}	750 mg L^{-1}
Temperature	29.44°C	n/a	n/a	n/a
* hypolimnion exempt during summer and winter				

Table 8: Numeric standards applicable for North Dakota lakes and reservoirs.

State Water Quality Standard	Parameter	Guidelines	Limit
Numeric standard for Class I streams and classified lakes	Nitrates (dissolved)	1.0 mg L ⁻¹	Maximum allowed ¹
Numeric standard	Dissolved oxygen	5.0 mg L ⁻¹	Daily minimum
Guidelines for goals in a lake improvement or maintenance program	Chlorophyll-a	20 µg L ⁻¹	Goal ²
¹ Up to 10 % of samples may exceed			
² During the growing season of April through November			

The Forest River is categorized as a Class II river. The physical and chemical quality criteria are indicated as shown in **Table 9**.

Table 9: Numeric standards applicable for North Dakota Class II streams.

State Water Quality Standard	Maximum Limit
Chloride	250 mg L ⁻¹ (30-day arithmetic average)
pH	6.0-9.0*
Sodium	60 % of total cations as mEq L ⁻¹
Sulfate (total)	450 mg L ⁻¹ (30-day arithmetic average)
* Up to 10 % of samples collected during any 3-year period may exceed this range provided that lethal conditions are avoided	

4.3.11.3 IMPAIRED WATERS

The NDDH last published water quality data in its 2018 Water Quality Assessment Report (North Dakota Department of Health 2019). Of the 295 public lakes and reservoirs in the state, only 200 are listed specifically in the state's water quality standards as "classified" lakes and therefore are noted as having beneficial uses. The remaining 95 lakes and reservoirs, while included in the state's estimate of total lake acres, are not considered classified waters and thus not assessed.

Section 303(d) of the Clean Water Act of 1972 (CWA) requires states to monitor and assess their waters to determine if they meet water quality standards supporting the beneficial uses they are intended to provide (33 U.S.C. 1313(d)). Waters that do not meet their designated uses due to water quality standard violations are listed as impaired. States are required to develop a list of impaired waters that require total maximum daily load (TMDL) studies and to submit an updated list of impaired waters to the U.S. Environmental Protection Agency (EPA) every two years. The NDDEQ maintains this list of impaired waters for the state of North Dakota.

After the 1992-1993 Lake Water Quality Assessment (North Dakota Department of Health and Consolidated Laboratories 1993), the waters of Fordville Dam were determined to be exceeding the state's total phosphorous concentrations (**Table 10**). After that assessment, the NDDH designated Fordville Dam

(**Table 11**) (North Dakota Department of Health 2005), adjacent stretches of the river downstream (North Dakota Department of Health 2007), and upstream (North Dakota Department of Health 2015) as impaired and requiring TMDL studies. Additionally, harmful algal bloom warnings or advisories were posted from 2016 to 2017.

Table 10: 1992-1993 Lake Water Quality Assessment results for Fordville Dam (Site 381240, deepest site).

Parameter (mg L ⁻¹)	<i>n</i>	Average	Minimum	Maximum	Median
Total phosphorus	3	0.33	0.41	0.18	0.39
Dissolved phosphorus	3	0.28	0.43	0.13	0.03
Total nitrogen	3	1.60	2.41	1.17	1.21
Total Kjeldahl nitrogen	3	1.14	1.95	0.62	0.85
Nitrate/nitrite	3	0.11	0.29	0.01	0.02

Of the streams and lakes assessed within the AOI, Fordville Dam, and a portion of the Forest River, the South branch upstream, and on the main branch downstream are listed as impaired (**Table 11, Exhibit 09.1**). The South Branch Forest River upstream from Fordville Dam has been designated as impaired from 2014 to present. In the 2014, 2016, and 2018 Water Quality Assessment Reports this tributary (ND-09020308-018-S) was shown to support recreation uses but was threatened by the presence of *Escherichia coli* (North Dakota Department of Health 2015, 2017, 2019a). Fordville Dam was listed as impaired between 2004 and 2010, at which time a TMDL study was conducted and approved by the EPA in 2011 (see **Section 4.3.11.4**, North Dakota Department of Health 2011a). The reservoir was designated as fully supporting recreation uses but threatened due to various combinations of sedimentation/siltation, selenium, total dissolved solids, nutrients/eutrophication and biological indicators. Part of the Forest River downstream from Fordville Dam was listed as impaired from 2006-present (North Dakota Department of Health 2005, 2009, 2011b, 2013, 2015, 2017, 2019a). This stretch is located from the confluence of the South Branch to confluence with a tributary 13.04 miles downstream. This part of the river is designated as fully supporting fish and other aquatic biota, but is threatened by a combination of biological indicators, benthic macroinvertebrate bioassessments, fishes bioassessments, and selenium.

Table 11: Impaired waters in the Area of Interest

Waterbody Name	Sampling site no., feature size	Designated use, supports designated use	Water quality report date	Impairment
South Branch Forest River from its confluence with Unnamed tributary watershed (ND-09020308-018-S) downstream to Fordville Dam	ND-09020308-017-S_00, 7.96 miles	Recreation, fully supporting but threatened	2014, 2016, 2018	<i>Escherichia coli</i>
Fordville Dam	ND-09020308-001-L_00, 197 acres	Recreation, fully supporting but threatened	2004	Sedimentation / siltation, selenium, total dissolved solids, nutrients / eutrophication
			2006	Nutrients / eutrophication
			2008, 2010	Nutrients / eutrophication, biological indicators
			September 26, 2011	A TMDL study for nutrients (total phosphorus) was approved by EPA
Forest River from its confluence with South Branch Forest River downstream to its confluence with a tributary near Highway 18	ND-09020308-015-S_00, 13.26 miles	Fish and other aquatic biota, fully supporting but threatened	2006	Biological indicators
			2008, 2010, 2012	Fishes bioassessments
			2014, 2016, 2018	Fishes and benthic-macroinvertebrate bio-assessments, selenium

4.3.11.4 WATER QUALITY RESULTS

Fordville Dam was assessed as a hypereutrophic lake for the purposes of this TMDL assessment, according to data collected at the reservoir (Station 381240) between 2008 and 2010 (**Exhibit 09.1**, North Dakota Department of Health 2011a). Total phosphorus concentrations for the 16 water samples averaged 0.36 mg L⁻¹ and total nitrogen concentrations averaged 1.57 mg L⁻¹ (**Table 12**). Other concentrations include nitrate/nitrite (mean 0.33 mg L⁻¹), chlorophyll-a (mean 38.71 µg L⁻¹), dissolved phosphorus (mean 0.3 mg L⁻¹), and total Kjeldahl nitrogen (mean 1.24 mg L⁻¹). The results of the Secchi disk survey showed a range of visibility of 0.8 to 4.3 m depth with a mean depth of 1.8 m. **Table 13** shows additional data available from the NDDEQ Surface Water Quality Data Portal (North Dakota Department of Environmental Quality 2020). Data for the other three stations nearby (**Exhibit 09.1**) (shallow edge of reservoir (Station 385517), upstream site (Station 385410), and downstream site (Station 385420)) area also available.

Table 12: Summary of TMDL study results at Fordville Dam (Station 381240, deepest site, November 2008 through September 2010).

Parameter	n	Average	Minimum	Maximum	Median
Total Phosphorus (mg L ⁻¹)	16	0.35	0.04	0.92	0.28
Dissolved Phosphorus (mg L ⁻¹)	16	0.3	0.02	0.83	0.23
Total Nitrogen (mg L ⁻¹)	16	1.57	0.87	2.86	1.37
Total Kjeldahl Nitrogen (mg L ⁻¹)	16	1.24	0.42	2.33	1.11
Nitrate/Nitrite (mg L ⁻¹)	16	0.33	0.03	1.63	0.22
Chlorophyll-a (µg L ⁻¹)	12	39	1.5	138	32
Secchi Disk (meters depth)	11	1.8	0.8	4.3	1.3

Table 13: Surface water quality data from North Dakota Department of Environmental Quality at Fordville Dam (deepest part of the reservoir).

Results 2010	unit	Depth (m)	June 29	July 28	August 11	Sept. 27
Turbidity (Secchi disk)	meters	0-3	0.8	1.1	1.6	-
Temperature	°C	0-8	19.32	21.36	21.89	13.58
Dissolved oxygen	mg L ⁻¹	0-3	9.20	8.63	7.30	9.78
		4-11	2.60	1.62	1.88	8.30
Chlorophyll-a	µg L ⁻¹	0.92	32.0	75.0	38.0	44.5
Nitrate-nitrite	mg L ⁻¹	0.5	0.11	<0.03	<0.03	0.05
		4	0.34	<0.03	<0.03	0.04
		7	0.33	<0.03	<0.03	0.05
Ammonia-nitrogen	mg L ⁻¹	0.5	<0.17	<0.17	<0.17	*0.17
		4	0.25	<0.17	0.23	<0.17
		7	0.25	2.15	3.09	<0.17
Phosphorus total	mg L ⁻¹	0.5	0.30	0.36	0.44	0.41
		4	0.30	0.37	0.46	0.40
		7	0.24	1.61	1.86	0.40

The concentrations of nitrate-nitrite exceed the numeric water quality standard (**Table 14**) of 1.0 mg L⁻¹, dissolved oxygen concentrations are above the standard of 5.0 mg L⁻¹, concentrations of chlorophyll-a exceed the standard of 20 µg L⁻¹ (and the ideal concentrations of 17.5 µg L⁻¹ as specified in the TMDL study for protecting and maintaining the reservoir's beneficial uses).

Table 14: Numeric standards applicable for North Dakota lakes and reservoirs

Parameter	ND water quality standards	NDDEQ Fordville Dam data
Nitrates (dissolved)	1.0 mg L ⁻¹	1.57 mg L ⁻¹
Dissolved oxygen	5.0 mg L ⁻¹	10.45 mg L ⁻¹
Chlorophyll-a	20 µg L ⁻¹	38.71 µg L ⁻¹

Based on the Carlson's TSI and water quality data, the Fordville Dam is determined to be a eutrophic to hypereutrophic lake. Weed growth and blue-green algal blooms are characteristics of eutrophic lakes and are undesirable for recreational use. For the purposes of the TMDL report, hypereutrophic lakes do not fully support a sustainable fishery and are limited in recreational uses while eutrophic and mesotrophic lakes fully support aquatic life and recreation use. Eutrophication is defined as the degradation of water quality due to enrichment by nutrients, primarily nitrogen and phosphorus, which results in excessive plant (principally algae) growth and decay, and potentially leads to low DO concentrations. **Table 15** summarizes the phosphorus TMDL results for Fordville Dam in terms of loading capacity, wasteload allocations, load allocations, and a margin of safety (MOS) (North Dakota Department of Health 2011a, data available from North Dakota Department of Environmental Quality 2020).

Table 15: Summary of total phosphorus results for Fordville Dam.

Category	Total phosphorus (kg yr ⁻¹)	Explanation
Existing load	6,610	From observed data
Loading capacity	3,305	50 % total reduction based on BATHTUB modeling.
Wasteload allocation	0	No point sources in the contributing watershed
Load allocation	2,975	Entire loading capacity minus Margin of Safety is allocated to non-point sources
Margin of Safety	331	10 % of the loading capacity (kg yr ⁻¹) is reserved as an explicit margin of safety

A TMDL target is the value that is measured to judge the success of the TMDL pollution reduction effort. TMDL targets are based on state water quality standards and can also include site-specific values when no numeric criteria are specified in the standard. TMDL targets for Fordville Dam are based on the ability of the reservoir to attain and maintain all if its designated beneficial uses; the targets are discussed in Section 3 of the Fordville Dam TMDL report (North Dakota Department of Health 2011a). A 50 % nutrient load reduction target was established for the Fordville Dam watershed. Assuming a 50 % reduction in phosphorus loading will result in a predicted average growing season chlorophyll-a concentration of 17.50 µg L⁻¹, this will protect and maintain Fordville Dam's beneficial uses. The Fordville Dam loading capacity is 3,300 kg yr⁻¹ of total phosphorus. Load capacities are assigned to the non-point source load allocation assuming that there are no point sources in the receiving watershed and there is a 10 % MOS. Based on the TMDL condition, eutrophication has been and continues to be an existing issue in the Fordville Dam reservoir. A 50 % phosphorus reduction would maintain eutrophic conditions at Fordville Dam and increase recreational value.

As mentioned in **Section 4.3.7.5**, the PTMApp determines nutrient and sediment deliveries into the project area. The PTMApp results can be compared to the NDDEQ water quality standards established through the Fordville Dam TMDL report. The PTMApp results show that overland total phosphorus reaching the reservoir is 2,010 kg yr⁻¹. These phosphorus values do not exceed the load capacity (3,305 kg yr⁻¹) established in the Fordville Dam TMDL report.

The North Dakota Game and Fish Department (NDDGFD) has been collecting winter and summer temperatures, conductivity (specific conductance), and dissolved oxygen data at the deepest part of the reservoir since 1991, with the most recent sampling date of August 7, 2019 (see Randy Hiltner, Fisheries Supervisor, NE District, NDGFD for complete methods). The conductivity data show spikes of increased conductivity in the summer samples (**Figure 18**). This likely indicates increasing contribution of dissolved solids into the reservoir and may indicate the presence of discharge or other pollutants. The winter concentrations of dissolved oxygen have been similar over the last 20 years, and the mean concentration fell below the state water quality standard of 5.0 mg L⁻¹ during eight of the years but have not fallen below 3 mg L⁻¹ since 1994 (**Figure 19a**). This indicates the oxygen concentrations have been adequate for sustaining the fish populations through the winter months. The mean summer dissolved oxygen concentrations dropped below 5 mg L⁻¹ in six of the last 20 years (**Figure 19b**), indicating impaired conditions and potential for fish oxygen deprivation.

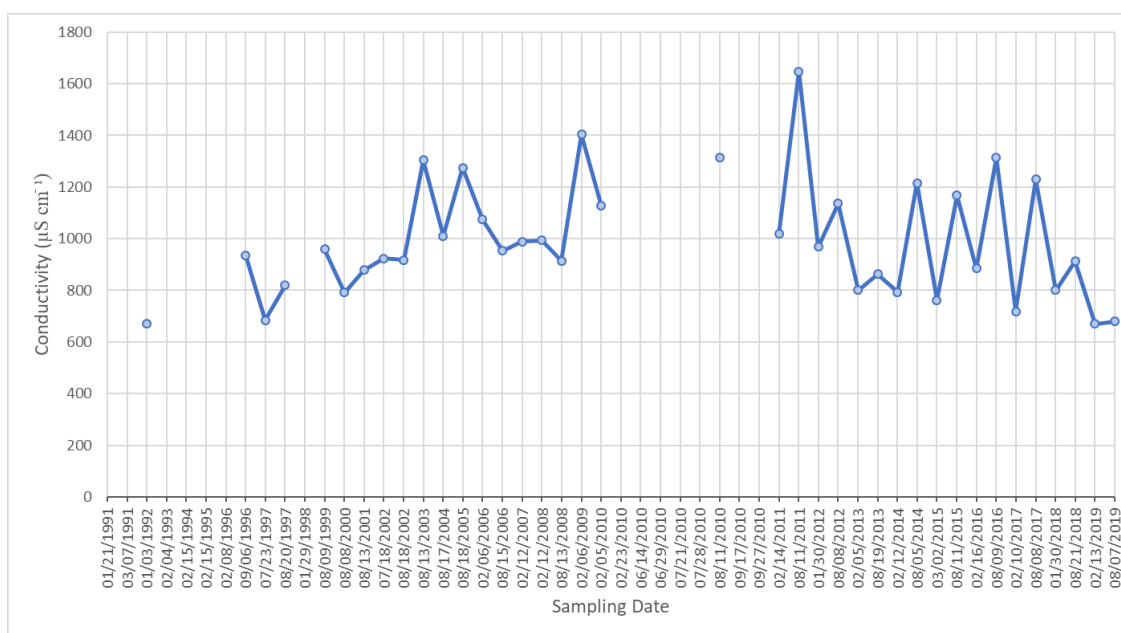


Figure 18: Mean conductivity in the Fordville Dam reservoir (NDGFD data).

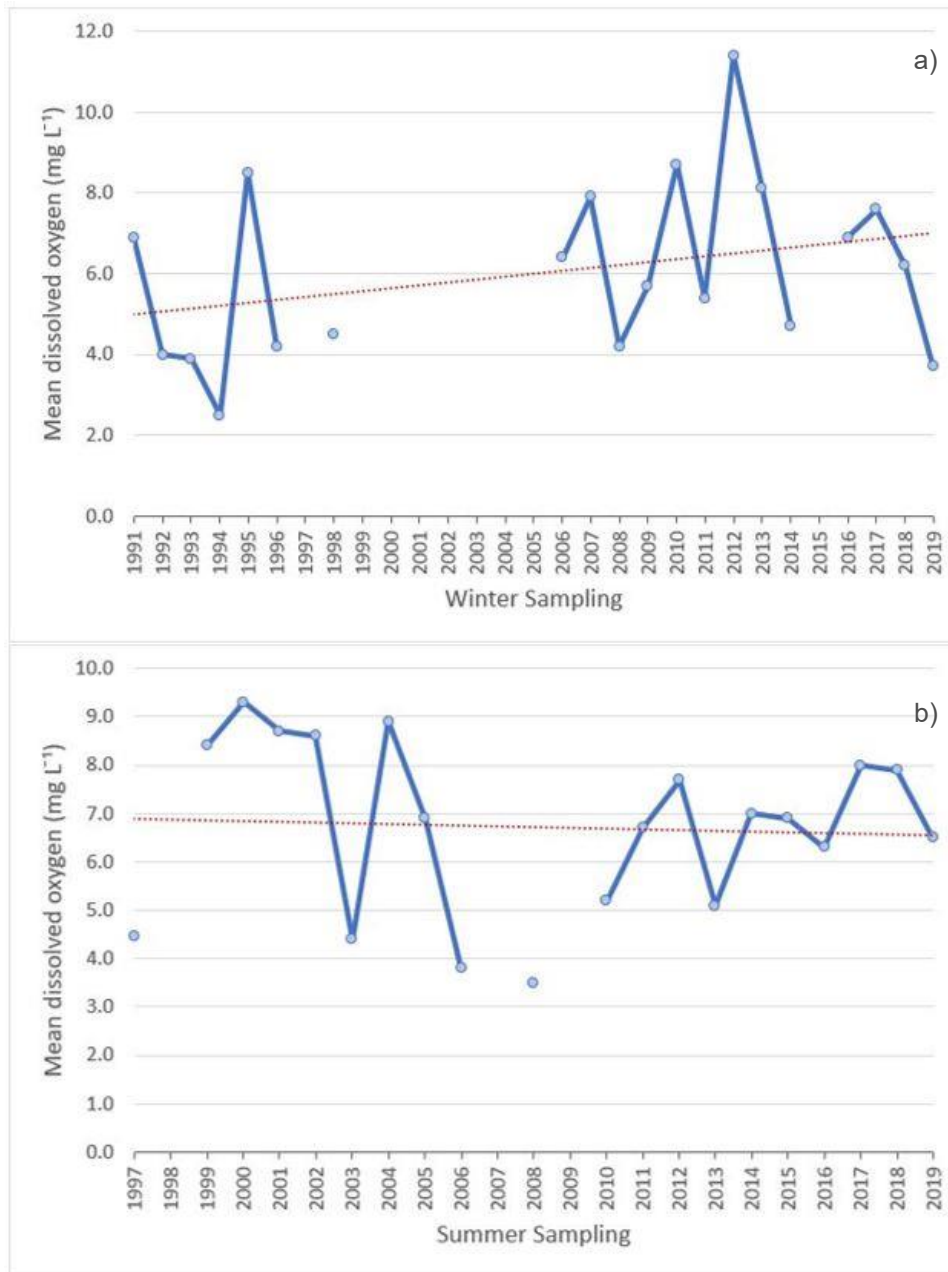


Figure 19: Mean dissolved oxygen concentrations in the Fordville Dam reservoir during the a) winter and b) summer seasons (NDGFD data).

4.3.12 AIR QUALITY

The United States Environmental Protection Agency (USEPA), as directed under the Clean Air Act, set National Ambient Air Quality Standards (AAQS) (40 CFR 50). These standards define six pollutants that contribute to degradation of regional visibility or are considered harmful to the environment and public health: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particle pollution (PM), and sulfur dioxide (SO₂). Nitrous oxide and particulates are the primary pollutants related to agriculture. Specific

locations, Class I areas, are given special protections for air clarity. These areas include locations where there is national or regional natural, scenic, recreational, or historic value.

The NDDEQ Division of Air Quality is responsible for ensuring air quality is maintained in accordance with the levels established by state and federal standards. NDDEQ operates a network of ambient air quality monitoring sites throughout the state. The stations closest to the AOI are in Grand Forks, Grand Forks County and Devils Lake, Ramsey County. No state or federal standards were exceeded according to the North Dakota Ambient Air Quality Monitoring Program 2019 Annual Report (North Dakota Department of Environmental Quality 2019). The AOI is designated to be in attainment or unclassifiable (to be considered in attainment) for all air quality standards.

4.3.13 HABITATS AND PLANT COMMUNITIES

4.3.13.1 HISTORIC COMMUNITIES

The watershed areas are located in two Level III Ecoregions: Northern Glaciated Plains and Lake Agassiz Glacial Plain (North Dakota Game and Fish Department 2016b, North Dakota Information Technology Department 2020) (**Exhibit 02.1, Section 4.3.3**). In the Northern Glaciated Plains ecoregion, most of the land has been converted primarily to farmland, but historic vegetation ranged from tallgrass prairie to short grass prairie and wetland ecosystems. Historic vegetation in the Lake Agassiz Glacial Plain included tallgrass prairie with many wetlands and shrubland and forests. The continental climate and the predominance of rich loamy soils supported tallgrass prairie until agriculture began to dominate from the mid-19th century. Most of the AOI is within the Glacial Lake Agassiz Basin, which is extremely productive for agriculture and thus most of the wetlands and natural areas have been cultivated. The Saline Area is more suitable for pasture or left natural because saline groundwater negatively affects crop production. This area supports salt-tolerant species and many of the wetlands are brackish.

4.3.13.2 CURRENT COMMUNITIES

Within the AOI there are several major plant communities as defined by the NDGFD (North Dakota Game and Fish Department 2016c) and these are described below. These consist of eastern Drift Plains mixed grass prairie, tame grassland, upland forest, riparian forest, and several types of wetlands. Wetlands and rivers are discussed in detail in **Section 4.3.9**. More will be known about specific vegetation communities in the APE once a biological inventory is complete.

Tallgrass prairie: Tallgrass prairie once covered much of the central plains and supports a wide variety of plant and animal species. Most tallgrass prairie has been altered for agriculture and only remnants exist in the AOI. The plant species found historically in this community are shown in **Table 16**.

Table 16: Plant species characteristic of historic tallgrass prairie habitat.

Group	Species
Grasses	<i>Andropogon gerardii</i> (big bluestem), <i>Schizachyrium scoparium</i> (little bluestem), <i>Elymus trachycaulus</i> (slender wheatgrass), <i>Hesperostipa spartea</i> (porcupine grass), <i>Muhlenbergia richardsonis</i> (mat muhly), <i>Panicum virgatum</i> (switchgrass), <i>Sorghastrum nutans</i> (Indian grass), and <i>Sporobolus heterolepis</i> (prairie dropseed)
Sedges	<i>Carex festucacea</i> (fescue sedge), <i>Carex praticola</i> (meadow sedge)
Forbs	<i>Anemone canadensis</i> (meadow anemone), <i>Artemisia ludoviciana</i> (white sage), <i>Drymocallis arguta</i> (prairie cinquefoil), <i>Glycyrrhiza lepidota</i> (wild licorice), <i>Liatris pycnostachya</i> (prairie blazing star), <i>Platanthera praeclara</i> (western prairie-fringed orchid), <i>Rudbeckia hirta</i> (black-eyed Susan), <i>Sisyrinchium montanum</i> (blue-eyed grass), and <i>Solidago altissima</i> (tall goldenrod)

Eastern Drift Plains mixed grass prairie: The mixed grass prairie is the transitional area between the tallgrass prairie (wetter) and the shortgrass prairie (drier). The mixed grass prairie includes many grasses and other graminoids, in addition to a variety of trees and shrubs (**Table 17**) and contains many wetland basins. This community also has been reduced significantly by agriculture and ranching practices.

Table 17: Plant species characteristic of historic eastern (Drift Plains) mixed grass habitat (historic).

Group	Species
Grasses	Prairie junegrass, green needlegrass, needle-and-thread, blue grama, little bluestem, western wheatgrass, Canada wild rye, spike oats, big sandgrass, porcupine grass, mat muhly, side-oats grama, Leiberg's panicum
Sedges	Yellow sedge, needleleaf sedge, threadleaf sedge
Forbs	Pasque flower, western wallflower, torch flower, prairie rose, Missouri milkvetch, purple loco, lead plant, Indian breadroot, purple prairie-clover, gaura, hairy puccoon, harebell, stiff goldenrod, smooth fleabane, purple coneflower, upland wormwood, fringed sage

Tame grassland: The tame grassland communities are characterized as returning previously converted tilled land back into grassland. Alfalfa is the most common hay crop, but tame grassland also includes typically *Bromus inermis* (brome grass) (**Table 18**). Much of the land area had been enrolled in the Conservation Reserve Program (CRP), which entails seeding the land with grass species. Walsh county and Nelson county had 100,001-150,000 acres of CRP in 2008 and 25,001-50,000 in 2018 (US Department of Agriculture 2018). Grand Forks County has held steady within the 50,001-100,000 acres range from 2008 to 2018.

Table 18: Plant species characteristic of tame grassland habitat

Group	Species
Grasses	Smooth brome, crested wheatgrass, intermediate wheatgrass, tall wheatgrass, big bluestem
forbs	Alfalfa, sweet clover

Upland forest: This community, which includes deciduous and coniferous forests, wooded shrubland, riparian forests, and rural tree plantings, is scattered throughout the state and is relatively rare (4 % of total land). Of the forests in North Dakota, most are deciduous (98 %, **Table 19**) and larger tracts are found in the Pembina Gorge, Turtle Mountains, Devils Lake Hills, and the Killdeer Mountains.

Table 19: Plant species characteristic of upland deciduous forest habitat

Group	Species
Trees / shrubs	Bur oak, green ash, quaking aspen, balsam poplar, paper birch, American hazelnut, black currant, Missouri gooseberry, red raspberry, Saskatoon serviceberry, hawthorn, prickly rose, pin cherry, choke cherry
Forbs	False lily-of-the valley, early meadowrue, yellow avens, pink wood violet, wild sarsaparilla, dwarf cornel, pink wintergreen, arrowleaf aster

Riparian Forest: Riparian forest occurs at the interface between a river, stream, or tributary and drier land. The soils and vegetation here are strongly influenced by the presence of water and this results in a distinct plant community (**Table 20**). Although federal law does not specifically regulate riparian areas, it is the policy of NRCS to integrate management of riparian areas into all plans and alternatives (190-GM, Part 411). As observed through aerial photography, scattered riparian areas exist in the western reaches of the South Branch of the Forest River, upstream of Fordville Dam in Area 1. Scattered wooded areas continue east of the Fordville Dam to its confluence with the mainstem Forest River. Along the Forest River, the abundance of tree cover forms a nearly continuous corridor downstream to the city of Minto. Between Minto and Lake Ardoch the riparian corridor is sparse due to the historic river channel movement and agricultural practices. Within the boundary of Area 3, there are 71 acres of freshwater forested / shrub wetlands listed by NWI, but there may be more (see **Section 4.3.9.2, Figure 14b**). A significant area of riparian forest was lost after the completion of the dam and flooding of the valley. **Figures 20a and b** show aerial photographs from 1962 and present day (North Dakota Department of Agriculture 2017).

Table 20: Plant species characteristic of riparian forest habitat

Group	Species
Trees / shrubs	Cottonwood, American elm, green ash, box elder, bur oak, basswood, hackberry, peachleaf willow, hophornbeam, prickly ash, Missouri gooseberry, black currant, buckthorn, nannyberry green ash and elm trees
Grasses	Virginia wild rye, nodding muhly
Sedges / rushes	Charming sedge, Sprengel's sedge
Forbs	Jack-in-the-pulpit, wood leek, large bellwort, false Solomon's seal, Solomon's seal, nodding trillium, carrion flower, tall nettle, wood nettle, wild four-o'clock, baneberry, wild ginger, columbine, kidneyleaf buttercup, tall meadowrue, bloodroot, yellow wood violet, pink wood violet, white avens, sweet cicely, wild sarsaparilla, honeywort, waterleaf, yellow wood parsnip, fringed loostripe, tall coneflower



Figure 20a and b: The Fordville Dam in a) 1962, approximately sixteen years before construction was completed, and b) present-day.

Wetlands and lakes: Prior to development, North Dakota had an estimated 4.9 million acres of wetlands (Dahl 2014). Today, that number has been reduced by nearly 42 % (2.8 million acres of wetlands). North Dakota is dominated by temporary emergent and seasonally emergent wetland types. Because wetlands are dynamic and, in many cases, dependent upon precipitation, they can be susceptible to tilling during drier years and are threatened by drainage in wetter years. Lakes are susceptible to non-point source

pollution, predominantly from agriculture. In spite of this, wetlands are critical for filtering and storing water, and for supporting habitat for animal populations and plant communities (**Table 21**). The North Dakota Rapid Assessment Method (NDRAM) was used to assess wetland condition in North Dakota (DeKeyser et al. 2014 in North Dakota Department of Health 2019). Of the wetlands present in North Dakota, 14 % (302,000 acres) were determined to be in good condition, 62 % (1.3 million acres) in fair condition, and 24 % (514,000 acres) in poor condition. Hardening, damming, filling, and ditching are four stressors associated with impacts to wetland hydrology. Hardening is any activity that leads to soil compaction to a wetland basin or wetland buffer, and this threatens 1.2 million acres (59 % of the remaining wetlands). The majority of wetlands in North Dakota were identified as having a low risk for damming, ditching, and filling. High risk wetlands for damming, ditching, and filling were estimated at 9 % (192,000 acres) for damming, 16 % (345,000 acres) for filling, and 27 % (585,000 acres) for ditching.

Wetlands cover 5 % (4,800 acres) of the project AOI. Area 1 and 2 are dominated by freshwater emergent wetlands covering 1,350 acres and 1,600 acres within the AOI. Area 3 (Dam Zone) is dominated by lakes (58 %, 196 acres) while freshwater forested/shrub wetlands (21 %, 71 acres) and freshwater emergent wetlands (18 %; 60 acres) comprise the remainder (see **Section 4.3.9.2**).

Table 21: Plant species characteristic of wetland and lake habitats

Group	Species
Grasses	Fine-textured grasses, northern reedgrass, prairie cordgrass, phragmites, tall mannagrass, whitetop, sloughgrass
Sedges / rushes / cattails	Narrow-leaf cattail, hybrid cattail, slender sedge, slough sedge, common spikerush, hardstem bulrush, river bulrush, slender bulrush, Baltic rush, softstem bulrush, water sedge
Forbs	Marsh smartweed, narrow leaf dock, western dock, marsh cress, silverweed, rough cinquefoil, lance leaf loostrike, clasping leaf dogbane, germander, marsh hedge nettle, western water horehound, wild mint, giant bur reed, narrowleaf water plantain, western water plantain, water parsnip
Trees / shrubs	Sandbar willow
Aquatic	Sago pondweed, horned pondweed, grass-leaf pondweed, coontail, common watermilfoil, common bladderwort, musk grass, white water crowfoot, western wigeon grass

4.3.14 FISH AND WILDLIFE

4.3.14.1 GENERAL FISH AND WILDLIFE

A large variety of animals potentially occupy the AOI and these include the taxonomic groups of birds, mammals, fish, reptiles, amphibians, and various invertebrates (**Tables 22-28**). More will be known about specific animal species present in the APE once a biological inventory is complete.

Portions of the Forest River have been designated for “fish and other aquatic biota” uses (North Dakota Department of Health 2019). Some of these stretches are currently impaired (see **Table 11**, **Section 4.3.11.3**, **Exhibit 09.1**). Fish species found in the Forest River Watershed include typical communities of warm water streams and many species occurring in the connected waters of the Red River of the North drainage area. There are 51 typical fish species present within the North Dakota portion of the Red River Basin, 27 fish species have been identified characteristic to the Forest River (**Table 25**) (Goldstein 1995). Even though there are many lakes in North Dakota, as of 2018 there have been no thorough fish population assessments done by fisheries biologists (North Dakota Game and Fish Department 2018b). The Fordville

Dam reservoir is populated with walleye, yellow perch, northern pike, black crappie, largemouth bass, bullhead catfish.

Table 22: Animals characteristic of tallgrass prairie habitat.

Group	Species
Birds	Mallard, blue-winged teal, red-tailed hawk, American kestrel, ring-necked pheasant, killdeer, eastern kingbird, western kingbird, American crow, common yellowthroat, clay-colored sparrow, vesper sparrow, savannah sparrow, Henslow's sparrow, western meadowlark, brown-headed cowbird
Mammals	Northern short-tailed shrew, white-tailed jackrabbit, snowshoe hare, Franklin's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, plains pocket gopher, western harvest mouse, deer mouse, northern grasshopper mouse, prairie vole, meadow vole, meadow jumping mouse, western jumping mouse, coyote, red fox, raccoon, badger, striped skunk, white-tailed deer, moose
Reptiles / amphibians	American toad, Great Plains toad, northern leopard frog, chorus frog, tiger salamander, plains garter snake, common garter snake

Table 23: Animals characteristic of eastern mixed grass (Drift Plains) and tame grassland habitat.

Group	Species
Birds	American wigeon, green-winged teal, mallard, blue-winged teal, Northern shoveler, gadwall, lesser scaup, red-tailed hawk, American kestrel, gray partridge, ring-necked pheasant, spotted sandpiper, killdeer, mourning dove, common nighthawk, western kingbird, western kingbird, horned lark, American crow, eastern bluebird, common yellowthroat, clay-colored sparrow, vesper sparrow, savannah sparrow, western meadowlark, brown-headed cowbird
Mammals	Northern short-tailed shrew, white-tailed jackrabbit, snowshoe hare, Franklin's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, olive-backed pocket mouse, western harvest mouse, deer mouse, northern grasshopper mouse, prairie vole, meadow vole, meadow jumping mouse, western jumping mouse, coyote, red fox, raccoon, badger, striped skunk, white-tailed deer, moose
Reptiles / amphibians	American toad, Great Plains toad, Woodhouse's toad, Northern leopard frog, chorus frog, tiger salamander, plains garter snake, common garter snake

Table 24: Animals characteristic of upland deciduous forest habitat.

Group	Species
Birds	Turkey vulture, sharp-shinned hawk, Cooper's hawk, broad-winged hawk (Turtle Mountains), red-tailed hawk, American kestrel, merlin, ruffed grouse, wild turkey, mourning dove, great horned owl, eastern screech owl, long-eared owl, common nighthawk, ruby-throated hummingbird, yellow-bellied sapsucker, downy woodpecker, hairy woodpecker, yellow-shafted flicker, western wood pewee, eastern wood-pewee, yellow-bellied flycatcher, willow flycatcher, least flycatcher, great crested flycatcher, purple martin, tree swallow, blue jay, black-billed magpie, common crow, black-capped chickadee, white-breasted nuthatch, brown creeper, house wren, golden-crowned kinglet, ruby-crowned kinglet, eastern bluebird, veery, wood thrush, American robin, gray catbird, brown thrasher, cedar waxwing, yellow-throated vireo, warbling vireo, Philadelphia vireo, red-eyed vireo, yellow warbler, chestnut-sided warbler, yellow-rumped warbler, American redstart, black-and-white warbler, ovenbird, northern waterthrush, mourning warbler, common yellowthroat, migratory warblers, scarlet tanager, rose-breasted grosbeak, black-headed grosbeak, lazuli bunting, indigo bunting, spotted towhee, eastern towhee, chipping sparrow, lark sparrow, clay-colored sparrow, song sparrow, common grackle, brown-headed cowbird, orchard oriole, Bullock's oriole, Baltimore oriole, pine siskin, American goldfinch, evening grosbeak
Mammals	Little brown bat, silver-haired bat, big brown bat, eastern red bat, hoary bat, eastern cottontail, woodchuck, eastern chipmunk, gray squirrel, fox squirrel, northern flying squirrel, beaver, white-footed mouse, southern red-backed vole, meadow vole, meadow jumping mouse, western jumping mouse, porcupine, coyote, red fox, gray fox, raccoon, American marten, ermine, long-tailed weasel, least weasel, bobcat, elk, mule deer, white-tailed deer
Reptiles / amphibians	American toad, gray tree frog, wood frog, common garter snake, plains garter snake

Table 25: Fish characteristic of the Forest River (Goldstein 1995).

Group	Species
Fish	<i>Ambloplites rupestris</i> (rock bass), <i>Ameiurus melas</i> (black bullhead), <i>A. nebulosus</i> (brown bullhead), <i>Aplodinotus grunniens</i> (freshwater drum), <i>Carpiodes cyprinus</i> (quillback), <i>Catostomus commersonii</i> (white sucker) <i>Culaea inconstans</i> (brook stickleback), <i>Cyprinus carpio</i> (carp), <i>Esox lucius</i> (northern pike), <i>Etheostoma nigrum</i> (Johnny darter), <i>Ictalurus punctatus</i> (channel catfish), <i>Ictiobus cyprinellus</i> (bigmouth buffalo), <i>Luxilus cornutus</i> (common shiner), <i>Notropis blennioides</i> (river shiner), <i>Notropis stramineus</i> (sand shiner), <i>Noturus gyrinus</i> (adpole madtom), <i>Perca flavescens</i> (yellow perch), <i>Percina maculata</i> (blackside darter), <i>Percopsis omiscomaycus</i> (trout-perch), <i>Pimephales notatus</i> (bluntnose minnow), <i>Pimephales promelas</i> (fathead minnow), <i>Pomoxis nigromaculatus</i> (black crappie), <i>Rhinichthys atratulus</i> (blacknose dace), <i>R. cataractae</i> (longnose dace), <i>Sander canadensis</i> (sauger), <i>S. vitreus</i> (walleye), and <i>Semolilus atromaculatus</i> (creek chub)

Table 26: Fish characteristic of Fordville Dam (deepwater habitat, lake), stocked and wild species.

Group	Species
Fish	Walleye, yellow perch, northern pike, black crappie, largemouth bass, bullhead catfish

Table 27: Animals characteristic of riparian forests.

Group	Species
Birds	Wood duck, mallard, hooded merganser, common merganser, turkey vulture, osprey, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, American kestrel, ring-necked pheasant, wild turkey, American woodcock, mourning dove, yellow-billed cuckoo, great horned owl, eastern screech owl, barred owl, long-eared owl, common nighthawk, chimney swift, ruby-throated hummingbird, yellow-bellied sapsucker, downy woodpecker, hairy woodpecker, yellow-shafted flicker, pileated woodpecker, Western wood pewee, eastern wood-pewee, yellow-bellied flycatcher, willow flycatcher, least flycatcher, eastern flycatcher, great crested flycatcher, purple martin, tree swallow, northern rough-winged swallow, bank swallow, cliff swallow, blue jay, black-billed magpie, common crow, black-capped chickadee, white-breasted nuthatch, brown creeper, house wren, eastern bluebird, veery, wood thrush, American robin, gray catbird, brown thrasher, cedar waxwing, Bell's vireo, yellow-throated vireo, warbling vireo, Philadelphia vireo, red-eyed vireo, yellow warbler, yellow-rumped warbler, American redstart, ovenbird, northern waterthrush, common yellowthroat, migratory warblers, scarlet tanager, rose-breasted grosbeak, black-headed grosbeak, lazuli bunting, indigo bunting, spotted towhee, eastern towhee, chipping sparrow, lark sparrow, clay-colored sparrow, song sparrow, common grackle, brown-headed cowbird, orchard oriole, Bullock's oriole, Baltimore oriole, American goldfinch
Mammals	Little brown bat, silver-haired bat, big brown bat, eastern red bat, hoary bat, eastern cottontail, woodchuck, eastern chipmunk, gray squirrel, fox squirrel, northern flying squirrel, beaver, white-footed mouse, southern red-backed vole, meadow vole, meadow jumping mouse, western jumping mouse, porcupine, coyote, red fox, gray fox, raccoon, American marten, ermine, long-tailed weasel, least weasel, bobcat, elk, mule deer, white-tailed deer
Reptiles / amphibians	Woodhouse's toad, Great Plains toad, gray tree frog, northern leopard frog, tiger salamander, common mudpuppy, common garter snake, plains garter snake, painted turtle

Table 28: Animals (breeding) characteristic of wetlands and lakes.

Group	Species
Birds	Common loon, pied-billed grebe, red-necked grebe, eared grebe, western grebe, double-crested cormorant, great blue heron, great egret, black-crowned night heron, white-faced ibis, Canada goose, wood duck, green-winged teal, mallard, blue-winged teal, northern shoveler, gadwall, American wigeon, ring-necked duck, lesser scaup, common goldeneye, hooded merganser, ruddy duck, Virginia rail, sora, American coot, killdeer, spotted sandpiper, Wilson's snipe, ring-billed gull, California gull, common tern, Forster's tern, belted kingfisher, willow flycatcher, tree swallow, northern rough-winged swallow, bank swallow, cliff swallow, marsh wren, yellow warbler, common yellowthroat, yellow-breasted chat, savannah sparrow, song sparrow, swamp sparrow, red-winged blackbird, yellow-headed blackbird, brown-headed cowbird
Mammals	Beaver, muskrat, otter
Reptiles / amphibians	American toad, Great Plains toad, Woodhouse's toad, gray treefrog, chorus frog, wood frog, northern leopard frog, tiger salamander, common mudpuppy, painted turtle, common garter snake, plains garter snake

The NDGFD oversees fisheries information for the state. The Fisheries Supervisor in Devils Lake, Randy Hiltner, provided information regarding Fordville Dam and vicinity. The Fordville Dam was originally stocked with northern pike, largemouth bass, walleye, and black crappie. Today the reservoir is stocked primarily with northern pike and walleye on an alternate yearly basis. There are occasional largemouth bass and black crappie stockings (R. Hiltner pers. comm.). Fishing pressure is present for both ice fishing and open-water seasons. No winter fish kills have been reported at the reservoir. There are no critical fisheries in the vicinity of the dam and there are no management plans for the dam or for the Forest River.

Researchers at Valley City State University, who are contracted by the NDGFD to conduct stream sampling in the Forest River, provided data from a fish survey in 2018 (Dr. C. Williams pers. comm.). Three sampling sites locations were within eight linear miles of the Fordville Dam. Fish were identified and counted (methods included shocking and seining) on May 29, 2018. Data are provided here from three locations in the Forest River (**Exhibit 10.1**). **Table 29** shows the species and counts for each location. Observations from a site on the Forest River (Site 1), approximately eight linear miles from Fordville Dam, showed 14 species, the most abundant being *Semotilus spp.* (creek chubs) and *Rhinichthys cataractae* (longnose dace). The survey found a few individuals of *Nocomis biguttatus* (hornyhead chub), a Level III species of concern, once common but now only found in North Dakota in the Forest and Park Rivers (North Dakota Game and Fish Department 2016d). This declining distribution is attributed to land use practices, water control structures, and degraded riparian and stream habitat.

Table 29: Fish species and abundance in the downstream vicinity of Fordville Dam, site numbers refer to VCSU sampling locations 2018 (see **Exhibit 10.1**).

Latin name	Common name	Site 1	Site 2	Site 3
number of individuals observed				
<i>Catostomus commersonii</i>	white sucker	38	138	2
<i>Culaea inconstans</i>	brook stickleback	14	1	0
<i>Etheostoma nigrum</i>	Johnny darter	41	10	3
<i>Lepomis macrochirus</i>	bluegill	3	17	14
<i>Luxilus cornutus</i>	common shiner	72	6	26
<i>Nocomis biguttatus</i>	hornyhead chub	3	0	4
<i>Notropis dorsalis</i>	bigmouth shiner	19	0	21
<i>Noturus gyrinus</i>	tadpole madtom	3	2	0
<i>Percina maculata</i>	blackside darter	2	2	7
<i>Pimephales notatus</i>	bluntnose minnow	3	0	1
<i>Pimephales promelas</i>	fathead minnow	15	97	6
<i>Pomoxis nigromaculatus</i>	black crappie	0	1	0
<i>Rhinichthys atratulus</i>	blacknose dace	10	2	6
<i>Rhinichthys cataractae</i>	longnose dace	321	20	113
<i>Semotilus spp.</i>	creek chub	106	136	72

4.3.14.2 MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) makes it unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. Provisions are in place for the protection of migratory bird, part, nest, egg, or product. Under the MBTA, “migratory birds” essentially include all birds native to the U.S.; and the law pertains to any time of the year, not just during migration.

North Dakota is located within the Central Flyway, one of the major migration paths in North America. Migratory birds may occur in the AOI during spring and fall migration, as well using the area as breeding

and nesting grounds through the summer. Three-hundred seventy-five bird species can be seen in the state (North Dakota Game and Fish Department 2016e). Because the AOI is located within the Prairie Pothole Region, the area has additional importance to waterfowl species. According to the Information for Planning and Consultation system of the US Fish and Wildlife Service (USFWS) (US Fish and Wildlife Service 2020b), migratory bird species of concern (USFWS Birds of Conservation Concern list) that may be in the project vicinity and may be affected by activities in the AOI are listed in **Table 30**. Waterfowl that have been observed in either Grand Forks County or Walsh County and may also be present in the planning area include snow goose, Ross's goose, greater white-fronted goose, cackling goose, Canada goose, trumpeter swan, tundra swan, wood duck, blue-winged teal, northern shoveler, gadwall, American wigeon, mallard, American black duck, northern pintail, canvasback, redhead, ring-necked duck, greater scaup, lesser scaup, surf scoter, white-winged scoter, bufflehead, common goldeneye, hooded merganser, common merganser, red-breasted merganser, ruddy duck, pied-billed grebe, horned grebe, red-necked grebe, eared grebe, and western grebe (Cornell Lab of Ornithology 2019).

Table 30: Migratory bird species of concern (not full list of all birds that may occur).

Species name	Breeding season	Species name	Breeding season
American bittern	Apr 1 to Aug 31	Marbled godwit	May 1 to Jul 31
American golden-plover	Breeds elsewhere	Nelson's sparrow	May 15 to Sept 5
Bald eagle	Dec 1 to Aug 31	Red-headed woodpecker	May 10 to Sept 10
Black tern	May 15 to Aug 20	Ruddy turnstone	Breeds elsewhere
Black-billed cuckoo	May 15 to Oct 10	Semipalmated sandpiper	Breeds elsewhere
Bobolink	May 20 to Jul 31	Short-billed dowitcher	Breeds elsewhere
Franklin's gull	May 1 to Jul 31	Willet	Apr 20 to Aug 5
Golden eagle	Jan 1 to Aug 31	Yellow rail	May 15 to Sept 10
Lesser yellowlegs	Breeds elsewhere		

4.3.14.3 BALD AND GOLDEN EAGLES

The Bald and Golden Eagle Protection Act (16 USC § 668-668c) provides for the protection of bald and golden eagles by prohibiting the taking, possession, and commerce of such birds, except under certain specified conditions. USFWS issues permits to take, possess, and transport bald and golden eagles. There is potential for nests in the project vicinity. This information will be determined by the North Dakota Game and Fish Department.

4.3.15 THREATS TO ECOLOGICAL SYSTEMS

4.3.15.1 GENERAL THREATS

There are numerous threats to ecological systems in the region affecting plant communities and animal populations. Most of these threats are due, either directly or indirectly, to human activity and impact on land use. Threats to organisms and habitats have been listed in the North Dakota State Wildlife Action Plan (Dyke et al. 2015) and the categories include residential and commercial development, agriculture, energy production and mining, transportation and service corridors, biological resource use, human intrusions and disturbance, natural system modification, invasives and other problematic species, pollution, geological events, climate change and severe weather, among others. NRCS policy (190-GM, Part 414) follows the requirements of the Executive Order 13112 (Invasive Species, February 3, 1999), which directs federal agencies to "prevent the introduction of invasive species, provide for their control, and to minimize the

economic, ecological, and human health impacts that invasive species cause.” Projects that are associated with NRCS also require “No action be authorized, funded, or carried out that is believed to or is likely to cause or promote the introduction or spread of invasive species in the US or elsewhere.”

