Eau Galle Project Master Plan

US Army Corps of Engineers ®
St. Paul District

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Spring Valley, Wisconsin

November 2019

US Army Corps
of Engineers
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EXECUTIVE SUMMARY

The Eau Galle Project (Project) Master Plan (Master Plan) is a strategic land use document that will serve as a vital tool for the responsible stewardship of resources to benefit present and future generations. This Master Plan has multiple purposes:

- Prescribe an overall land use management plan for all land (fee, easements, or other interests) acquired for the Project.
- Identify resource objectives and associated design and management concepts.
- Provide broad concepts rather than details of design or administration.
- Facilitate appropriate management, use, development, enhancement, protection, and conservation of the natural, cultural, and man-made resources.
- Ensure responsible stewardship of these resources to benefit present and future generations.
- Guide the U.S. Army Corps of Engineers (Corps, USACE) pursuant to applicable federal laws, policies, and regulations.

As a dynamic, operational document, this Master Plan is broad and flexible and based upon changing conditions. The Master Plan deals with concepts rather than details of design or administration. Detailed management and administration functions are addressed in the operational management plan, which implements the concepts within this Master Plan into operational actions.

The primary goals of the Master Plan are to prescribe an overall land use management plan and identify resource objectives and associated design and management concepts. A Corps interdisciplinary team developed this Master Plan with input from local, state, and federal agencies, tribal representatives, and the public. The Corps developed the original Master Plan in 1964, approved an updated Master Plan in 1990, and created a supplemental plan in 1999.

By definition, master plans for Corps' reservoirs are land and recreational use management plans that do not address the technical aspects of water level management, regional water quality, shoreline management, or operation and maintenance of Project operations facilities. To ensure consideration of natural and cultural resources, the Corps also prepared an environmental assessment to identify and evaluate potential impacts.

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1 Introduction

1.1 Project Authorization*

Congress authorized the U.S. Army Corps of Engineers (Corps ,USACE) to construct and operate the Eau Galle Dam, Eau Galle Reservoir, and downstream channel improvements via the Flood Control Act of 1958 (Public Law 85–500). The Eau Galle Project (Project) Master Plan (Master Plan) (Senate Document No. 52, 84th Congress, 1st Session) sets forth the details of the Project.

1.2 Project Purpose*

Authorized purposes for the Project include flood control, recreation (Public Law 78–534, Flood Control Act of 1944), and enhancement of fish and wildlife (Public Law 85–624, Fish and Wildlife Coordination Act of 1958). The Corps constructed the Project from 1965 to 1969, which included a variety of recreation facilities, picnicking sites, swimming beaches, camping sites, boat launches, and trails. The Corps included the enhancement of fish and wildlife and natural resources in the design and construction of the various facilities.

1.2.1 Flood Control

Referred to as flood risk management (FRM), flood control is an authorized purpose as designated by the Flood Control Act of 1936, Public Law 74–738 (50 Stat. 844). FRM reduces threats to life and property damages from riverine and coastal flooding.

1.3 Scope and Purpose of Master Plan*

In accordance with Engineer Regulation (ER) 1130-2-550, Project Operations – Recreation Operations and Maintenance Policies, Change 7, dated 30 January 2013 and Engineer Pamphlet (EP) 1130-2-550, Project Operations – Recreation Operations and Maintenance Guidance and Procedures, Change 5, dated 30 January 2013, master plans are required for most Corps water resources development projects having a federally owned land base. This revision of the Eau Galle Project Master Plan is intended to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the lake, as well as those anticipated to occur within the planning period of 2019 to 2044 (i.e., 25 years).

The scope of this Master Plan covers the present and future use of all land within the Project boundaries. This Master Plan is a strategic land use document with multiple purposes:

- Prescribe an overall land use management plan for all land (fee, easement, or other interests) acquired for the Project.
- Identify resource objectives and associated design and management concepts.
- Provide broad concepts rather than details of design or administration.
- Facilitate appropriate management, use, development, enhancement, protection, and conservation of the natural, cultural, and man-made resources.
- Ensure responsible stewardship of these resources to benefit present and future generations.
- Guide the Corps pursuant to applicable federal laws, policies, and regulations.

As a dynamic, operational document, this Master Plan is broad and flexible, and based upon changing conditions. All Corps actions and individuals who are granted leases to Corps' lands must be consistent with the Master Plan. Therefore, the Master Plan must be updated regularly to provide effective guidance to the Corps' decision-making process.

The Master Plan is based on regional and local needs, resource capabilities, and expressed public interests that are consistent with authorized Project purposes. It provides a district-level policy consistent with national objectives as well as state and regional goals and programs.

To ensure consideration of natural and cultural resources, the Corps also prepared an environmental assessment (EA) to identify and evaluate potential impacts. The EA can be found in Appendix A.

This Master Plan is programmatic and identifies conceptual types and levels of activities — not designs, Project sites, or estimated costs. By definition, master plans for Corps reservoirs are land and recreational use management plans that do not address the technical aspects of water level management, regional water quality, shoreline management, or operation and maintenance of Project operations' facilities; however, these topics are addressed in the operational management plan for the Eau Galle Project. Because this Master Plan doesn't address water level management, the operation and maintenance of the reservoir is not included.

1.3.1 Guiding documents

Both the Master Plan and EA were prepared in accordance with the following guidance:

- ER 1130-2-550, Project Operations – Recreation Operations and Maintenance Guidance and Procedures, 15 November 1996 (with changes 1 October 1999, 1 March 2002, 15 August 2002, 30 August 2008, 30 March 2009, 30