4.3.15.2 LAND USE THREATS

Specific threats noted for the AOI include poor water quality in the Fordville reservoir likely resulting from intensive agricultural practices (tilling, erosion, chemical treatments) (**Exhibit 03.1**). Other threats include riparian forest and wetland loss. Prior to development, North Dakota had an estimated 4.9 million acres of wetlands (Dahl 2014). Today, that number has been reduced by nearly 42 % (2.8 million acres of wetlands). North Dakota is dominated by temporary emergent and seasonally emergent wetland types. Because wetlands are dynamic and, in many cases, dependent upon precipitation, they can be susceptible to tilling during drier years and are threatened by drainage in wetter years. Lakes are susceptible to non-point source pollution, predominantly from agriculture. In terms of ecosystem services, wetlands are critical for filtering and storing water, and for supporting habitat for animal populations and plant communities (**Table 21**). The North Dakota Rapid Assessment Method (NDRAM) was used to assess wetland condition in North Dakota (DeKeyser et al. 2014 in North Dakota Department of Health 2019). Of the wetlands present in North Dakota, 14 % (302,000 acres) were determined to be in good condition, 62 % (1.3 million acres) in fair condition, and 24 % (514,000 acres) in poor condition. Hardening, damming, filling, and ditching are four stressors associated with impacts to wetland hydrology. Hardening is any activity that leads to soil compaction to a wetland basin or wetland buffer, and this threatens 1.2 million acres (59 % of the remaining wetlands). Most wetlands in North Dakota were identified as having a low risk for damming, ditching, and filling. High risk wetlands for damming, ditching, and filling were estimated at 9 % (192,000 acres) for damming, 16 % (345,000 acres) for filling, and 27 % (585,000 acres) for ditching.

4.3.15.3 NON-NATIVE / INVASIVE SPECIES

In addition to noxious weeds and invasive plant species, there are other organisms which are problematic, including invasive animal species and pathogens. There are fourteen noxious weeds identified for North Dakota (Lym and Travnicek 2015). The counties of the watershed areas have additional designated noxious weeds within their jurisdictions (North Dakota Department of Agriculture 2019) (**Table 31**). There are many other species of non-native plants in North Dakota, some of which are invasive or a nuisance to landowners (**Table 32**, Lym 2018). According to the NDGFD, *Dreissena polymorpha* (zebra mussels) are present within the entire length of the Red River and tributaries (North Dakota State University 2016). *D. polymorpha* may be present in the lower reaches of the Forest River but may not be present within the study area. *Ophiostoma ulmi* and *Ophiostoma novo-ulmi* (Dutch elm disease) has been confirmed within every county and is likely present within the AOI (LeBoldus et al. 2016).

Table 31: North Dakota state and county listed noxious weeds (as of May 2019).

Location	Species
Statewide	<i>Artemisia absinthium</i> (absinth wormwood), <i>Amaranthus palmeri</i> (palmer amaranth), <i>Carduus nutans</i> (musk thistle), <i>Centaurea diffusa</i> (diffuse knapweed), <i>Centaurea maculosa</i> (spotted knapweed), <i>Centaurea repens</i> (Russian knapweed), <i>Cirsium arvense</i> (Canada thistle), <i>Cynoglossum officinale</i> (houndstongue), <i>Euphorbia esula</i> (leafy spurge), <i>Linaria genistifolia</i> subsp. <i>dalmatica</i> (Dalmatian toadflax), <i>Linaria vulgaris</i> (yellow toadflax), <i>Lythrum salicaria</i> , <i>Lythrum virgatum</i> , and all cultivars (purple loosestrife), <i>Tamarisk</i> spp. (salt cedar)
Cavalier County	<i>Matricaria recutita</i> (false chamomile), <i>Tanacetum vulgare</i> (common tansy)
Grand Forks County	<i>Bassia scoparia</i> (kochia)
Nelson County	<i>Sonchus arvensis</i> (perennial sow thistle)
Ramsey County	<i>Sonchus oleraceus</i> (annual sow thistle), <i>Matricaria recutita</i> (false chamomile)
Walsh County	<i>Matricaria recutita</i> (false chamomile)

Table 32: Troublesome non-native plant species in North Dakota (Lym 2018, * other species).

Species name	Species name
<i>Acroptilon repens</i> (Russian knapweed)	<i>Halogeton glomeratus</i> (halogeton -sandy areas)
<i>Amaranthus palmeri</i> (Palmer amaranth)	<i>Hieracium aurantiacum</i> (orange hawkweed)
<i>Arctium minus</i> (common burdock)	<i>Hyoscyamus niger</i> (black henbane)
<i>Artemisia absinthium</i> (absinth wormwood)	<i>Linaria dalmatica</i> (dalmatian toadflax)
<i>Asclepias syriaca</i> (common milkweed)	<i>Linaria vulgaris</i> (yellow toadflax)
<i>Bassia prostrata</i> (kochia)	<i>Lythrum salicaria</i> (purple loosestrife)
<i>Bromus tectorum</i> (downy brome)	<i>Matricaria recutita</i> (false chamomile)
<i>Cardaria draba</i> (hoary cress)	<i>Onopordum acanthium</i> (Scotch thistle)
<i>Carduus acanthoides</i> (plumeless thistle)	<i>Sonchus arvensis</i> (perennial sow thistle)
<i>Carduus nutans</i> (musk thistle)	<i>Sonchus arvensis</i> ssp. <i>Uliginosus</i> (marsh sow thistle)
<i>Centaurea diffusa</i> (diffuse knapweed)	<i>Sonchus asper</i> (spiny sow thistle)
<i>Centaurea solstitialis</i> (yellow star thistle)	<i>Sonchus oleraceus</i> (annual sow thistle)
<i>Centaurea stoebe</i> spp. <i>micranthos</i> (spotted knapweed)	<i>Tamarix</i> spp. (saltcedar)
<i>Cirsium arvense</i> (Canada thistle)	<i>Tanacetum vulgare</i> (common tansy)
<i>Cirsium vulgare</i> (bull thistle)	<i>Verbascum thapsus</i> (common mullein)
<i>Convolvulus arvensis</i> (field bindweed)	<i>Melilotus officinalis</i> *
<i>Crepis tectorum</i> (narrowleaf hawksbeard)	<i>Phalaris arundinacea</i> *
<i>Cynoglossum officinale</i> (houndstongue)	<i>Poa pratensis</i> *
<i>Euphorbia esula</i> (leafy spurge)	<i>Typha X glauca</i> *
<i>Gypsophila paniculata</i> (baby's breath)	

4.3.16 SPECIES CONSERVATION

4.3.16.1 FEDERAL AND STATE THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (ESA) directs federal agencies to conserve endangered and threatened species. There are twelve species listed as threatened (likely to become an endangered species in the near future) or endangered (in danger of extinction now) which may occur in North Dakota. Because North Dakota does not have a state threatened or endangered (T & E) species list, those species listed by the ESA of 1973, as amended, are considered listed and the USFWS has primary oversight of these species. However, the NDGFD has listed species of concern for the state's wildlife conservation strategy (Dyke et al. 2015).

The USFWS online Information Planning and Conservation System (IPaC) program (US Fish and Wildlife Service 2020b) shows no designated critical habitat in the AOI, but the following federally listed species may be present (**Table 33**). Descriptions of these listed species and their presence in relation to the project are provided below. These three species may be present temporarily in the APE, but the likelihood is low.

Table 33: North Dakota threatened and endangered species with potential to occur in Walsh, Nelson, and Grand Forks Counties or habitat within these counties.

Latin name	Common name	Status	Potential to occur
<i>Grus americana</i>	whooping crane	endangered	Potential territory, but not within core migration route. There is final designated critical habitat for this species. These birds may migrate through North Dakota but avoid human populations.
<i>Myotis septentrionalis</i>	northern long-eared bat	threatened	Potential territory, key breeding habitat in summer. No critical habitat has been designated for this species in North Dakota. Bats use trees, particularly if they are part of a forest corridor, for roosting and breeding.
<i>Canis lupus</i>	gray wolf	endangered	No known breeding populations. There is final designated critical habitat for this species. The location is not available. Wolves tend to avoid human population and can roam widely.
<i>Bombus affinis</i>	rusty patched bumble bee	endangered	No designated critical habitat, extirpated, historic range
<i>Oarisma poweshiek</i>	Poweshiek skipperling	endangered	No designated critical habitat, extirpated
<i>Platanthera praeclara</i>	western fringed prairie orchid	threatened	No designated critical habitat

4.3.16.2 PLANTS OF STATE CONSERVATION PRIORITY

The North Dakota Natural Heritage Program has compiled a list of plants of concern (North Dakota Natural Heritage Program 2013). Thirteen species are listed as Level I conservation priority (**Table 40**). These species are defined as those with low or declining populations and thus vulnerable to extinction. **Figure 21** shows the estimated distribution of priority plant species in North Dakota. Of the 13 species listed as North Dakota Level I conservation priority, seven are potentially present in Walsh, Nelson, or Grand Forks Counties (BONAP 2019, **Table 34**).

There are three sites in Walsh County, three in Nelson County, and two sites in Grand Forks County, but none identified within approximately ten linear miles from the dam. There is a site indicating species of

Level II priority downstream of the confluence of the South Branch Forest River, but that may be many miles downstream from the dam and likely not potentially affected by any of the project alternatives.

Table 34: North Dakota plants of Level I conservation priority and potential presence at Fordville Dam.

Latin name	Common name	Potential presence in Walsh, Nelson, or Grand Forks Counties
<i>Allium canadense</i>	meadow onion	yes
<i>Asclepias lanuginosa</i>	wooly milkweed	yes
<i>Astragalus neglectus</i>	Cooper's milkvetch	yes
<i>Botrychium campestre</i>	prairie grapefern	yes
<i>Carex formosa</i>	handsome sedge	yes
<i>Chenopodium subglabrum</i>	smooth goosefoot	yes
<i>Cypripedium candidum</i>	white lady's slipper	yes
<i>Eriogonum visherii</i>	Dakota buckwheat	yes
<i>Helianthemum bicknellii</i>	Bicknell's sunrose	no
<i>Mentzelia pumila</i>	dwarf mentzelia	yes
<i>Platanthera praeclara</i>	western prairie fringed orchid	yes
<i>Polygonum leptocarpum</i>	thin-fruited knotweed	no
<i>Triantha glutinosa</i>	sticky false-asphodel	yes

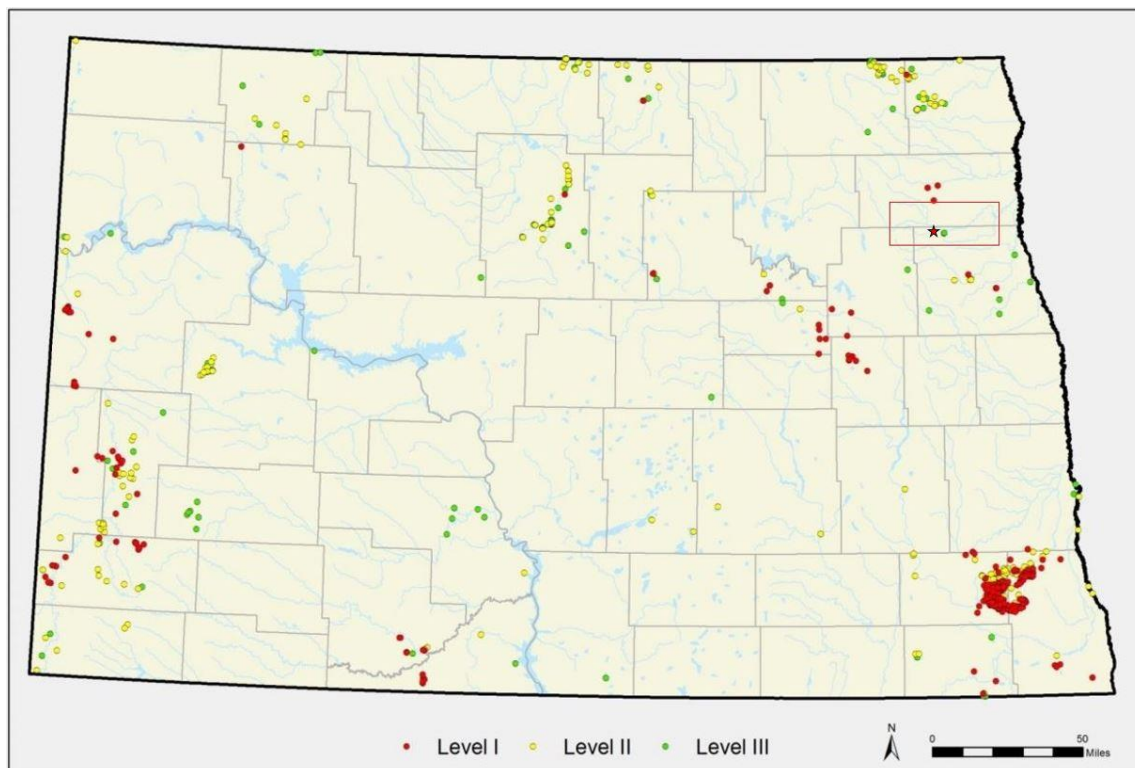


Figure 21: Sites of North Dakota plant species of conservation priority (red outline indicates the Fordville Dam AOI; the star indicates the Fordville Dam).

4.3.16.3 ANIMALS OF STATE CONSERVATION PRIORITY

In the State Wildlife Action Plan (Dyke et al. 2015), the NDGFD describes the strategies for fish and wildlife conservation. The plan lists animal species targeted for conservation priority. The species on that list that may occur in the watershed areas are shown for the following habitats: tallgrass prairie (**Table 35**), eastern Drift Plains mixed grass prairie (**Table 36**), tame grassland (**Table 37**), deciduous forest (**Table 38**), wetlands (**Table 39**), and rivers and riparian forests (**Table 40**).

Table 35: Animal species of state conservation priority in tallgrass prairie habitat.

Group	Species
Birds	American bittern, northern pintail, northern harrier, Swainson's hawk, American kestrel, sharp-tailed grouse, greater prairie-chicken, yellow rail, willet, upland sandpiper, marbled godwit, Wilson's phalarope, short-eared owl, grasshopper sparrow, Le Conte's sparrow, Nelson's sparrow, dickcissel, bobolink, western meadowlark
Mammals	Pygmy shrew, arctic shrew, plains pocket mouse, Richardson' ground squirrel, eastern spotted skunk, gray fox
Reptiles / amphibians	Canadian toad, northern prairie skink, plains hog-nosed snake
Insects	Dakota skipper, Poweshiek skipperling, monarch butterfly, regal fritillary

Table 36: Animal species of state conservation priority in eastern drift plains mixed grass habitat.

Group	Species
Birds	Horned grebe, American bittern, northern pintail, lesser scaup, northern harrier, American kestrel, Swainson's hawk, ferruginous hawk, sharp-tailed grouse, yellow rail, willet, upland sandpiper, marbled godwit, Wilson's phalarope, franklin's gull, black tern, short-eared owl, loggerhead shrike, sedge wren, Sprague's pipit, lark bunting, grasshopper sparrow, Baird's sparrow, Le Conte's sparrow, Nelson's sparrow, chestnut-collared longspur, dickcissel, bobolink, western meadowlark
Mammals	Pygmy shrew, arctic shrew, plains pocket mouse, Richardson's ground squirrel, gray fox
Reptiles / amphibians	Plains spadefoot, Canadian toad, smooth green snake, plains hog-nosed snake
Insects	Dakota skipper, monarch butterfly, regal fritillary

Table 37: Animal species of state conservation priority in tame grassland habitat.

Group	Species
Birds	American bittern, northern pintail, lesser scaup, northern harrier, Swainson's hawk, sharp-tailed grouse, greater prairie-chicken, willet, upland sandpiper, marbled godwit, long-billed curlew, Wilson's phalarope, short-eared owl, burrowing owl, loggerhead shrike, lark bunting, grasshopper sparrow, Baird's sparrow, Le Conte's sparrow, Nelson's sparrow, chestnut-collared longspur, dickcissel, bobolink, western meadowlark
Mammals	Arctic shrew, pygmy shrew, plains pocket mouse, hispid pocket mouse, Richardson's ground squirrel
Reptiles / amphibians	Plains spadefoot, Canadian toad, smooth green snake, plains hog-nosed snake
Insects	Monarch butterfly, regal fritillary

Table 38: Species of state conservation priority in deciduous forest habitat.

Group	Species
Birds	Horned grebe, golden eagle, bald eagle, Swainson's hawk, black-billed cuckoo, red-headed woodpecker
Mammals	Arctic shrew, pygmy shrew, northern long-eared bat, western small-footed bat, long-eared bat, long-legged bat, little brown bat, big brown bat, Townsend's big-eared bat, American marten, gray fox

Table 39: Animal species of state conservation priority in wetland habitat

Group	Species
Birds	Horned grebe, American white pelican, American bittern, northern pintail lesser scaup, canvasback, bald eagle, northern harrier, yellow rail, whooping crane, piping plover, American avocet, willet, upland sandpiper, long-billed curlew, marbled godwit, red knot, Wilson's phalarope, Franklin's gull, black tern, short-eared owl, Le Conte's sparrow, Nelson's sparrow
Mammals	Arctic shrew, pygmy shrew, river otter
Reptiles / amphibians	Plains spadefoot, Canadian toad, snapping turtle
Insects	Monarch butterfly

Table 40: Animal species of state conservation priority in rivers and riparian forests

Group	Species
Birds	Golden eagle, bald eagle, red-headed woodpecker, blackbilled cuckoo, whooping crane, piping plover, red knot, least tern
Mammals	Northern long-eared bat, western small-footed bat, long-legged bat, long-eared bat, big brown bat, little brown bat, pygmy shrew, river otter
Reptiles / amphibians	False map turtle, smooth softshell, spiny softshell, snapping turtle
Fish	Chestnut lamprey, silver lamprey, pallid sturgeon, paddlefish, sturgeon chub, sicklefin chub, silver chub, northern pearl dace, hornyhead chub, pugnose shiner, blacknose shiner, carmine shiner, northern redbelly dace, finescale dace, flathead chub, blue sucker, yellow bullhead, trout-perch, logperch, river darter, largescale stoneroller, burbot
Mussels	Threeridge, Wabash pigtoe, mapleleaf, black sandshell, creek heelsplitter, pink heelsplitter, pink papershell, fragile papershell, deertoe, creeper

4.4 THE HUMAN ENVIRONMENT

4.4.1 SOCIOECONOMIC CHARACTERISTICS

Environmental justice is the principle that all human populations have the opportunity to comment on proposed federal actions and all populations share benefits, are not excluded, and are not adversely affected disproportionately by government programs affecting human health or the environment. Executive Order 12898 (February 11, 1994) requires federal agencies to make environmental justice part of the mission. To do this, the agencies must identify how their activities affect minority or low-income populations and Indian Tribes.

Analysis of the socioeconomic status within the AOI was reviewed for Walsh, Nelson, and Grand Forks counties. Employment within this tri-county region from 1970 to 2000 is shown in **Table 41** (Headwater Economics, 2017). Service-related jobs represented 57 % of the workforce in the assessment area; this had increased from 1970 (42 %) to 2000 (57 %) by 13 %. Government jobs represented 25 % of the workforce followed non-services related jobs representing 18 % of the workforce. From 1970 to 2000, jobs in non-service-related industries grew from 8,498 to 9,981, a 17 % increase.

The U.S. Department of Labor, Bureau of Labor Statistics (BLS), monitors labor market activity, working conditions, and price changes in the economy. The BLS quarterly census of employment and wages data were utilized to characterize the public and private employment characteristics of the AOI. The data are available on a county level. Because Grand Forks County contains most of the land of the AOI, the Grand Forks County statistical data were considered representative (**Table 42**) (US Department of Labor, Bureau of Labor Statistics 2020). Private entities represent approximately 78 % of the commerce within Grand Forks County.

Table 41: Walsh, Nelson, and Grand Forks Counties employment by industry, 1970-2000 (percent of total).

Total Employment %	1970	1980	1990	2000	Change 1990-2000
Non-Services Related	22	18	14	18	29
Farm	13	9	6	5	-10
Agricultural services, forestry, fishing & other	0	1	1	1	56
Mining (including fossil fuels)	0	0	0	0	-77
Construction	4	5	4	6	70
Manufacturing (incl. forest products)	4	3	3	5	57
Services Related	42	50	54	57	13
Transportation & public utilities	4	5	4	4	6
Wholesale trade	3	4	4	4	3
Retail trade	15	18	18	19	10
Finance, insurance, & real estate	4	4	5	4	-2
Services	15	19	22	26	21
Government	37	31	32	25	-17

Table 42: Grand Forks County 2015-2018 annual average employment and wages (US Department of Labor, Bureau of Labor Statistics 2020)

Summary Change Table	Annual Establish-ments	Annual Average Employment	Total Annual Wages (\$ US)	Annual Average Weekly Wage	Annual Wages per Employee (\$ US)
Walsh County 2015-2018 Annual Averages - Private					
2015 levels	2,084	32,620	\$1.3 billion	\$788	\$40,971
2018 levels	2,154	32,202	\$1.4 billion	\$850	\$44,186
Change from 2015 to 2018	70	-418	\$100 million	\$62	+\$3,215
Percent change from 2015 to 2018	+3.4	-1.3	+7.7	+7.9	+7.8
Grand Forks County 2015-2018 Annual Averages - Federal Government					
2015 levels	45	1,018	\$61.6 million	\$1,164	\$60,525
2018 levels	48	1,012	\$64 million	\$1,216	\$63,249
Change from 2015 to 2018	3	-6	+\$2.4 million	+\$52	+\$2,724
Percent change from 2015 to 2018	+6.6	-0.6	+3.9	+4.5	+4.5

4.4.2 PUBLIC SAFETY AND TRANSPORTATION

There are few schools and medical facilities in the region (**Exhibit 11.1**). The two schools closest to Area 3 Dam Zone (Fordville Dam) are the Fordville-Lankin Public School in Fordville to the northwest (5.5 miles driving distance from the dam) and the Forest River School to the east (4.5 miles) at the Forest River Hutterite Colony. The Fordville-Lankin elementary school has 41 students in pre-K through 12th grade (as of August 2019). The Forest River School is a private religious K-12 school with 21 students. The closest medical facilities are the First Care Health Center in Park River (21 miles) and includes a critical access hospital and health clinic. If the road across the dam were to be closed, alternate routes north from the south side of the dam would be three miles west or three miles east.

4.4.3 CULTURAL AND HISTORIC CHARACTERISTICS

The National Historic Preservation Act (NHPA) of 1966 directed Federal agencies to develop a program of cultural preservation and consider effects of projects on historic properties. NRCS has established a policy and guidance for compliance with NHPA and other authorities, including the American Indian Religious Freedom Act (42 U.S.C. Section 1996); Native American Graves Protection and Repatriation Act (25 U.S.C. Sections 3001-3013); Executive Order (EO) 13175, Consultation and Coordination with Indian Tribal Governments (2000); EO 13007, Indian Sacred Sites (1996); and a range of Executive Orders.

A Class I: Literature Search of cultural resources report was completed for the Forest River Watershed Plan – Environmental Assessment (McFarlane and Cummings 2019). The entire study area for this assessment was approximately 570 square miles and included Areas 1 and 2 with some additional area to the north of the AOI within the Forest River drainage area. Within the AOI, the results noted six sites listed cultural resource sites for architecture, 36 historic structures, seven cemeteries, and 44 Cultural Resource Sites of

isolated finds (**Exhibit 11.2**). There is one isolated find and one historic structure (feature unclear from Cultural Resources Report) and within the Area 3 Dam zone.

4.4.4 RECREATION

There are several sites in the AOI area which provide for a variety of recreational activities including fishing, boating, swimming, camping, hunting, snowmobiling, birdwatching, and hiking. There are several locations for fishing and one with boating access sites located at local dams within the AOI (**Table 6**). Within 25 miles of Fordville Dam there are seven sites for boating and fishing (Whitman Dam, Matejcek Dam, Bylin Dam, Homme Lake, Niagara Dam, Larimore Dam, and Kolding Dam) and two sites with fishing only (Laretta Lake and Dougherty Dam) (North Dakota Game and Fish Department 2016a). There are no Wildlife Management Areas or Waterfowl Protection Areas in the AOI (see **Section 4.3.5**) and part of the Ardoch National Wildlife Refuge is located at the eastern edge of the AOI.

Fordville reservoir, a 185-acre lake which has approximately six miles of shoreline and is an average depth of 11 feet (maximum depth 30.4 feet), is suitable for boating, fishing and swimming. Fordville Dam (Area 3) provides opportunities for tent camping, RV sites, a picnic area with a playground, a swimming beach, boating, and fishing (Grand Forks County Information Services 2014). The northern side of the lake has boat access and a public beach (**Figure 12**). The western side has boat access, day-use picnic area, campground, playground, and hiking paths. The lake is populated by black crappie, northern pike, largemouth bass, walleye, yellow perch, and bullhead catfish (North Dakota Game and Fish Department 2019a), and is currently stocked with northern pike and walleye (North Dakota Game and Fish Department 2019b). Recently, fish stocking consisted of approximately 21,000 northern pike (2017), 22,000 walleyes (2018), and 17,000 northern pike and 25,000 walleyes (2019).

4.4.5 AESTHETICS

The scenic beauty or aesthetic nature of a viewshed includes the existing natural and built features visible to a viewer. Some features which elicit viewers' positive perceived value can include historic properties; cultural resources, traditional cultural places, and cultural landscapes; areas of scenic beauty, scenic overlooks, and highways; wilderness areas, parks, and national forests; wild and scenic rivers, recreational, or nationwide inventory rivers; and pastoral landscapes. Changes to these viewsheds can be perceived as a negative impact to the landscape. Area 3, Fordville Dam, is located within a rural, agricultural setting, but the view of the lake, the woodland, and the valley below the dam provide some relief to the flat landscape and a surprise as the viewer descends into the valley. The majority of the viewshed within the AOI includes fields, hayland, and rural residences. There are no designated scenic byways or scenic waterways within the study area.

5 PRELIMINARY RESULTS OF THE ENVIRONMENTAL EVALUATION

5.1 POTENTIAL ALTERNATIVES

Concept alternatives are discussed in this section. Details of specific alternatives will be refined and further evaluated for resource impacts during more detailed planning. The following alternative concepts will be evaluated as part of the Watershed Planning Effort. The alternatives of no action and decommissioning the dam are included here as requested by NRCS, but do not preclude other alternatives which meet the project purpose and need.

5.1.1 NO FEDERAL ACTION

The anticipated future condition of Fordville Dam will be estimated assuming no federal action is taken. It is anticipated that one of the following three potential actions would be taken through a non-federally financed project. Options for Fordville Dam will be discussed with the SLO, NRCS, NDSWC, and other affected non-federal entities to determine an anticipated future condition assuming no federal action is taken.

5.1.2 DECOMMISSION

Decommissioning of Fordville Dam was evaluated preliminarily in the previously completed Dam Assessment Report (HDR/Kleinfelder 2015). This option consists of removing the earthen embankment to the approximated original ground line where practical. A steel sheet pile weir will be constructed across the site to serve as a sediment trap and grade control for the former reservoir. It may not be practical to store all sediment accumulated over the life of the structure and some may pass through the structure to the downstream channel. The sheet pile weir will be designed to pass the 25-year 24-hour peak discharge with freeboard. The structure will pass the 100-year 24-hour peak flow with minimal freeboard. The weir structure will include 30-inch diameter pipe to pass low flows and dewater the sediment trap during periods of no flow.

5.1.3 NON-STRUCTURAL REHABILITATION

Removal of flood risk from the breach inundation zone to reduce Dam Hazard Classification may be an applicable alternative for Fordville Dam. The previously completed Dam Assessment Report identifies 140 structures within the inundation zone, including one structure within the zone but above water (i.e. localized island), 81 structures (23 homes or mobile homes) inundated by less than one foot of water and 57 structures (8 homes) inundated by more than one foot of water. Removal of flood risk during a dam failure may require property acquisition and structure demolition, structure relocation, well and septic capping and/or removal, and flood proofing. Additional flood risk that would be required to be removed includes the protection or resizing of structures through roads with high traffic volume within the breach zone. A reduced Dam Hazard Classification may still require structural improvements to Fordville Dam to meet NRCS and State Dam Safety criteria, however these improvements would likely be a reduced scope compared to structural rehabilitation to meet High Hazard Classification requirements.

5.1.4 STRUCTURAL REHABILITATION

Potential rehabilitation alternatives for Fordville Dam were evaluated preliminarily in the previously completed Dam Assessment Report (HDR/Kleinfelder 2015). Alternatives were developed to meet High Hazard Classification requirements. The most cost-effective alternative identified consisted of the following structural improvements:

- Raise the top of dam elevation by 4.8 feet to meet freeboard requirements,
- Utilize roller-compacted concrete to armor the auxiliary spillway ensure spillway integrity requirements are met,
- Upgrade the principal spillway riser structure to meet current NRCS design standards, and
- Replacement of the foundation drain and anti-seep collars with a seepage diaphragm to meet TR-60 requirements.

5.2 ESTIMATED COSTS

This preliminary investigation does not evaluate costs of alternatives; however, limited cost data are available through the previously completed Dam Assessment Report (HDR/Kleinfelder 2015). The cost data, using 2015-dollar estimates, are presented in **Table 43**.

Table 43: Dam assessment report alternative cost estimate (2015 dollars).

Alternative	Total Construction Costs	Construction Contingency (30 %)	Other Project Costs (40 %)	Total Costs
No Federal Action ^[1]	Unknown	Unknown	Unknown	Unknown
Decommission ^[1]	\$2,000,000	\$600,000	\$800,000	\$3,400,000
Non-Structural ^[2]	Unknown	Unknown	Unknown	Unknown
Structural Rehabilitation	\$8,600,000	\$2,590,000	\$3,440,000	\$14,630,000

[1] Costs assume removal of entire dam and replacing it with a sheet pile weir. The weir would be designed to pass a 25-year storm with approximately 1 foot of freeboard and a 100-year storm with minimal freeboard. A 30-inch diameter RCP would be installed for low flow.

[2] Not included in the Dam Assessment Report.

The costs presented in the table above are conceptual and will be subject to revision through the Fordville Dam Rehabilitation project planning effort. Costs associated with identified reasonable alternatives will be evaluated to determine if they are feasible.

5.3 IDENTIFIED RESOURCE CONCERNS AND POTENTIAL EFFECTS

Alternatives have not been analyzed to sufficiently determine specific impacts to various resources. Complete site evaluations and more detailed watershed planning will use an interdisciplinary team consisting of technical expertise across a range of disciplines. The group will work to establish a workable solution with the local resources of concern. Depending on the scope of impacts for identified alternatives, the following potential impacts will be reviewed by the team (**Table 44**).

Consistent with the NRCS, National Watershed Program Manual (NWPM), Part 501.24(B), a list of potential resources concerns will be presented to the public during a public meeting. This meeting will enable the general public to rate the level of concern for several various considerations. After engaging the public in scoping, the interagency team will the concerns that are identified by the public

Table 44: Identified resource concerns and potential effects.

Identified Resource Concern	Potential Effects				
	Existing Condition	No Federal Action	Decommission	Non-Structural Rehabilitation	Structural Rehabilitation
Description	FD is currently designated as a high hazard structure that doesn't meet current Dam Safety criteria. dam failure risk	Alternative not yet defined. Assumed to be consistent with one of the three potential federal actions.	Dam removal, channel stabilization, revised road design and river crossing, eliminates dam failure risk	Downstream at-risk property acquisition, eliminates dam failure risk only if reduced scope structural improvements are implemented	Structural improvements to Matejcek Dam to bring the dam into current NDSWC and NRCS High Hazard requirements. This may include increasing embankment heights, increasing spillway capacities, or a combination thereof. While the risk of dam failure may be reduced, a dam breach could be more catastrophic than the existing condition if embankment heights were increased.
Dam Safety (Section 3.2)	FD is currently designated as a high hazard structure that doesn't meet current Dam Safety criteria. This poses an increased risk of dam failure for downstream residents.	Alternative not yet defined.	Removal of FD would eliminate the associated risk with a dam failure.	Removal of at-risk structures would reduce the Dam Hazard classification. Some structural improvements would likely still be required due to identified dam safety deficiencies. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	FD would meet all Dam Safety criteria for a High Hazard Classification, resulting in a reduced dam failure risk as compared to the existing condition. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Land Use (Section 4.3.4)	FD facilitates increased agricultural production downstream due to reduced severity of summer floods. A dam failure resulting from Dam Safety concerns would have an immediate impact to agricultural land use downstream of the dam.	Alternative not yet defined.	Increased frequency of flooding may result in land use changes and/or crop type changes in the downstream floodplain.	Rehabilitation to a Significant Hazard classification may result in increased impacts to land use during low frequency flood events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Land use impacts would remain largely unchanged from the existing condition. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
State and Federal Lands (Section 4.3.5)	There are currently no State and Federal Lands in Area 3. The normal pool of FD is a state managed fishery. Lake Ardoch National Wildlife Refuge is located downstream of FD.	Alternative not yet defined.	Decommissioning of FD may result in hydrologic impacts to Lake Ardoch NWR. The normal pool of FD would no longer be present as a state managed fishery.	Rehabilitation to a Significant Hazard classification may result in increased flows into Lake Ardoch NWR during low frequency flood events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Rehabilitation to a High Hazard classification may result in increased flows into Lake Ardoch NWR during low frequency flood events. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Soils (Section 4.3.7)	Potential for erosion in tilled areas of the downstream floodplain. A dam failure resulting from Dam Safety concerns would likely result in erosion and/or deposition of sediment in inundated areas.	Alternative not yet defined.	Increased potential for erosion initially in tilled areas due to more frequent out-of-bank flows downstream, rehabilitation of upstream wetland hydraulic buffering capacity would sustain long-term flood mediation.	Rehabilitation to a Significant Hazard classification may result in increased impacts to soils during low frequency flood events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	FD would meet all Dam Safety criteria for a High Hazard Classification, resulting in a reduced dam failure risk as compared to the existing condition. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Agricultural Productivity (Section 4.3.8)	FD increases agricultural production in the historic downstream floodplain along the Forest River by reducing peak flow rates on moderate to high frequency rainfall events. Dam failure would likely result in significant impacts to agriculture due to flooding, erosion, and/or deposition on cropland within the breach zone.	Alternative not yet defined.	Decommission of FD would increase the frequency of flooding downstream, resulting in reduced agricultural productivity in flood zones. Potential to increase flooding on prime farmlands downstream of FD. Rehabilitation of upstream wetland hydraulic buffering capacity would sustain long-term flood mediation.	While rehabilitation to a Significant Hazard classification may result in increased impacts to cropland during low frequency flood events, these impacts are anticipated to be negligible. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	While rehabilitation to a High Hazard classification may result in reduced impacts to cropland during low frequency flood events, these impacts are anticipated to be negligible. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Aquatic Resources – rivers and streams (Section 4.3.9.1)	FD interferes with the water flow of South branch of the Forest River. The FD normal pool and flood pool inundates a portion of the historic riparian corridor and associated floodplain. Attenuated flows from FD have altered downstream hydrology and have likely impacted the riparian corridor and associated floodplain. A dam failure resulting from Dam Safety concerns would have an immediate impact to riparian zones downstream of the dam.	Alternative not yet defined.	Removal of FD would modify the hydrologic response to surface runoff downstream along the Forest River. While this may change/improve riparian functions, it may not restore them due to other alterations to hydrology within Forest River watershed.	Rehabilitation to a Significant Hazard classification may result in increased impacts to downstream rivers and streams during low frequency flood events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Expected to remain unchanged from the existing condition. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Aquatic Resources – wetlands and lakes (Section 4.3.9.2 and 4.3.9.3)	Wetlands and open water exist within the FD area. Wetlands are identified downstream of the dam. Peak flow attenuation caused by FD has likely affected riparian floodplain wetland connectivity in riparian zones. A dam failure resulting from Dam Safety concerns would likely result in significant impacts due to flooding, erosion, and/or deposition within wetland basins downstream of FD.	Alternative not yet defined.	Removal of the normal pool at FD could allow for re-establishment of riparian floodplain wetlands connected to historic riparian zones downstream.	Rehabilitation to a Significant Hazard classification may result in increased impacts to riparian wetlands during low frequency flood events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Depending on required dam heights and normal pool elevations, open water and wetlands within the flood pool may change. Downstream wetlands are expected to remain unchanged from the existing condition, upstream wetlands would be flooded but over time reestablish higher along the tributary. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.

Identified Resource Concern	Existing Condition	No Federal Action	Potential Effects		
			Decommission	Non-Structural Rehabilitation	Structural Rehabilitation
Floodplain Management (Section 4.3.10.4)	FD currently regulates flows to 13,000 acres of regulatory 100-year floodplain (designated Zone A and Zone XE flood areas).	Alternative not yet defined.	Decommissioning would result in more frequent flooding downstream and could lead to an increased 100-year regulatory Base Flood Elevation.	Reduced downstream flood risk due to removal of structures within the FD breach zone. Regulatory floodplain downstream of FD may be affected due to rehabilitation to a Significant Hazard Dam.	No changes expected to regulatory 100-year floodplain. Benefits to the 500-year floodplain may occur due to increased hydrologic capacity of the Principal Spillway before activation of the Auxiliary Spillway.
Water Quality (Section 4.3.11)	Various reaches of the Forest River downstream of FD are listed on the EPA's 303(d) list. The conservation pool at FD is also listed on the EPA's 303(d) list. FD has had high phosphorus concentrations and algal blooms. Dam failure would likely result in immediate sediment and nutrient loading of downstream water bodies through erosion of the embankment and accumulated sediment.	Alternative not yet defined.	Normal river flows and functions would resume upstream after dam removal resulting in a rehabilitated dynamic landscape and habitat. The residence time provided by FD would be removed and may result in increased sediment and nutrient loading downstream.	Expected to remain unchanged from the existing condition. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Expected to remain unchanged from the existing condition. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Air Quality (Section 4.3.12)	There are no issues in the area	Alternative not yet defined.	Expected to remain unchanged from the existing condition.	Expected to remain unchanged from the existing condition.	Expected to remain unchanged from the existing condition.
Plant Communities (Section 4.3.13)	FD and downstream watershed currently support a range of agricultural uses as well as natural communities of wetland, riparian/upland forest species. Dam failure would result in immediate impacts to plant communities downstream along the Forest River.	Alternative not yet defined.	Normal river flows would result in rehabilitation of floodplain riparian forests and spatial adjustments in palustrine and riverine wetlands	Expected to remain unchanged from the existing condition. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Expected to remain unchanged from the existing condition. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Fish and Wildlife (Section 4.3.14)	FD currently provides habitat for animals associated with deep water habitat, wetlands, riparian forests. Dam failure would remove deep water habitat, and impact habitat downstream along the Forest River.	Alternative not yet defined.	Deep water habitat will be lost. Additional habitat gains would be made through restoration of channel and forested floodplain.	Minimal changes in fish and wildlife habitat expected. Rehabilitation to a significant hazard dam may result in slightly reduced flood pool impacts to habitat during low frequency events. These reduced impacts are expected to be negligible because of the low frequency of these events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Minimal changes in fish and wildlife habitat expected. Minor temporary impacts to riparian forest and riverine wetlands due to increased dam height, however increased flood pool usage would be infrequent. Modifications to the principal spillway may provide an opportunity to enhance the current fishery. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Threats to Ecological Systems (Section 4.3.15)	FD impacts ecological systems by altering hydrology and inundating historic riparian areas and associated flood plains. Dam owners currently work to spray noxious weeds as they are noted on the dam embankment. Dam failure would result in extremely high flow rates within the downstream channel and would adversely affect the current ecological condition.	Alternative not yet defined.	Riparian ecology would be restored in the FD flood pool and downstream.	Minimal changes to ecological systems are expected. Rehabilitation to a significant hazard dam may result in slightly reduced flood pool impacts during low frequency events. These reduced impacts are expected to be negligible because of the low frequency of these events. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	Minimal changes to ecological systems are expected. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Species Conservation (Section 4.3.16)	There is one federally listed endangered species and one threatened species with potential territory within the Area of Interest (FD), and many species listed by state for conservation priority associated with open water habitat, riparian forests, wetlands	Alternative not yet defined.	Likely no change to federally listed species, potential for increased population of state-listed species in riparian forests, decreased populations for state listed species in open water habitat.	No change to federally listed species, and minimal change for state-listed species	No change to federally listed species, and minimal change for state-listed species

Identified Resource Concern		Potential Effects			
	Existing Condition	No Federal Action	Decommission	Non-Structural Rehabilitation	Structural Rehabilitation
Socioeconomics (Section 4.4.1)	FD currently provides flood damage reduction benefits to agriculture, private structures, public infrastructure, and communities on the Forest River downstream of FD. Dam failure would likely be a catastrophic event that would adversely affect area socioeconomics through impacts to public and private structures, infrastructure, and agricultural land.	Alternative not yet defined.	Decommissioning would result in increased downstream economic losses and/or additional costs associated with mitigating the increased risk.	Removal of residents from occupied structures could result in minor economic impacts to the region due to loss of residents and property values. Flood damage reduction benefits to agriculture provided from FD are anticipated to remain consistent with the existing conditions. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	The reduction of flood damages FD currently provides would continue. Impacts associated with dam failure are expected to be increased slightly due to the anticipated requirement for an increased dam height.
Public Safety and Transportation (Section 4.4.2)	FD results in a reduced frequency of adverse impacts public safety and transportation. High flows can result in increased frequency of road overtopping, road damages, residential access, and community access. The increased dam failure potential associated with Dam Safety concerns poses an increased risk public safety and transportation downstream of the dam.	Alternative not yet defined.	Initially, increased frequency of flooding downstream of FD would result in frequent flood associated impacts to transportation and public safety. Potential impacts include increased frequency of road overtopping, road damages, residential access, and community access. Adverse impacts would likely need to be addressed initially, but rehabilitation of upstream wetland hydraulic buffering capacity would sustain long-term flood mediation.	Removal of at-risk structures and critical access routes would reduce public safety and transportation concerns downstream of FD. Transportation routes for non-critical routes would likely remain relatively unchanged. Impacts associated with dam failure are expected to be reduced slightly due to a lesser hazard classification.	The reduced frequency of adverse impacts to public safety and transportation would still be provided. The adverse impacts associated with risk of dam failure would be reduced by addressing Dam Safety concerns.
Cultural and Historic (Section 4.4.3)	Preliminary (incomplete) assessment indicates numerous National Register of Historic Places, historic structures, cemeteries, and archaeological sites, downstream of FD, several archaeological sites downstream of the dam.	Alternative not yet defined.	These historic items existed prior to the construction of FD. Rehabilitation of dynamic river flow may expose these or additional sites.	These historic items existed prior to the construction of FD. Failure of a significant hazard dam may pose a risk to sites listed within the breach zone.	Expected to remain unchanged from the existing condition because these historic items existed prior to the construction of FD. Failure of a high hazard dam may pose a risk to sites listed within the breach zone.
Recreation (Section 4.4.4)	FD provides recreation opportunities to area residents, including boating, hiking, fishing, hunting, picnicking, camping, swimming, and birdwatching. Because current recreational opportunities are present because of FD, dam failure would remove these opportunities.	Alternative not yet defined.	Fishing and boating opportunities would be removed with elimination of the pool. Restored riparian areas may provide additional opportunities for hiking, hunting, and birdwatching.	Minimal changes to recreation opportunities anticipated. Failure of the dam would remove recreational opportunities currently provided by the dam.	Modifications to the principal spillway could provide enhanced storage in the reservoir resulting in additional fishing opportunities. Recreational opportunities associated with riparian areas adjacent to the reservoir would be impacted by a change to the normal pool elevation.
Aesthetics (Section 4.4.5)	FD provides scenic beauty with the pool, forested banks, and valley downstream as contrast to the predominant viewscape of flat, tilled land.	Alternative not yet defined.	Controlled water release and dam removal would restore normal river flows and functions upstream and downstream. This would result in a picturesque forested river valley.	Minimal changes anticipated unless dam fails. In this case, after twenty years of vegetation regrowth the picturesque forested river valley would become reestablished.	Minimal changes anticipated.

5.4 REQUIRED CONSULTATION AND PERMITS

Required consultations will be completed as required by applicable laws and policies as part of the Fordville Dam Rehabilitation project effort. These agencies have indicated a willingness to participate in the interagency review consultations that will occur throughout the planning process. Input from willing agencies will be solicited at various steps in this planning effort to include, at a minimum, during the definition of the purpose and need, formulation of alternatives, evaluation of alternative effects, selection of the preferred alternative, and the final draft environmental assessment stages. Permit requirements will be defined throughout this interagency collaboration process. Anticipated required consultations are listed in the **Table 45**.

Table 45: Potential Required Consultations

Resource Concern/Regulation	Consulting Entity
Air Quality	EPA Office of Air and Radiation
Water Quality	North Dakota Department of Health
Cultural Resources (Historic Properties)	State Historic Preservation Officer; Tribal Historic Preservation Officer
Endangered and Threatened Species	US Fish and Wildlife Service
Tribal Interests	Affected Tribal Government
Waters of the United States	US Army Corps of Engineers

5.5 NEPA DOCUMENTATION REQUIRED

It is anticipated that selected alternatives will require an Environmental Assessment (EA) only. However, this is dependent on the scope of impacts for selected alternatives. If the impacts cannot be reasonably overcome, an Environmental Impact Statement (EIS) may be necessary. This will not be known until impacts are quantified through the Fordville Dam Rehabilitation project process.

6 SCOPE OF PLANNING EFFORT

The Fordville Dam Rehabilitation project will focus on extending the service life of the dam and bringing the dam into compliance with applicable safety and performance standards. The general public, watershed stakeholders, and various agencies with a vested interest in the watershed will be engaged to initially determine resources of concern within the study area. Outreach will continue throughout the planning effort to ensure that reasonable alternatives are developed. The following list of general tasks will be completed through this planning effort:

- Purpose and Need for Action
- Public Participation
- Data Collection & Resource Inventory
- Development of Alternatives
- Detailed Alternative Review
- Environmental Consequences
- Select Preferred Alternative
- Complete Watershed Plan-EA

The corresponding Statement of Work that is included in the Cooperative Agreement between NRCS and the WCWRD is included in **Appendix A**. This plan of work provides more details on sub tasks that will be completed in each of the tasks outlined above.

7 COOPERATIVE AGENCIES IDENTIFIED

Letters of Invitation have been prepared for the following entities to participate in Planning. Each County Water Resource District will also be permitted to appoint an additional resident to the Project Team.

- United States Army Corps of Engineers
- United States Fish and Wildlife Service
- Federal Emergency Management Agency, Region 8
- North Dakota State Water Commission
- North Dakota Game and Fish Department
- North Dakota Department of Transportation
- North Dakota Department of Environmental Quality
- North Dakota Department of Emergency Services
- State Historical Society of North Dakota
- Walsh County Commission
- Walsh County Department of Emergency Management
- Walsh County Three Rivers Soil Conservation District
- Walsh County Highway Department
- Nelson County Water Resource District
- Grand Forks County Commission
- Grand Forks County Water Resource District
- Grand Forks County Department of Emergency Management
- Grand Forks County Highway Department
- Red River Retention Authority
- Grand Forks County Soil Conservation District 319 Project Coordinator
- The Blackfeet Nation
- Chippewa Cree Tribe of the Rocky Boy's Reservation
- Confederated Salish and Kootenai Tribes
- The Crow Tribe of Indians
- Fort Belknap Indian Community
- Fort Peck Assiniboine and Sioux Tribes
- Northern Cheyenne Tribe
- Shoshone Tribe of the Wind River Reservation
- Northern Arapaho Tribe
- Mandan, Hidatsa & Arikara Nation
- Spirit Lake Tribe of Fort Totten
- Standing Rock Sioux Tribe
- Turtle Mountain Band of Chippewa
- Bois Forte Band of Chippewa Indians
- Fond du Lac Band of Lake Superior Chippewa

- Grand Portage Band of Lake Superior Chippewa
- Leech Lake Band of Ojibwe
- Prairie Island Indian Community of Minnesota
- Lower Sioux Indian Community
- Mille Lacs Band of Ojibwe
- Upper Sioux Community Red Lake Band of Chippewa Indians
- Cheyenne River Sioux Tribe
- Crow Creek Sioux Tribe
- Flandreau Santee Sioux Tribe Oglala Sioux Tribe
- Rosebud Sioux Tribe of Indians
- Sisseton-Wahpeton Oyate
- Yankton Sioux Tribe

8 PUBLIC PARTICIPATION

The project team and cooperating agencies met on a regular basis to provide comment and participate in watershed planning. Outreach for the planning effort will include engaging the general public. A copy of the Public Participation Plan is available in **Appendix B**.

The first public meeting (for NRCS Milestone 1) was held at the Minto Community Center on March 6, 2020. Zach Hermann and Mike Opat of Houston Engineering along with Christi Fischer, State Conservation Engineer for the NRCS, presented an introduction to the project for an audience of 29 stakeholders (see presentation and meeting sign-in sheets, **Appendix B**). A comment sheet was provided and the comments resulting from the meeting have been collated after the closing of the comment period (seven responses, August 3, 2020). The comments received from stakeholders were as follows:

- Concern about water quality (e.g. weeds and algae) and negative impacts on recreation (fishing and swimming);
- Need for maintained flood protection, both during construction and long-term;
- Desire for maintained recreational opportunities;
- Question about options for water quantity-controlling measures in addition to those presented for dam structural improvements (infiltration, no-till grants, wetland restoration, more filter strips)
- Request for considerations of downstream erosion impacts and upstream BMPs to reduce sediment and nutrient loading (cropland buffers, sediment loading impacts, study of nitrate and phosphorus impacts) (Park River NRCS); and
- Proposal for potential uses of dredged sediment potential (Forest River Colony?).

Future opportunity for public participation includes another public meeting (for NRCS Milestone 3) which will consist of presentation of the NED Alternative, a discussion will include work completed since the initial public meeting, and review of each alternative, unavoidable adverse impacts, and benefits provided. The general public will be engaged to solicit comments and concerns with the proposed alternatives. The intended means of notification are a notice of public meeting submitted to local newspapers (the Walsh County Record and the Grand Forks Herald). The public will also have the opportunity to review the Environmental Evaluation document (for NRCS Milestone 5). This and other documents will be available on the PL-566 website structure for ND NRCS.

9 FACILITATING & OBSTRUCTING FACTORS

Various factors that will affect the outcome of the planning effort will be identified during planning. To date, these factors are largely unknown because alternatives have not been studied to sufficiently understand impacts.

10 TIMING AND AVAILABILITY OF RESOURCES

Development of the Watershed Plan-EA is anticipated to be completed by September 30, 2022.

11 VIABILITY EVALUATION OF SPONSORS

The Sponsors meet all requirements to move forward with rehabilitation of Fordville Dam.

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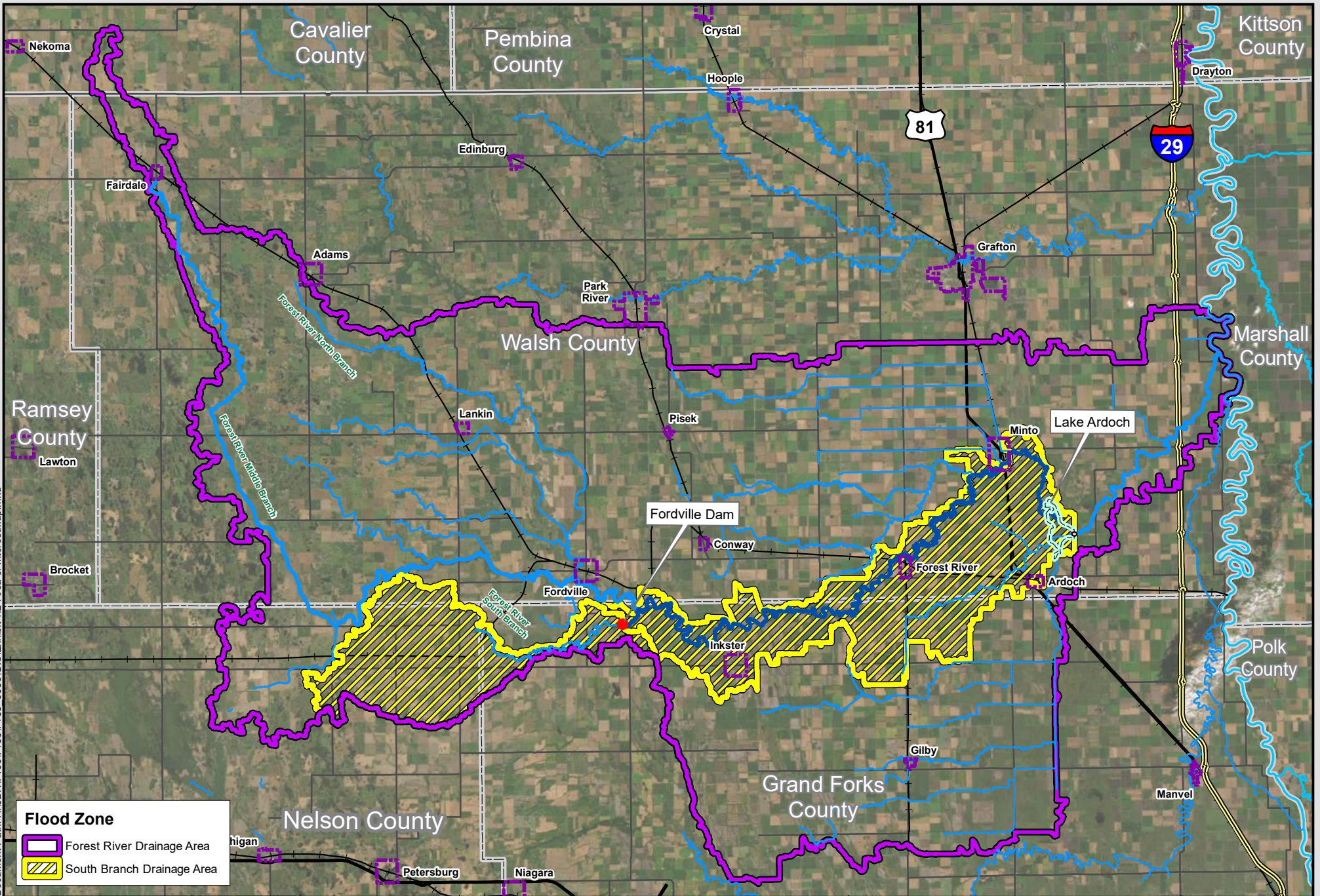
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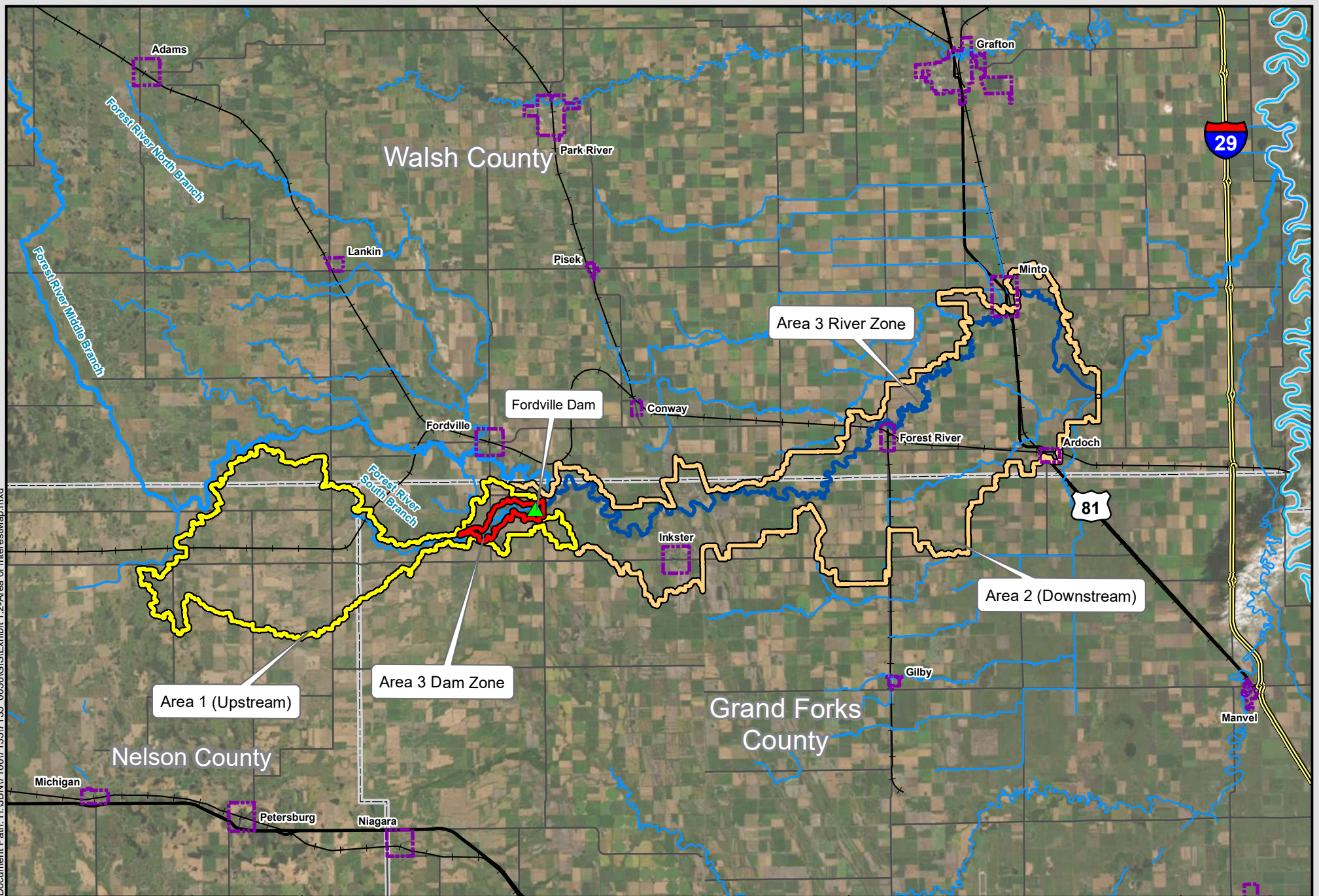
ATTACHMENT 1

EXHIBITS

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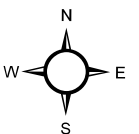
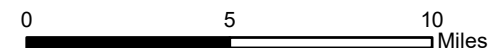
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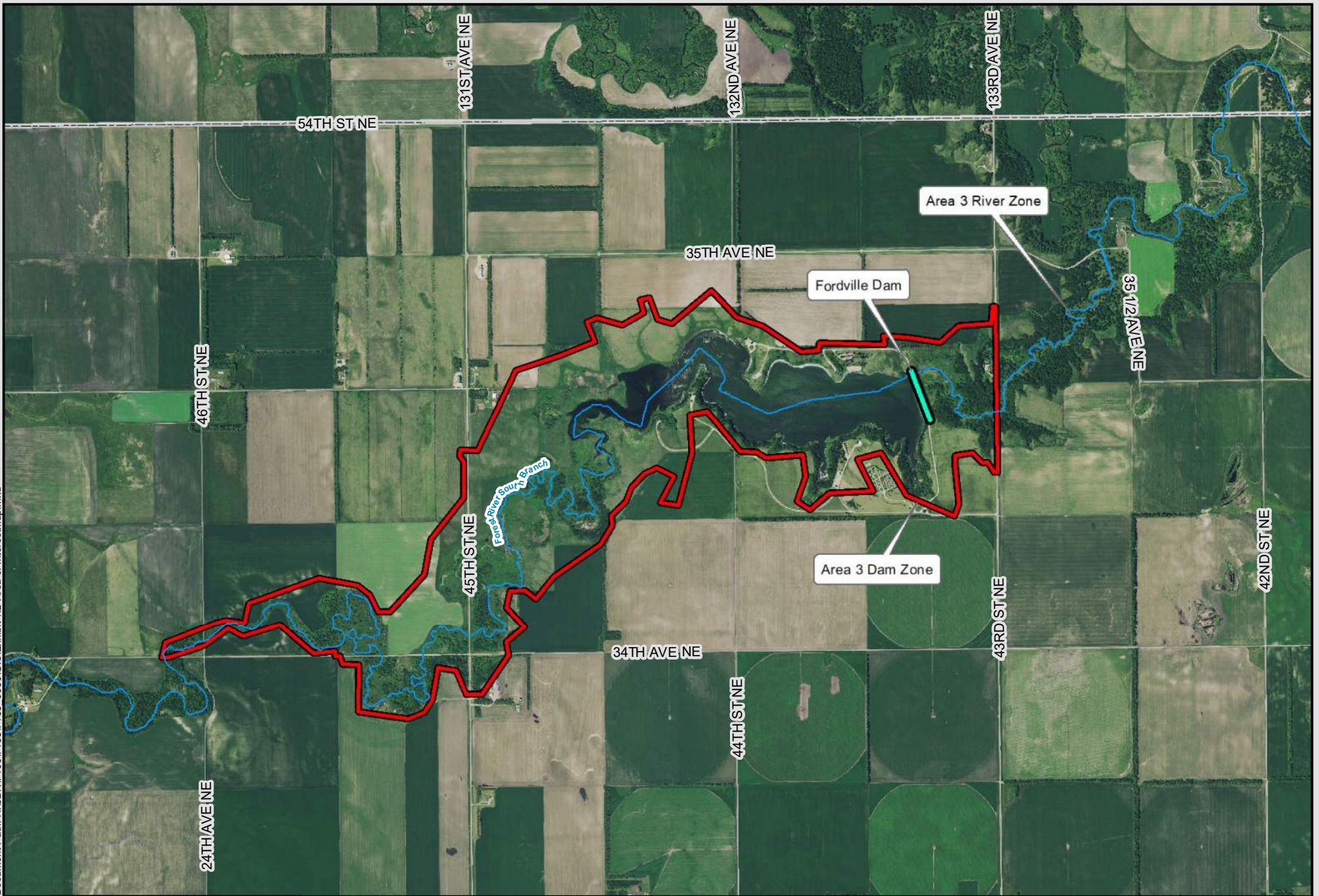


Exhibit 01.2-Project Area of Interest Map

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles

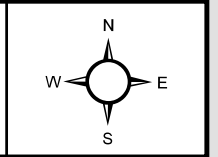
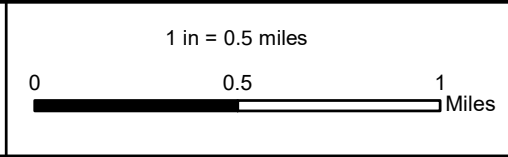




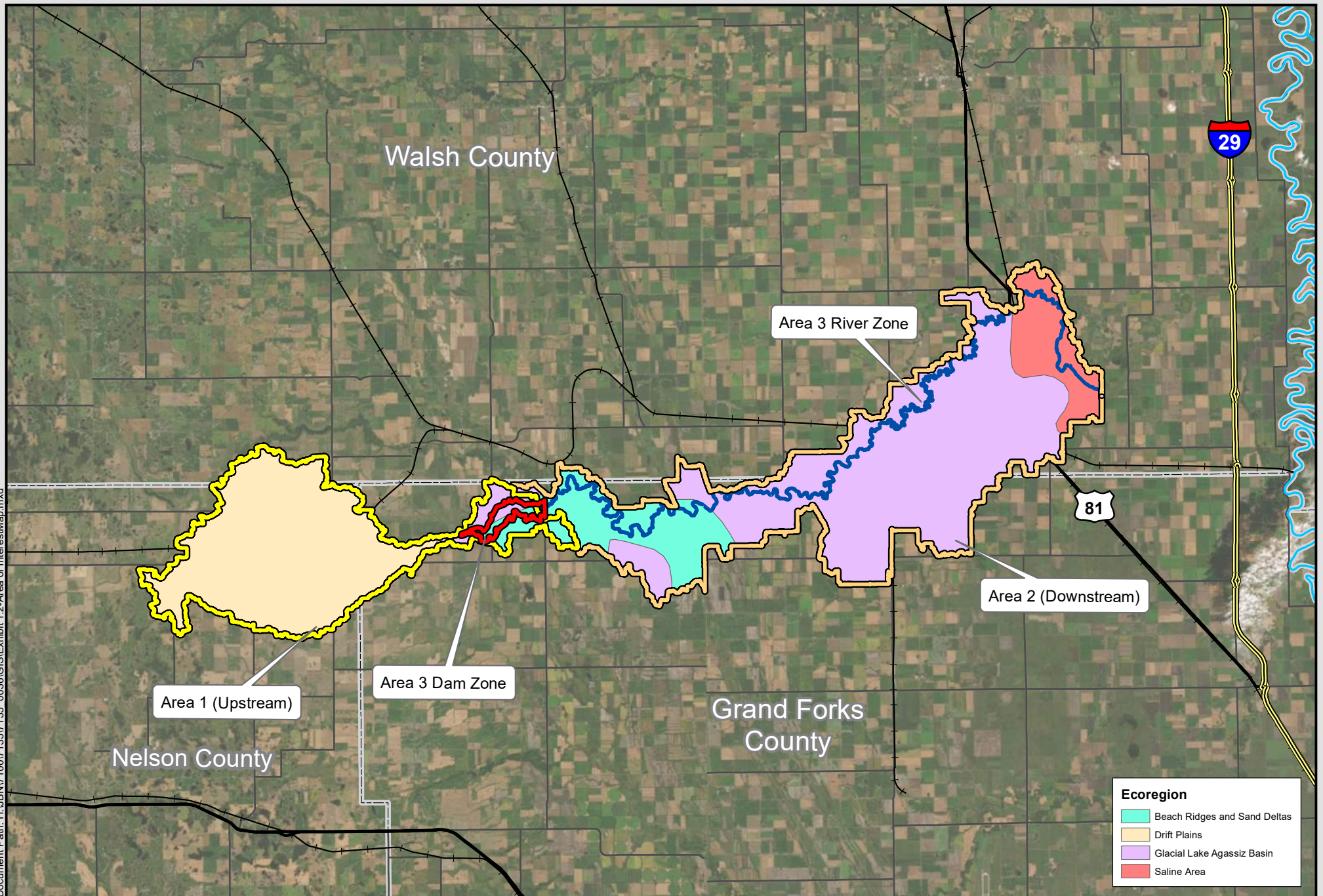
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Exhibit 01.3-Area of Potential Effect-Dam Zone

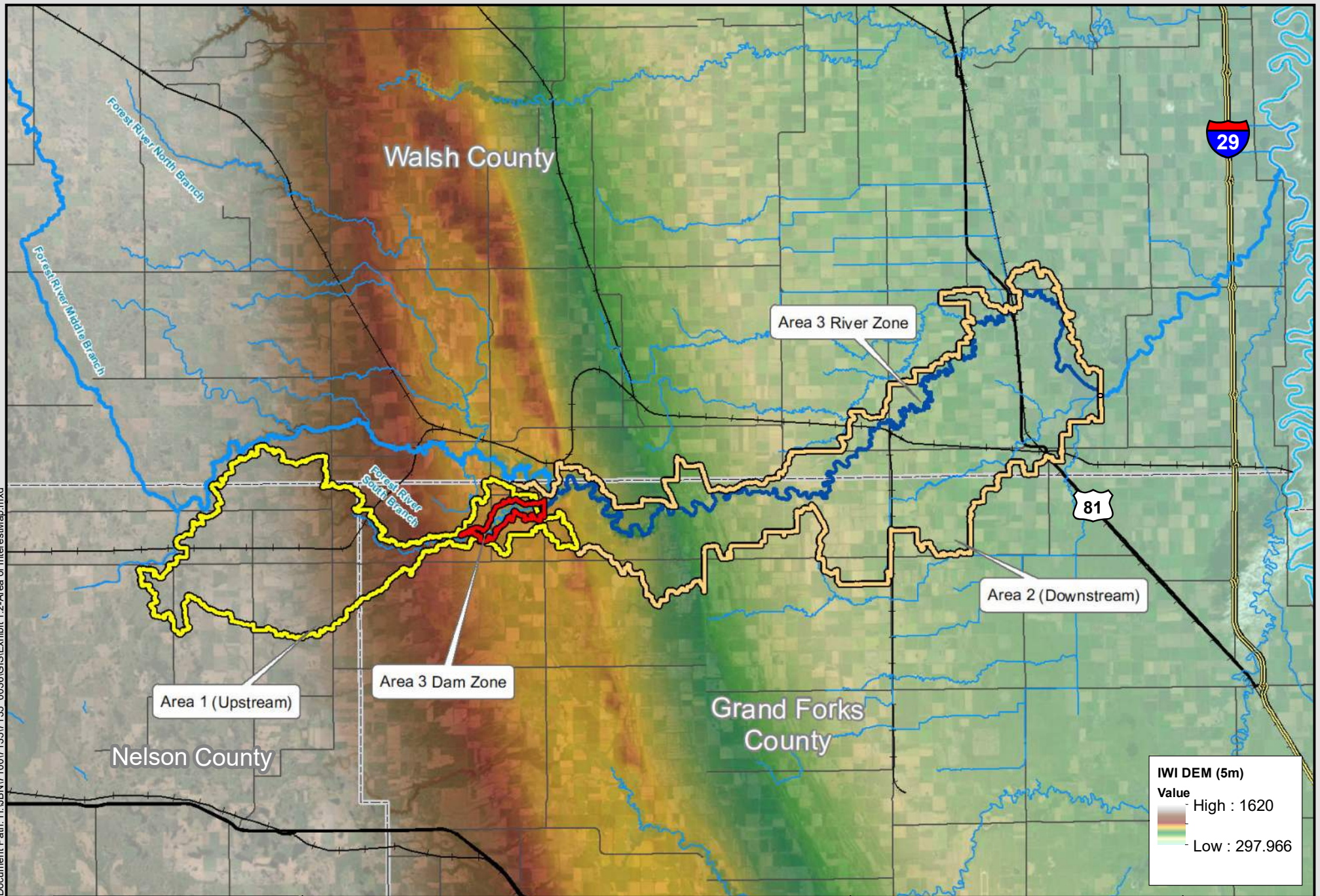
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



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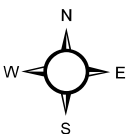
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Exhibit 02.2-LiDAR map of Area of Interest

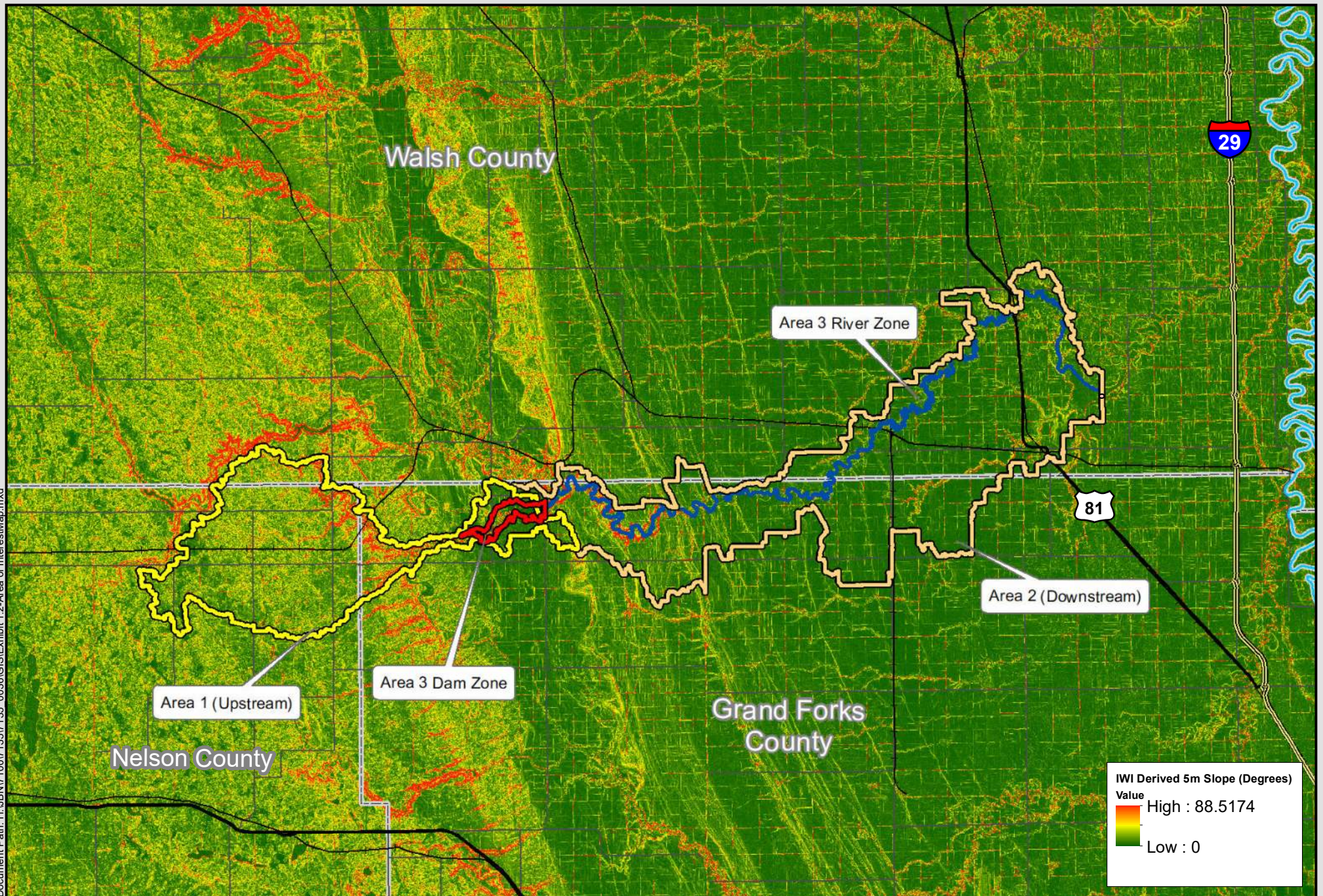
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles

0 5 10 Miles



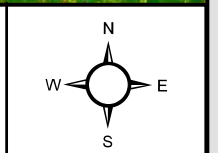
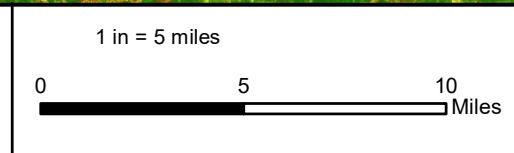
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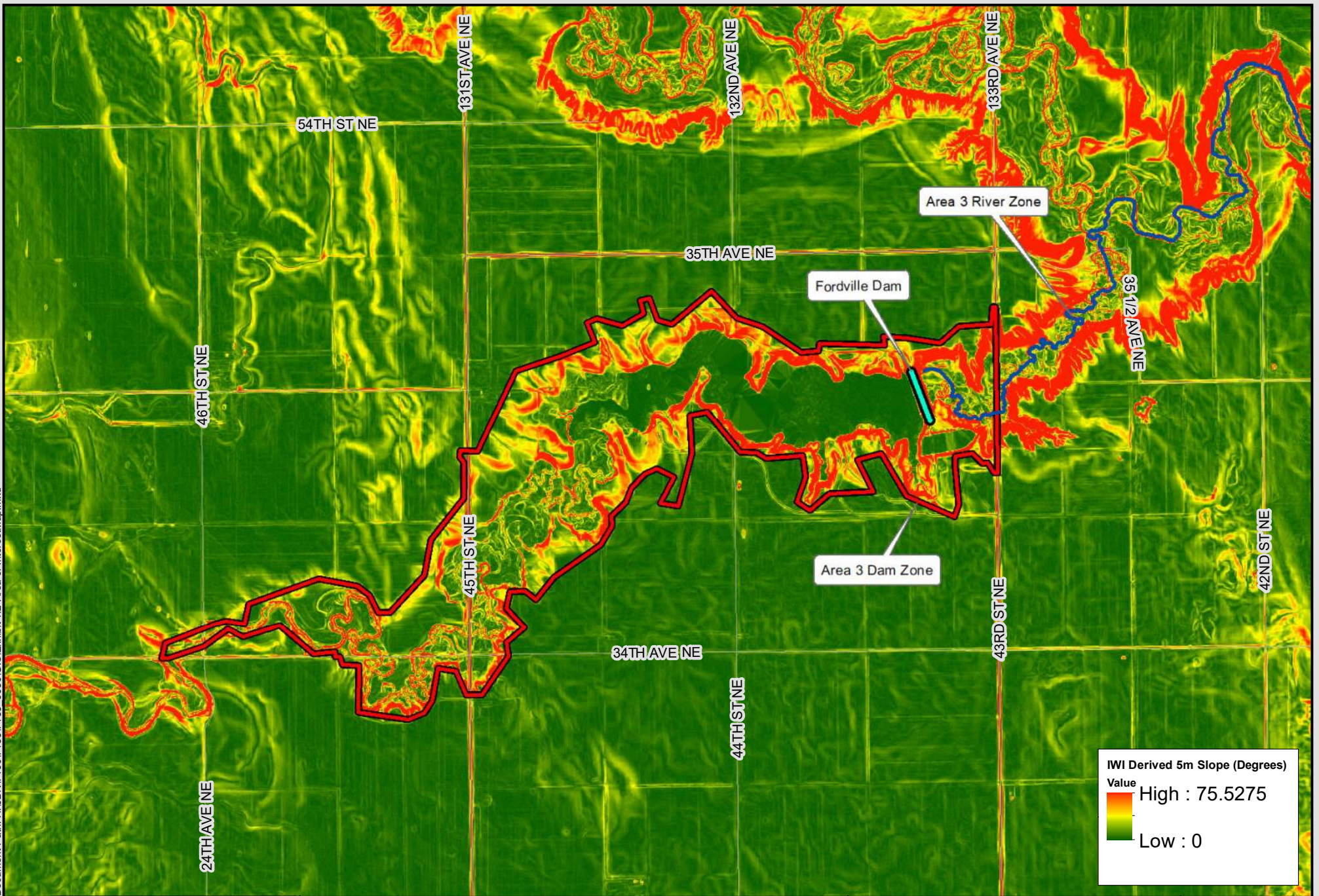
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Exhibit 02.3- LiDAR Derived Slope of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



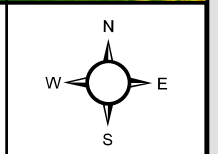
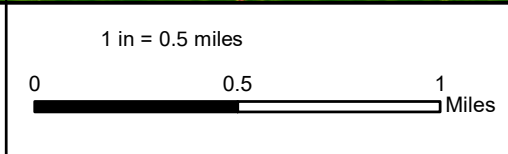
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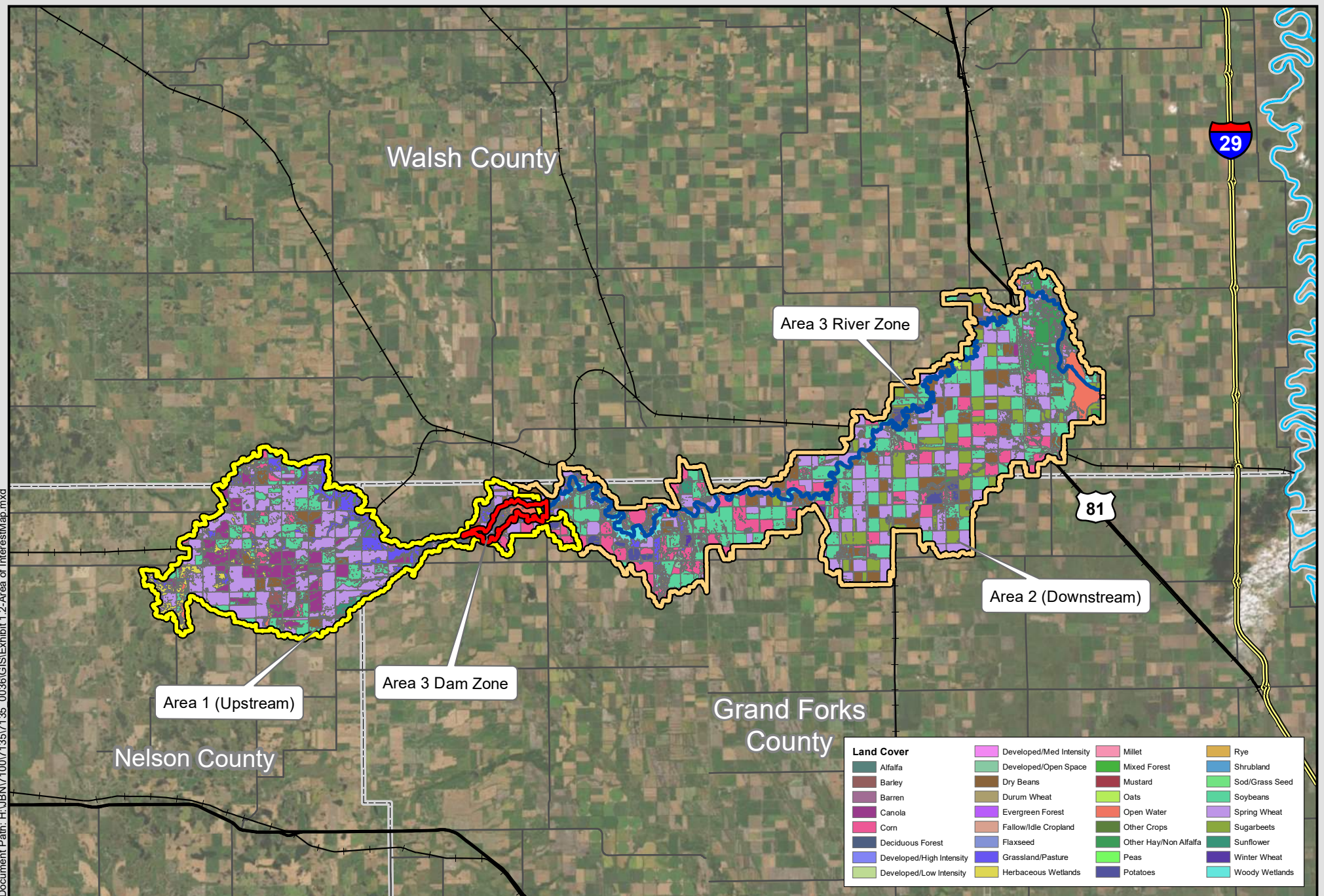
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Exhibit 02.4-LiDAR Derived Slope of Area of Potential Effect-Dam Zone

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



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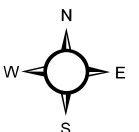
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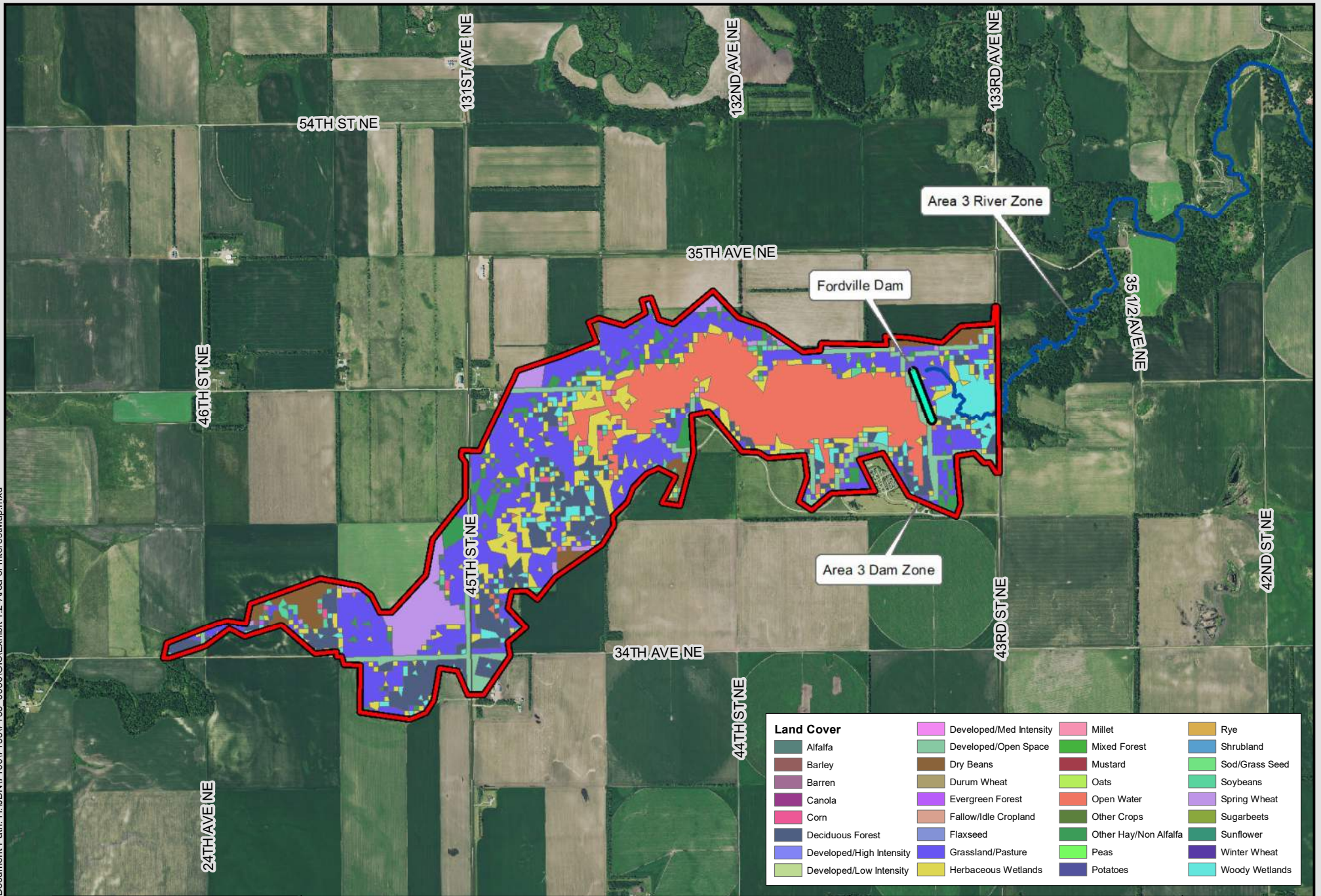
Exhibit 03.1- Land Use Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles

0 5 10 Miles





Land Cover		
Alfalfa	Developed/Med Intensity	Millet
Barley	Developed/Open Space	Mixed Forest
Barren	Dry Beans	Mustard
Canola	Durum Wheat	Oats
Corn	Evergreen Forest	Open Water
Deciduous Forest	Fallow/Idle Cropland	Other Crops
Developed/High Intensity	Flaxseed	Other Hay/Non Alfalfa
Developed/Low Intensity	Grassland/Pasture	Peas
	Herbaceous Wetlands	Potatoes
		Rye
		Shrubland
		Sod/Grass Seed
		Soybeans
		Spring Wheat
		Sugarbeets
		Sunflower
		Winter Wheat
		Woody Wetlands

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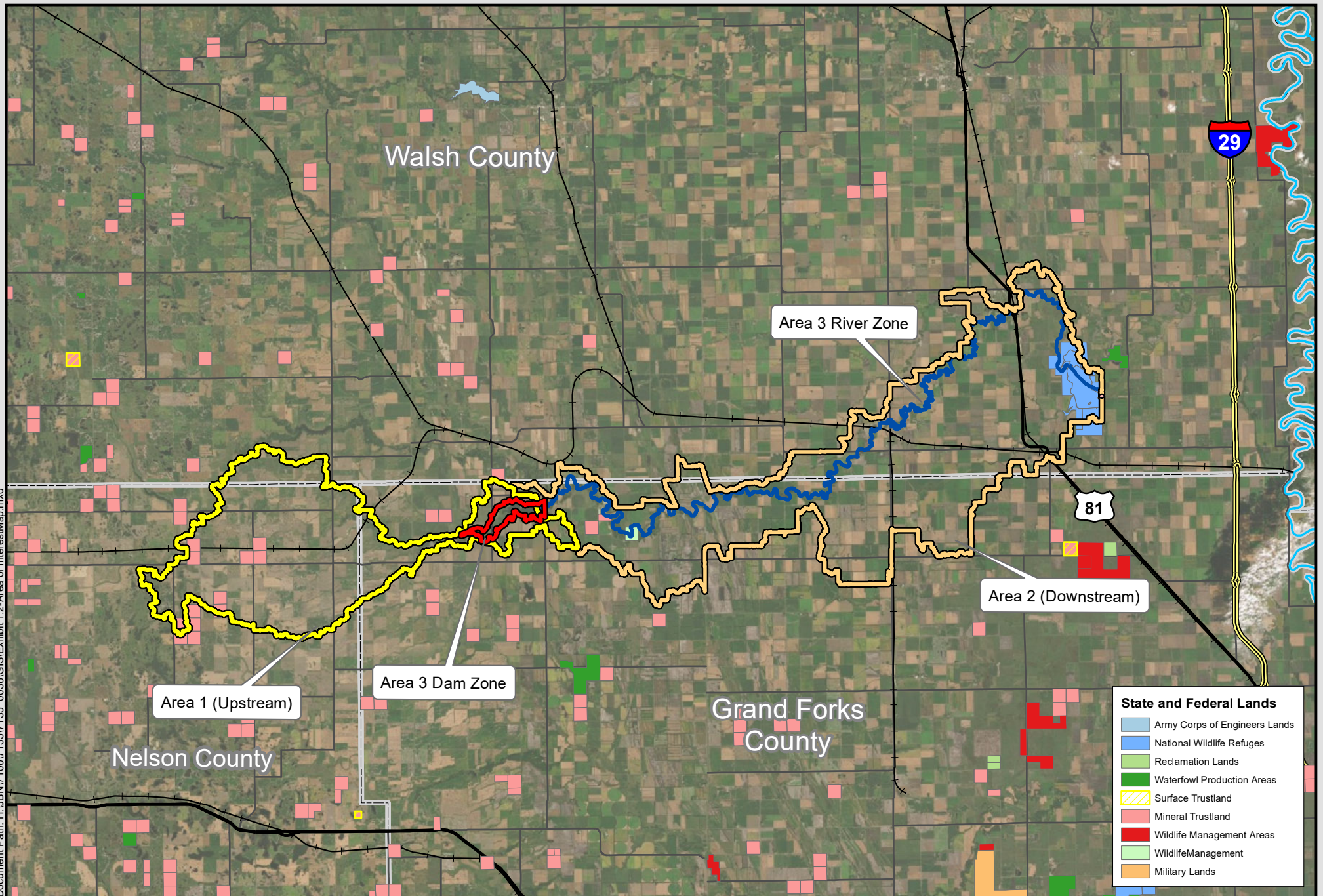
Exhibit 03.2-Land Use Map of Area of Potential Effect-Dam Zone

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 0.5 miles

0 0.5 1 Miles

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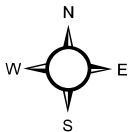
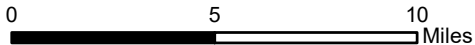
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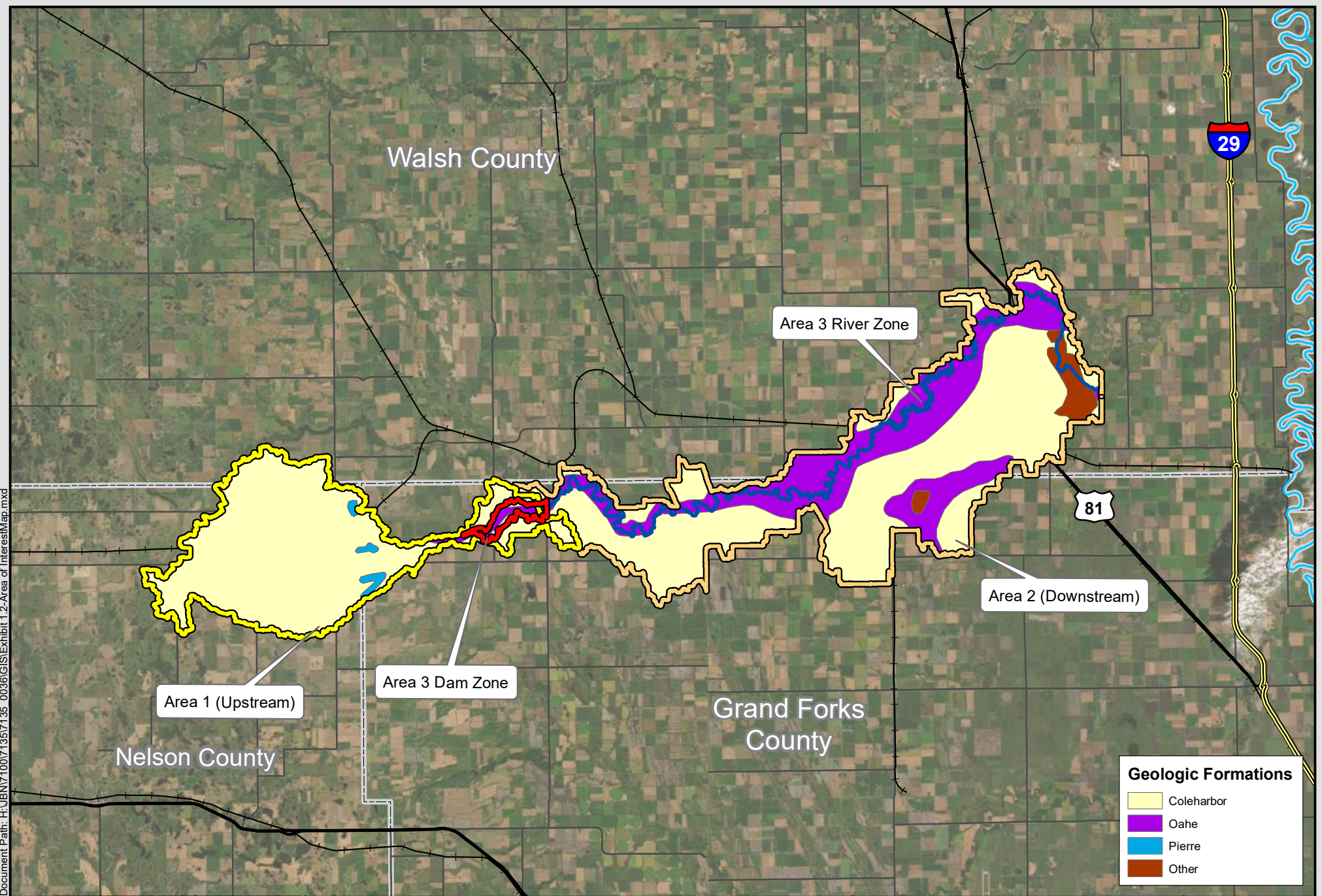
Exhibit 04.1-State and Federal Lands Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

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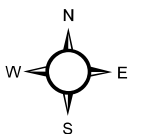
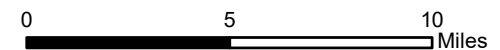


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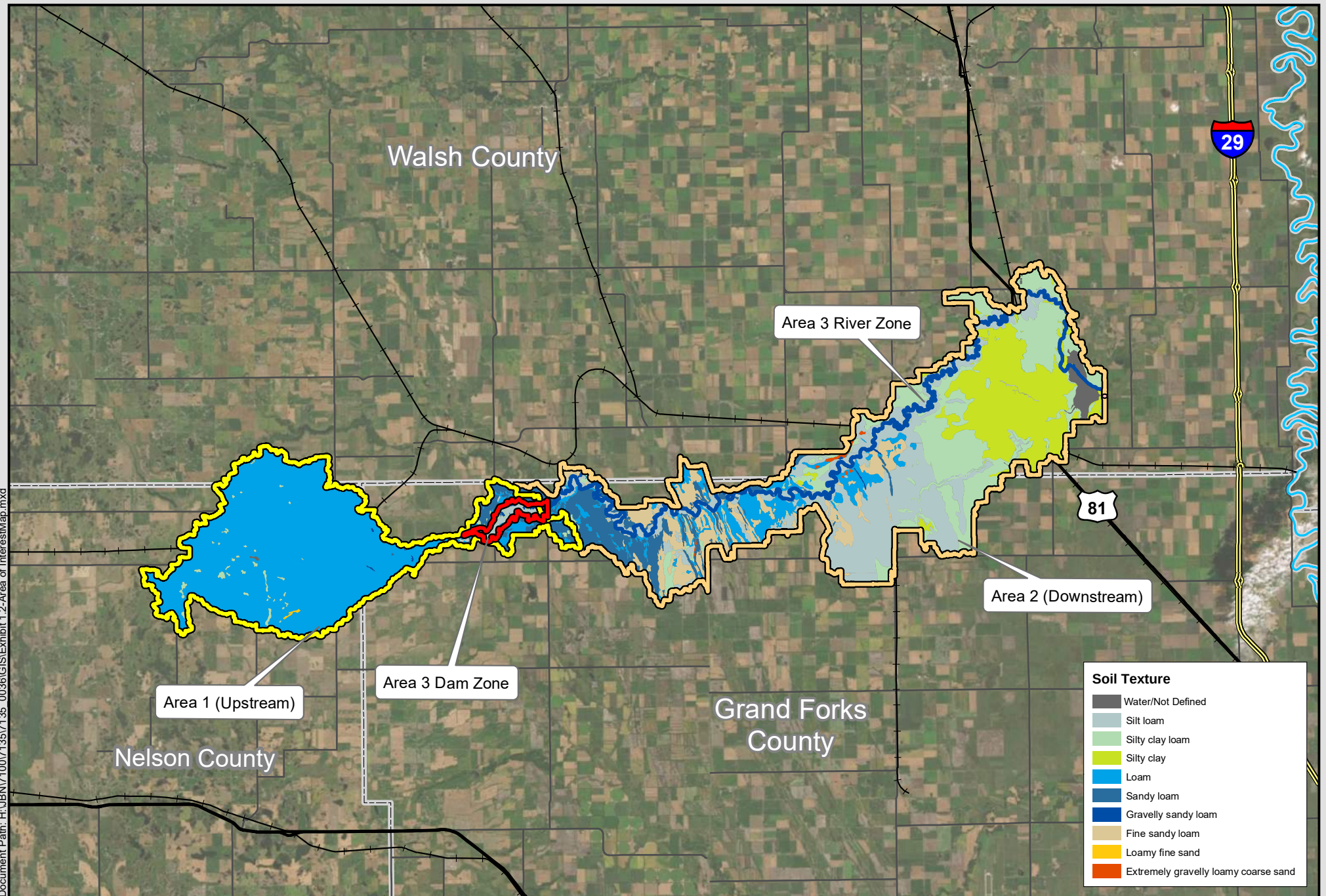
Exhibit 05.1-Geologic Units Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles



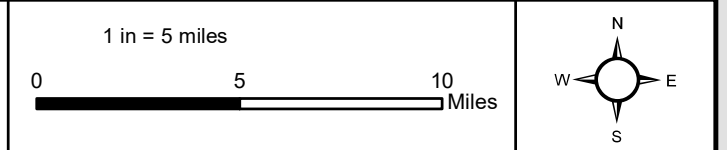
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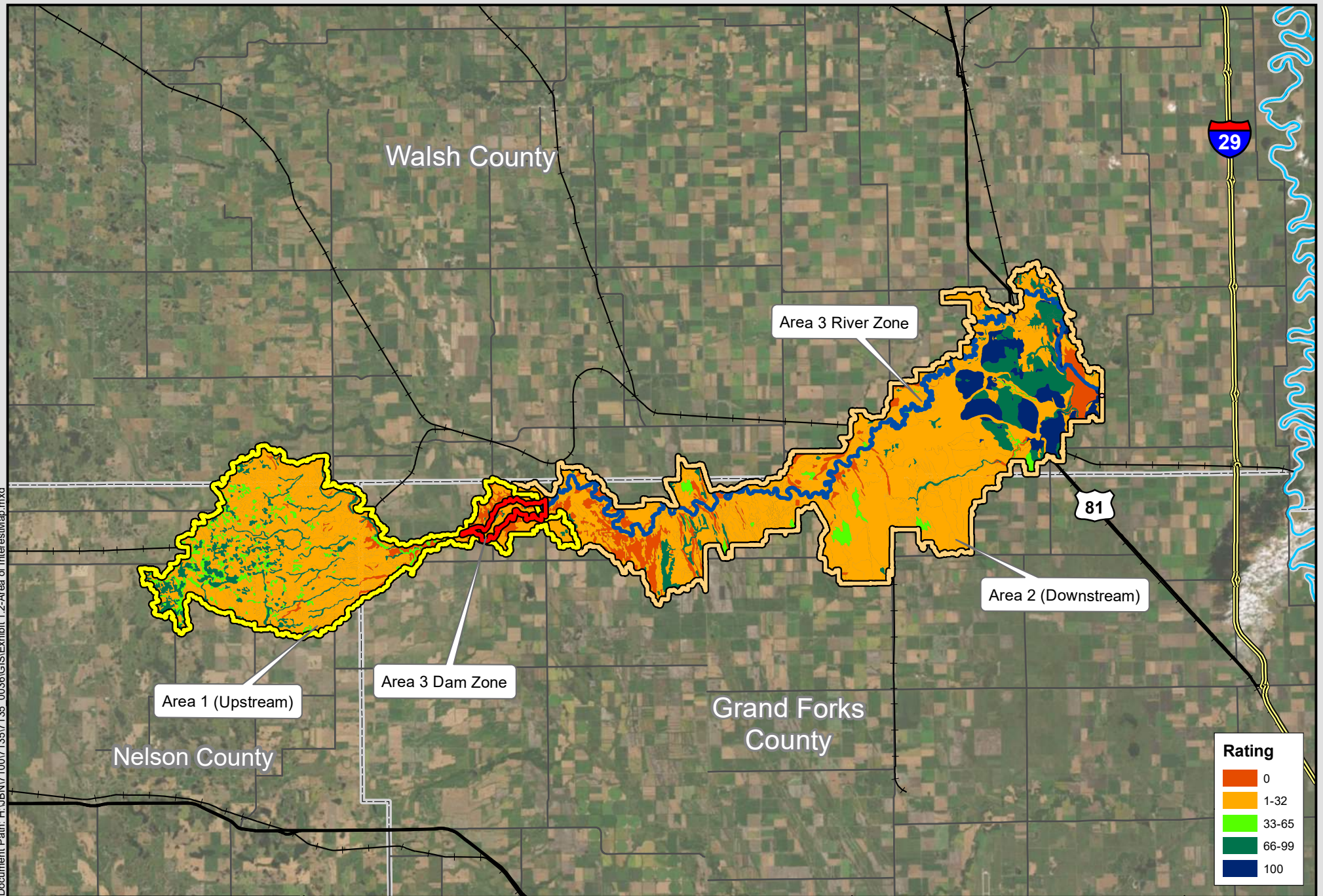
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Exhibit 05.2-Soil Texture Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



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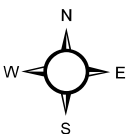
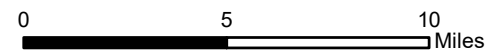


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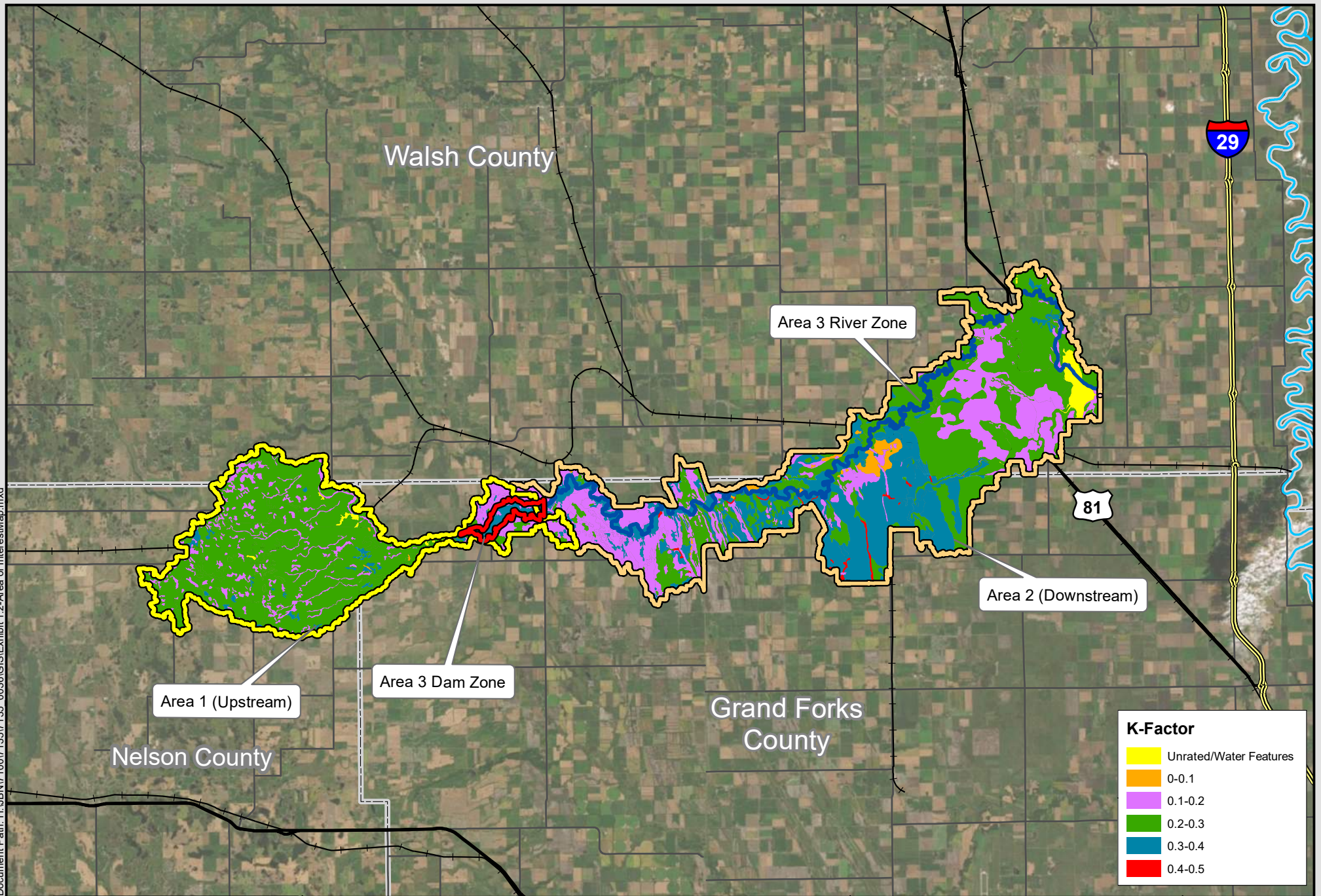
Exhibit 05.3-Soil Hydric Rating Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

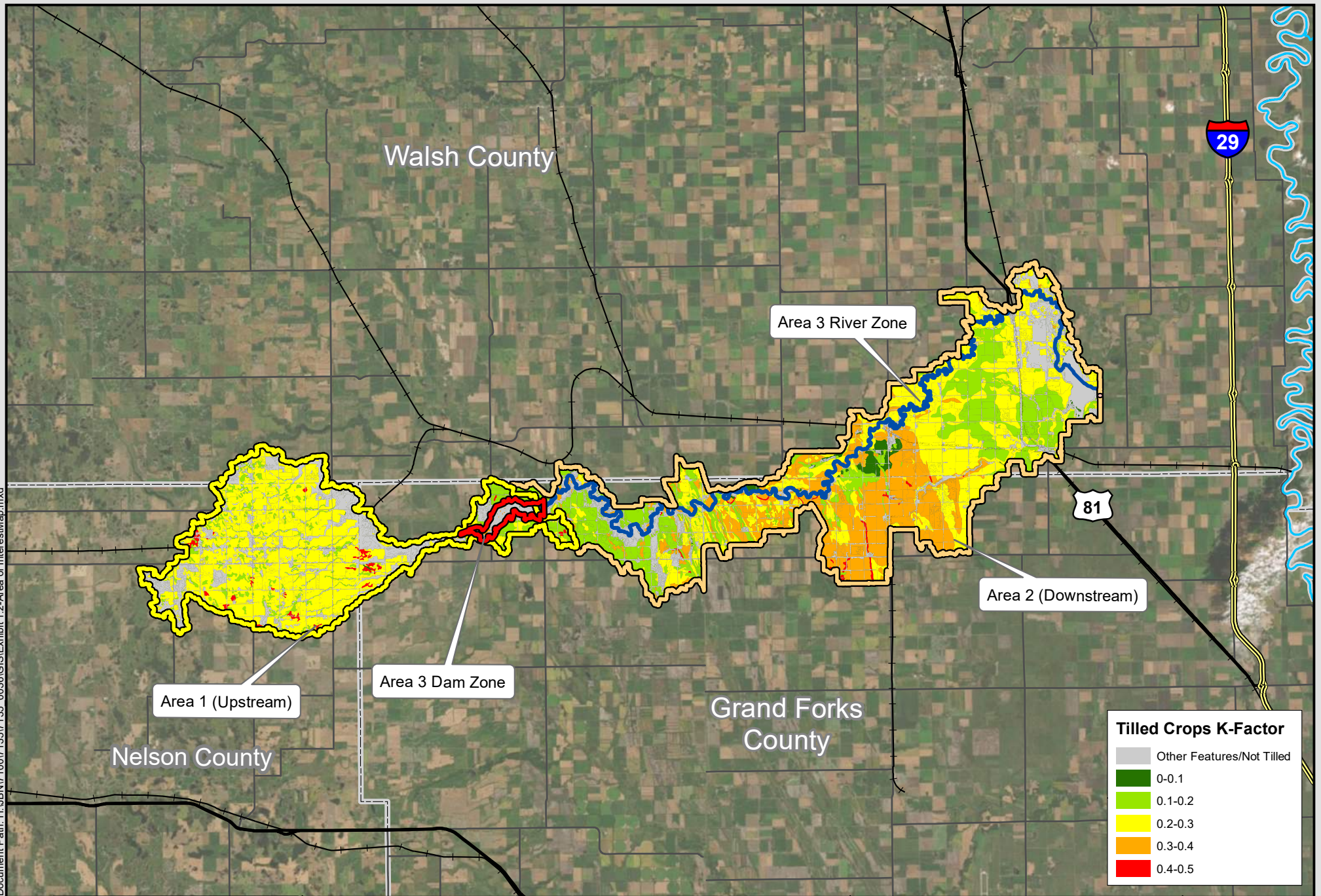
1 in = 5 miles



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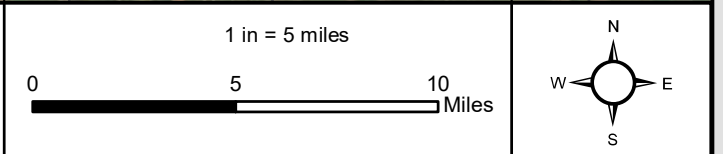
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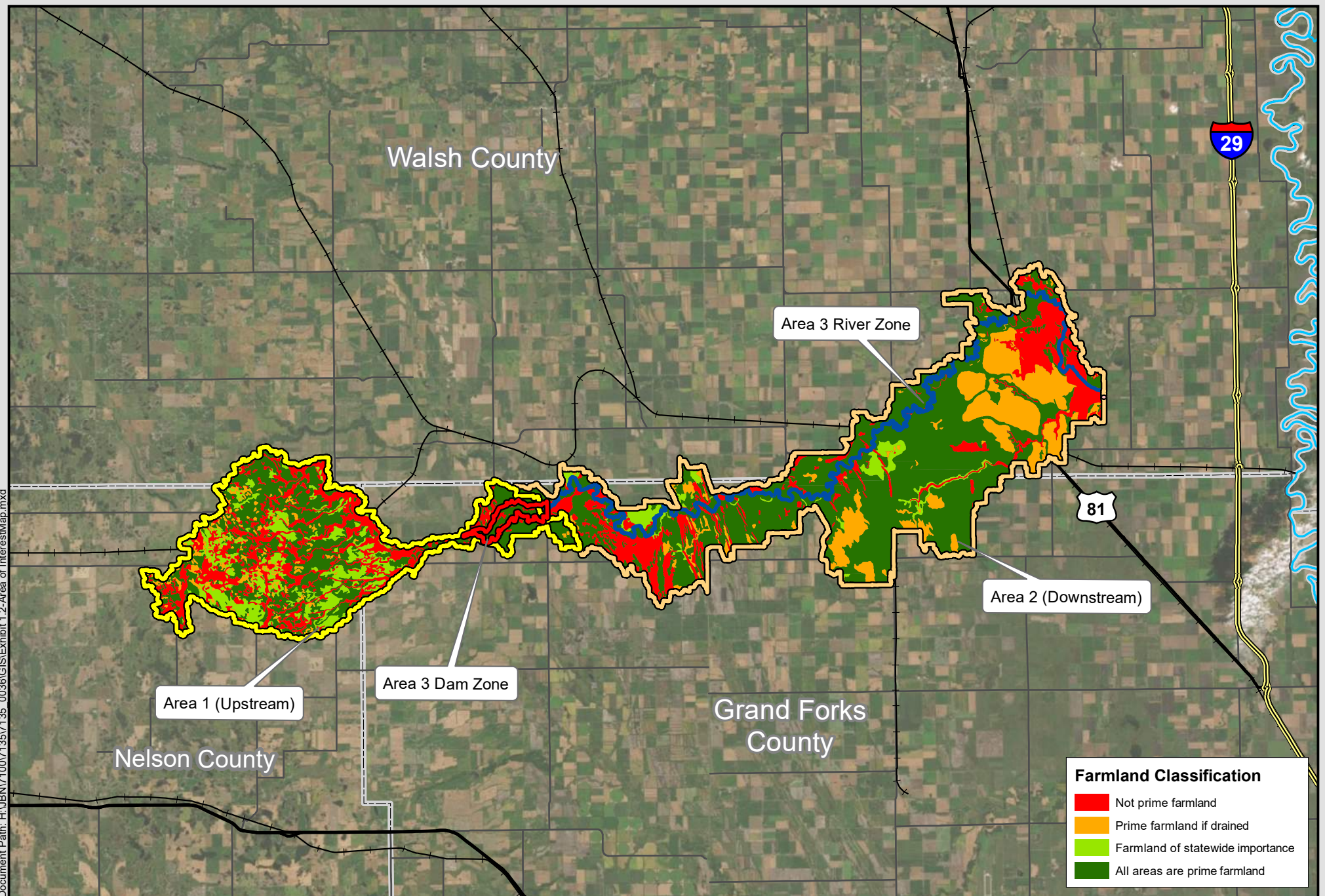
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Exhibit 05.5-K Factor (Rock Free, Tilled Soils) Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



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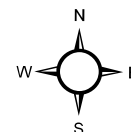
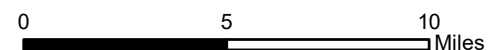
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Exhibit 06.1-Farmland Classification Map of Area of Interest

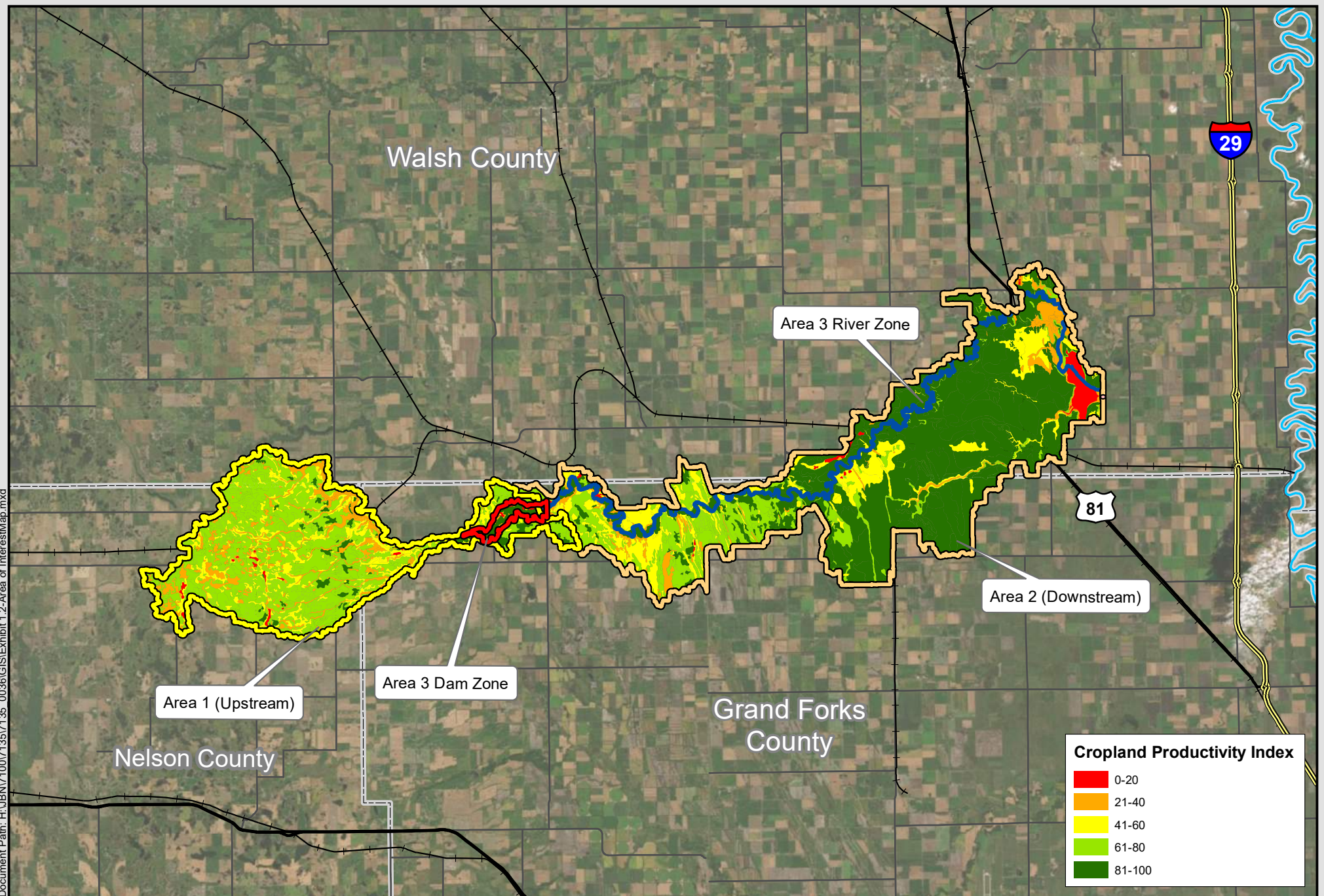
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



1 in = 5 miles



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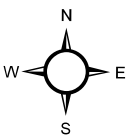
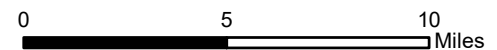
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Exhibit 06.2-Crop Productivity Index Map of Area of Interest

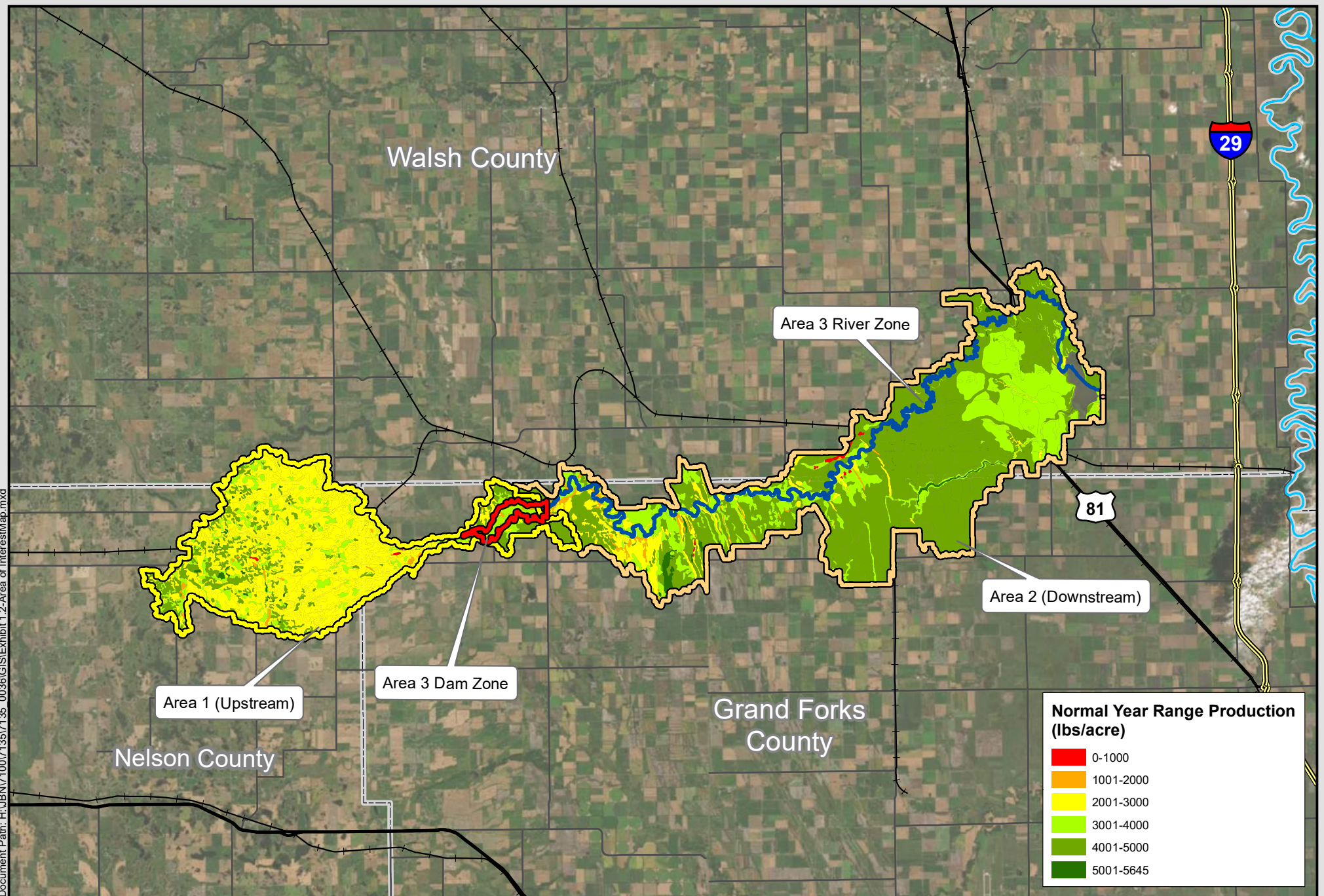
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
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Forest River Joint Water Resource District

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1 in = 5 miles



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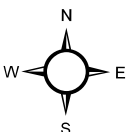
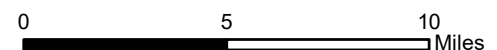
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Exhibit 06.3-Normal Year Range Production Map of Area of Interest

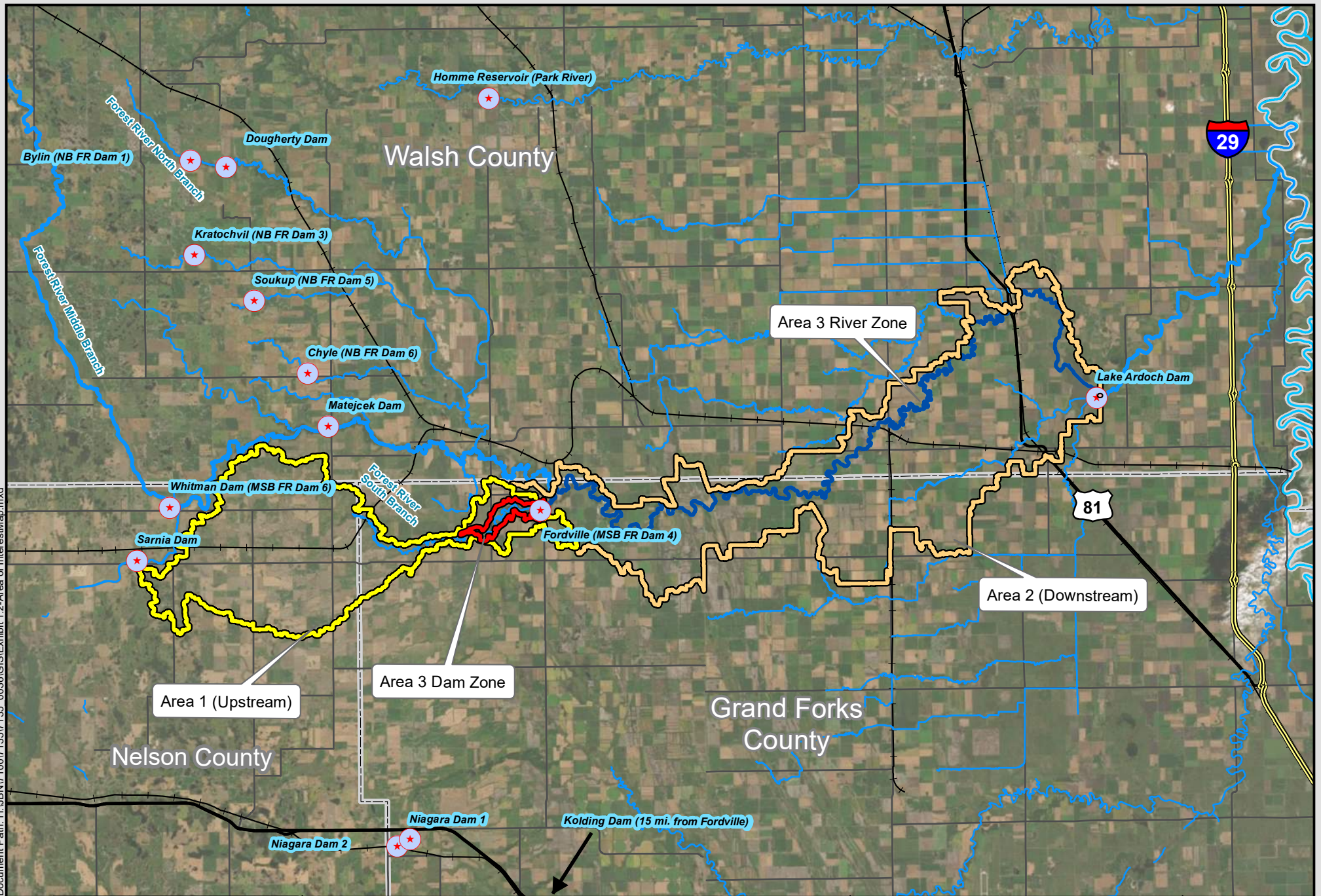
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



1 in = 5 miles



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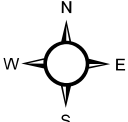
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Exhibit 07.1-Rivers and Dams Map of Area of Interest

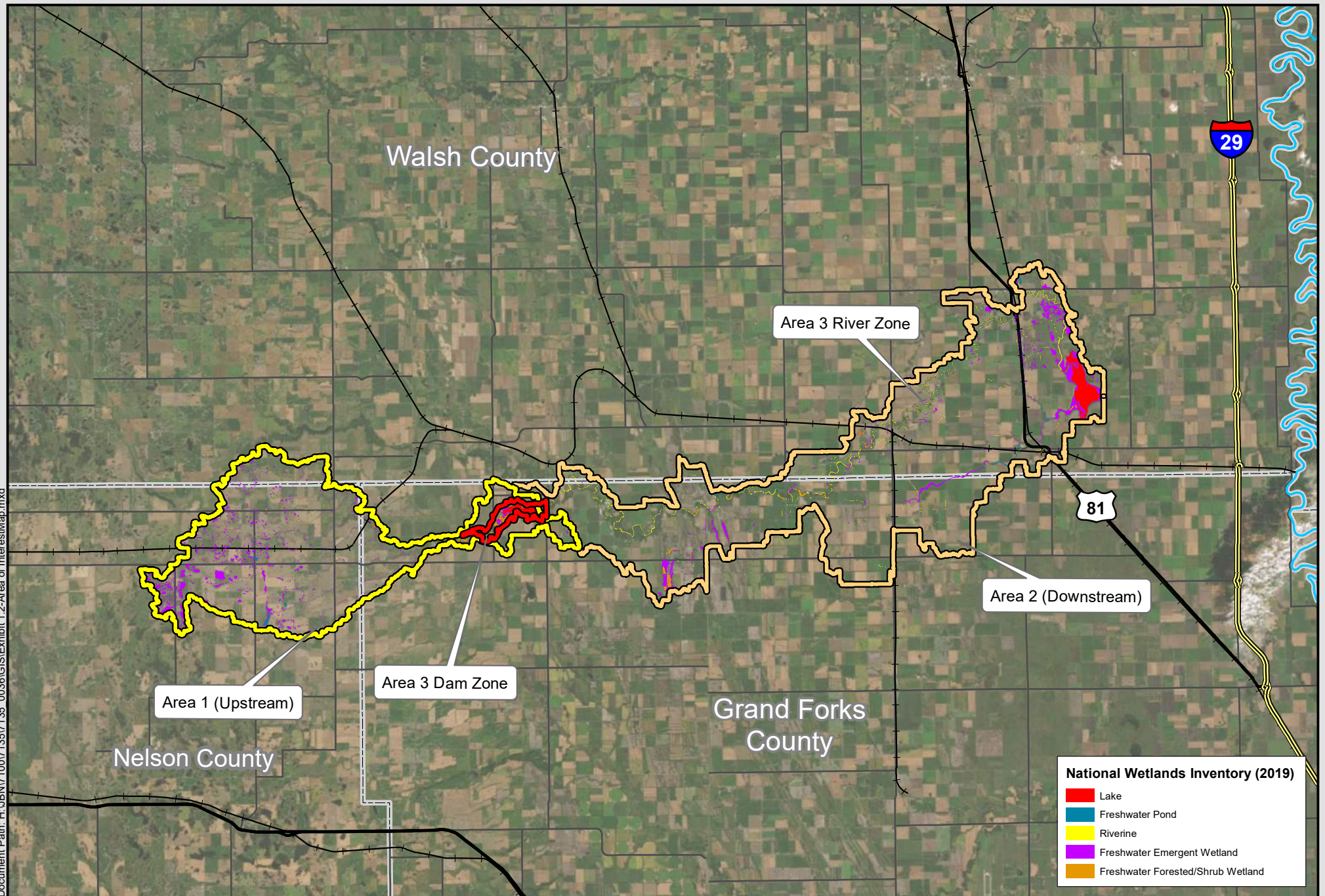
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles

0 5 10 Miles



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National Wetlands Inventory (2019)

- Lake
- Freshwater Pond
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

Scale: AS SHOWN	Drawn by: JHL	Checked by: DJ	Project No.: 7135-0033	Date: 1/15/2020	Sheet: 1 of 1
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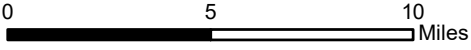
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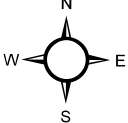
Exhibit 07.2-National Wetland Inventory Map of Area of Interest

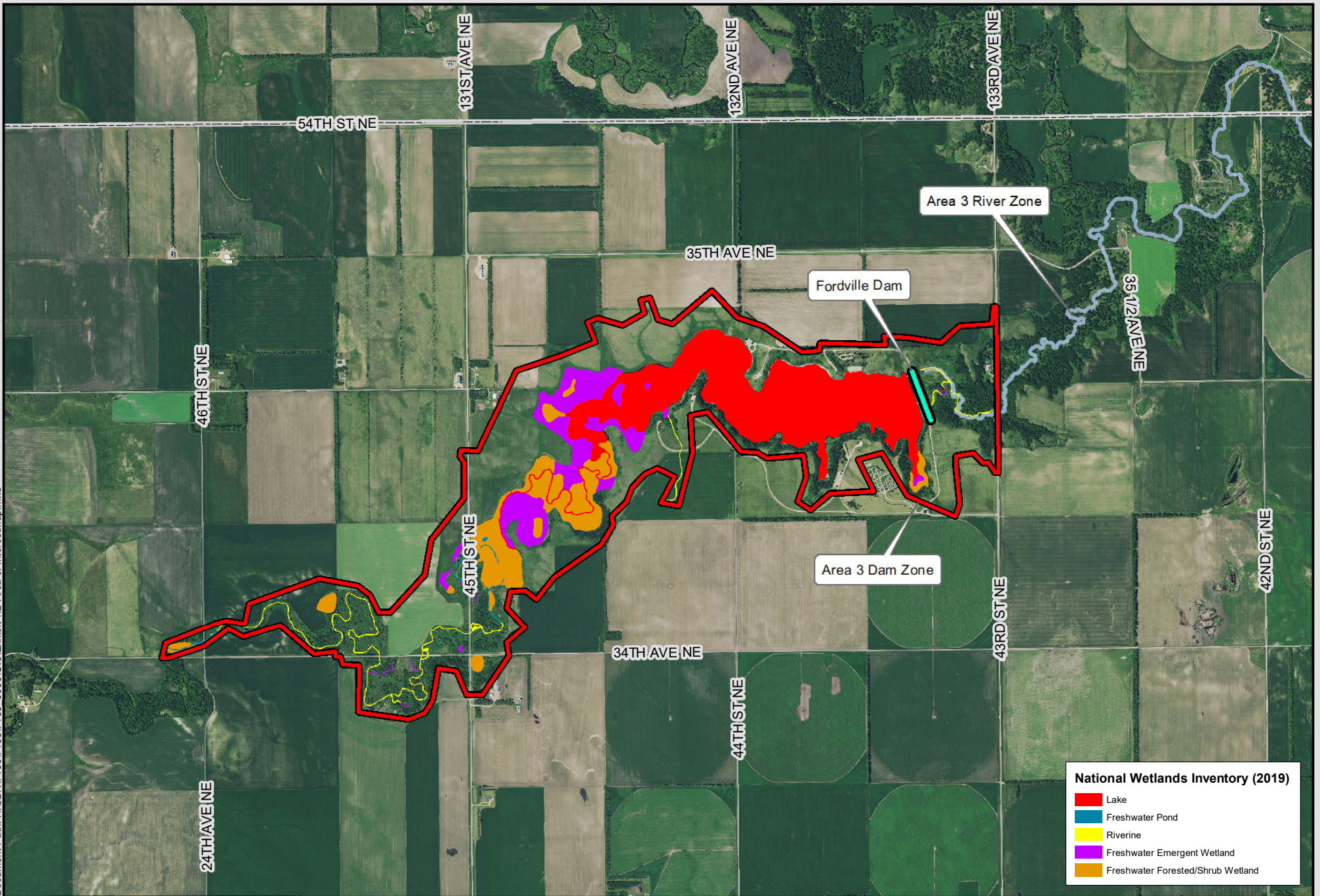
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles



0 5 10 Miles





National Wetlands Inventory (2019)

- Lake
- Freshwater Pond
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

Scale: AS SHOWN	Drawn by: JHL	Checked by: DU	Project No.: 7135-0033	Date: 1/15/2020	Sheet: 1 of 1
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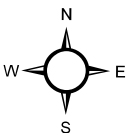
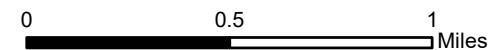


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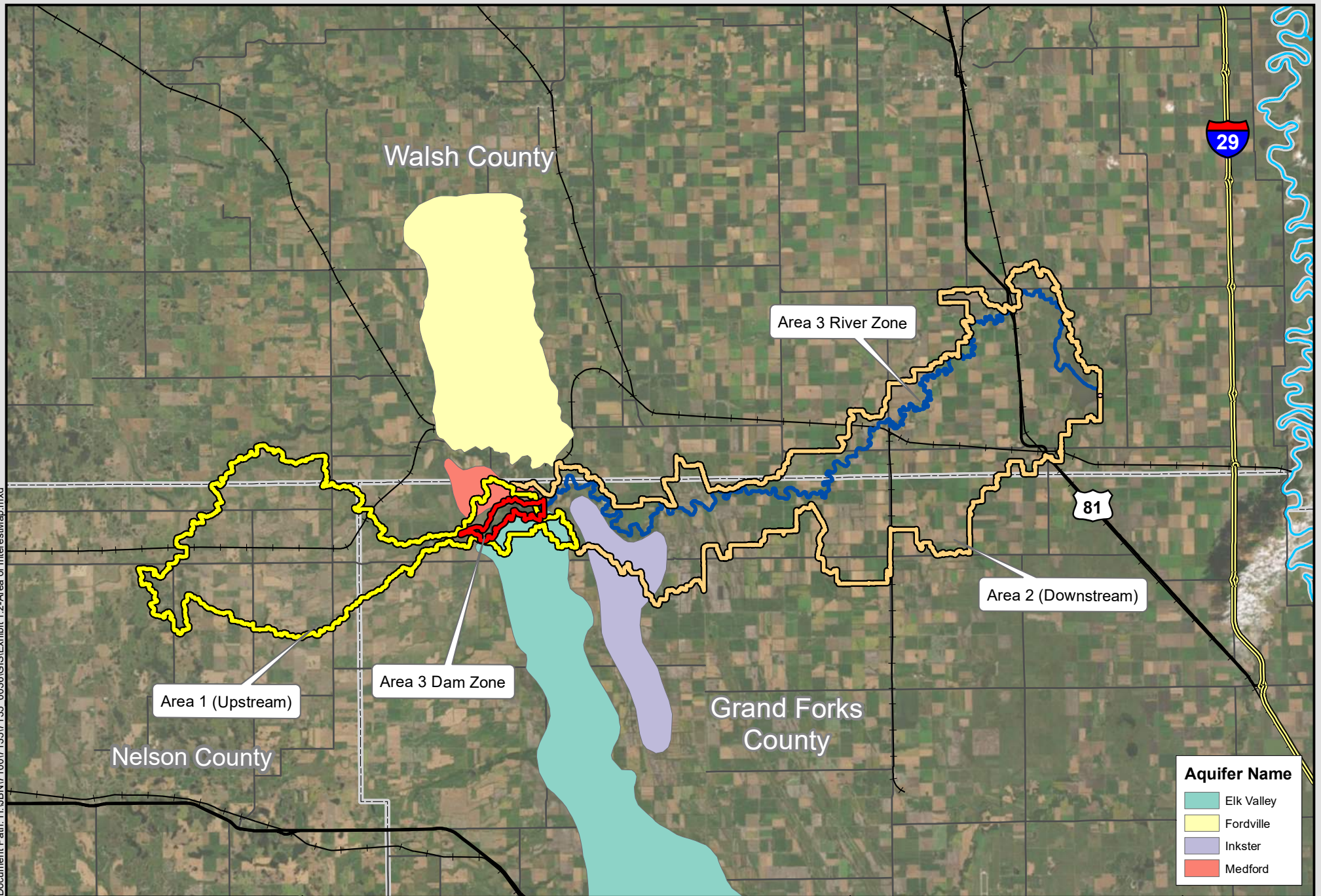
Exhibit 07.3 – National Wetland Inventory Map of APE– Dam Zone

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 0 miles



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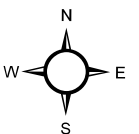
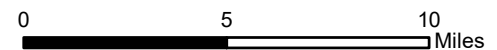
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Exhibit 08.1-Aquifers Map of Area of Interest

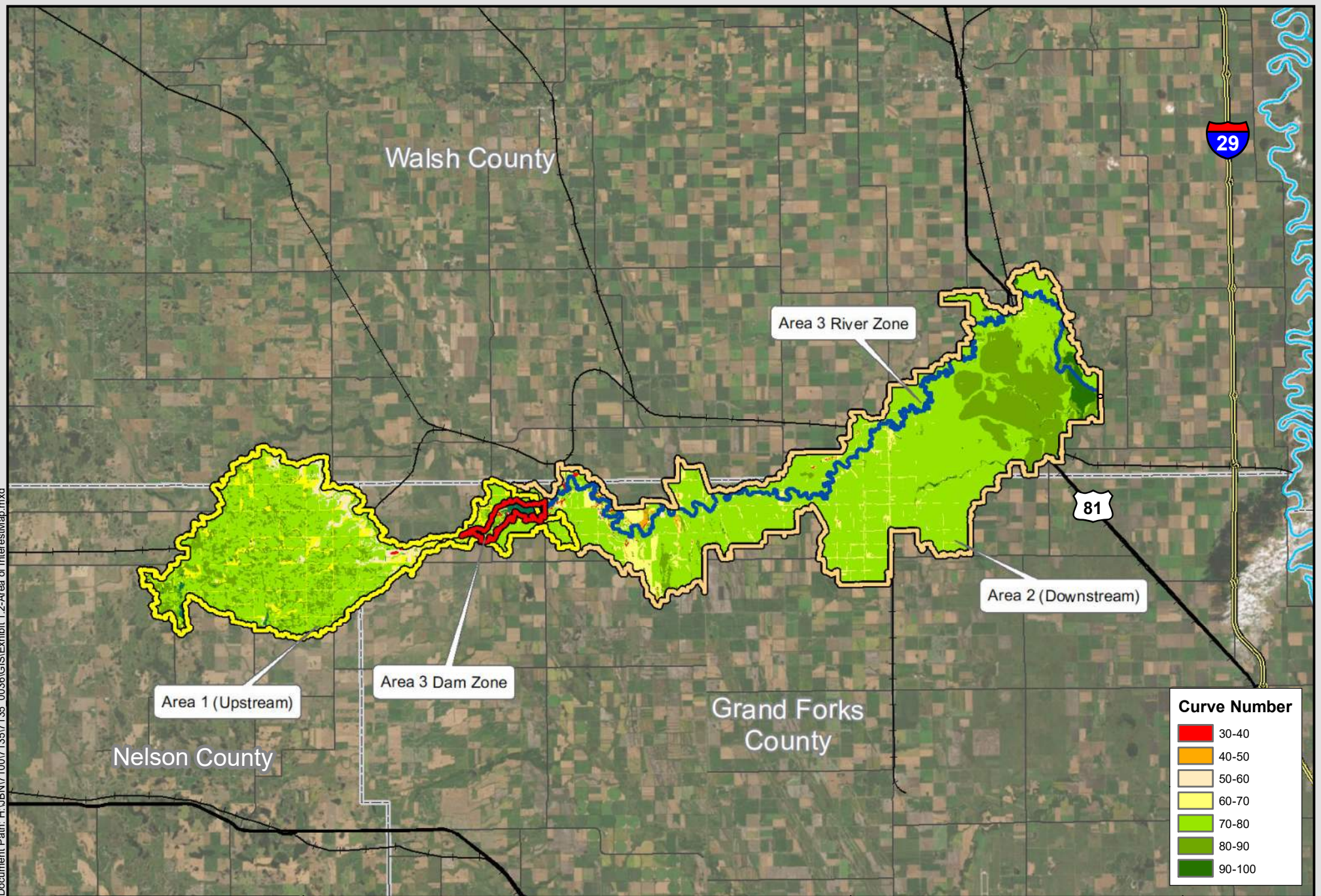
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



1 in = 5 miles



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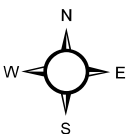
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Exhibit 08.2-24-Hour Curve Number of Area of Interest

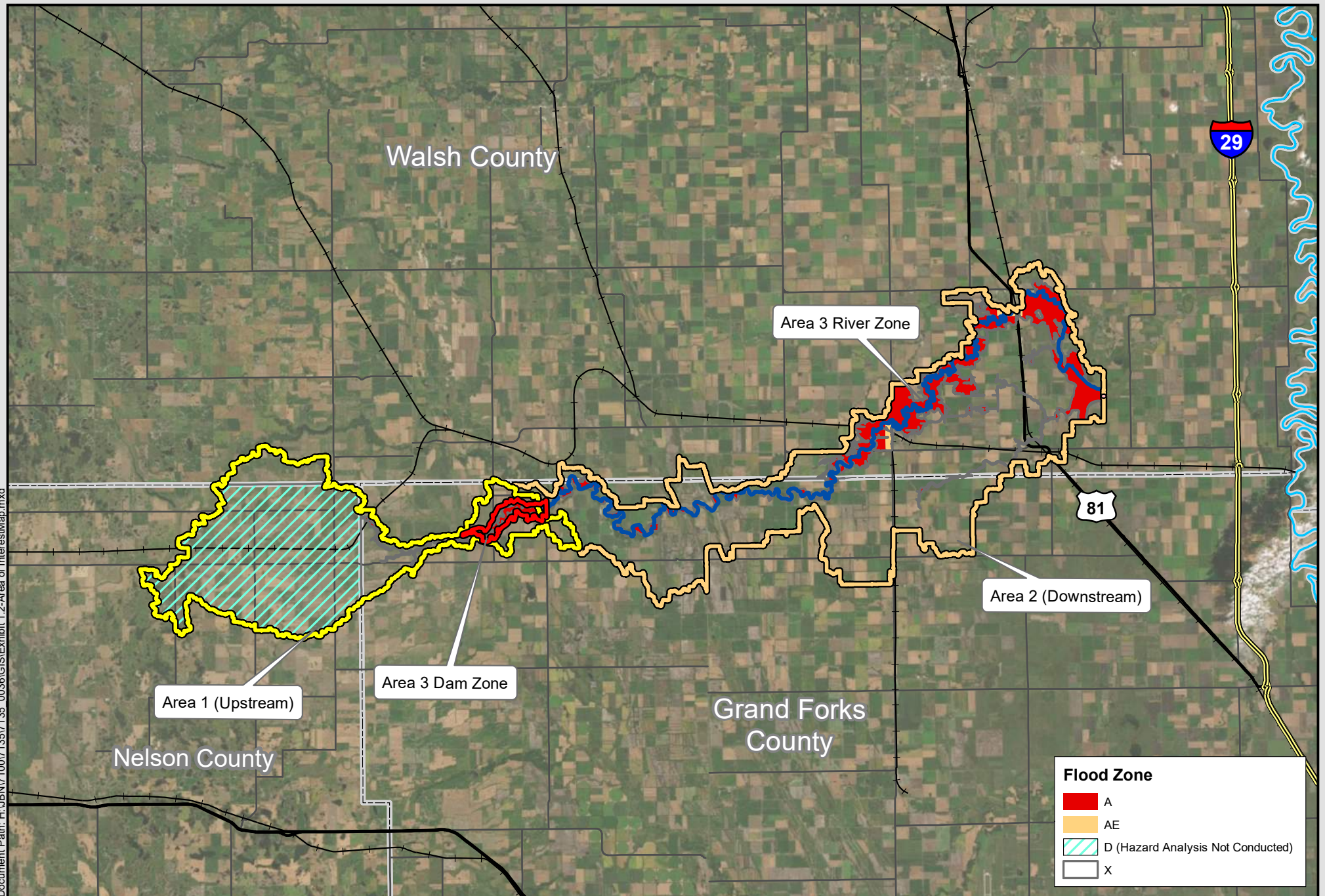
Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles

0 5 10 Miles



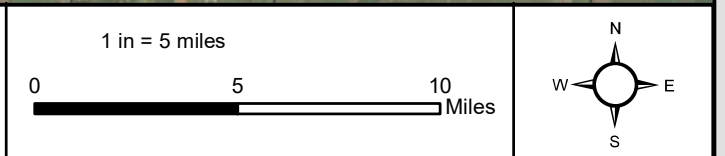
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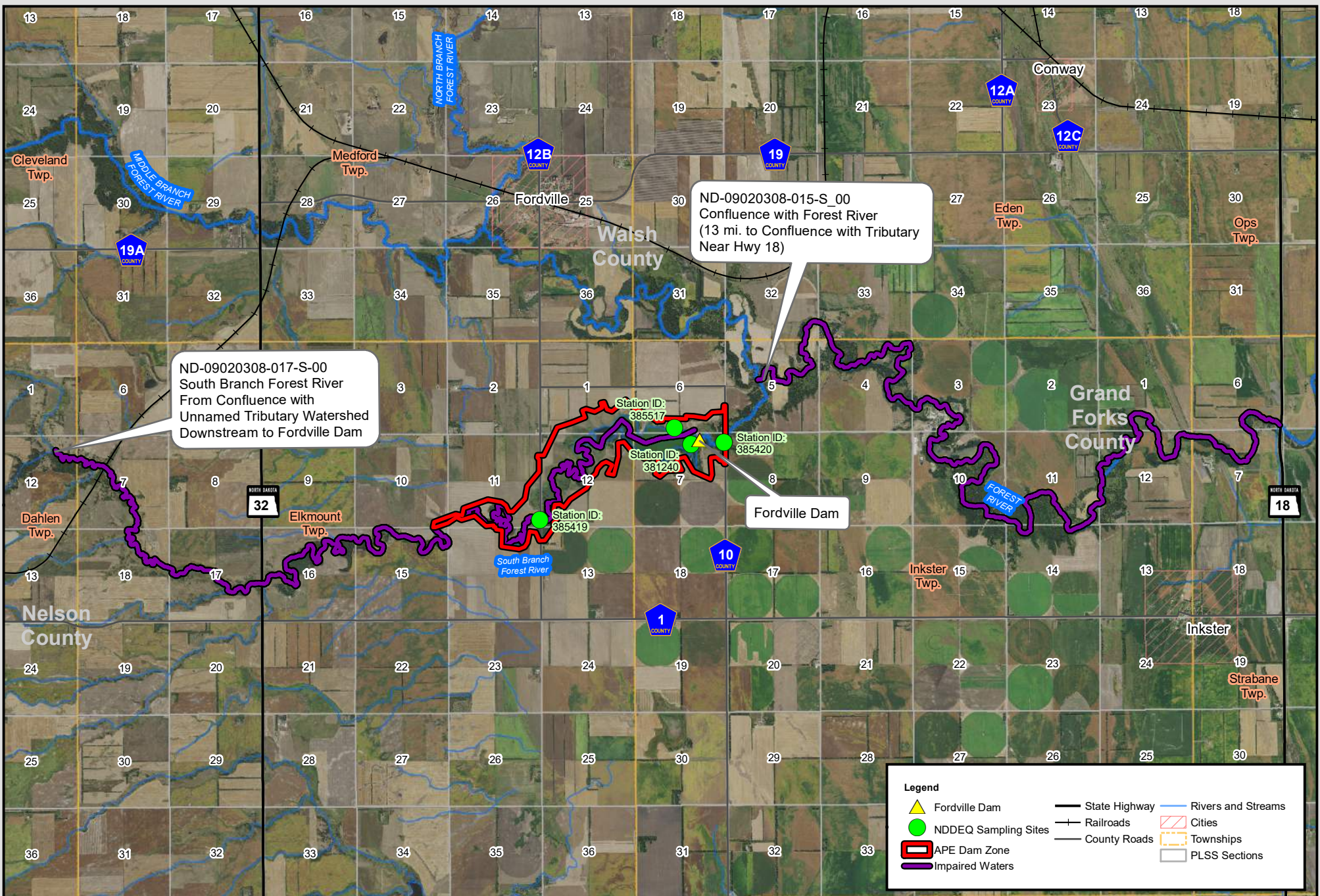
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Exhibit 08.3-FEMA Flood Zone Map of Area of Interest

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



Document Path: C:\Users\jlarson\Desktop\Projects\Project MXD s\DEQ Map.mxd



Legend

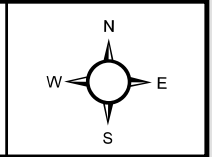
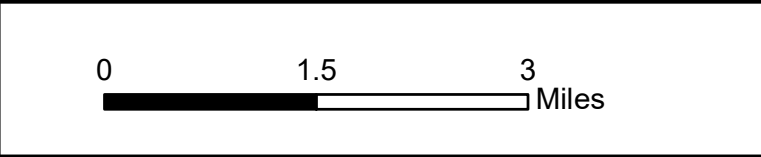
Fordville Dam	State Highway	Rivers and Streams
NDDEQ Sampling Sites	Railroads	Cities
APE Dam Zone	County Roads	Townships
Impaired Waters		PLSS Sections

Scale: AS SHOWN
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Checked by: DJ
Project No.: 7135-0033
Date: 1/14/2020
Sheet: 1 of 1

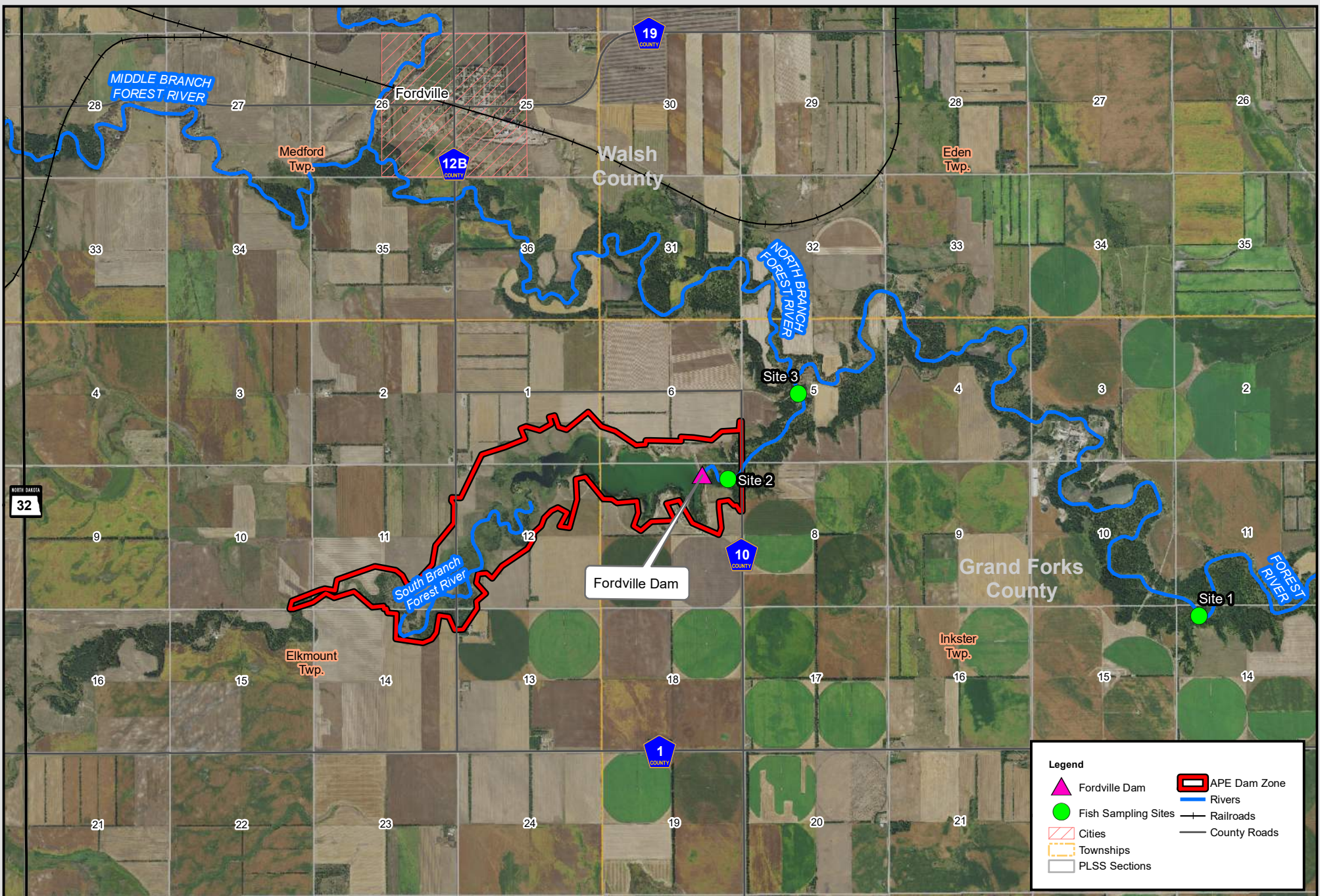
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Exhibit 09.1-Impaired Waters and Water Quality Sampling Sites

Middle-South Branch Forest River Dam No. 4 Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



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Legend

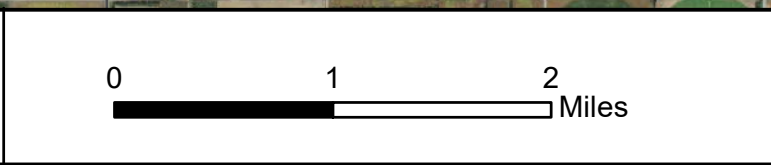
- Fordville Dam
- Fish Sampling Sites
- Cities
- Townships
- PLSS Sections
- APE Dam Zone
- Rivers
- Railroads
- County Roads

Scale: AS SHOWN
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Checked by: DJ
Project No.: 7135-0033
Date: 1/9/2020
Sheet: 1 of 1

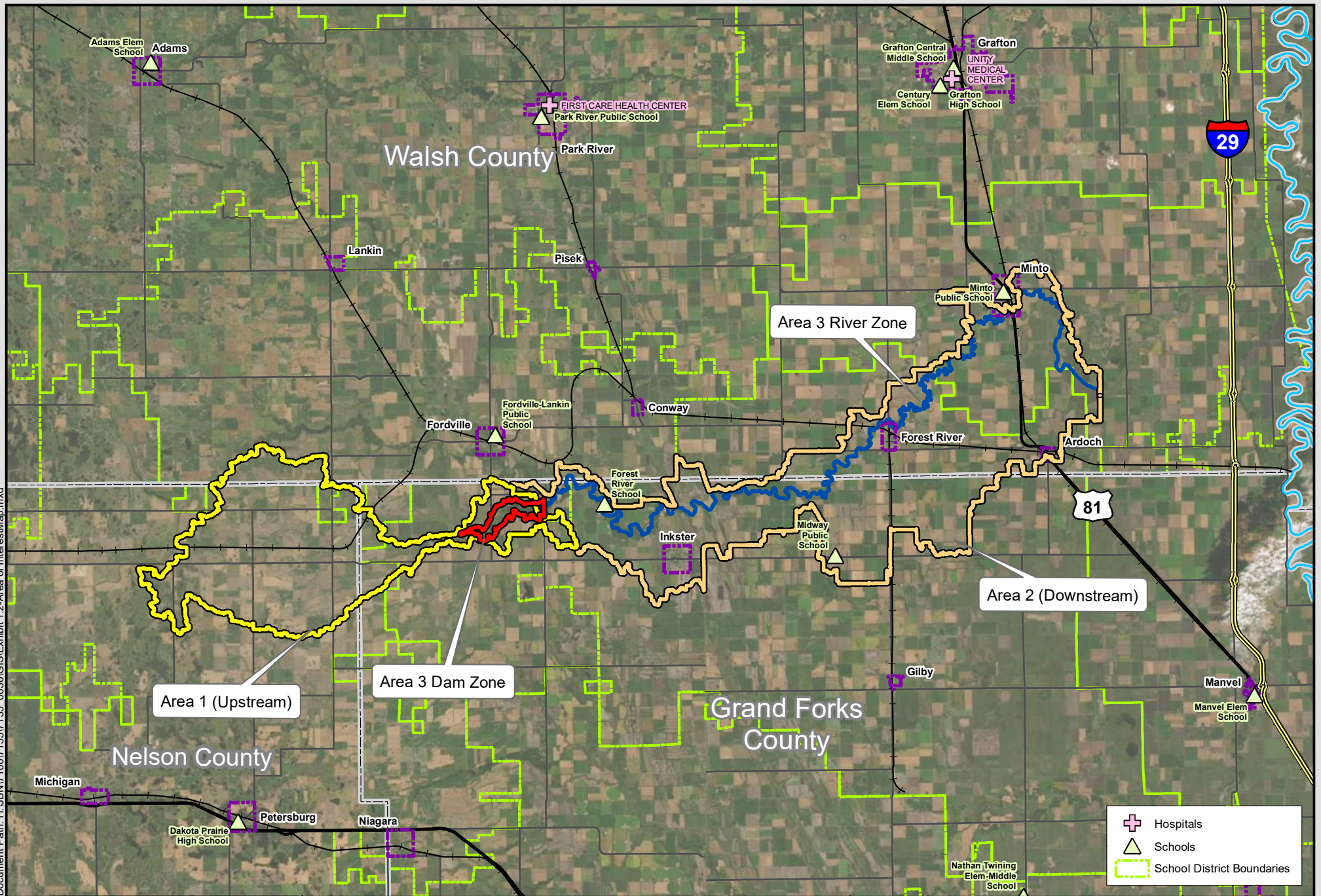
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Exhibit 10.1: VCSU Fish Sampling Sites

Middle-South Branch Forest River Dam No. 4 Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District



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- Hospitals
- Schools
- School District Boundaries

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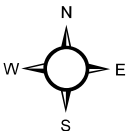
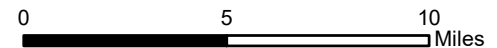


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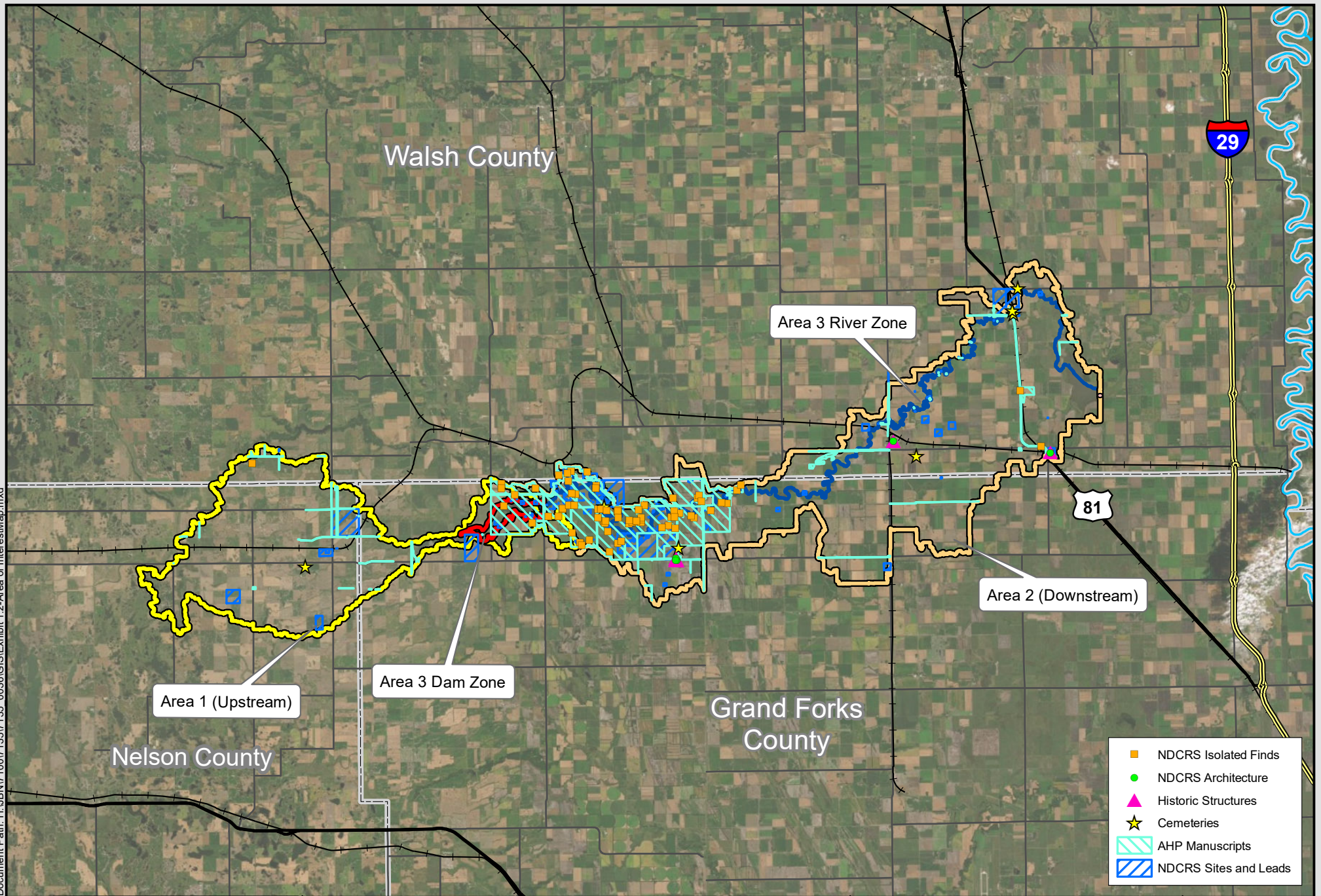
Exhibit 11.1-Access to School and Healthcare Facilities

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)
Feasibility Study and Plan of Work
Forest River Joint Water Resource District

1 in = 5 miles



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APPENDICES

APPENDIX A

STATEMENT OF WORK





NOTICE OF GRANT AND AGREEMENT AWARD

1. Award Identifying Number NR196633XXXXC006	2. Amendment Number	3. Award /Project Period Date of Final Signature- 06/30/2022	4. Type of award instrument: Cooperative Agreement
5. Agency (Name and Address) Natural Resources Conservation Service 220 East Rosser Avenue Federal Building, Room 270 Bismarck, ND 58501		6. Recipient Organization (Name and Address) W C W R D 600 COOPER AVE GRAFTON ND 58237-1535 DUNS: 078416902 EIN:	
7. NRCS Program Contact Name: Christi Fisher Phone:701-530-2091 Email: christi.fisher@nd.usda.gov	8. NRCS Administrative Contact Name: KAYLIE ALDERMAN Phone:919-875-4825 Email: kaylie.alderman@usda.gov	9. Recipient Program Contact Name: Daryl Campbell Phone: (701) 352-0081 Email: wcwrb@nd.gov	10. Recipient Administrative Contact Name: Daryl Campbell Phone: (701) 352-0081 Email: wcwrb@nd.gov
11. CFDA 10.916	12. Authority 16 U.S.C. 1012	13. Type of Action New Agreement	14. Program Director Name: Daryl Campbell Phone: (701) 352-0081 Email: wcwrb@nd.gov
15. Project Title/ Description: Middle South Branch Forest River Dam 4 (Fordville Dam)			
16. Entity Type: D = Special District Government			
17. Select Funding Type			
Select funding type:	☒ Federal	☒ Non-Federal	
Original funds total	\$572,110.00	\$245,190.00	
Additional funds total	\$0.00	\$0.00	
Grand total	\$572,110.00	\$245,190.00	
18. Approved Budget			

Personnel	\$0.00	Fringe Benefits	\$0.00
Travel	\$0.00	Equipment	\$0.00
Supplies	\$0.00	Contractual	\$572,110.00
Construction	\$0.00	Other	\$0.00
Total Direct Cost	\$572,110.00	Total Indirect Cost	\$0.00
		Total Non-Federal Funds	\$245,190.00
		Total Federal Funds Awarded	\$572,110.00
		Total Approved Budget	\$817,300.00

This agreement is subject to applicable USDA NRCS statutory provisions and Financial Assistance Regulations. In accepting this award or amendment and any payments made pursuant thereto, the undersigned represents that he or she is duly authorized to act on behalf of the awardee organization, agrees that the award is subject to the applicable provisions of this agreement (and all attachments), and agrees that acceptance of any payments constitutes an agreement by the payee that the amounts, if any, found by NRCS to have been overpaid, will be refunded or credited in full to NRCS.

Name and Title of Authorized Government Representative Richard Webb Acting State Conservationist	Signature  RICHARD WEBB Digitally signed by RICHARD WEBB Date: 2019.08.09 07:45:23 -05'00'	Date 8/9/2019
Name and Title of Authorized Recipient Representative Jennifer Lindenberger Secretary/ Treasurer	Signature 	Date 08/08/2019

NONDISCRIMINATION STATEMENT

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW., Washington, DC 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

PRIVACY ACT STATEMENT

The above statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. Section 522a).

Statement of Work

Purpose

Develop a Watershed Plan for the Middle-South Branch Forest River Watershed Forest River Dam #4, Fordville Dam. Fordville Dam is a high hazard potential dam, constructed in 1978 through funding and technical assistance provided by the Natural Resource Conservation Service (NRCS) Watershed Program, and owned and operated by the Walsh County Water Resource District (WCWRD) and the Grand Forks County Water Resource District (GFCWRD). The dam was constructed for the purposes of flood control and recreation. As documented in the 2015 Assessment Report completed by HDR|Kleinfelder under contract with NRCS, the auxiliary spillway and riser structure do not meet current NRCS dam safety standards. The principal spillway does not pass the 100-year Principal Spillway Design Hydrograph without activating the auxiliary spillway and does not meet 10-day drawdown requirements. Additionally, the dam is not capable of passing the required Freeboard Design Hydrograph without experiencing overtopping of the embankment. Preliminary dam breach modeling suggests that approximately 140 structures, 10 county/township roads, ND State Highway 18, the Forest River Hutterite Colony, the community of Forest River, ND, recreational facilities, potentially historic/cultural resources, and degradation of river, wetland, and riparian habitat.

Objectives

The Watershed Protection and Flood Protection Act (Section 14 of PL-83-566, as amended), authorizes financial and technical assistance to rehabilitate aging flood control dams originally constructed with the assistance of the NRCS Watershed Program.

Rehabilitation is defined as all work necessary to extend the service life of a dam and to meet applicable safety and performance standards. Through the course of the planning process the need for the project will be identified, and the purposes and needs that can be practically accomplished will be determined, and a preferred alternative will be identified. It is anticipated that the WCWRD will continue to seek assistance through the NRCS PL-83-566 program for funding assistance in completion of a final engineering design in 2023, and then construction potentially in 2024. Fordville Dam is located within the Forest River Watershed, in which a current NRCS Regional Conservation Partnership Program (RCPP) funded PL-566 Watershed Operations Plan has been ongoing with the WCWRD since 2016. Applicable data from the RCPP effort will be used in the Rehabilitation Plan for Fordville Dam.

Budget Narrative

All funds to be expended for the project will be via a contract between the Walsh County Water Resource District (WCWRD) and a private engineering firm. A long-term contract, procured through State of North Dakota A&E Contracting regulations, has already been signed between the WCWRD and Houston Engineering, Inc. As detailed in the attached planning cost estimate from Houston Engineering, the total cost of that 4-year contract will be approximately \$ 817,300.

The projected project budget, based on current sources, is: Quarterly invoices will be submitted, with reimbursement to the WCWRD made on the following basis:

Federal: \$ 572,110

WCWRD: All remaining costs, estimated at \$245,190

Responsibilities of the Parties:

A. The Recipient will:

1. Complete all procurement and contract administration functions necessary to hire a professionally licensed engineering firm and/or appropriately qualified technical services firms with the appropriate disciplines to perform interdisciplinary watershed planning services for the Fordville Dam Rehabilitation Project.

2. Ensure that the scope of technical services are within the subset of "watershed rehabilitation" activities as defined in Expected Accomplishments And Deliverables of this document. Technical services related to final engineering design and permitting activities are not within the scope of this agreement, and would be incorporated into a new standalone project agreement if the Recipient and NRCS choose to continue work on the project beyond this agreement.

3. Provide 30% of the total actual costs for technical services, on an individual invoice basis, and all costs in excess of

the federal share of \$572,110.00 to complete the plan. Based on the initial estimate, the total project cost will be \$817,300.00; therefore the recipient's share is estimated at \$245,190.00 (or 30%). Actual costs for planning work are expected to vary. Payments will be on an individual invoice basis, as the project progresses; however, the federal reimbursement by review point will not exceed the totals listed in Expected Accomplishments And Deliverables of this document.

4. Ensure consultant billings between this cooperative agreement, for Watershed Rehabilitation Planning on Fordville Dam, and RCPP Watershed Operations Planning on the Forest River Watershed (Cooperative Agreement 66-6633-15-011) are correctly allocated and well documented in the accounting records. Federal statute does not allow RCPP funds to be utilized for Watershed Rehabilitation Planning.

5. Designate an individual (Project Liaison) to serve as liaison between the Recipient and NRCS and identify that person to NRCS in writing along with a list of his or her duties, responsibilities and authorities.

6. Hold and save NRCS free from any and all claims or causes of action whatsoever resulting from the obligations undertaken by the Recipient under this agreement or resulting from the work provided for in this agreement.

7. Provide quarterly reports of progress, as well as invoices for technical services provided.

B. The NRCS will:

1. Provide a maximum of 70% of the total actual costs for technical services, on an individual invoice basis, to a maximum federal cost share of \$572,110.00 to complete the plan. Payments will be on an individual invoice basis, as the project progresses; however, the federal reimbursement by review point will not exceed the totals listed in Expected Accomplishments And Deliverables of this document. Only those costs for technical services incurred after the date of the Cooperative Agreement signature by NRCS, are reimbursable.

2. Provide initial technical review at milestone points as outlined in the Expected Accomplishments and Deliverables section of this agreement. Review comments will be preliminary in nature, may be incomplete, and will be typically provided via informal phone or email communications.

3. If an Environmental Impact Statement (EIS) is determined to be necessary for the project, NRCS will file a Notice of Intent and Record of Decision in the National Register. If an Environmental Assessment (EA) is determined to be adequate, NRCS will prepare a Finding of No Significant Impact and publish its availability.

4. Complete final technical review and approval of the Watershed Plan, per Part 502.11 of the National Watershed Planning Manual (NWPM), including pursuit of exceptions to the National Economic Development Plan if determined necessary. A formal written report will be provided to the Recipient, containing findings and recommendations for correcting identified deficiencies.

5. ND NRCS will review the deliverables and provide technical comments to the Recipient within thirty (30) calendar days of the submittal. Note that ND NRCS review is interim, and may not be comprehensive or exactly reflect final review comments from the NRCS NWMC.

C. The Recipient and NRCS will:

1. Jointly work to ensure that public funds are spent in a prudent manner for the intended purpose of this agreement. Each party will communicate issues and concerns with work progress or quality in a clear and timely manner. Either party may terminate this agreement at any point in time, for ongoing issues related to adequate progress or technical quality.

Expected Accomplishments and Deliverables

The work consists of the performance of any part or all inventories, surveys, preliminary designs, and planning necessary to complete an NRCS acceptable combined Watershed Plan and EA/EIS. Work shall conform to NRCS regulations and policy documents, standards, technical guidelines, and references. Most of these reference materials are available on the NRCS Website. The address for these documents is: <https://directives.sc.egov.usda.gov/>.

NRCS policy documents include:

General Manual (GM)

National Engineering Manual (NEM)

National Operations and Maintenance Manual (NO&M)

National Watershed Program Manual (NWPM)

Environmental Principles Requirements and Guidelines for Water and Related Land Resources Implementation Studies

(PR&G)

USDA Department Manual 9500-13 Guidance for Conducting Analysis Under the Principles, Requirements, and Guidelines for Water and Land Related Resource Implementation Studies and Federal Water Resource Investments.

NRCS technical guidelines include

National Watershed Program Handbook (NWPH),

National Planning Procedures Handbook, (NPPH)

National Engineering Handbooks (NEH)

Natural Resources Economics Handbook, (NREH), Part 611 Water Resources Handbook for Economics

National Environmental Compliance Handbook (NECH)

National Cultural Resources Procedures Handbook (NCRPH) and

National Handbook of Conservation Practices (NHCP)

Technical references include:

NRCS Technical Releases (TR) and Technical Notes TN)

ND NRCS Hydrology Manual

Project Specific NRCS supplied materials include:

As-built Drawings Middle-South Branch Forest River Dam No 4

Inspections and O&M Reports

Dam Assessment Report

The Watershed Plan – EE, EA, or EIS will meet all requirements set forth by the NEPA, Endangered Species Act and the National Historic Preservation Act. The Watershed Plan–EE, EA, or EIS will be presented in a document following the format as described in NWPM Part 501.31, Plan Format Outline and as described in Section 501.32 through 501.45.

The Plan- Environmental Document shall follow the policy outlined in DR 9500-013, Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments, and other requirements set forth in the Council on Environmental Quality (CEQ) Principles Requirements and Guidelines for Federal Investments in Water Resources (P&G), and Interagency Guidelines (IAG); and other PR&G guidance as developed through agency training or policy updates.

Engineering surveys, engineering hydrologic and hydraulic analyses and geologic activities must be performed in accordance with NRCS and North Dakota standards. All work performed for this SOW must be certified that it meets required criteria. All activities shall comply with the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) as amended by the Small Watershed Rehabilitation Amendments of 2000 (Section 313 of Public Law 106-472).

If during project planning additional analyses, evaluations, environmental compliance activities, and documentation are needed that are beyond the requirement detailed in this SOW, NRCS, in consultation with the Recipient and other affected parties, will determine the need and extent of the work. If it is decided the additional work is needed, NRCS will determine the avenue by which additional work will be completed. If funding is available, NRCS will acquire the needed work by negotiating with the Recipient, utilizing federal contracting sources, or utilizing or use of NRCS staff.

The Recipient is responsible for reviewing the accuracy of the supplied materials and informing NRCS of any inaccuracies.

A. Purpose and Need for Action, Public Participation

1. A Feasibility Report and Plan of Work will be prepared and will summarize the studies completed to date and describe the remaining work needed. The report will meet the requirements outlined in the NWPM, Parts 501.20 and 501.21.

2. Assemble a project team and a technical team (interagency review team) to assist in guiding the project. The NRCS State Conservation Engineer (SCE), or his/her designee, will serve as a member of both teams.

3. Develop a Public Participation Plan in conformance with Title 400 General Manual Part 400. Public participation may include advertising for public meetings, conducting meetings, transcription of meetings, coordinating Government to Government consultations, or Environmental Justice public participation activities.

4. Draft letters of invitation for NRCS signature to the U.S. Army Corps of Engineers (USACE) (as a cooperating agency), U.S. Fish and Wildlife Service (USFWS) (as a cooperating agency), Federal Emergency Management Agency (FEMA) Region 8, Grand Forks County Commissioners, Grand Forks County Soil and Water Conservation District, the Grand Forks County Floodplain Administrator, ND State Water Commission, ND Game and Fish Department, ND Department of Transportation, ND Department of Health, ND State Historical Society, the Red River Retention Authority, and all tribal nations whose ancestral lands include the project area.

5. Complete the process of obtaining initial public, landowner, and agency input on resource problems, concerns, and opportunities in the watershed as outlined in the public participation plan. Note that meetings beyond the initial public and agency meetings are assumed to be embedded with later review points as appropriate.

6. Formulate project based on the principles outlined in the NRCS NWPM (In particular, Parts 501.11 A (2); 501.12. C; 505.35 B (1) (iii)-(iv); 505.35 E-F).

7. Adopt an initial Purpose and Need statement based on the feasibility report, available technical information, and public and agency input. The need portion of the statement will contain as much quantitative detail on damage extents as possible; however, it may be amended with additional information gained through analysis as planning progresses.

8. Develop a Quality Assurance/Quality Control Plan (QA/QC) for the Project. The Recipient's QA/QC officer will be charged with responsibility of the Plan's implementation and documentation of current QA/QC activities. An update on all QA/QC activities will be reported in the progress reports. All work performed by the Recipient's personnel, including sub-consultants, will be in accordance with this QA/QC Plan.

Review Point #1: submit documentation of Section A. 1-8 listed above to the ND NRCS SCE for technical review. The cumulative maximum federal reimbursement amount for these items is \$22,190.

B. Data Collection, Resource Inventory

1. Complete engineering surveys including: sediment/bathymetric survey, apparent property line location, and topographic surveys including auxiliary spillway cross sections and profile, top of dam profile, embankment cross sections, principal spillway geometrics and elevations. Supplemental survey data to existing LiDAR topographic data will be acquired as necessary for the breach analysis, focusing on the low flow channel and forested areas of the floodplain where LiDAR may not be accurate. The limit of the breach inundation study shall extend downstream to where the maximum breach inundation water surface elevations converge with the base flood elevations (100-year recurrence interval flood). A proposed plan for the survey work will be completed and submitted to NRCS for concurrence prior to starting survey efforts. The plan will include proposed methodology, accuracy, and level of detail. Data collection shall be completed in vertical datum NAVD88, US vertical feet. The survey work will include the following, at a minimum:

Profiles, with points at a 50-foot interval maximum spacing, along the centerlines of the dam, principal spillway, outlet works, and auxiliary spillway.

Cross sections, taken at a 50-foot maximum spacing along each profile centerline of the dam, principal spillway, outlet works, and auxiliary spillway.

Supplemental cross sections and centerline profile of the downstream channel, to those collected by field survey for the Fordville Dam Emergency Action Plan, of the bankfull river channel downstream of the dam, through the full extents of the breach zone, at intervals of no more than 1,000 feet and immediately upstream and downstream of all crossing structures. It is expected that LIDAR data will be used for floodplain elevations outside of the bankfull channel, however some survey work to verify accuracy in forested areas is required.

Foundation elevations of all structures valued at over \$50,000 located within the breach zone extents.

A sediment and bathymetric survey of the reservoir area utilizing multi-frequency sonar equipment capable of recording original bed and top of accumulated sediments, in conjunction with GPS survey equipment, with a grid spacing not to exceed 500 feet in any direction. Based on results for both submerged and aerated sediment, compute the current submerged sediment capacity, aerated sediment capacity, floodwater-retarding capacity, and floodwater retarding pool. Using the sediment survey and as-built topographic information compute the historic sediment deposition and average annual rate of sediment deposition, and compare to PTMapp or RUSLE2 based predictions. Complete laboratory analysis to evaluate reservoir contamination at a minimum of 2 locations in the reservoir (1 near the dam and 1 in the upstream delta), and include testing for arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, PAHs, PCBs, and TPH.

A minimum of 2 permanent survey benchmarks to serve as horizontal and vertical control points during construction shall be established at the site. Permanent markers shall be set in concrete with a minimum length of 4 feet with an iron rod located in the center of the concrete. Markers will be set at convenient locations that will not be subject to disturbance during construction.

Survey records, to include all electronic data collected and a consolidated Civil3D file of all field survey work, will be provided to NRCS.

2. Complete geologic investigations and resulting report under the requirements of NEM Part 531 and NEH Part 631 for Group A Structures, including: conducting subsurface investigations, obtaining samples for lab testing, soil mechanics tests for SITES and WinDAM inputs and for use in analysis of foundation conditions and slope stability of current structure. Backfill and seal all drilled boreholes with a cement/bentonite slurry grout mix. All boreholes shall be surveyed with accuracies within +/- 3.0' horizontal and +/- 0.2' vertical. Geologic reconnaissance should be completed to develop the Plan of Investigation described in NEM Part 531-Geology, Subpart A-Geologic Investigation, Section 531.7D. The Plan of Investigation must be submitted to NRCS for concurrence prior to starting the preliminary geologic investigation.

The subsurface exploration is anticipated to consist of 3 test borings in the auxiliary spillway to determine geologic profile for use in spillway integrity evaluation and 3 test borings within the dam embankment footprint to characterize embankment and foundation soils. The three test borings in the embankment will be outfitted with vibrating wire transducers to allow for measurement of pore water pressures within the embankment and foundation stratum. Each of these test borings, one from the dam crest, one from the downstream bench, and one at the toe of the dam will be backfilled with two piezometric sensing zones each. Estimated total drilling lengths for the six truck (or track) accessible

test borings are soil sampling of 500 feet, based on review of available literature. Disturbed and undisturbed soil and rock samples will be collected, preserved, and transported to the laboratory for testing. The following laboratory tests are anticipated: grain sieve analysis with hydrometer, specific gravity, natural water content, Atterberg Limits, triaxial and direct shear strength, permeability, and crumb dispersion. The quantity of each test conducted will be determined based on stratigraphy encountered. Results of the subsurface exploration and laboratory testing will be tabulated and summarized in a geologic report.

3. Complete watershed hydrology studies, including data gathering as required. All modeling and mapping shall use vertical datum NAVD88, US vertical feet; all appropriate models and maps sheets shall make note of coordinate system and datum. The evaluation of hydrologic and hydraulic parameters used to model the performance of the structure shall be performed using the most current data and state of the art computational methods. Analysis of higher frequency recurrence interval events (2, 5, 10, and 25 year) are expected to be important for economic analysis, representing crop damages during summer thunderstorm generated peak flow events. Lower frequency events (50, 100, 500 year) and the Probable Maximum Flood will be necessary, in conjunction with development of related NRCS Earth Dams and Reservoirs TR-60 design criteria required to size and proportion structural rehabilitation alternatives. Flood inundation maps of all storms required will be developed and presented in a useful visual scale in reaches as necessary, and including structures, roads, and critical infrastructure to determine need for a project. Include description of how TR-60 guidance and adoption of NOAA Atlas 14 design precipitation data affects the functionality and safety of the dam. Evaluate current watershed hydrologic parameters (i.e. Runoff Curve Number and Time of Concentration) to accurately model structural functionality.

4. Complete hydraulics and stability analyses of existing structure and projected future without project action, for the existing structure condition, and all project alternatives examined in detail. Expand and compact relevant existing hydrology and hydraulics models to applicable extents to analyze alternatives. Develop Probable Maximum Precipitation (PMP) event using appropriate technical methodology. (A statewide PMP update is expected in 2020 and must be utilized for the final analysis, however HMR 52 can be used as is for preliminary work). Update hydrology and hydraulics models based on new data obtained from geotechnical evaluations, topographic, and bathymetric surveys. Complete structural analysis of the existing structure, including riser components. Evaluate existing auxiliary spillway integrity on the basis of information derived from the onsite geologic investigation and associated soil mechanics testing to determine appropriate parameters for SITES analysis for stability and integrity of the auxiliary spillway. Use the NRCS SITES program to determine stage-discharge ratings for covered risers incorporating the procedures outlined in TR-29, Hydraulics of Standard Covered Risers. This activity shall evaluate the sizing and proportioning of the dam embankment and spillways and the stability and integrity of the existing auxiliary spillway for the current hazard classification in accordance with the criteria contained in TR-60 and in accordance with the State of North Dakota, including special considerations for dams in series, if applicable.

5. Perform a breach inundation analysis. The minimum breach discharges will be determined by the criteria in TR-60 (2019). Dam failure flood profiles and inundation maps shall be developed in HEC-RAS unsteady 1-d flow or 2-d flow models, or as determined by the NRCS in consultation with the Recipient. Inundation areas will be mapped downstream to where dam failure profiles converge to within one foot of currently effective regulatory 100-year flood elevations or to within one foot of the 100-year flood elevations. The points of downstream routing termination must be concurred by NRCS for each inundation area modeled. Documentation shall include location and description of existing and forecasted development in the downstream valley (houses, commercial and farm structures, industrial facilities, utilities, highways, railroads, and also critical structures and facilities such as schools, hospitals, nursing homes, prisons, emergency response stations, hazardous material storage, critical transportation and utility facilities, etc.). Inundation maps showing and labeling the dam location and potential hazard locations shall be prepared using base maps with the latest high-resolution aerial photos or other high-resolution data. Dam failure modeling and mapping shall include routing of inflow hydrograph for PMP event, static breach, and seismic breach. Static breach assumes reservoir water surface elevation is at the crest of the auxiliary spillway elevation or at the maximum reservoir water surface elevation obtained by routing a 100-yr-generated inflow hydrograph through the dam, whichever is higher. Seismic breach assumes the reservoir is at the crest of the principal spillway (permanent pool) elevation or in the case of significant base flows at the reservoir water surface elevation obtained by routing the base flow through the dam. Minimum peak breach discharges shall be used according to TR-60 or WinDAM program. A spreadsheet tool to compute TR-60 minimum peak breach discharges and to construct breach hydrographs is available from the NRCS upon request. Model the breaches as overtopping failures unless WinDAM shows that the dams do not fail from overtopping; in which case they shall be modeled as a piping failures, or auxiliary spillway breaches, as determined by the NRCS with advisement from the Recipient.

6. Complete environmental evaluations as outlined in NWPM Parts 501.35 and 501.36, including (at a minimum): field determination and mapping of onsite wetlands per USACE procedures (including potential future pool extents), establishing air and water quality conditions, identifying land use classifications, evaluating sediment delivery from cropland through the use of PTMapp or other a Geographic Information System (GIS) based Revised Universal Soil Loss Equation (RUSLE2) analysis, highly erodible cropland, characterization of fish and wildlife habitat/populations, identification of threatened and endangered species, and field characterization and evaluation of riparian areas and stream channel stability.

7. Complete evaluation of archaeological and historical resources, including: consultation with State Historic Preservation Officer (SHPO), NRCS Archaeologist, and Tribes and conducting Phase I, II, and III cultural resource studies as necessary.

8. Complete social evaluations, including documenting historic (at time of dam installation or 20-30 years ago) and current watershed demographics (population, income, poverty) with an evaluation of any Environmental Justice Communities or Tribal communities. Characterize public health and safety conditions. Characterize commercial and residential structures affected and to what extent. Characterize transportation networks and conditions, including emergency vehicle and school bus transportation routes, access to medical facilities,

9. Complete evaluation of general economic and social effects including recreation and impacts related to drawdown time of detention pool. Recreation analysis will include documenting current primary and secondary contact recreation user days by recreation activity.

10. Relay technical information developed throughout the course of these efforts as outlined in the Public Participation Plan. Revise purpose and need as necessary to reflect analysis.

Review Point #2: submit documentation of Section B.1-10 to the NRCS SCE for technical review. If desired to maintain efficiency on the part of the Sponsor's engineering consultant, NRCS will provide review of partial submittals for these elements. The cumulative maximum federal reimbursement amount for these items is \$259,280.00.

C. Develop Structural Alternatives for Dam Rehabilitation

1. Identify all practical structural rehabilitation alternatives to bring the dam up to NRCS and NDSWC Dam Safety Standards. Engineering analyses will be conducted to determine viable structural dam rehabilitation alternatives. Include an evaluation of alternatives that would increase principal and auxiliary spillway capacities in conjunction with an earthen spillway recognizing the resulting increase to the BFE and related LOMR (and other NFIP related actions) that would be required. Evaluate structural rehabilitation alternatives on the basis of feasibility and impacts to the identified resource concerns such as public safety, economics, environmental, social, cultural, floodplain management, and land use.

2. The Recipient will perform preliminary analyses and evaluations of alternatives, and present / obtain input from the project team, technical team, cooperating agencies, and others. Final decision on which structural rehabilitation alternative(s) to be carried forward to detailed evaluation per the National Environmental Policy Act (NEPA) process will be made in consultation with NRCS

3. For structural rehabilitation alternatives, only those that rehabilitate the dam to NRCS and State Dam Safety criteria will be considered.

4. Alternatives carried forward for detailed study will have preliminary structural analysis and embankment stability work completed to verify feasibility. Preliminary drawings will be prepared showing existing/proposed features as well as borrow, spoil, and staging areas.

D. Develop Nonstructural Alternatives

1. No Action (Future Without Project) Alternative

Hold meeting with the NRCS, WRD, and NDSWC representatives to determine the likely long-term plans for Fordville Dam without federal funding. (Note: this scope assumes that state and local financing limitation will prevent rehabilitation of the dam, and decommissioning will be required.)

Evaluate relevant trends in land use changes such as wetland/range/forest conversion to cropland and installation of new surface and subsurface drainage systems. Update H&H models if necessary.

Complete conceptual/preliminary engineering analysis to provide detailed evaluation of alternative.

Conduct interdisciplinary technical review meetings as necessary to review summary results and forecasting analyses.

2. Decommissioning Alternative

Analyze decommissioning of Fordville Dam with additional environmental remediation for elevations below the normal pool. This alternative involves restoring the river by re-connecting the upstream and downstream channel in a non-erosive manner and restoring the stream/river. Dam embankment would be excavated to allow normal flows and up to 100-year flood flows through the site in a non-erosive manner. Accumulated sediment may need to be removed if directed by regulatory agencies. The decommission alternative would be developed in consideration of guidance in NRCS National Engineering Handbook, Part 653, Stream Corridor Restoration: Principles, Processes, and Practices.

Evaluate relevant trends in land use changes such as wetland/range/forest conversion to cropland and installation of new surface and subsurface drainage systems. Update H&H models if necessary.

Complete conceptual/preliminary engineering analysis to provide detailed evaluation of alternative.

Conduct interdisciplinary technical review meetings as necessary to review summary results and forecasting analyses.

3. Non-Structural Alternative(s)

Identify any suitable alternatives available for nonstructural measures such as removal or floodproofing all structures and facilities within the breach inundation area and includes estimated costs for relocation, property acquisition, demolition, decommissioning utilities, septic, wells and similar facilities and site stabilization/restoration. Other features could include acquisition of floodplain lands for recreational, fish and wildlife, and other public purposes, conversion of land use to forest, and relocating downstream hazard locations in the breach inundation area and purchasing flowage easements in the breach inundation area to preserve a lower hazard classification.

Evaluate relevant trends in land use changes such as wetland/range/forest conversion to cropland and installation of new surface and subsurface drainage systems. Update H&H models if necessary.

Complete conceptual/preliminary engineering analysis to provide detailed evaluation of alternative.

Conduct interdisciplinary technical review meetings as necessary to review summary results and forecasting analyses.

Provide clear documentation of the rationale behind the decision to eliminate alternatives considered, but eliminated, from further detailed study. Narrative descriptions in the Supplemental Watershed Plan are required for Alternatives Considered, But Not Developed in Detail. The descriptions should clearly show why they do not reasonably provide for complete, effective, efficient and /or acceptable solutions.

E. Obtain input from the project team, technical team, cooperating agencies, and others to identify alternatives to be carried forward to detailed evaluation per the National Environmental Policy Act (NEPA) process. A minimum of one alternative is required, however as many alternatives that appear to be nearly equivalent may be carried forward to full evaluation. Provide clear documentation of the rationale behind the decision to eliminate alternatives considered, but eliminated, from further detailed study. Narrative descriptions in the Supplemental Watershed Plan-EA/EIS are required for Alternatives Considered, But Not Developed in Detail. The descriptions should clearly show why they do not reasonably provide for complete, effective, efficient and /or acceptable solutions.

NRCS Review Point #3: Submit all items outlined in Sections C through E with supporting technical materials for review to the ND SCE. The cumulative maximum federal reimbursement amount for these items is \$369,950.00.

F. Complete Supporting Documentation

1. The Recipient shall prepare drawings and reports to adequately convey the design approach and methods.

2. Preliminary drawings shall consist of a cover sheet, overall site map, detailed site map, plans, profiles, elevations, cross sections, and details needed to describe the work to be constructed.

3. The plans and profiles from geologic investigation should be included.

4. Preliminary structural drawings should be included.

5. The design report should consist of computations pertinent to the work completed including but not limited to correspondence, flood routings, geology reports, soil mechanics testing reports, hydraulic, slope stability, foundation and structural design computations, and a list of applicable NRCS specifications and standard drawings required. The folder shall include a design report to explain the design assumptions, methodology, and references used for each design component and or consideration. Drawings that are necessary for proper explanation of the subject matter shall be included in the folder. The folder shall be partitioned and indexed in a logical manner.

6. Engineering models and data will be provided electronically to NRCS.

G. Develop Landrights Work Maps.

Develop landrights work maps (also termed real property acquisition map) as outlined in NWPM Part 504, Subpart A, 504.3. Landrights work maps shall be prepared electronically with the latest Digital Orthophoto Quarter Quadrangle (DOQQ) as the background. The landrights work map(s) shall show physical features of the project area, major project features, project boundaries, easement limits, apparent property lines labeled with owner's name and address (if available), utilities with owners' information, and the minimum area, rights, and easements needed for each project measure. Maps should also include scale, north arrow, legends, title blocks, and match lines between corresponding sheets. This item shall also consist of preparing drawings and data for any required permits and NEPA documents.

H. Environmental, Social Effects, and Economic Analysis of Alternatives

In accordance with PRG and/or NRCS regulation and policy, the following alternatives shall be identified:

- i. The locally preferred (sponsor's) alternative
- ii. A non-structural alternative (least-cost combination of structural and non-structural features)
- iii. Environmentally preferred alternative (for an EIS)
- iv. The Net Economic Efficiency (NEE) alternative

1. Evaluate effects of the alternatives for all resources and concerns identified during the Scoping process. Conduct

interdisciplinary review meetings as necessary to review environmental consequence determinations.

2. Field assessment of feasible alternatives as needed to determine unavoidable adverse impacts to wetlands, uplands, cultural resources, or other identified relevant concerns. Describe impacts (context and intensity) for the relevant concerns, including cumulative effects in Supplemental Watershed Plan. Develop mitigation strategy to address adverse impacts, including an estimate of all related costs.

3. Complete a final draft version of "Environmental Consequences" (NWPM Part 501.38).

4. Recipient will identify and list expected permits required for the rehabilitation project. Recipient will identify likely compensatory mitigation based on coordination with federal regulatory agencies such as U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. Complete an economic analysis of each alternative.

5. Economic evaluations will be conducted using the current Federal Watershed Project Discount Rate. The rate changes in October of each year and can be found at <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/eco n/>.

The project period of analysis (evaluation life plus implementation period) must be for the time over which any alternative has significant beneficial or adverse effects, usually 100 years for a NRCS high hazard potential dam, but not less than 50 years. Since sediment life is usually the limiting factor for evaluated life, an economic evaluation will be performed to determine the longest sediment life that continues to provide net benefits. A sediment rationale will be described for each structural rehabilitation alternative that spans the entire evaluated life.

6. Determine average annual values for all costs and benefits associated with each evaluated alternative. Determine net monetary benefits and benefit/cost ratios for all with project alternatives (Future With Federal Investment under PR&G) as compared to the no action (Future Without Federal Investment). Develop an economic section for Appendix D, Investigations and Analyses Report, that details the methods, assumptions, and data to support the economic analyses and results. Further, disclose any monetizable benefits that were not evaluated along with the rationale for not developing the values. As part of this section disclose how not developing these monetized benefits will not affect the identification of the correct NEE plan. Complete all required economic and structural tables per the NWPM Section 506, subpart B and NWPH Section 606, Subpart B and NWPH, Subpart B.

7. Calculate and document monetary and dam breach fatality estimates for each alternative.

I. Identify the preferred alternative which will be identified as the reasonable alternative that maximizes net public benefits to society. This alternative shall meet technical requirements and best addresses the environmental, social, and economic concerns for the rehabilitation of the structure, which is the one that maximizes public benefits relative to cost. Work with Sponsors to determine the Sponsor Preferred Alternative.

J. Identify the Non-structural alternative, if it exists, that best meets the federal objectives and Guiding Principles of PR&G. The non-structural alternative is to be a reasonable alternative which will contain nonstructural works and may contain structural works.

K. Identify the Environmentally Preferred alternative if the environmental document is an EIS.

L. Identify the National Economic Efficiency Alternative (NEE).

1. This phase includes formulation of alternative solutions, evaluation and comparison of the ecological, cultural, economic and social effects of alternatives, cost estimates, and development of a National Economic Efficiency (NEE) alternative (required for water resource projects and must be evaluated according to Economic and Environmental Principles, Requirements and Guidelines for Water and Related Resources Implementation Studies (PR&G) 2013) and DM 9500-013 completed in 2017.

2. Communicate alternative development and consequences to the public and Stakeholders Group, and solicit input.

3. Use this alternative as a basis for comparison of other federally assisted alternatives to highlight their environmental and social trade-offs.

M. Develop a Summary and Comparison Table to summarize the trade-offs of monetary and non-monetary benefits and costs of all alternatives. The analysis will include comparison of alternatives relative the PR&G federal objectives, and guiding principles, monetary and non-monetary effects using an ecosystem services framework, and trade-offs of monetary and non-monetary effects among alternatives. The preferred alternative will be described along with rationale for the preference. Economic and structural tables will be prepared. Deliverable items include written narratives for all alternatives for the appropriate sections of the plan-environmental document, cost estimates, and preliminary drawings for all alternatives studied in detail, upstream and downstream floodplain inundation maps for the frequency-based floods modeled for each alternative studied in detail, economic and structural tables for the preferred alternative.

NRCS Review Point #4: Submit all items outlined in Sections F through M, with supporting technical materials, for review to the ND SCE. The cumulative maximum federal reimbursement amount for these items is \$540,960.00.

N. Prepare Preliminary Supplemental Watershed Plan EA/EIS and Appendices

1. The plan will include, but is not limited to, development of the Preliminary Watershed Plan and EA or EIS for technical review by NRCS-ND, NRCS National Water Management Center (Preliminary only), the Sponsor and others directly involved in the planning.

2. The plan must disclose all assumptions, data sources, models, and methodologies to support each interdisciplinary team member's analysis and recommendations.

3. The consultant must facilitate a public and interagency review of the preliminary plan. All comments require a written response by the consultant, and documentation in final plan.

NRCS Review Point #5: Submit Preliminary Supplemental Watershed Plan-EA/EIS to NRCS for review as listed in Section N. The cumulative maximum federal reimbursement amount for this item is \$563,500.00.

O. Assemble final Supplemental Watershed Plan-EA/EIS, including all Appendices

1. The consultant must respond, in writing, to each comment by NRCS and sponsor, and make required changes to plan.

2. A draft final Supplemental Watershed Plan-EA/EIS should be provided to NRCS and Sponsor for concurrence to finalize plan.

3. The final Supplemental Watershed Plan should be provided to NRCS and sponsor.

4. Provide specific and summary responses to public and interagency comments in Appendix A of the Final Watershed Project Plan (NWPM 501.45A and NWPH 601.45A).

NRCS Review Point #6: Submit Final Supplemental Watershed Plan-EA/EIS to NRCS. Provide a minimum of five hard copies, as well as an electronic version of the Supplemental Watershed Plan-EA/EIS and all supporting information. The cumulative maximum federal reimbursement amount for this item is \$572,110.00.

Resources Required

No additional resources required other than funding.

Milestones

2020- Quarter 3 Purpose and Need for Action; Public Participation

2021- Quarter 2 Data Collection; Resource Inventory

2021- Quarter 3 Preliminary Development of Alternatives; Establish Alternatives for Detailed Review

2022- Quarter 2 Detailed Alternative Review; Environmental Consequences; Preferred Alternative

2022- Quarter 2 Prepare Draft Supplemental Watershed Plan-EA

2022- Quarter 3 Finalize Supplemental Watershed Plan-EA

GENERAL TERMS AND CONDITIONS

Please reference the below link(s) for the General Terms and Conditions pertaining to this award:

NATURAL RESOURCES CONSERVATION SERVICE U.S. DEPARTMENT OF AGRICULTURE

GENERAL TERMS AND CONDITIONS GRANTS AND COOPERATIVE AGREEMENTS

I. APPLICABLE REGULATIONS

a. The recipient, and recipients of any subawards under this award, agree to comply with the following regulations, as applicable. The full text of Code of Federal Regulations references may be found at <https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR> and <http://www.ecfr.gov/>.

(1) 2 CFR Part 25, "Universal Identifier and System of Award Management" (2) 2 CFR Part 170, "Reporting Subaward and Executive Compensation Information" (3) 2 CFR Part 180, "OMB Guidelines To Agencies On Governmentwide Debarment And Suspension (Nonprocurement)" (4) 2 CFR Part 182, "Governmentwide Requirements for Drug-Free Workplace (Financial Assistance)" (5) 2 CFR Part 200, "Uniform Administrative Requirements, Cost Principles, And Audit Requirements for Federal Awards"

b. The recipient, and recipients of any subawards under this award, assure and certify that they have and/or will comply with the following regulations, as applicable. The full text of Code of Federal Regulations references may be found at <https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR> and <http://www.ecfr.gov/>.

(1) 2 CFR Part 175, "Award Term for Trafficking in Persons" (2) 2 CFR Part 417, "Nonprocurement Debarment and Suspension" (3) 2 CFR Part 418, "New Restrictions on Lobbying" (4) 2 CFR Part 421, "Requirements for Drug-Free Workplace (Financial Assistance)"

c. Allowable project costs will be determined in accordance with the authorizing statute, the purpose of the award, and to the extent applicable to the type of organizations receiving the award, regardless of tier. The following portions of the Code of Federal Regulations are hereby incorporated by reference. The full text of Code of Federal Regulations references may be found at <https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR> and <http://www.ecfr.gov/>.

(1) 2 CFR Part 200, "Uniform Administrative Requirements, Cost Principles And Audit Requirements For Federal Awards" (2) 48 CFR Part 31, "Contract Cost Principles and Procedures"

II. UNALLOWABLE COSTS

The following costs are not allowed:

a. Costs above the amount authorized for the project b. Costs incurred after the expiration of the award including any no-cost extensions of time c. Costs that lie outside the scope of the approved project and any amendments thereto d. Compensation for injuries to persons or damage to property arising from project activities

This list is not exhaustive. For general information about the allowability of particular items of costs, please see 2 CFR Part 200, "Subpart E – Cost Principles", or direct specific inquiries to the NRCS administrative contact identified in the award.

III. CONFIDENTIALITY

a. Activities performed under this award may involve access to confidential and potentially sensitive information about governmental and landowner issues. The term "confidential information" means proprietary information or data of a personal nature about an individual, or information or data submitted by or pertaining to an organization. This information must not be disclosed without the prior written consent of NRCS.

b. The recipient's personnel will follow the rules and procedures of disclosure set forth in the Privacy Act of 1974, 5 U.S.C. Section 552a, and implementing regulations and policies with respect to systems of records determined to be subject to the Privacy Act. The recipient's personnel must also comply with privacy of personal information relating to natural resources conservation programs in accordance with section 1244 of Title II of the Farm Security and Rural Investment Act of 2002 (Public Law 107-171).

c. The recipient agrees to comply with NRCS guidelines and requirements regarding the disclosure of information protected under Section 1619 of the Food, Conservation, and Energy Act of 2008 (PL 110-246), U.S.C. 8791.

d. The recipient agrees to comply with the “Prohibition Against Certain Internal Confidentiality Agreements:”

1. You may not require your employees, contractors, or subrecipients seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting them from lawfully reporting that waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information. 2. You must notify your employees, contractors, or subrecipients that the prohibitions and restrictions of any internal confidentiality agreements inconsistent with paragraph (1) of this award provision are no longer in effect. 3. The prohibition in paragraph (1) of this award provision does not contravene requirements applicable to any other form issued by a Federal department or agency governing the nondisclosure of classified information. 4. If NRCS determines that you are not in compliance with this award provision, NRCS: a. Will prohibit your use of funds under this award, in accordance with sections 743 and 744 of Division E of the Consolidated Appropriations Act, 2016, (Pub. L. 114-113) or any successor provision of law; b. May pursue other remedies available for your material failure to comply with award terms and conditions.

IV. PRIOR APPROVAL REQUIREMENTS

The following are the most common situations requiring prior approval. However, the recipient is also bound by any other prior approval requirements of the applicable administrative provisions and Federal cost principles.

a. Purpose or Deliverables.—When it is necessary for the recipient to modify the purpose or deliverables, the recipient must submit a written request and justification for the change along with the revised purpose or deliverables of the award to the NRCS administrative contact. The request should contain the following: 1. Grant or agreement number 2. Narrative explaining the requested modification to the project purpose or deliverables 3. A description of the revised purpose or deliverables 4. Signatures of the authorized representative, project director, or both

b. Subaward/contractual Arrangement.—The recipient must submit a justification for the proposed subaward/contractual arrangements, a statement of work to be performed, and a detailed budget for the subaward/contract to the NRCS administrative contact. Subaward/contractual arrangements disclosed in the application do not require additional postaward approval.

c. Absence or Change in Project Leadership.—When a project director or the person responsible for the direction or management of the project—

1. Relinquishes active direction of the project for more than 3 consecutive months or has a 25 percent or more reduction in time devoted to the project, the grantee must notify the NRCS administrative contact in writing, identifying who will be in charge during the project director’s absence. The notification must include the qualifications and the signature of the replacement, signifying his or her willingness to serve on the project.

2. Severs his or her affiliation with the grantee, the grantee’s options include— i. Replacing the project director. The grantee must request written approval of the replacement from the NRCS administrative contact and must include the qualifications and the signature of the replacement signifying his or her willingness to serve on the project. ii. Subcontracting to the former project director’s new organization. The grantee must request approval from the administrative contact to replace the project manager and retain the award, and to subcontract to the former project director’s new organization certain portions of the project to be completed by the former project director. iii. Relinquishing the award. The grantee must submit to the NRCS administrative contact a signed letter by the grantee and the project director that indicates that the grantee is relinquishing the award. The letter must include the date the project director is leaving and a summary of progress to date. A final Standard Form (SF) 425 reflecting the total amount of funds spent by the recipient must be attached to the letter.

3. Transfers the award to his or her new organization, the authorized organization’s representative at the new organization must submit the following to the NRCS administrative contact as soon as the transfer date is firm and the amount of funds to be transferred is known: i. The forms and certifications included in the application package ii. A project summary and work statement covering the work to be completed under the project (deliverables and objectives must be the same as those outlined in the approved proposal) iii. An updated qualifications statement for the project director showing his or her new organizational affiliation iv. Any cost-sharing requirements under the original award transfer to the new institution; therefore, cost-sharing information must be included in the proposal from the new organization

Note: The transfer of an award from one organization to another can take up to 90 calendar days to accomplish, which may result in a delay in the project director resuming the project at the new organization.

d. Budget Revisions.—Budget revisions will be in accordance with 2 CFR Part 200.308.

e. No-Cost Extensions of Time.—When a no-cost extension of time is required, the recipient must submit a written request to the NRCS administrative contact no later than 30 calendar days before the expiration date of the award. The request must contain the following: The length of additional time required to complete the project and a justification for the extension A summary of progress to date An estimate of funds expected to remain unobligated on the scheduled expiration date A projected timetable to complete the portions of the project for which the extension is being requested Signature of the grantee and the project director A status of cost sharing to date (if applicable)

Note: An extension will not exceed 12 months. Requests for no-cost extensions received after the expiration of the award will not be granted. V. PAYMENTS

a. Payment by NRCS to the entity will be made monthly or quarterly (whichever is mutually agreed upon by both parties) on a reimbursable or advanced basis upon completion of work outlined herein. Payment will be executed upon the submission of a properly executed form SF-270 with supporting documentation. The SF-270 must cite the agreement number, remittance address, and billing period. The SF-270 must be sent to the NRCS administrative contact at the email address identified in block 8 of the Notice of Grant/Agreement Award.

b. Unless otherwise specified in the award, the recipient must receive payments through electronic funds transfers.

c. Recipients requesting advances should request payments in amounts necessary to meet their current needs pursuant to procedures contained in the Federal administrative provisions and 31 CFR Part 205.

d. The method of payment between the recipient and its contractors will be in accordance with the policies and procedures established by the recipient except that the contractors may not use the USDA Office of Financial Management/National Finance Center method to request payments. If the grantee makes advance payments to contractors, the grantee must ensure that the timing of such payments is designed to minimize elapsed time between the advance payment and the disbursement of funds. Payment requests from the grantee's contractors will not be sent to NRCS for review or approval.

e. Accounting records for all costs incurred under this award must be supported by source documentation. Such documentation includes, but is not limited to, canceled checks, paid bills, payroll records, and subaward documents. Labor cost charges to this award must be based upon salaries actually earned and the time actually worked on this award. All project costs must be incurred within the approved project period of this award, including any approved no-cost extension of time. Costs that cannot be supported by source documentation or that are incurred outside of the approved project period and budget may be disallowed and may result in award funds being returned to the Federal Government by the recipient.

VI. ACCRUALS

a. Recipients must submit an accrual estimate to the NRCS Program/Technical no later than 15 calendar days prior to the end of the quarter (submit by March 15, June 15, September 15 and December 15th). b. An accrual represents the value of goods or services provided to NRCS for which you have not requested payment. The quality and completeness of NRCS audited financial statements depends on your continuing cooperation and timely information. c. At a minimum, the signed accrual statement should include, "Under agreement number ____, at the close of the quarter ending ____, we have provided or anticipate providing goods or services that we have not requested payment for in the amount of \$____." Include the name and title of the person preparing the accrual estimate.

VII. FINANCIAL REPORTING

a. Recipients must submit a Federal Financial Report (FFR), SF 425 and 425A, in accordance with the following schedule:

Quarterly Schedule Report Due Date October 1 to December 31 January 31 January 1 to March 31 April 30 April 1 to June 30 July 31 July 1 to September 30 October 31

Reports must be submitted on an accrual accounting basis. Failure to submit reports in accordance with the above schedule may result in suspension or termination of award.

b. A final Report must be submitted no later than 90 calendar days after the completion of the award. For final FFRs, reporting end date must be the end date of the project or agreement period. The reports should be submitted to the NRCS administrative contact identified in award notifications.

VIII. PERFORMANCE MONITORING AND REPORTING

- a. The recipient is responsible for monitoring day-to-day performance and for reporting to NRCS. If the project involves subaward arrangements, the recipient is also responsible for monitoring the performance of project activities under those arrangements to ensure that approved goals and schedules are met.
- b. Every 6 months the recipient must submit a written progress report. Each report must cover— 1. A comparison of actual accomplishments with the goals and objectives established for the reporting period and, where project output can be quantified, a computation of the costs per unit of output.
- 2. The reasons why goals and objectives were not met, if appropriate.
- 3. Additional pertinent information including, where appropriate, analysis and explanation of cost overruns or high unit cost.
- c. The recipient must submit a final performance report within 90 calendar days after completion of project.

IX. AUDIT REQUIREMENTS

The recipient is responsible for complying with audit requirements in accordance with 2 CFR 200, Subpart F. A non-Federal entity that expends \$750,000 or more during the non-Federal entity's fiscal year in Federal awards must have a single or program-specific audit conducted for that year.

X. SPECIAL PROVISIONS

- a. The recipient assures and certifies that it will comply with the minimum-wage and maximum- hour provisions of the Federal Fair Labor Standards Act.
- b. Employees of NRCS will participate in efforts under this agreement solely as representatives of the United States. To this end, they may not participate as directors, officers, employees, or otherwise serve or hold themselves out as representatives of the recipient. They also may not assist the recipient with efforts to lobby Congress or to raise money through fundraising efforts. Further, NRCS employees must report to their immediate supervisor any negotiations with the recipient concerning future employment and must refrain from participation in efforts regarding such parties until approved by the agency.
- c. Employees of the recipient will not be considered Federal employees or agents of the United States for any purposes under this agreement.

XI. PATENTS, INVENTIONS, COPYRIGHTS, AND ACKNOWLEDGMENT OF SUPPORT AND DISCLAIMER

- a. Allocation of rights of patents, inventions, and copyrights must be in accordance with 2 CFR Part 200.315. This regulation provides that small businesses normally may retain the principal worldwide patent rights to any invention developed with USDA support.
- b. In accordance with 37 CFR Section 401.14, each subject invention must be disclosed to the Federal agency within 2 months after the inventor discloses it in writing to contractor personnel responsible for patent matters. Invention disclosure statements pursuant to 37 CFR Section 401.14(c) must be made in writing to:

Acquisitions Division Grants and Agreements Services Branch 1400 Independence Avenue, SW. Room 6823 South Building Washington, DC 20250

- c. USDA receives a royalty-free license for Federal Government use, reserves the right to require the patentee to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must manufacture it domestically.
- d. The following acknowledgment of NRCS support must appear in the publication of any material, whether copyrighted or not, and any products in electronic formats (World Wide Web pages, computer programs, etc.) that is substantially based upon or developed under this award:
 - “This material is based upon work supported by the Natural Resources Conservation Service, U.S. Department of Agriculture, under number [recipient should enter the applicable award number here].”

In addition, all publications and other materials, except scientific articles or papers published in scientific journals, must include the following statement:

- “Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture.”

e. All publications printed with Federal Government funds will include the most current USDA nondiscrimination statement, available from the Public Affairs Division, Civil Rights Division, or on the USDA and NRCS home pages. If the material is too small to permit the full nondiscrimination statement to be included, the material must, at a minimum, include the statement:

• “USDA is an equal opportunity provider and employer.” Any publication prepared with funding from this agreement must include acknowledgement to USDA, Natural Resources Conservation Service.”

The recipient is responsible for ensuring that an acknowledgment of NRCS is made during news media interviews, including popular media such as radio, television, and news magazines, that discuss in a substantial way work funded by this award.

XII. COST-SHARING REQUIREMENTS

a. If the award has specific cost-sharing requirements, the cost-sharing participation in other projects may not be counted toward meeting the specific cost-share requirement of this award, and must come from non-Federal sources unless otherwise stated in the applicable program announcement.

b. Should the recipient become aware that it may be unable to provide the cost-sharing amount identified in this award, it must— 1. Immediately notify the NRCS administrative contact of the situation. 2. Specify the steps it plans to take to secure replacement cost sharing. 3. Indicate the plans to either continue or phase out the project in the absence of cost sharing.

c. If NRCS agrees to the organization's proposed plans, the recipient will be notified accordingly. If the organization's plans are not acceptable to NRCS, the award may be subject to termination. NRCS modifications to proposed cost sharing revisions are made on a case-by-case basis.

d. Failure by the recipient to notify NRCS in accordance with paragraph (b) above may result in the disallowance of some or all the costs charged to the award, the subsequent recovery by NRCS of some of the NRCS funds provided under the award, and possible termination of the award, and may constitute a violation of the terms and conditions of the award so serious as to provide grounds for subsequent suspension or debarment.

e. The recipient must maintain records of all project costs that are claimed by the recipient as cost sharing as well records of costs to be paid by NRCS. If the recipient's cost participation includes in-kind contributions, the basis for determining the valuation for volunteer services and donated property must be documented.

XIII. PROGRAM INCOME

Income derived from patents, inventions, or copyrights will be disposed of in accordance with the recipient's own policies. General program income earned under this award during the period of NRCS support must be added to total project funds and used to further the purpose and scope of this award or the legislation under which this award is made.

XIV. NONEXPENDABLE EQUIPMENT

Recipients purchasing equipment or products with funds provided under this award are encouraged to use such funds to purchase only American-made equipment and products. Title to nonexpendable equipment purchased with award funds will vest in the recipient upon completion of the award project and acceptance by NRCS of required final reports. When equipment is no longer needed by the recipient and the per-unit fair market value is less than \$5,000, the recipient may retain, sell, or dispose of the equipment with no further obligation to NRCS. However, if the per-unit fair market value is \$5,000 or more, the recipient must submit a written request to the NRCS administrative contact for disposition instructions.

XV. LIMIT OF FEDERAL LIABILITY

The maximum financial obligation of NRCS to the recipient is the amount of funds indicated in the award as obligated by NRCS. However, in the event that an erroneous amount is stated on the approved budget, or any supporting document relating to the award, NRCS will have the unilateral right to make the correction and to make an appropriate adjustment in the NRCS share of the award to align with the Federal amount authorized.

XVI. MODIFICATIONS AND TERMINATIONS

NRCS may amend or modify the award through an exchange of correspondence between authorized officials of the recipient and NRCS. The award is subject to termination if NRCS determines that the recipient has failed to comply with the terms and conditions of the award. In the event that the award is terminated, the financial obligations of the parties

will be those set forth in 2 CFR Part 200.339.

XVII. AWARD CLOSEOUT

Award closeout is the process by which NRCS determines that all required project activities have been performed satisfactorily and all necessary administrative actions have been completed.

APPENDIX B

PUBLIC PARTICIPATION PLAN



FR River Dam No 1 Matejcek Dam Rehab Project



NRCS SMALL WATERSHED PLAN
PUBLIC PARTICIPATION PLAN

Activity	Estimated Date of Occurrence	Description of Activity	Notice Method	Activity Objectives
Assemble Interdisciplinary Team	12/17/2018 to 1/14/2019	The interdisciplinary team developed based on requirements in the NWPM Section 501.3/NWPH Section 601.3. The interdisciplinary team will be made up of Federal, State, and Local agencies that have an expertise or authority over the proposed action.	Individual letters outlining NEPA requirements for Cooperating Agencies.	Invitation letters consistent with the NWPH will be sent out to agencies with a vested interest in Watershed Planning activities within the Planning Area. Additionally, invitations will be sent out to representatives of the previously established Wateshed Stakeholders Group.
Conduct Public Meeting to Obtain Local Input	2/4/2019 to 2/18/2019	An initial public meeting will be held based on the Public. Participation Plan. This meeting will serve to inform the public within the watershed area of the study tasks and schedule. The initial Public Meeting will allow for public input to be gathered about the Need for the Proposed Action.	Two advertisements in the newspaper of record for Walsh County.	Educate the geneal public on the Watershed Planning effort. Establish concerns from NWPM 501.24 are important to the general public for the planning area. Document oral and written concerns from the general public.
Conduct Interdisciplinary Team Meeting	2/4/2019 to 2/18/2019	The interdisciplinary team will meet to review the Purpose and Need Statement. Information should be provided to the interdisciplinary team prior to meeting to allow for sufficient review.	Individual invitation letters and e-mail notification, if applicable.	Educate the Cooperating Agencies & Watershed Stakeholders on the Watershed Planning Effort. Discuss the Feasibility Study and Plan of Work documents. Introduce concerns from NWPM 501.24 are important to Cooperating Agencies within the planning area as it relates to the proposed action. Solicit written response from Cooperating Agencies.
Conduct Interdisciplinary Team Meeting	3/25/2019 to 4/8/2019	The interdisciplinary team will convene to review the technical information and the required concerns for NEPA. These concerns are highlighted in the NWPM 501.24. Information required to develop information required in NWPH Sections 606.18 and 606.19. This will be conducted concurrently with the Interdisciplinary Team Meeting to formally adopt the purpose and need.	Individual invitation letters and e-mail notification, if applicable.	Finalize scoping information to satisfy information requirements to complete NWPH 606.18 and 606.19.
Conduct Interdisciplinary Team Meeting - Field Review	6/10/2019 to 6/17/2019	The Interdisciplinary team will conduct a field review of the watershed to gain a better understanding of the watershed setting. This field review will be conducted over a one day period. This will be conducted concurrently when conditions permit. If applicable, this will coincide with peak spring runoff. Comments will be solicited from the Interdisciplinary Team to assist in developing scoping materials.	Individual invitation letters and e-mail notification, if applicable.	If requested by members of the Cooperating Agencies, a one day field review of the watershed will be provided by the HEI staff.
Solicit comment and incorporate as it relates to the proposed action	6/15/2019 to 7/15/2019	The Draft Scope of Environmental Assessment will be made available to the interdisciplinary team for comments. Any comments received will be incorporated into the Scope of Environmental Assessment as necessary. Comment will be solicited after completion of the Field Review with available Interdisciplinary Team members.	Individual invitation letters and e-mail notification, if applicable.	Incorporate comments from Cooperating Agencies on the Scope of the Environmental Assessment.
Conduct Interdisciplinary Team Meeting	9/1/2019 to 10/1/2019	Resource data will be presented to the Interdisciplinary Team. Resource data will be discussed to identify potential environmentally sensitive areas to aid in alternative development. Resource data will also be reviewed and discussed to identify resource opportunities to achieve goals in the Purpose and Need Statement.	Individual invitation letters and e-mail notification, if applicable.	Provide Resource Inventory Data to Cooperating Agencies & Watershed Stakeholders for review. Discuss how resource data will relate to the proposed action. Document concerns from Cooperating Agencies.
Conduct Interdisciplinary Team Meeting	9/1/2019 to 10/1/2019	The future without project condition will be presented to the Interdisciplinary Team. This meeting may run concurrently with the Interdisciplinary Team Meeting defined in the Inventory Resources list of tasks. This meeting will be conducted concurrently with the Inventory Resource Interdisciplinary team meeting.	Individual invitation letters and e-mail notification, if applicable.	Provide the Cooperating Agencies & Watershed Stakeholders with information about the anticipated future-without-project conditions. The information will be largely related to effects to resources of concern.
Public Outreach - Impacted Landowners Meetings	10/1/2019 to 3/1/2020	Landowners impacted by alternatives will be engaged in small groups to discuss the preliminary alternatives. Concerns by the impacted landowners will be noted, and revisions that may appease concerns will be discussed. Revisions will include embankment alignments, frequency of use, and other considerations for the initially selected alternative. Multiple meetings are anticipated with impacted landowners to address concerns.	Individual invitation letters and e-mail notification, if applicable.	Discuss design considerations for potential alternatives with landowners within the project footprints. Document concerns of impacted landowners.
Conduct Interdisciplinary Team Meeting	10/15/2019 to 3/15/2020	Revisions to the alternatives based on coordination with impacted landowners will be discussed with the Interdisciplinary Team. The Interdisciplinary Team may eliminate any alternatives that may have insurmountable obstacles.	Individual invitation letters and e-mail notification, if applicable.	Provide information about preliminary alternatives to Cooperating Agencies & Watershed Stakeholders. Information will include preliminary impacts to resource concerns. Document concerns of Cooperating Agencies & Watershed Stakeholders. Documentation will assist in determining reasonable alternatives to carry forward.
Conduct Interdisciplinary Team Meeting	10/15/2019 to 3/15/2020	The Interdisciplinary Team will meet to review each alternative & the NED alternative, adverse impacts, and benefits. Concerns voiced by each team member will documented.	Individual invitation letters and e-mail notification, if applicable.	Discuss impacts to resource concerns for alternatives. Present the NED alternative. Document Cooperating Agency & Watershed Stakeholder concerns. Solicit written responses from Cooperating Agencies related to the NED alternative and other alternatives studied in detail.
Conduct Public Meeting to Obtain Local Input	3/15/2020 to 5/15/2020	The NED Alternative will be presented to the general public. This discussion will review work completed since the initial public meeting, review of each alternative, unavoidable adverse impacts, and benefits provided. The general public will be engaged to solicit comments and concerns with the proposed alternatives.	Two advertisements in the newspaper of record for the Walsh County, Grand Forks County, and Nelson County.	Update the general public on the Watershed Planning effort. Present alternatives studied in detail. Present the NED alternative. Discuss resource impacts. Solicit comments from the general public. An opportunity will be given for oral comments and a form will be provided for written comments. Comments will be documented for use as rational to select the locally preferred alternative.
Conduct Interdisciplinary Team Meeting	6/1/2020 to 7/1/2020	Review of the public engagement meeting and comments received will be presented and by the interdisciplinary team. Note - meeting may not be needed, unless locally preferred alternative is different than the NED Alternative.	Individual invitation letters and e-mail notification, if applicable.	If public comment, Cooperating Agency comment, and Watershed Stakeholders Comment suggests that the locally preferred plan is not the NED plan, the Watershed Stakeholders and Cooperating Agencies will meet to discuss rational for selecting an alternative plan. Rational will be documented. Cooperating Agencies will be requested for written response.
Meeting with Project Sponsors	3/2/2020 to 4/2/2020	The NED Alternative and other feasible alternatives will be discussed with the Project Sponsor to determine the locally preferred alternative.	Meeting posted as required for governing board by the ND Century Code. Will be open to the public.	Project sponsors will discuss the NED alternative and other alternatives studied. Project sponsors will determine whether to pursue NED alternative, or differing alternative. Board action on alternative to proceed forward with.
Conduct Interdisciplinary Team Meeting	5/1/2020 to 6/1/2020	The Draft Watershed Plan-EA will be discussed with the Interdisciplinary Team. Comments on the Plan will be documented.	Individual invitation letters and e-mail notification, if applicable.	Review the draft Watershed Plan-EA with Cooperating Agencies and Watershed Stakeholders. Provide draft plan to Cooperating Agencies to review for comment.
Solicit and Address Agency Comments	6/1/2020 to 7/6/2021	After Watershed Plan-EA comments are address, the Draft Plan will be made available for review by impacted Agencies and Local Governing Bodies. Any comments received will be documented and addressed, if necessary.	Posted by NRCS for agency review.	After Cooperating Agency comments have been addressed, the Watershed Plan-EA will be posted for comment.

Anticipated Milestone Dates	Primary Objectives	Tasks	Interdisciplinary Team Meeting	Public Meeting
		Assemble the Public Participation Plan to guide the public input and participation throughout the process.		
		Develop Interdisciplinary and Technical Project Teams. The teams will be developed based on requirements in the NWPM Section 501.3/NWPH Section 601.3. The Interdisciplinary Team will be made up of Federal, State, and Local agencies that have an expertise or authority over the proposed action.		
		Send Invitation Letters to team members to verify representatives for agencies and confirm the roster for the Interdisciplinary Team.		
	Complete the process of obtaining public, landowner and agency input. Adopt an initial Purpose and Need Statement	Conduct Public Meeting to Obtain Local Input. An initial public meeting will be held based on the Public Participation Plan. This meeting will serve to inform the public within the watershed area of the study tasks and schedule. The initial Public Meeting will allow for public input to be gathered about the Need for the Proposed Action.		X
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team will review the Purpose and Need Statement and to review the required concerns for NEPA. These concerns are highlighted in the NWPM 501.24. Information required to develop information required in NWPH Sections 606.18 and 606.19. Information will be provided to the interdisciplinary team prior to meeting to allow for sufficient review.	X	
Jul. 2020		NRCS MILESTONE 1		
	Gather project data and technical information. Review technical information with the Interdisciplinary Team, identify environmentally sensitive areas to guide alternatives.	Data collections and resource evaluations will be conducted by the Technical Team including engineering surveys, geologic investigations, hydrology studies, hydraulics analysis, environmental evaluations, archaeological and historic studies and economic and social evaluations.		
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team will review technical information. Resource data will be presented to the Interdisciplinary Team. Resource data will be discussed to identify potential environmentally sensitive areas to aid in alternative development. Resource data will also be reviewed and discussed to identify resource opportunities to achieve goals in the Purpose and Need Statement.	X	
Mar. 2021		NRCS MILESTONE 2		
	Develop project alternatives, review alternatives with the Interdisciplinary Team, identify the NED alternative and identify the list of alternatives to be carried forward.	The Technical Team will develop structural and nonstructural project alternatives.		
		Conduct a meeting with the NRCS, WCWRD, and the NDSWC to determine the likely long term plan for the project without federal funding.		
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team review the project alternatives. They will review each alternative & the NED alternative, adverse impacts, and benefits. Concerns voiced by each team member will be documented. Information will be provided to the interdisciplinary team prior to meeting to allow for sufficient review.	X	
		The Technical Team will develop draft list of alternatives to be carried forward based on the technical information and input from the Interdisciplinary Team.		
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team will review the project alternatives to be carried forward. Information will be provided to the interdisciplinary team prior to meeting to allow for sufficient review.	X	
Jul. 2021		NRCS MILESTONE 3		
	Identify the environmental consequences of the alternatives carried forward. Conduct the economic analysis of the alternatives and mitigation strategies, obtain public and agency input on the proposed alternatives.	The Technical Team will develop project work maps, supporting documentation and environmental consequences of alternatives.		
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team will meet to review the environmental consequences of alternatives and provide input to the Technical Team.	X	
		The Technical Team will prepare the economic analysis and mitigation strategies for project alternatives carried forward.		
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team will review the development of alternatives, the NED and the selection of the Preferred Alternative	X	
		Conduct Public Meeting to Obtain Local Input. The NED Alternative will be presented to the general public. This discussion will review work completed since the initial public meeting, review of each alternative, unavoidable adverse impacts, and benefits provided. The general public will be engaged to solicit comments and concerns with the proposed alternatives.		X
Feb. 2022		NRCS MILESTONE 4		
	Prepare the EA Document, obtain public and agency input and comments on the EA. Respond to Comments.	The Technical Team will prepare the Preliminary Plan/EA.		
		Conduct an Interdisciplinary Team Meeting. The interdisciplinary team will review the Preliminary Plan/EA. Information will be provided to the interdisciplinary team prior to meeting to allow for sufficient review.	X	
		Public Review of the EA		
		The Technical Team will respond to comments		
Apr. 2022		NRCS MILESTONE 5		
	Revise the Document	Assemble the Final Plan/EA		
Jul. 2022		NRCS MILESTONE 6		
	NRCS Approval of EA	Send Hardcopies of Final EA Document		

PUBLIC MEETING SUMMARY

The Walsh County Resource District, (WCWRD) along with their consultant, Houston Engineering, Inc., hosted a public meeting regarding the planning process for the rehabilitation of Fordville Dam on March 6, 2020 at 9:00 a.m. at the Minto Community Center in Minto, North Dakota. Along with representatives of the WCWRD and Houston Engineering, there were 17 representatives of various state, federal, and local agencies along with 12 members of the general public.

Zach Hermann and Mike Opat of Houston Engineering along with Christi Fischer, State Conservation Engineer for the NRCS, presented information regarding the history of the PL-566 program, the original Middle-South Branch Forest River Watershed Workplan, as well information specific to Fordville Dam. The planning process was explained, and a proposed timeline was provided.

The planning effort will include extensive field data collection and analysis as well as hydrologic and hydraulic modelling. Field data collection will include surveying, field environmental review, cultural resources inventory, and geotechnical data collection. The hazard rating of the dams will be reviewed and their ability to meet current dam design standards will be evaluated and their current structural condition assessed. Alternatives for decommissioning or rehabilitating the dams will be developed and evaluated and a preferred alternative selected. The target is a completed final Supplemental Watershed Workplan by September 30, 2022. There will be additional opportunities for public input as the planning effort proceeds.

After the presentation, the presenters fielded questions from the audience. A Questionnaire and Comment form was provided to attendees and will remain available through the WCWRD. The desire is to receive public comments by April 3, 2020 so that the feedback can be incorporated into the planning effort feasibility report currently under development.

**Notice of Public Meeting
Friday, March 6, 2010 at 9:00am
Minto Community Center
114 Harvey Avenue, Minto, ND 58261
Fordville Dam Rehabilitation
Public Scoping Meeting
Walsh County Water Resource District (WCWRD)**

The WCWRD will host a public meeting on Friday, March 6, 2020 at 9:00am at the Minto Community Center (114 Harvey Avenue, Minto, ND 58261). The WCWRD is proceeding as the Local Sponsoring Organization for the rehabilitation of Middle-South Branch Forest River Dam No. 4 (Fordville Dam). The initial phase of this effort is to complete a Supplemental Watershed Plan that will include review of the existing structure, watershed/resource concerns, development of alternatives, and selection of a preferred alternative. The purpose of the meeting is to provide background of the Watershed Planning effort and opportunity for input about resource concerns pertinent to Fordville Dam. Input may be provided through oral comments at the meeting as well as through completion of a questionnaire. For those unable to attend the meeting, the questionnaire will be made available, along with presentation material from the meeting, on the WCWRD web page following the public meeting.

Comment forms will also be available from the WCWRD office at the address listed below. Comments forms will be accepted for all forms postmarked on or before April 3, 2020. Completed comment forms can be mailed to the WCWRD office at:

Walsh County Water Resource District
600 Cooper Avenue
Grafton, ND 58237

**Special Meeting of the Walsh County Water Resource District
Fordville Dam NRCS Rehab Study – Public Scoping Meeting
Friday, March 6, 2020
Minto Community Center, Minto, ND**

March 6, 2020 – 9:00 a.m.

Vice Chairman Larry Tanke called the meeting of the Walsh County Water Resource District Board to order on Friday, March 6, 2020. He introduced the members of the Board and then turned the meeting over to Christy Fischer – NRCS and Mike Opat with Houston Engineering. (For those in attendance, please see attached sign in roster.)

Christy began the presentation with a brief summary of the NRCS dam rehab study process and how funds were distributed. Mike began with a brief history on Fordville Dam and how funding was secured for the rehab study of the dam with NRCS, SWC and RRJWRD. He then moved on to an overview of what the rehab study will entail and how the study will develop into a final recommendation report.

The current issues with the dam stem from a 2015 dam assessment report from the State Water Commission that classified the dam as a high hazard structure. This study will look into what areas of the dam need to be repaired/replaced and what options are most feasible to keep the dam in good repair and operation.

The study will research all alternatives available to the dam to include:

- No action – no federal action or assistance;
- Rehab to federal high hazard criteria – concrete spillway;
- Remove downstream flood risk & rehab to reduced hazard classification;
- Decommissioning dam.

The final report is expected to be completed by September 2022. Comment forms were provided for the public to fill out and return by Friday, April 3rd, 2020.

Comments/Questions from attendees:

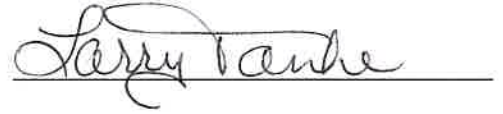
- What happens downstream while construction on the dam occurs? This would depend on what type of construction would be selected to be completed.
- What if both dams (Matejcek & Fordville) were under construction at the same time? That is unknown as both dams are still under review.
- Would increasing storage capacity be an outcome looked into? Yes
- Ted Birkholz stated he is against any project that would take place on his property.
- What has changed in the dams to warrant these studies? The dams are past their life expectancy and need to be studied to see how they can be repaired and/or enhanced.
- Will the sediment deposited be studied? Yes
- The Forest River Colony would like a low head dam for irrigation purposes.
- What would be the life span on the rehab project? 100 years
- How was this dam selected for a study? Funds were allocated at the Federal level to be cost shared with locals. The state NRCS office helped the WRDs apply for funding and the selection was completed at the federal level.
- Important to look at flood control as Minto is the outlet for the Forest River. Weather has been very extreme the past few years. Thank you to the agencies for their efforts in helping with flood control/drainage issues.
- How open is the SWC with funding the rehab projects? These projects need to be included in the WRDs water plan for 2021-2023 so they could be considered for cost share. Keith Weston offered to help with discussion on funding at the SWC.
- Could river be cleaned? Yes looking at starting a snag & clear project on the Forest River.

- Is WRD trying to decrease 20% volume going to the Red River? Mike Opat stated that is the Red River Retention Authority's goal along with increasing water quality.
- Look at partnering with multiple agencies as the counties will be unable to bear the full cost of a rehab project.
- Would like to see the dams repaired to keep the structures in good operation after all the work done to construct them.

Comment sheets will be available on the Walsh County Water Resource District's website.

With no other questions, the meeting was adjourned.

Attest: 
Jennifer Lindemberger, Sec/Treas.



Larry Tanke, Vice Chairman

Walsh County Water Resource District
 Fordville Dam Rehab Study Public Scoping Meeting
 March 6, 2020
 Minto Community Center – Minto, ND

Name	Organization	City/State
Maura Curry	NDASCD	Park River, ND
Stephen Hulst	Stephen Hulst Farm	Inkster ND
Keith Weston	RRRA	Fargo, ND
Pat McQuarrie	USACE	Bismarck, ND
TEO BRETHERTON		INKESTER ND.
Danny Pengilly		Inkster, ND
Pete Swack	GFC water Board	Conrad, ND
Judith Osowski	Three Rivers Soil Pres. Dist	Minto
Yari Villanueva	Walsh Co. SCD	Grafton
Sarah Johnston	Walsh Co. SCD	Park River, ND
Bruce Plank	Minto	Minto ND
Debra Vanman	Nelson Co. SCD	Foblete
Don Barclay		Grafton, ND
Albin Galla	WCWAB	Fordville
Pamela Gjesfug	ND SCD / PRSWD	Fargo

Walsh County Water Resource District
 Fordville Dam Rehab Study Public Scoping Meeting
 March 6, 2020
 Minto Community Center – Minto, ND

Name	Organization	City/State
Diane Knapp	CoF County Commission	Grand Forks, N.D.
Charles Varnum	Nelson County WRD	Hecketa, ND.
Sharon Hestegard		Thompson N.D.
Tom Perdue	GF WRD	GRAND FORKS ND
Chr's Nelson	NRCS	Park River, ND
RITA SVEEN	NRCS	Park River, ND
Larry Tarkenton	Walsh Cty Water Board	Grafton, N.D.
Alvin Brown	LAWSON WPD	MINTO, ND
Mary Ann Ryerson		Jankin, N.D.
George Hoyer		Minto ND
Brent Nelson	Walsh Co. Emergency Mgmt	Grafton ND
Chris Schulz	Jankin 3821 35th Avenue	Jankin ND 58233
Robert M. Mardel	Forest River Colony	Fordville, ND 58231
Richard Axvib	GFCRWD	GRAND FORKS ND 58201
Tim's Storch		

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Rehabilitation of Middle-South Branch Forest River Dam No. 4 (Fordville Dam)



**WALSH COUNTY WATER
RESOURCE DISTRICT**



**Scoping Meeting
Minto, ND
March 6, 2020**



Introductions

- Christi Fisher, PE – NRCS
- Mike Opat, PE – Houston Engineering, Inc.
- Zach Herrmann, PE – Houston Engineering Inc.
- Jennifer Lindenberger – Secretary of Walsh County Water Resource District
- Daryl Campbell – Chairman of Walsh County Water Resource District
- Larry Tanke – Vice-Chairman of Walsh County Water Resource District
- Albin Jallo – Manager of Walsh County Water Resource District



Agenda

- PL-566 Watershed Rehabilitation Overview
- Dam and Watershed Plan History
- Fordville Dam Overview
- Planning Process
- Purpose & Need
- Dam Safety Concerns
- Flood Prevention Concerns
- Recreation Concerns
- Data Collection & Resource Inventory
- Preliminary Alternatives
- Factors Considered
- Public Input



PL-566 Watershed Rehabilitation Overview



WALSH COUNTY
North Dakota





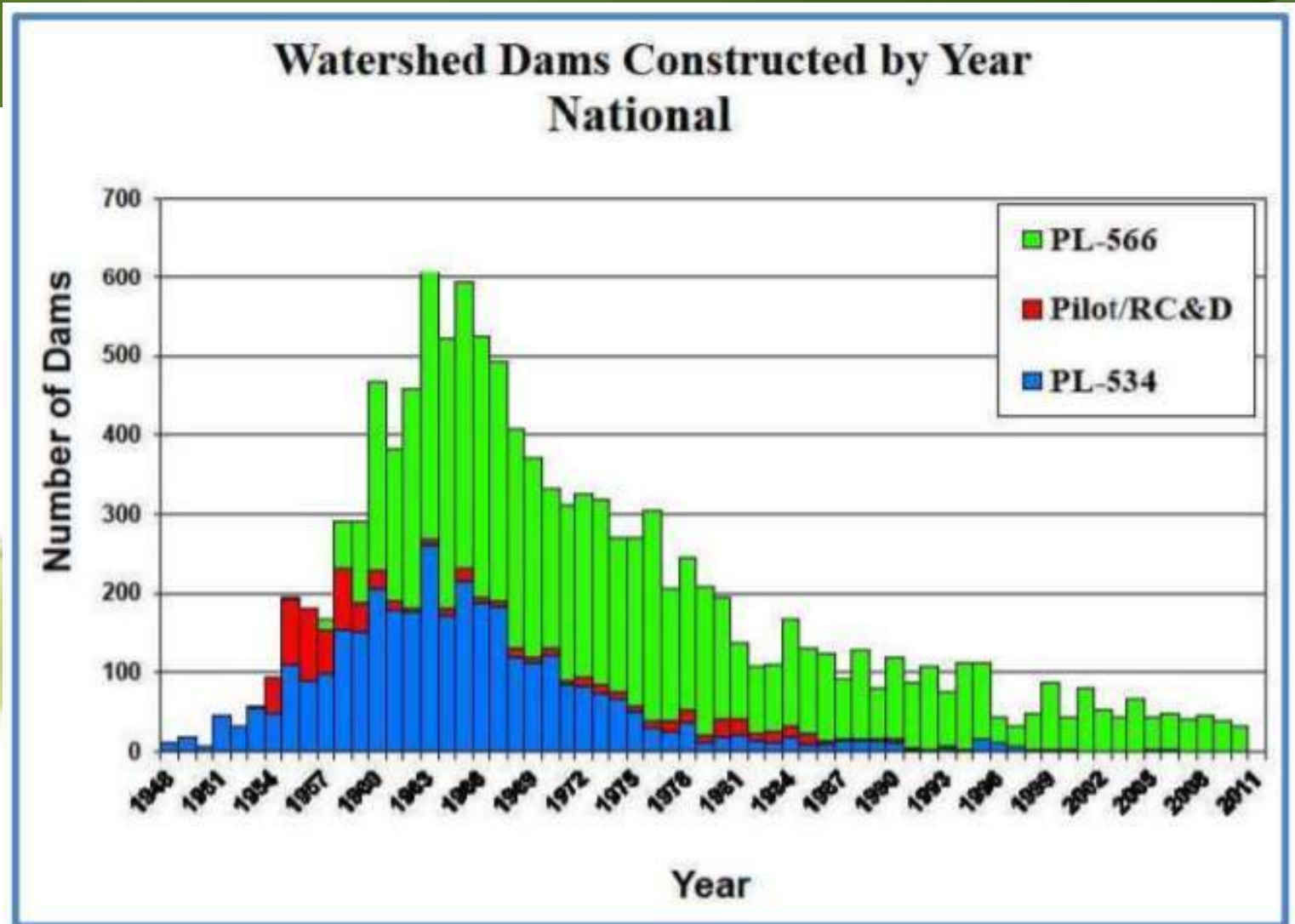
Applicable Agency Authority - Construction

Federal Watershed Protection and Flood Prevention Act

Public Law 78-534
1944

Public Law 83-566
Section 14(a)(1) 1954

11,000+ dams nationally





DAM #	DAM NAME	INSTALLED
1	Boundary Creek Dam #1	1962
2	Boundary Creek Dam #3	1973
3	Elm River Dam #1	1964
4	Elm River Dam #2	1966
5	Elm River Dam #3	1962
6	English Coulee Dam	1990
7	McDowell Dam	1976
8	Middle Br. Park River Dam #10	1971
9	Middle Br. Park River Dam #6	1974
10	Middle Br. Park River Dam #8	1970
11	Middle Br. Park River Dam #9	1970
12	Middle Br. Park River Dam #5	2005
13	Mott Watershed Dam	1969
14	Middle South Br. Forest River Dam #1	1966
15	Middle South Br. Forest River Dam #4	1978
16	Middle South Br. Forest River Dam #6	1965
17	North Br. Forest River Dam #1	1964
18	North Br. Forest River Dam #3	1962
19	North Br. Forest River Dam #5	1962
20	North Br. Forest River Dam #6	1966
21	North Salt Lake	1971
22	Square Butte Creek Dam #2	1973
23	Square Butte Creek Dam #4	1974
24	Square Butte Creek Dam #5	1979
25	Square Butte Creek Dam #6	2007
26	Swan Buffalo Dam #12	1960
27	Swan Buffalo Dam #5	1961
28	Swan Buffalo Dam #8	1968
29	Tewaukon Dam T-1-A	1963
30	Tewaukon Dam T-2	1965
31	Tewaukon Dam T-7	1961
32	Tongue River W.S. Dam M-3	1961
33	Tongue River W.S. Dam M-4	1961
34	Tongue River W.S. Dam T-2-2	1957
35	Tongue River W.S. Dam T-2-4	1958
36	Tongue River W.S. Dam T-3-1	1957
37	Tongue River W.S. Dam T-3-2	1955
38	Tongue River W.S. Dam T-3-5	1955
39	Tongue River W.S. Dam T-3-6	1957
40	Tongue River W.S. Dam T-7-1	1957
41	Tongue River W.S. Dam T-8-1	1956
42	Upper Turtle River Dam #1	1977
43	Upper Turtle River Dam #2	1974
44	Upper Turtle River Dam #4	1980
45	Upper Turtle River Dam #5	1975
46	Upper Turtle River Dam #6	1972
47	Upper Turtle River Dam #7	1973
48	Upper Turtle River Dam #8	1973
49	Upper Turtle River Dam #9	1979
50	Willow Creek-Park River Dam #1	1968



Applicable Agency Authority - Rehabilitation

2000 Amendment to the Federal Watershed Protection and Flood Prevention Act

Public Law 106-472, Section 313

Rehabilitation:

Extend the service life of dams and bring them up to applicable safety and performance standards, or decommission them so they no longer pose a threat to life or property.

Why now?

**Status of Watershed Rehabilitation Projects
February 2018**



Legend

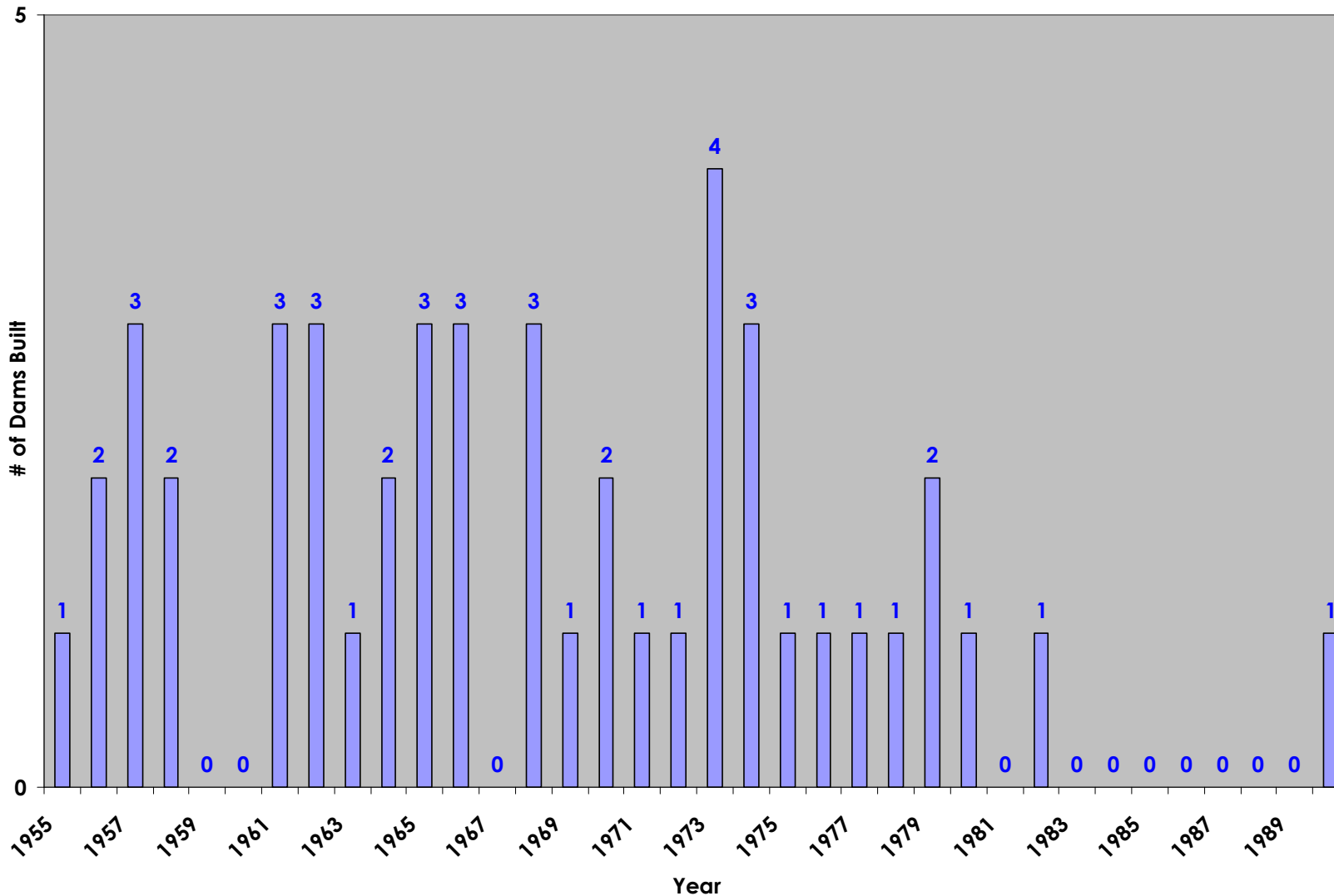
Status

- 57 Projects in Planning (20 States)
- 78 Projects Authorized - Implementation in Progress (17 States)
- 145 Projects Completed (23 States)

Total 280 Projects in 30 States

Fiscal Year	Program Funding
2000	\$8 M
2001	\$8 M
2002	\$10 M
2003	\$30 M
2004	\$30 M
2005	\$28 M
2006	\$32 M
2007	\$31 M
2008	\$20 M
2009	\$35 M
2010	\$83 M
2011	\$17 M
2012	\$15 M
2013	\$14 M
2014	\$262 M
2015	\$83 M
2016	\$12 M
2017	\$21 M
2018	\$12 M
2019	\$10 M
Total	\$761 M

ND Watershed Dams Built by Year



ND PL-566 Dams

Total = 50

High Hazard (NRCS) = 14

Assessments Complete = 11

Rehabilitation Complete = 1

Planning Underway = 7

2018 Start: Matecjek

**2019 Start: Fordville
Larimore
Bylin
Senator Young
Bourbanis
Olson**



Planning Team Structure

- **Planning Lead:** Natural Resources Conservation Service
 - **State Conservationist:** Mary Podoll
 - **State Conservation Engineer:** Christi Fisher, PE
- **Sponsoring Local Organization:** Walsh County Water Resource District
 - **Secretary:** Jennifer Lindenberger
 - **Chairman:** Daryl Campbell
 - **Vice-Chairman:** Larry Tanke
 - **Manager:** Albin Jallo
- **Planning Technical Lead:** Mike Opat, PE (*Houston Engineering, Inc.*)





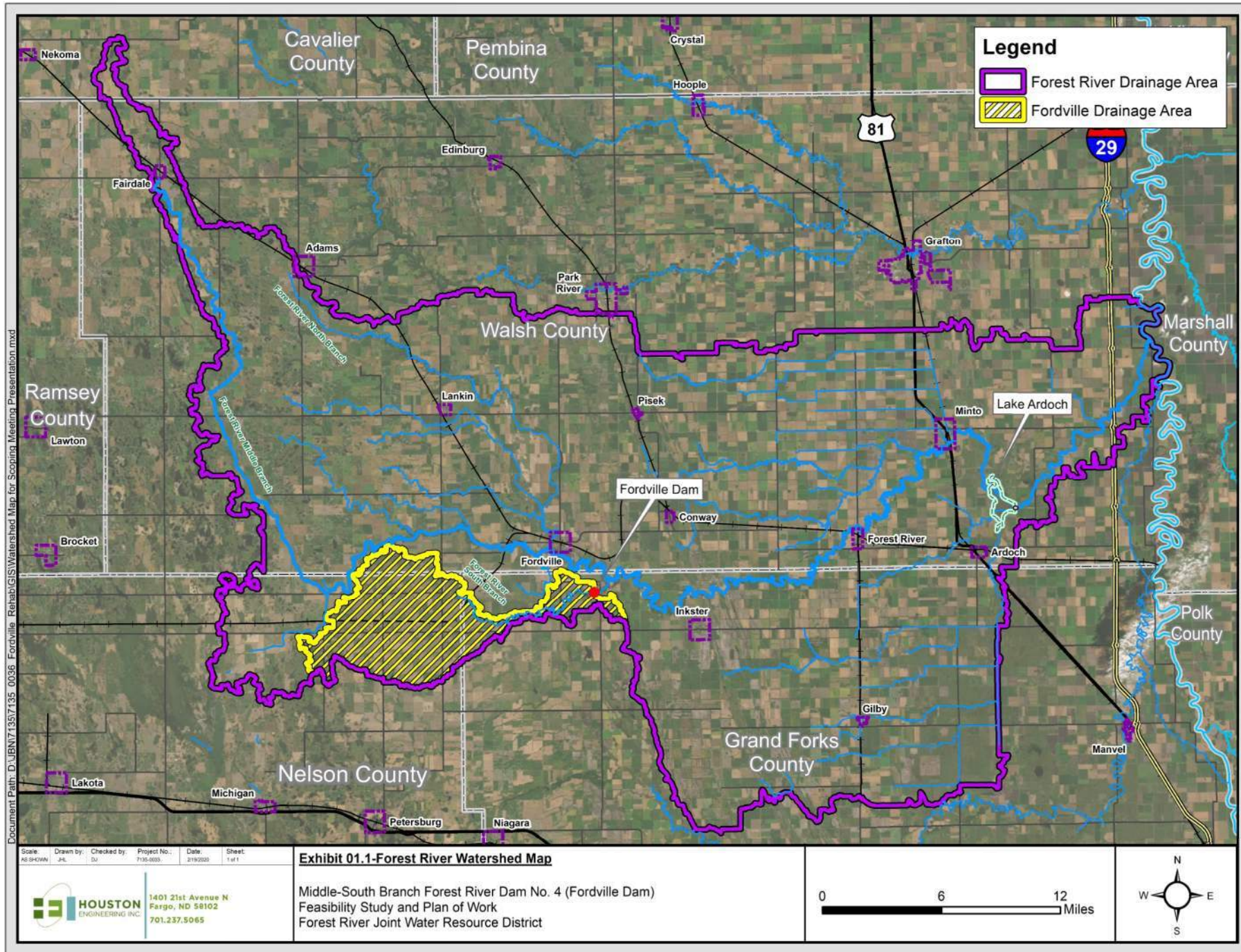
Planning to Construction

- Planning, typically 2 years
- Design, typically 1-2 years
- Construction, typically 1-2 years
- Complex process, informal and formal public input, regulatory agency involvement
- Local endorsement and support of the plan is key
- Planning requires patience and perseverance



Planning Process- Locally Led

- Purpose and Need for Action
- Data Collection and Resource Inventory
- Development of Alternatives (Structural and non-Structural)
- Evaluation of Alternatives
- Preliminary Supplemental Watershed Plan (EA/EIS)
- Final Supplemental Watershed Plan



Watershed Map



Watershed Work Plan - History

- Part of a Watershed Work Plan for the Middle-South Branch of the Forest River (SCS, 1961)
- Sponsored by various local soil conservation and flood control districts
- Annual flood damage estimated at \$134,542 in 1961 dollars
- Plan included a combination of land treatment measures and structural improvements
- Estimated annual benefits at \$92,155 in 1961 dollars
- Resulted in a benefit-cost ratio of 1.65:1 (SCS, 1961)



Watershed Work Plan - History

- Three flood retarding structures were constructed:
 - Matejcek Dam (Dam No. 1)
 - Fordville Dam (Dam No. 4)
 - Whitman Dam (Dam No. 6)
 - Controlled a total of 179.2 square miles of drainage area
 - Fish and wildlife pools were eventual modifications
- Fairdale Drain was not part of the initial plan but was later added and constructed
- Channelization project on the Lower Forest River was included in the initial Plan but never constructed



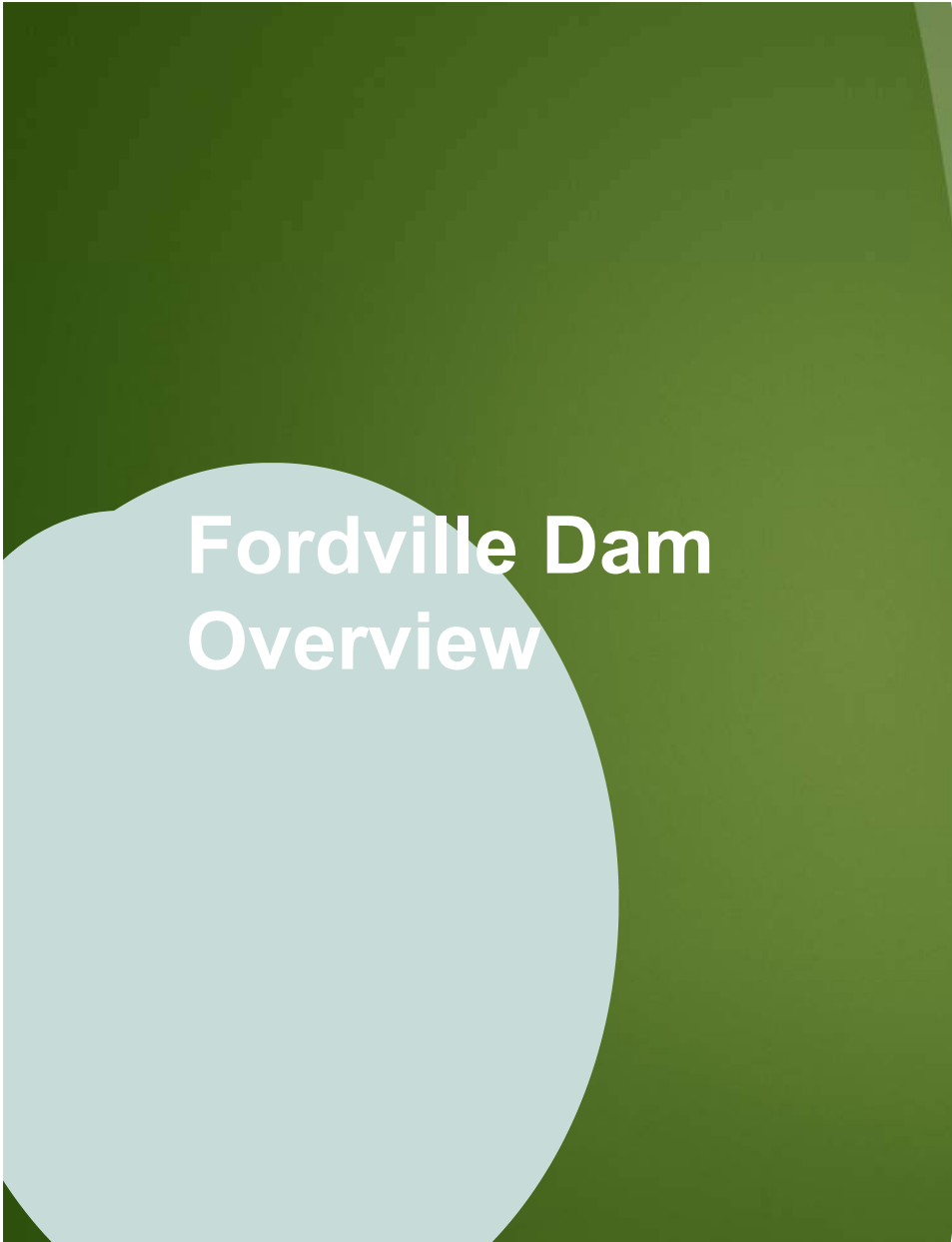
Dam Classification Summary

- The *National Engineering Manual, Part 520, Subpart C – Dams* contains the following definitions for dam classification;
 - Low Hazard Potential: Dams in rural or agricultural areas where failure may damage farm buildings, agricultural land, or township and country roads.
 - Significant Hazard Potential: Dams in predominantly rural or agricultural areas where failure may damage isolated homes, main highways or minor railroads, or interrupt service of relatively important public utilities.
 - High Hazard Potential: Dams where failure may cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads.



Assessment Report - History

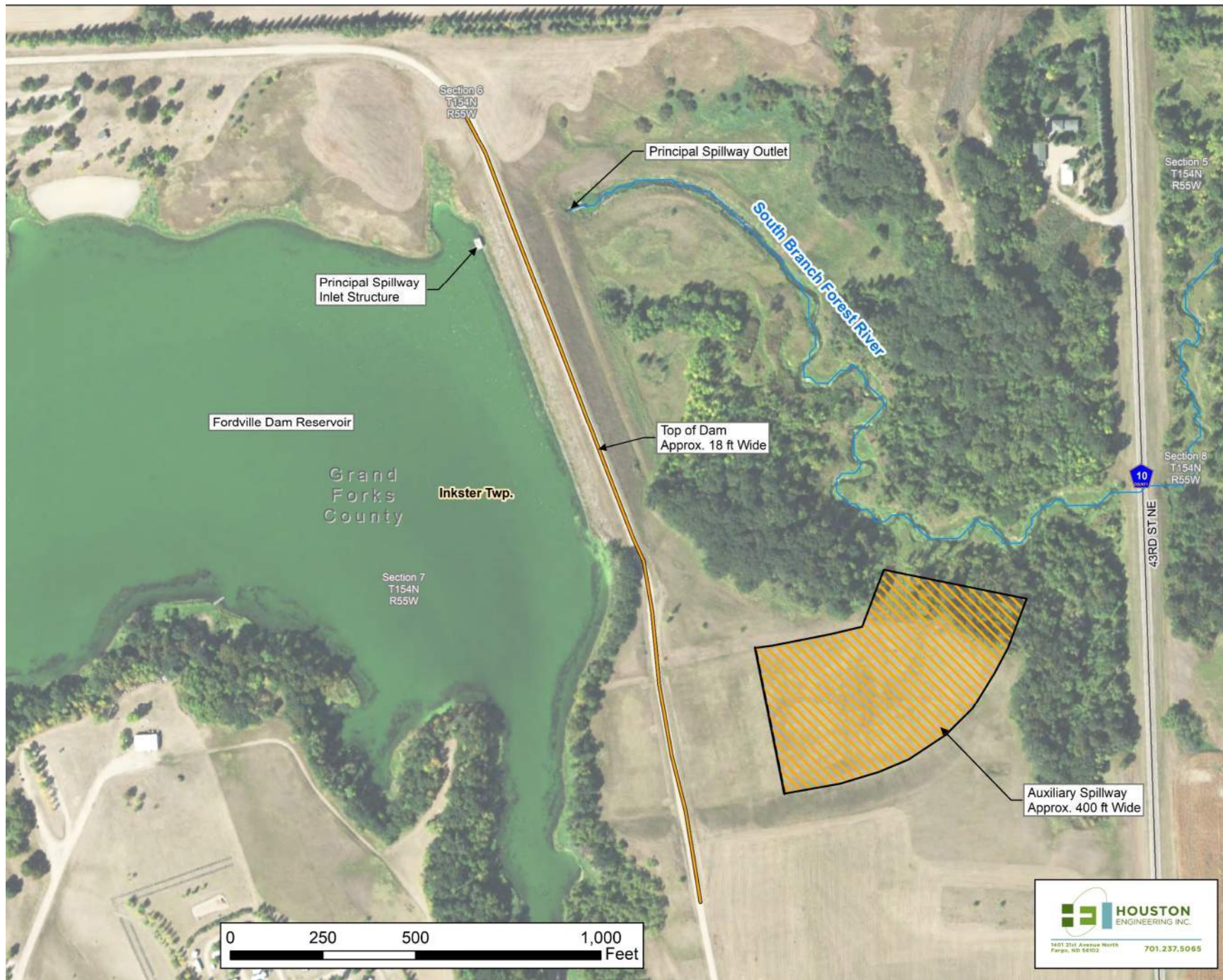
- Fordville Dam Assessment Report completed in 2015
 - Report commissioned by the NRCS
 - Determined that the dam should be classified as High Hazard Dam based on NRCS criteria
 - Concluded that the dam does not meet dam safety requirements with regard to hydraulic capacity or stability



General Data		
Year Designed		1971
Year Constructed		1978
Purpose		Flood Control, and Recreation
Original Hazard Classification		Significant
Current Hazard Classification		High
Design Life		50 Years
Original Design Drainage Area		41.5 square miles
Revised Drainage Area (Direct) ^[1]		49.5 square miles
Maximum Dam Height		54.1 feet
Embankment Length		1,875 feet
Embankment Top Width		18 feet
Embankment Upstream Slope		3.5H:1V
Embankment Downstream Slope		2.5H:1V
Critical Elevations (Based on As-built Information)		Elevation (NGVD29) ^[2]
Top of Dam		1129.1 feet
Auxiliary Spillway Crest		1122.7 feet
Principal Spillway Riser Tower Crest (Second Stage Inlet)		1116.5 feet
Principal Spillway Orifice Inverts (First Stage Inlet)		1105.0 feet
Principal Spillway Conduit Outfall Invert		1078.0 feet
Principal Spillway SAF Stilling Basin Invert		1066.3 feet
Reference Point	Storage (Ac-Ft)	Surface Area (Ac)
Top of Dam	10,703	526
Auxiliary Spillway Crest	7,532	434
Principal Spillway Riser Tower Crest	5,322	346
Principal Spillway Orifice Inverts	2,186	197

[1] Revised using available LiDAR information

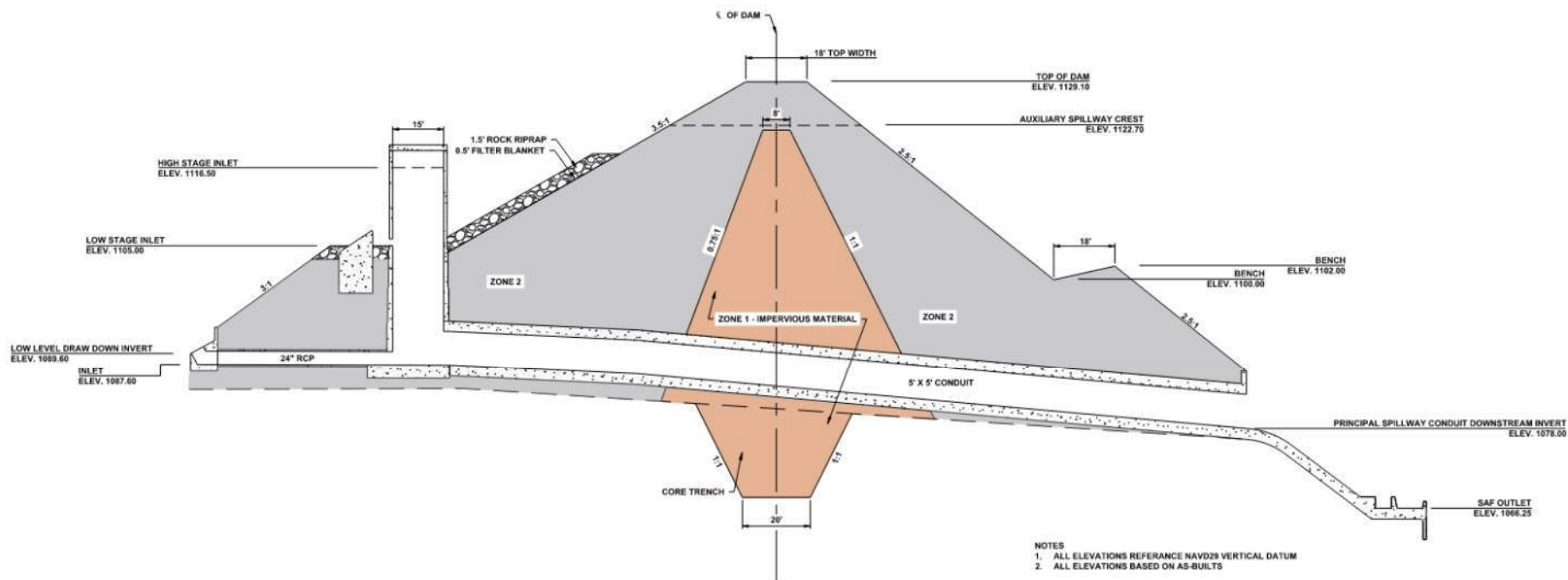
[2] Add 1.16 feet to convert NGVD 1929 vertical datum to NAVD 1988 vertical Datum (approximate)



Plan View



Embankment



FORDVILLE PRINCIPAL SPILLWAY CROSS SECTION
NOT TO SCALE

- NOTES
1. ALL ELEVATIONS REFERENCE NAVD29 VERTICAL DATUM
 2. ALL ELEVATIONS BASED ON AS-BUILTS

PRELIMINARY
Not for Construction



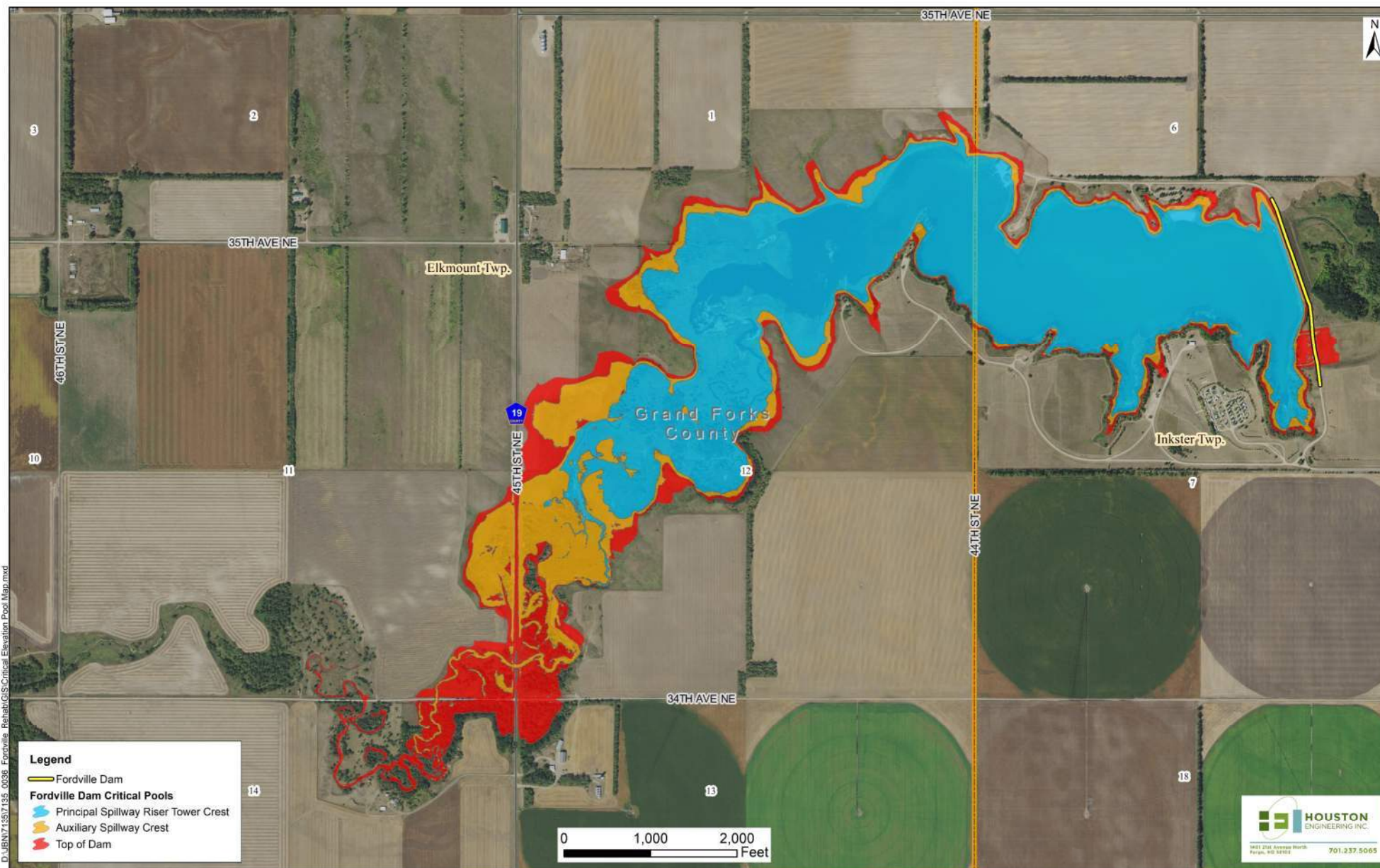
Fargo
P: 701.237.5065
F: 701.237.5101

Drawn by
CAD
Date
02-20-20
Checked by
-
Scale
AS SHOWN

FORDVILLE DETENTION DAM
WALSH COUNTY WATER RESOURCE DISTRICT
GRAFTON, NORTH DAKOTA

FORDVILLE DETENTION
DAM SECTION
PROJECT NO. 7135-0036

SHEET
1



Site Map of the Pool



Planning Team Structure

- **Planning Lead:** Natural Resources Conservation Service
 - **State Conservationist:** Mary Podoll
 - **State Conservation Engineer:** Christi Fisher, PE
- **Sponsoring Local Organization:** Walsh County Water Resource District
 - **Secretary:** Jennifer Lindenberger
 - **Chairman:** Daryl Campbell
 - **Vice-Chairman:** Larry Tanke
 - **Manager:** Albin Jallo
- **Planning Technical Lead:** Mike Opat, PE (*Houston Engineering, Inc.*)





Planning Team Structure

- Forest River Joint Water Resource District (FRJWRD) to assist with decision making throughout the planning process
- FRJWRD includes:
 - Walsh County Water Resource District
 - Grand Forks County Water Resource District
 - Nelson County Water Resource District



Agency Participation – State & Federal

Note: Agencies listed were invited to participate. Level of participation for each agency is unknown at this time.

Federal

- USACE
- USFWS
- FEMA



US Army Corps
of Engineers



FEMA

State

- ND State Water Commission
- ND Game & Fish Department
- ND Department of Transportation
- ND State Historical Society
- ND Department of Environmental Quality



Water Commission



Game and Fish



STATE
HISTORICAL
SOCIETY
OF NORTH DAKOTA



Environmental
Quality

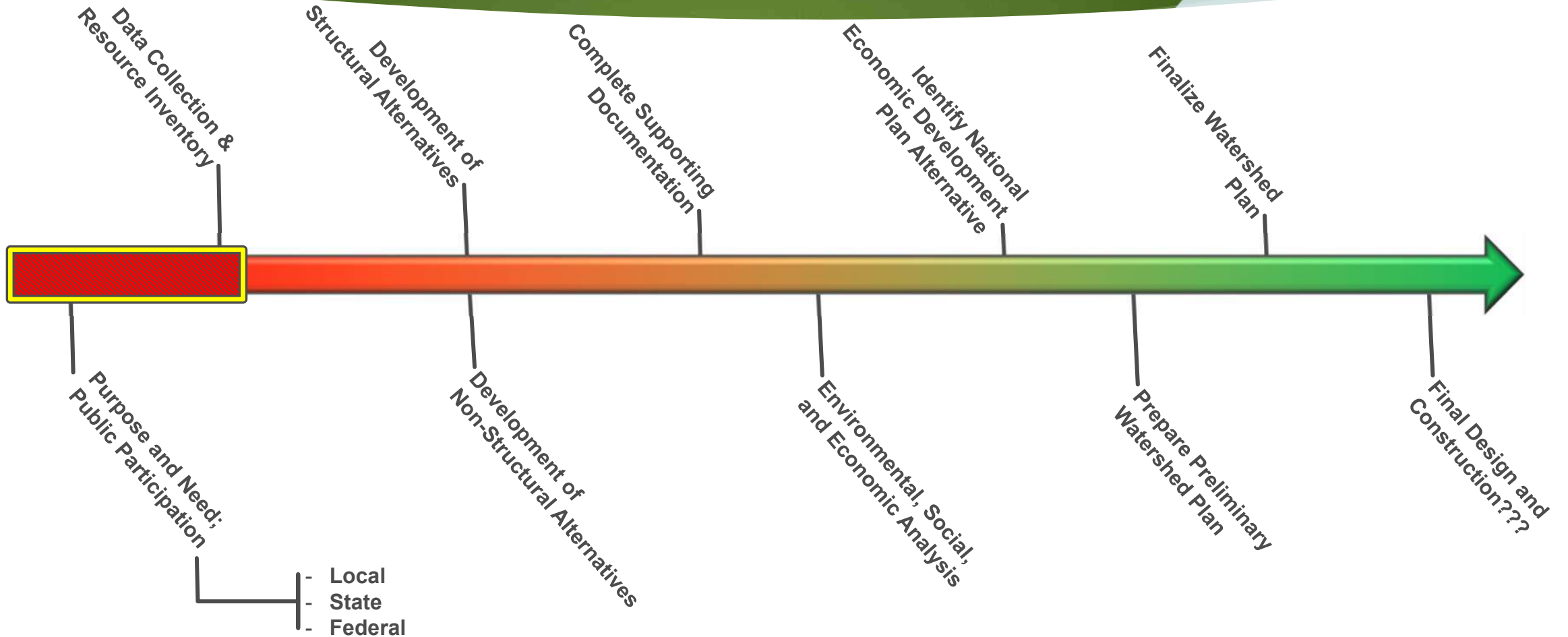


Agency Participation - Local

- Tribal Entities
- Walsh, Nelson, & Grand Forks County
 - Commissions
 - Water Resource Districts
 - Departments of Emergency Management
 - Soil Conservation Districts
 - Highway Departments



Planning Process





Purpose and Need

Purpose: Bring Fordville Dam into compliance for current federal and state dam safety standards for dam performance, design, and safety while maintaining current flood prevention and recreation opportunities.

Need:

- Dam Performance, Design, and Safety
- Flood Prevention
- Recreation



Hazard Classification/Dam Safety Standards

TR-60 Federal Requirements

Precipitation Depth (Inches)		
Standard	Significant Hazard	High Hazard
Principal Spillway	P_{50}	P_{100}
Auxiliary Spillway	$P_{100} + 0.12 (PMP - P_{100})$	$P_{100} + 0.26 (PMP - P_{100})$
Freeboard	$P_{100} + 0.40 (PMP - P_{100})$	PMP

*Probable Maximum Precipitation is being updated and subject to revisions.

** ND Dam Safety Guidelines are being updated.



Hazard Classification/Dam Safety Standards

TR-60 Federal Requirements

Dam Assessment Report – Fordville Dam

Precipitation Depth (Inches)	
Standard	High Hazard
Principal Spillway (24-hour / 10-day)	5.56 / 7.85
Auxiliary Spillway (24-hour)	11.2
Freeboard (24-hour)	27.4



Dam Safety - Classification

- **Dam Assessment Report –
Dam does not meet High Hazard Design Standards**
 - The Principal Spillway (PS) does not pass the 100-year event without activating the Auxiliary Spillway (AS)
 - The PS does not evacuate the 100-year storage in 10-days
 - The AS does not pass the Freeboard Hydrograph without overtopping the dam
 - Soil stability analyses show that the AS would breach during the 6-hour and 24-hour storms
 - AS exit velocities exceed allowable velocities presented in ND Dam Design Handbook



Downstream Risk

Breach Analysis *(From Dam Assessment Report – subject to revision)*

- Peak breach discharge estimated at 80,900 cubic feet per second – resulting in a wave 47 feet in height at the dam site
- Up to 140 potentially inhabitable structures flooded
 - The Forest River Hutterite Colony is located approximately 2.5 miles downstream of Fordville Dam

Downstream risk results in a High Hazard Designation



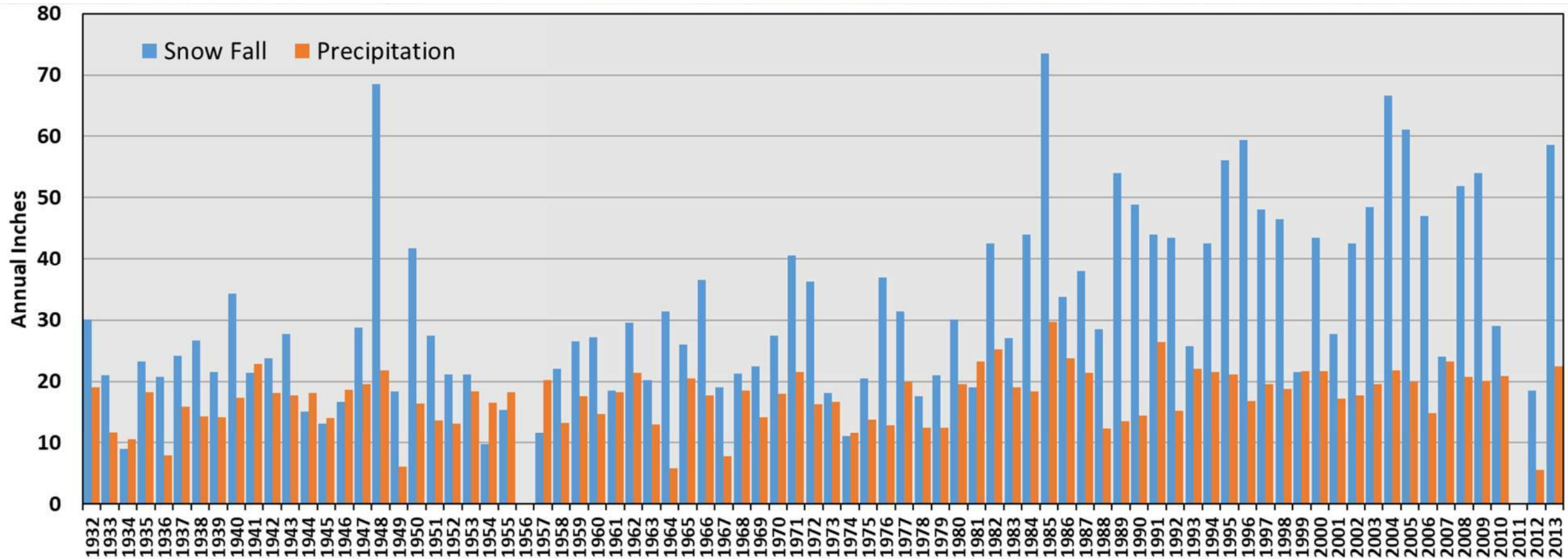
Flood Prevention

- **Agriculture** – delayed planting, prevented planting, crop damage, reduced yields, overland erosion, etc.
- **Infrastructure** – road overtopping, culvert washouts, road embankment scour, critical utilities, etc.
- **Structural** – Inhabited & uninhabited buildings
- **Public Safety** – Impacted transportation systems (possible critical access routes)

Flood Trends



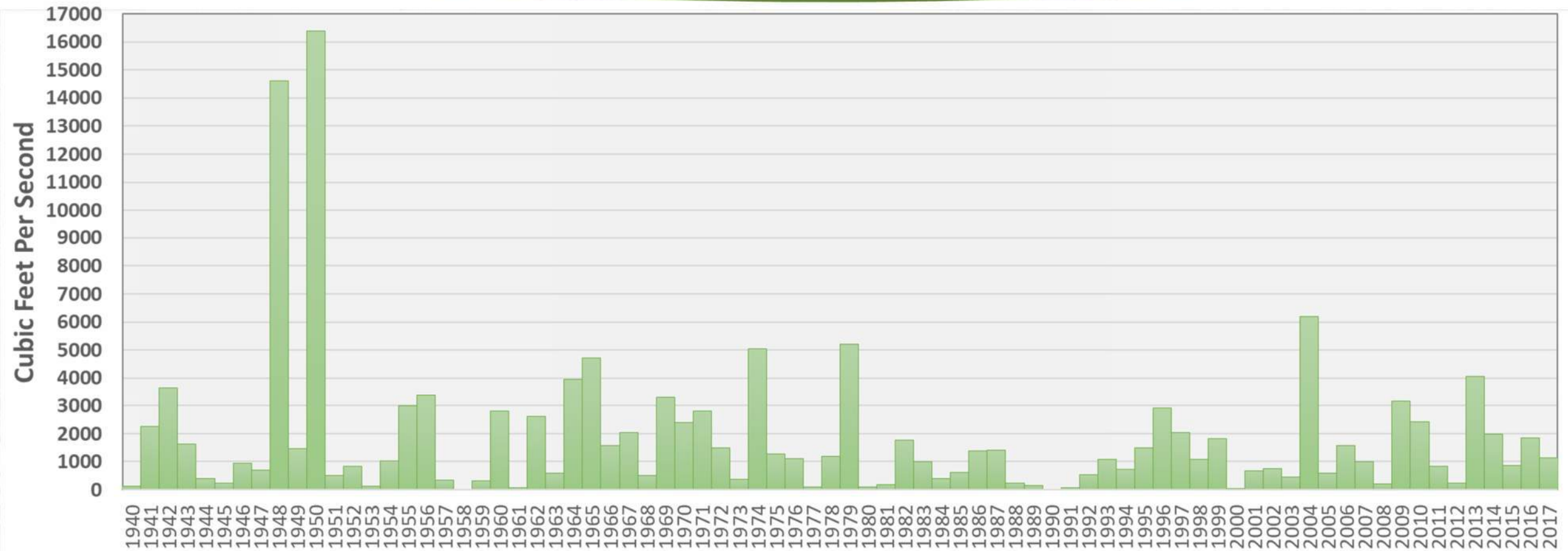
Historic Observed Rainfall and Snowmelt at Petersburg, ND





Flood Trends

Annual Peak Stream Flow
Forest River at Fordville, ND (USGS Gage 5084000)

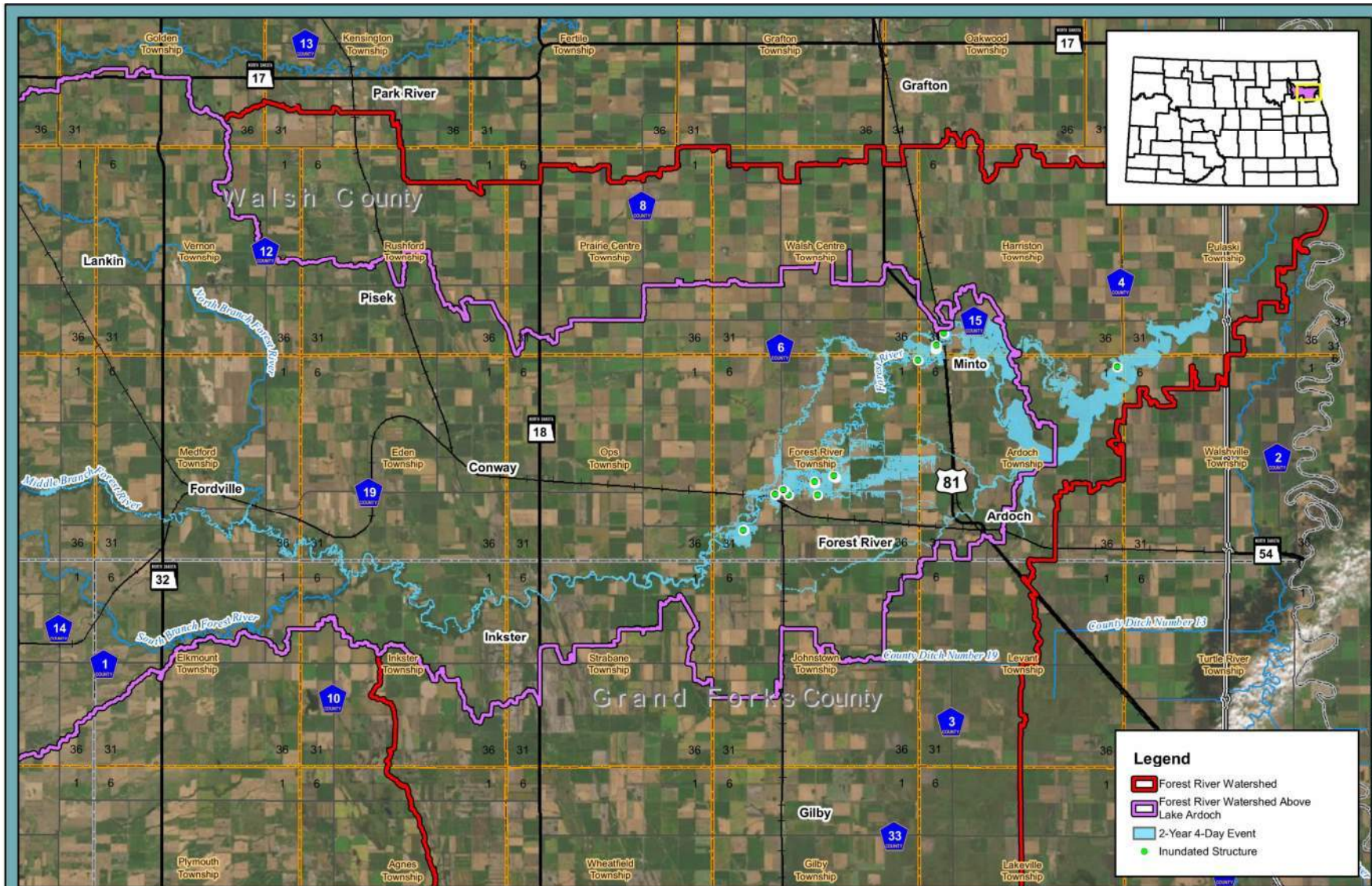




Hydrology and Hydraulics

- HEC-HMS hydrologic model developed to estimate flood flow and timing characteristics for the Forest River Watershed
- HEC-RAS unsteady state hydraulic model was developed estimate flood elevations using HEC-HMS results
- Hydrology and hydraulic models were calibrated to historic rainfall events
 - June 2016
 - May 2010
- Synthetic rainfall events were modeled (Source – Atlas 14)
- Model used to determine inundated acreages, duration of flooding, and potential damages to structures.
- Review of results determine the 4-day duration rainfall is the most damaging rainfall event.

Return Period	24-Hour Rainfall (in.)	4-Day Rainfall (in.)	10-Day Rainfall (in.)
2-year	2.0	2.7	3.6
5-year	2.5	3.3	4.3
10-year	3.0	3.9	5.0
25-year	3.8	4.9	5.9
50-year	4.4	5.6	6.7
100-year	5.1	6.4	7.5
500-year	7.0	8.6	9.6



4-Day Rainfall Depth: 2.69 inches

Total Inundation: 7,073 Acres

Inundated Structures: 24

B-11

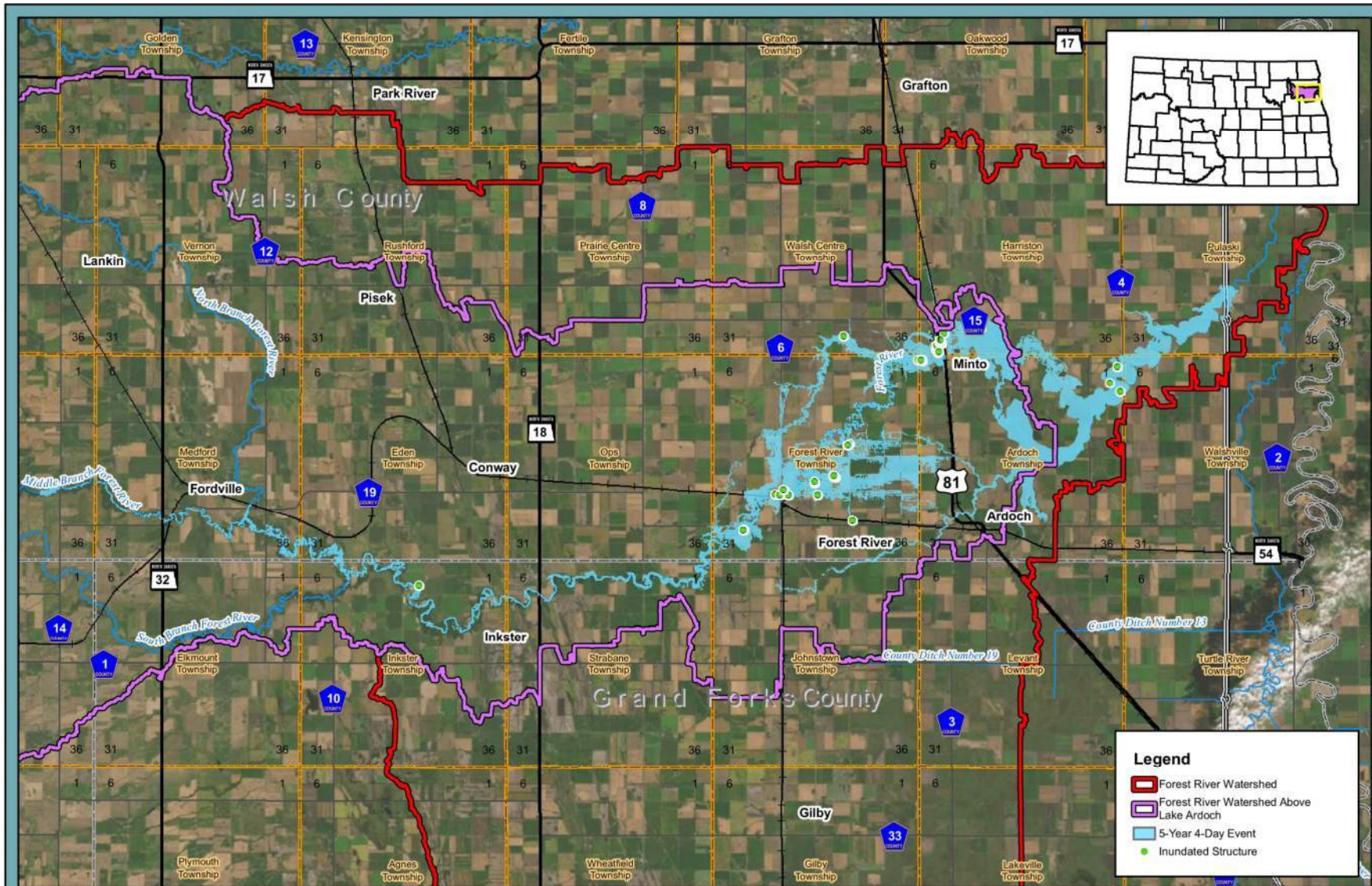
Figure B.11: 2-Year 4-Day Rainfall Inundation

Existing Conditions Hydrology and Hydraulics
Walsh County Water Resource District



0 1.5 3 6 Miles





4-Day Rainfall Depth: 3.34 inches
Total Inundation: 10,557 Acres
Inundated Structures: 61

B-12

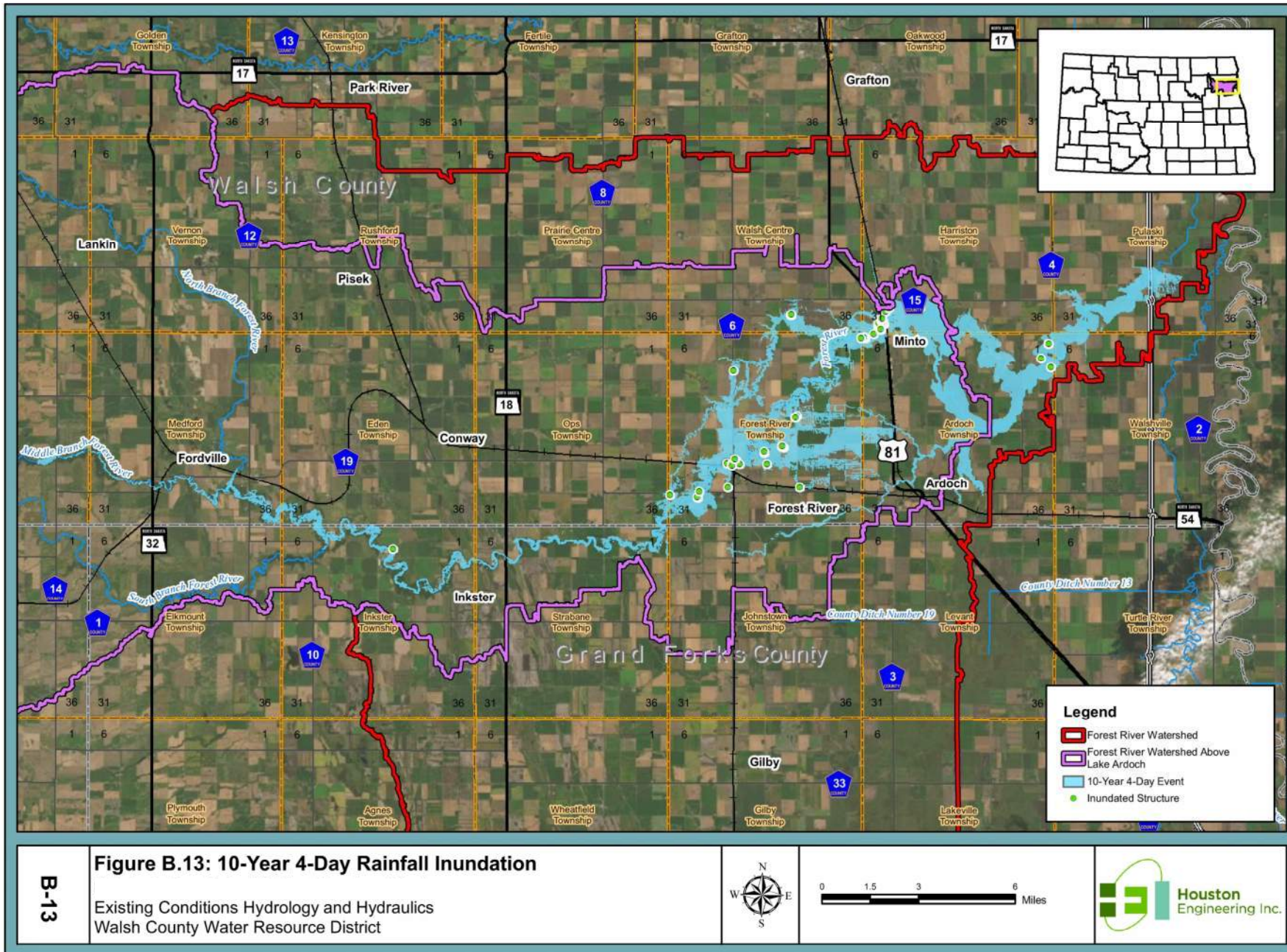
Figure B.12: 5-Year 4-Day Rainfall Inundation

Existing Conditions Hydrology and Hydraulics
Walsh County Water Resource District

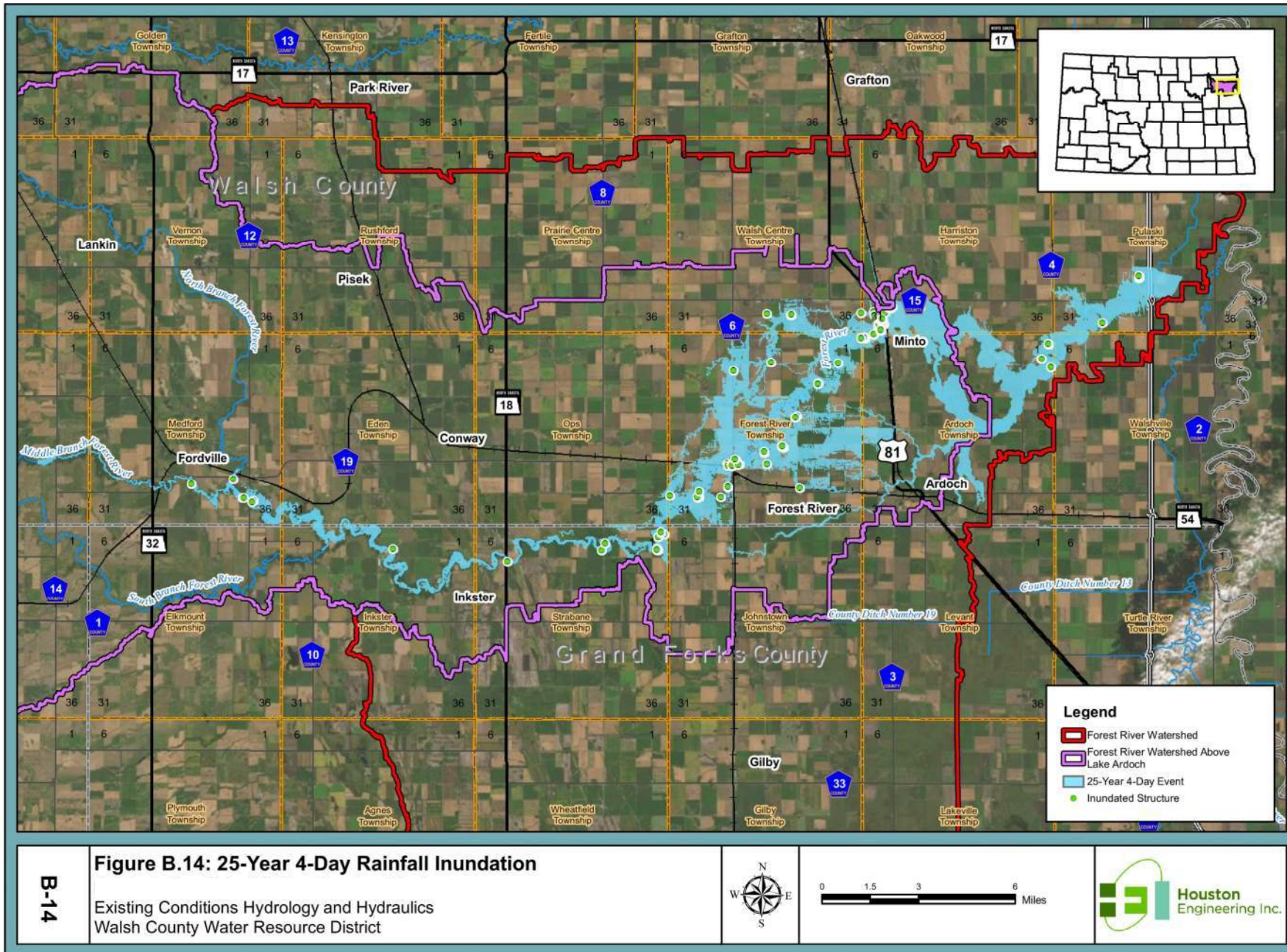


0 1.5 3 6 Miles

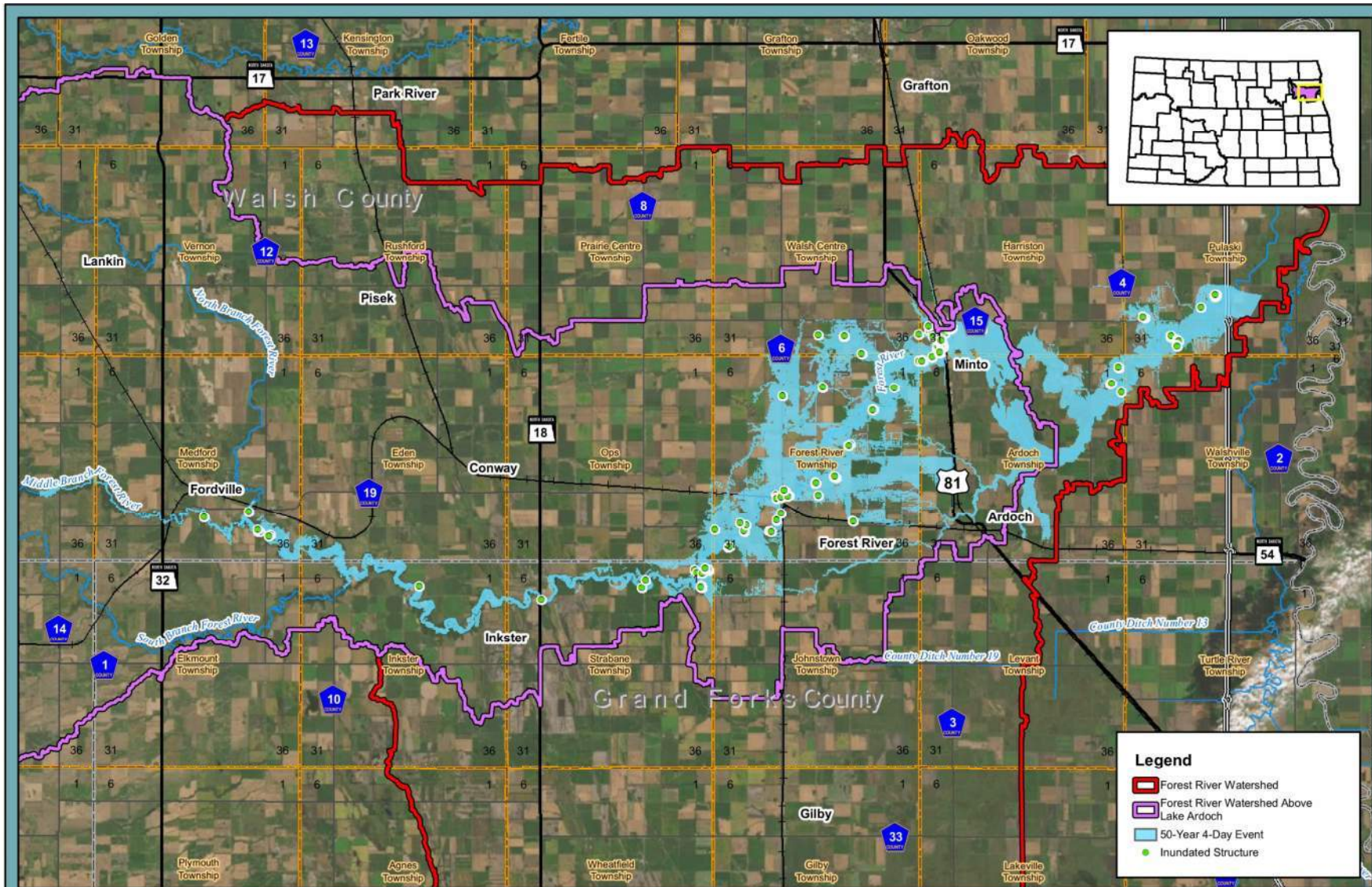




4-Day Rainfall Depth: 3.94 inches
Total Inundation: 13,130 Acres
Inundated Structures: 86



4-Day Rainfall Depth: 4.85 inches
Total Inundation: 16,894 Acres
Inundated Structures: 148



4-Day Rainfall Depth: 5.62 inches
Total Inundation: 20,296 Acres
Inundated Structures: 215

B-15

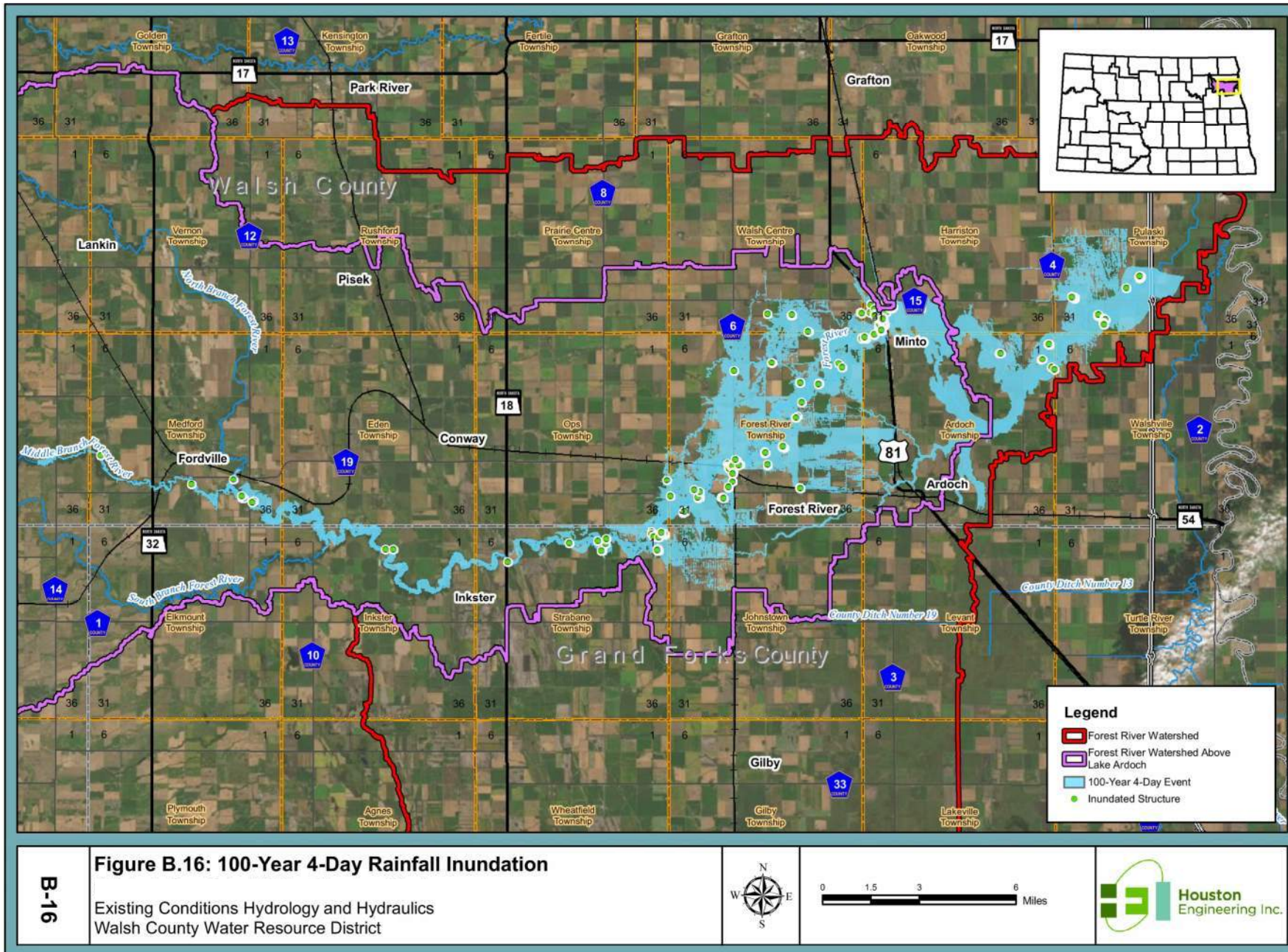
Figure B.15: 50-Year 4-Day Rainfall Inundation

Existing Conditions Hydrology and Hydraulics
Walsh County Water Resource District

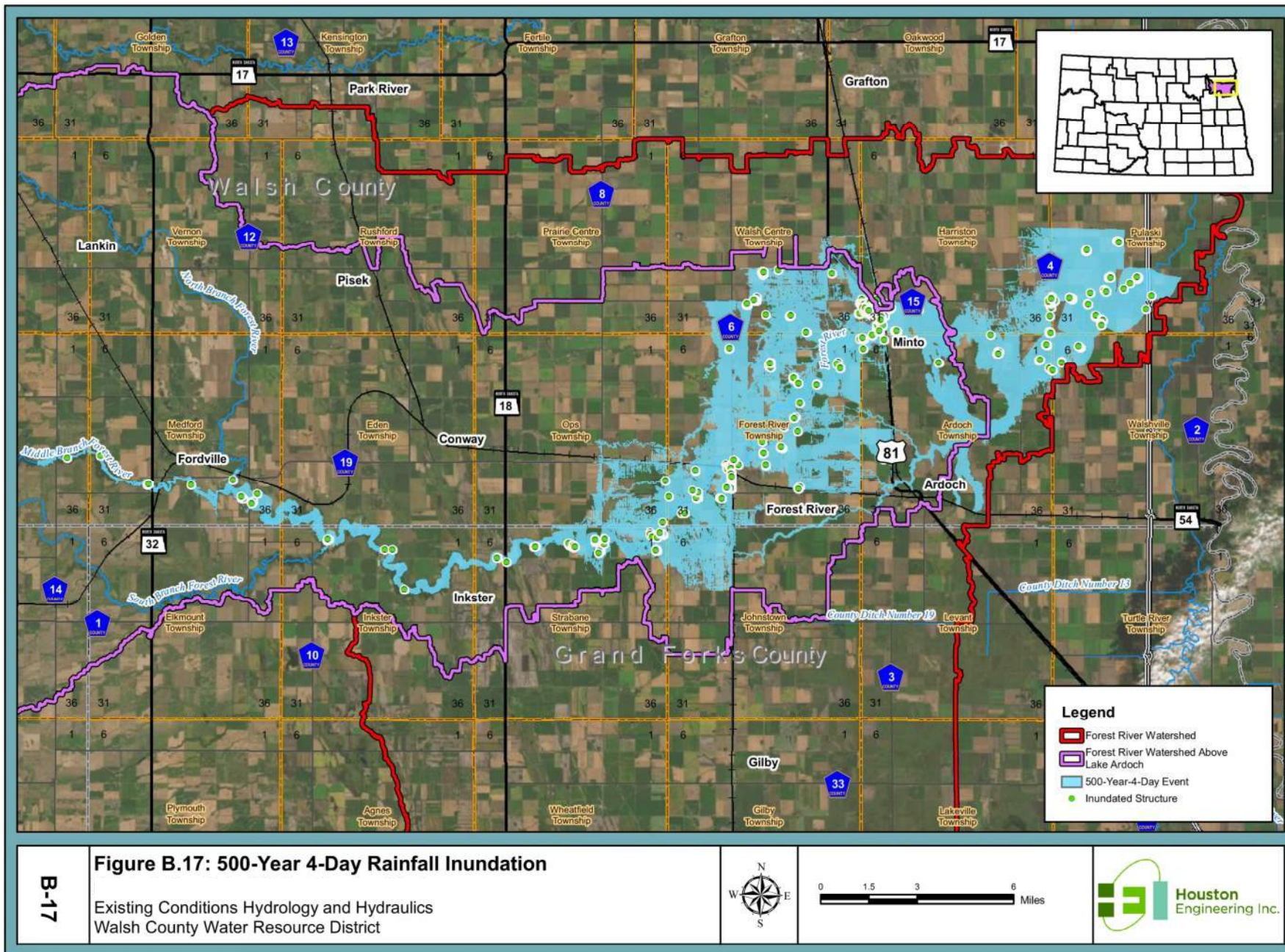


0 1.5 3 6 Miles





4-Day Rainfall Depth: 6.44 inches
Total Inundation: 23,855 Acres
Inundated Structures: 262

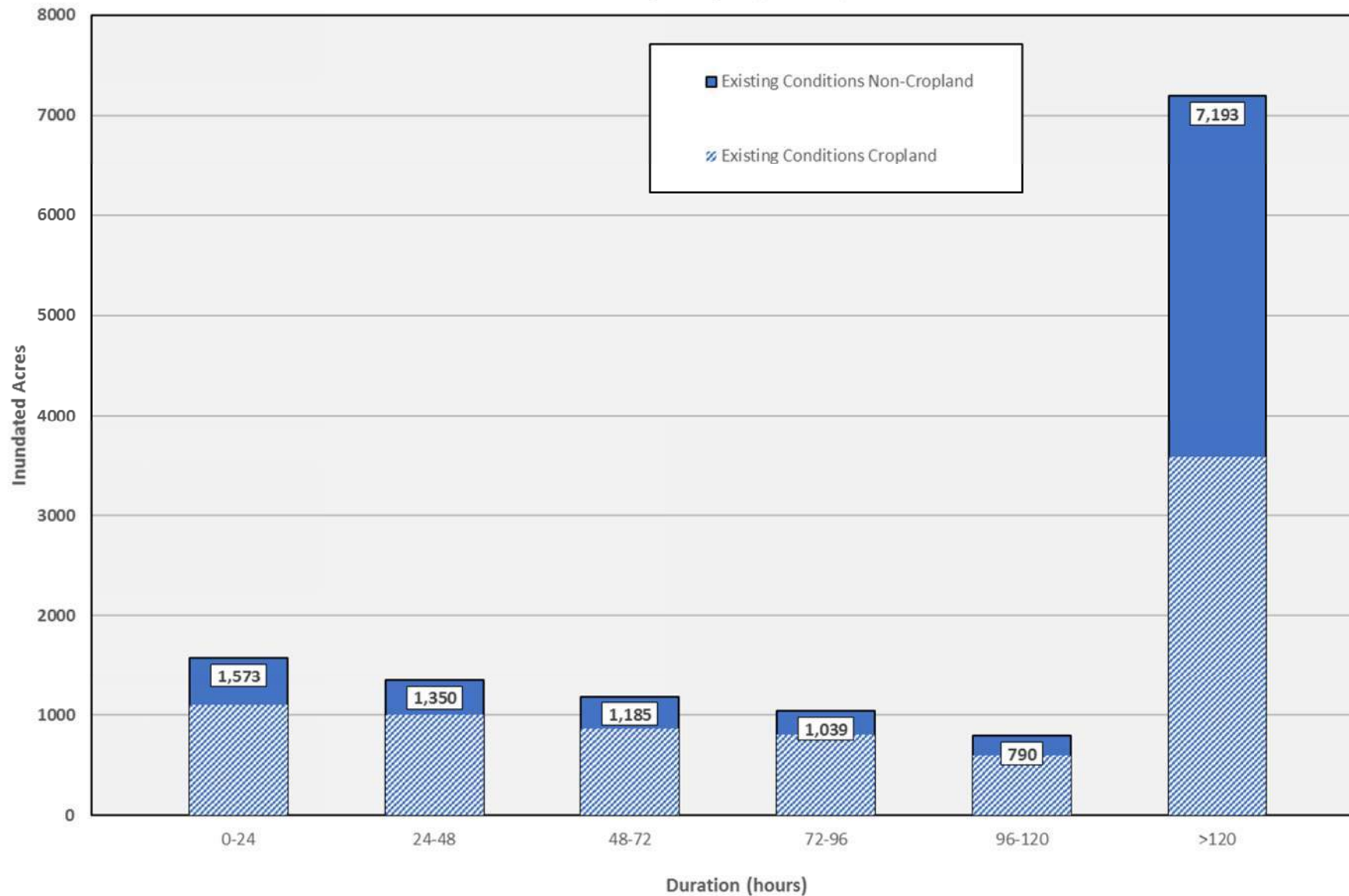


4-Day Rainfall Depth: 8.60 inches
Total Inundation: 35,374 Acres
Inundated Structures: 663





Flooded Acres vs Duration
10 Year, 4-Day Rainfall (Atlas 14)

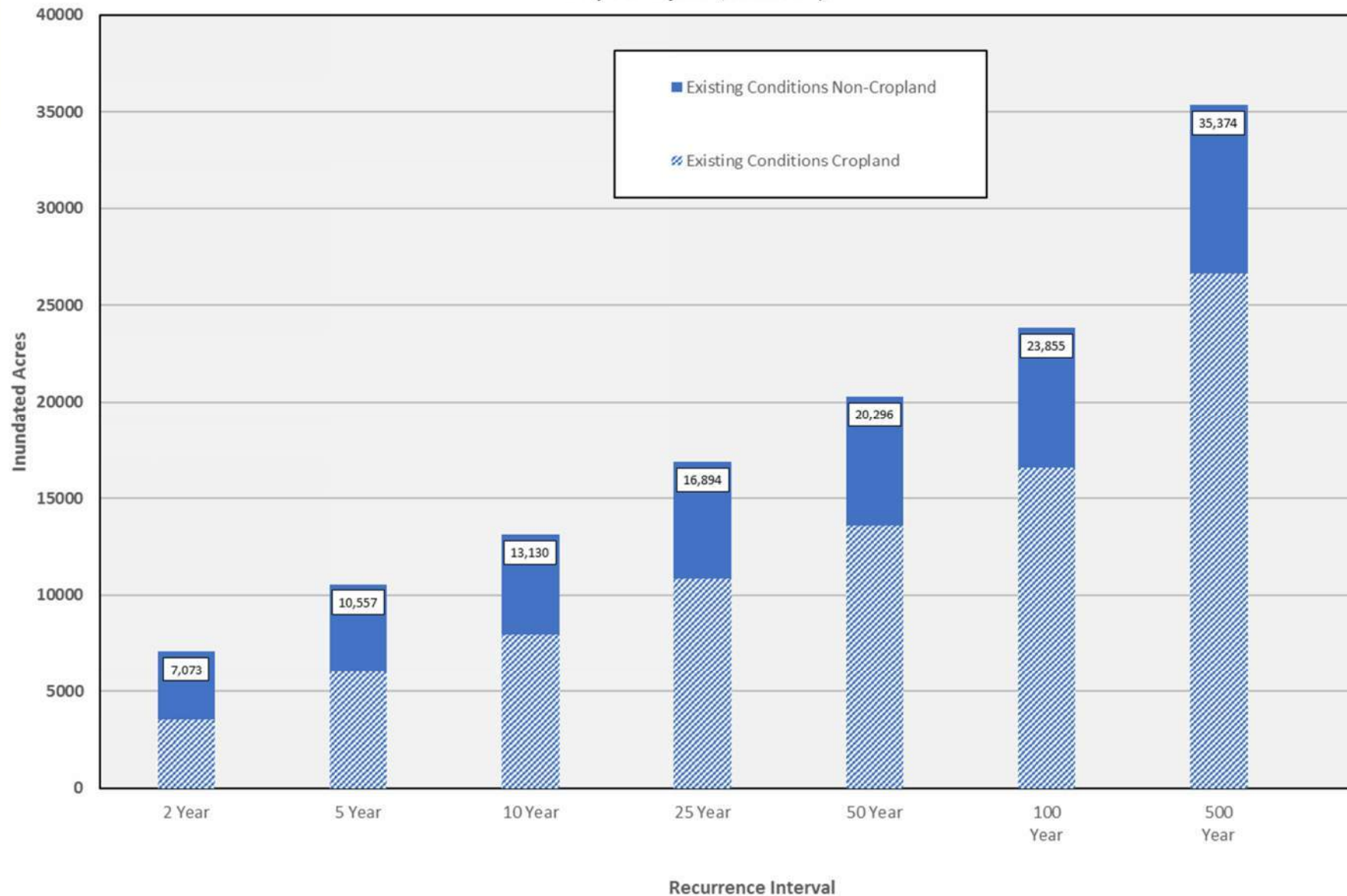


**Existing Flood
Characteristics**



Flooded Acres vs Recurrence Interval

4-Day Rainfall (Atlas 14)



**Existing Flood
Characteristics**



Recreation

- 185-acre lake
- 6.3 Shoreline Miles
- Max depth = 30.4 feet
Average depth = 11 feet
- Amenities:
 - *Boat Access*
 - *Public Beach*
 - *Day-Use Picnic Areas*
 - *Campground*
 - *Playground*
 - *Hiking Path*
- Fishery includes:
 - *Black Crappie*
 - *Northern Pike*
 - *Largemouth Bass*
 - *Walleye*
 - *Yellow Perch*
 - *Bullheads*



Data Collection and Resource Inventory

- Topographic survey
 - Channel survey data collected previously for the Middle Branch Forest River downstream of Fordville Dam
 - Additional survey needed for South Branch Forest River channel
 - Topographic survey to be completed for dam embankment and spillways
 - Bathymetric survey data to be collected for sedimentation analysis in the reservoir



Data Collection and Resource Inventory

- Hydrology and Hydraulics
 - Assessment of existing spillway adequacy
 - Assessment of existing conditions flooding downstream of dam
- Geotechnical
 - Soil borings to be completed at the dam site
 - Existing condition assessment of embankment soils and seepage to be completed
- Water quality
 - Water quality samples to be collected and analyzed



Preliminary Alternatives

- No Action
- Decommissioning
- Rehabilitation to High Hazard Criteria
- Remove Downstream Flood Risk and Rehabilitate to Reduced Hazard Classification



Factors Considered

- Technical Feasibility
- Economic Efficiency
- Public Health and Safety
- Environmental
- Social Considerations (Recreation)
- Cultural and Historic Resources
- Other Unique Factors

Project Funding



- NRCS
- ND State Water Commission
- Red River Joint Water Resource District
- Walsh County Water Resource District



WALSH COUNTY
North Dakota



Planning Process Timeline

- Purpose and Need for Action.....*July 2020*
- Data Collection and Resource Inventory.....*March 2021*
- Development of Alternatives (Structural and non-Structural).....*July 2021*
- Evaluation of Alternatives.....*February 2022*
- Preliminary Supplemental Watershed Plan (EA/EIS).....*April 2022*
- Final Supplemental Watershed Plan.....*July 2022*



Public & Agency Input

- Public Information Meeting.....*March 6, 2020*
- Interagency Meeting.....*January 2021*
- Interagency Meeting.....*May 2021*
- Interagency Meeting.....*July 2021*
- Interagency Meeting.....*September 2021*
- Public Information meeting.....*October 2021*

Public Input

COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Do you have any comments or concerns regarding this project: _____

(You may also indicate areas of concern on the reverse side of the attached map.)

Would you like to follow up with you for more information? YES NO

Provide your name, address, email address, and phone number: _____

Phone number: _____

drop this form off at the conclusion of the meeting, email, or mail back to:

Middle-South Branch Forest River Dam No. 4
ordville@houstoneng.com

MAIL: Middle-South Branch Forest River Dam No. 4
c/o Walsh County Water Resource District
600 Cooper Avenue
Grafton, ND 58237

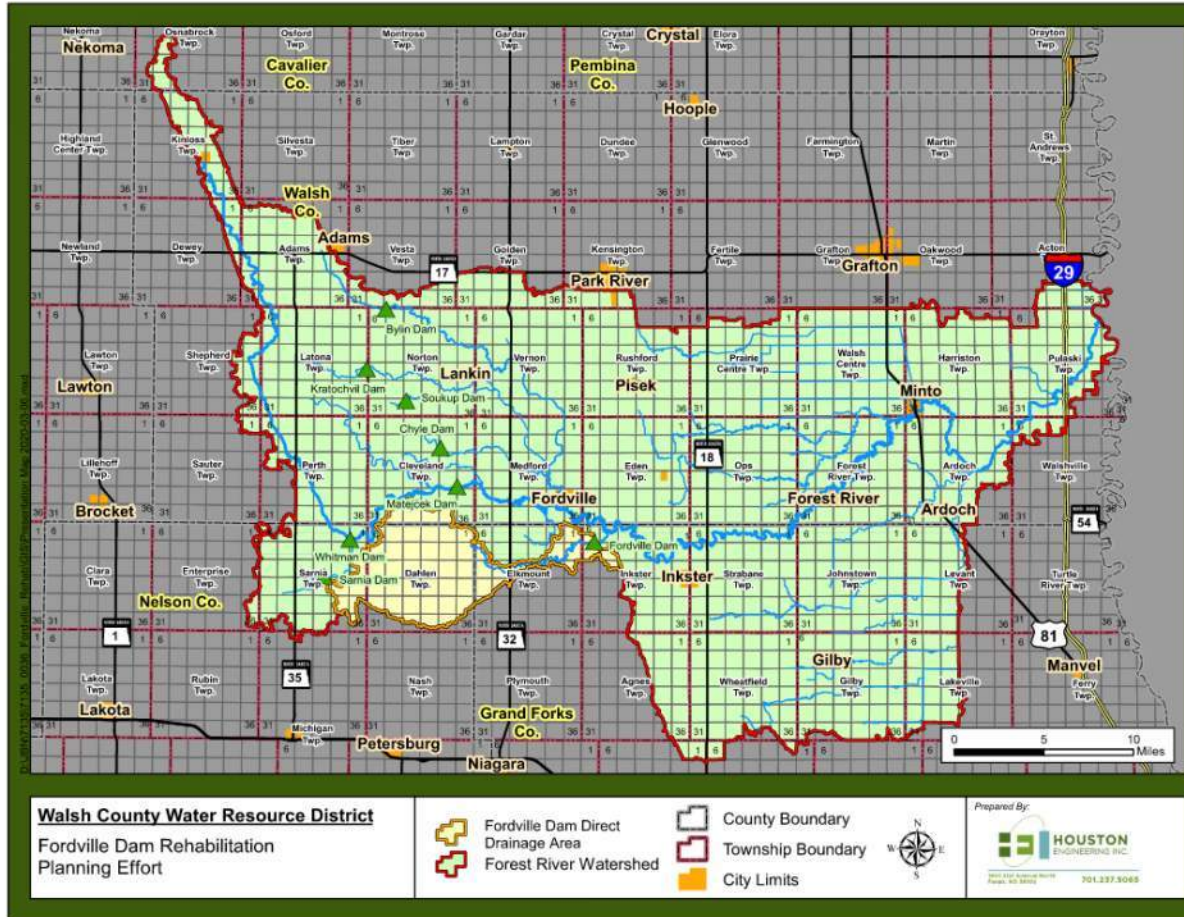
For taking the time to complete this comment form. Please return any completed questionnaire to the county Water Resource District before leaving.

If you would like more time to complete, please return no later than FRIDAY, APRIL 3, 2020 using the mail instructions above. Completed forms may also be dropped off at the Walsh County Water Resource office.

Thank You!!

HOUSTON
ENGINEERING INC.

WALSH COUNTY
North Dakota



Comment sheets are due by Friday, April 3, 2020



Thank You

Contact Information

Name: Mike Opat

Email: mopat@houstoneng.com

Phone: 701-499-9473

COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project: I would like to see Fordville Dam be more recreational. We camp out there and are unable to use water due to so many weeds. The swimming area is unusable due to seaweeds and green muck, fishing off the docks is nearly impossible because of the weeds. We use to be able to take boat to middle of lake and swim but now even the middle of the lake has too many weeds, seaweed and grn muck. I would like to see something done to clean it up.

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information?

☒ YES

☐ NO

Please provide your name, address, email address, and phone number:

Name: Crystal Gerszewski

Address: 392 3rd St Minto, ND

Email: crystal.gerszewski@gmail.com

Phone Number: 701-331-1508

Please drop this form off at the conclusion of the meeting, email, or mail back to:

EMAIL: Middle-South Branch Forest River Dam No. 4

Fordville@houstoneng.com

MAIL: Middle-South Branch Forest River Dam No. 4

c/o Walsh County Water Resource District

600 Cooper Avenue

Grafton, ND 58237

Thank you for taking the time to complete this comment form. Please return any completed questionnaire to the Walsh County Water Resource District before leaving.

If you would like more time to complete, please return no later than **FRIDAY, APRIL 3, 2020** using the email/mail instructions above. Completed forms may also be dropped off at the Walsh County Water Resource District office.

Thank You!!



COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project: The water is getting really bad.
I think we need more flow or to open it up for a while to recreation.
The last few years fishing and swimming has been so bad/poor due
to weeds and blue-green algae.

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information?

YES

NO

Please provide your name, address, email address, and phone number:

Name: Paul Gerszewski

Address: 322 9th St. Minto, ND 58261

Email: paulgerszewski@gmail.com

Phone Number: 701-331-1413

Please drop this form off at the conclusion of the meeting, email, or mail back to:

EMAIL: Middle-South Branch Forest River Dam No. 4

Fordville@houstoneng.com

MAIL: Middle-South Branch Forest River Dam No. 4

c/o Walsh County Water Resource District

600 Cooper Avenue

Grafton, ND 58237

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COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project:

My first priority would be keep all flood control in place. Save all recreation opportunity.

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information?

☒ YES

☐ NO

Please provide your name, address, email address, and phone number:

Name: *Albin Jallo*

Address: *5531 122 AVE NE Fordville, N.Dak. 58231*

Email: _____

Phone Number: *701-384-6252 Home 701-739-6865 Cell*

Please drop this form off at the conclusion of the meeting, email, or mail back to:

EMAIL: Middle-South Branch Forest River Dam No. 4

Fordville@houstoneng.com

MAIL: Middle-South Branch Forest River Dam No. 4

c/o Walsh County Water Resource District

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Thank You!!



COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project: Are there any other options?
Working on increased infiltration / No-till grants, wetland
restoration projects, more filter strips?

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information? YES NO

Please provide your name, address, email address, and phone number:

Name: _____

Address: _____

Email: _____

Phone Number: _____

Please drop this form off at the conclusion of the meeting, email, or mail back to:

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COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project: _____

- Considerations - downstream impacts - bank shifting
- River Incision downstream
- Buffers to be installed on riparian
- BMP's in Watershed
- Sediment loading impacts what is present
- Nitrate, phosphorus study (impacts)

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information?

☒ YES

☐ NO

Please provide your name, address, email address, and phone number:

Name: Chris Nelson, NRCS Park River

Address: _____

Email: _____

Phone Number: _____

Please drop this form off at the conclusion of the meeting, email, or mail back to:

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Fordville@houstoneng.com

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Thank You!!

COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project: If the dam is to be rebuilt what would need to happen downstream while construction for Fordville (+ Matejcek) dams are underway? The "What ifs" if they plan to do this then this needs to be done downstream. First.

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information?

YES

NO

Please provide your name, address, email address, and phone number:

Name: Chris Schulz

Address: 3821 35th Ave NE, Inkster ND 58233

Email: _____

Phone Number: 701 - 865 - 4255

Please drop this form off at the conclusion of the meeting, email, or mail back to:

EMAIL: Middle-South Branch Forest River Dam No. 4

Fordville@houstoneng.com

MAIL: Middle-South Branch Forest River Dam No. 4

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Thank You!!



Mora Currey?

COMMENT SHEET

Middle-South Branch Forest River Dam No. 4 (Fordville Dam)

Public Scoping Meeting – March 6, 2020

Please list any comments or concerns regarding this project: sediment, deposition, if
significant - maybe look at potential to mine
& use sediment? - The Forest River Colony is
a potential user?

(You may also indicate areas of concern via markup or comment on the map displayed on the reverse side of this sheet.)

May we follow up with you for more information? YES NO

Please provide your name, address, email address, and phone number:

Name: _____

Address: _____

Email: _____

Phone Number: _____

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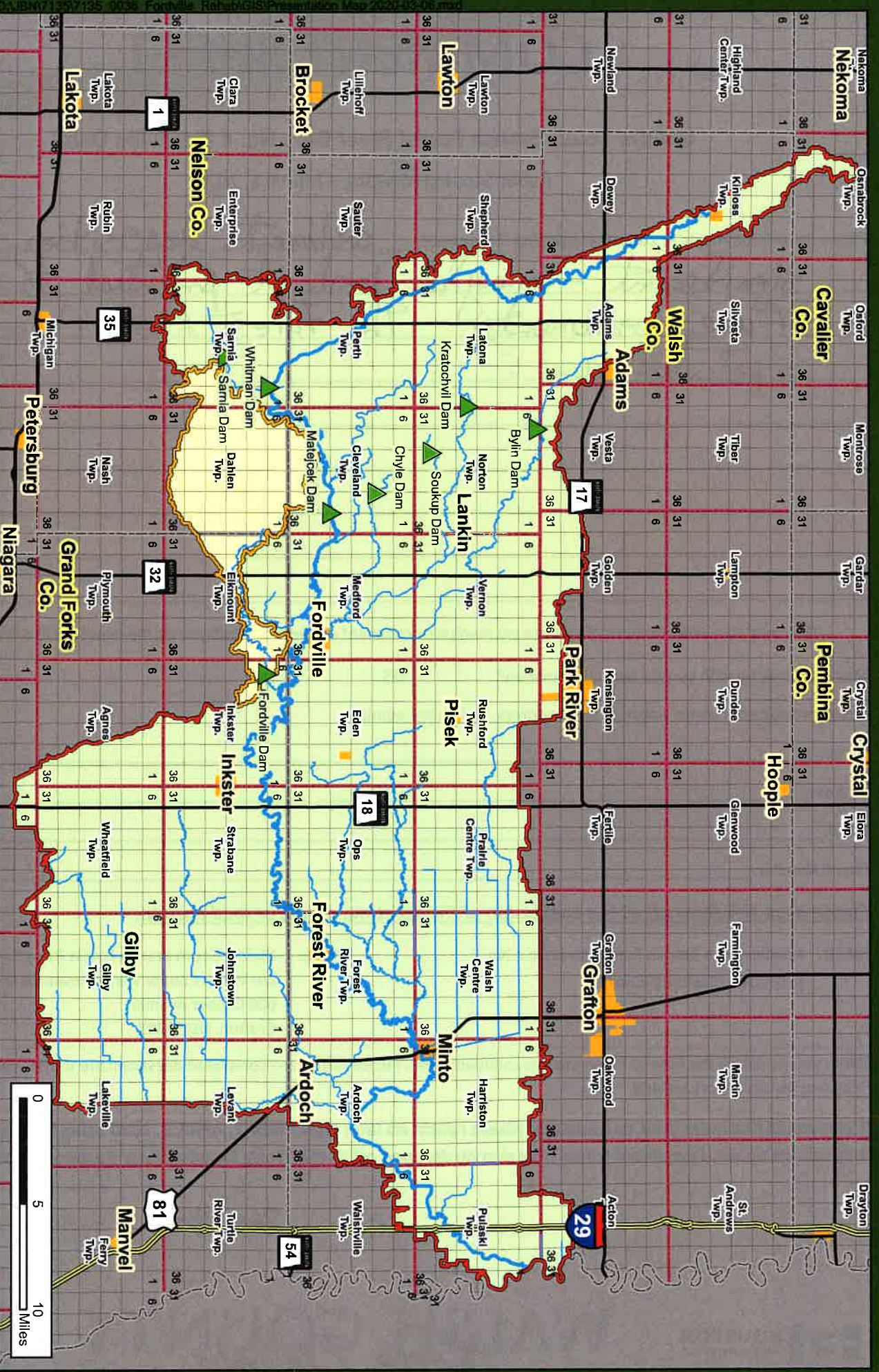
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Thank You!!





Walsh County Water Resource District

Fordville Dam Rehabilitation Planning Effort

- Fordville Dam Direct
- Drainage Area
- Forest River Watershed
- County Boundary
- Township Boundary
- City Limits



Prepared By:

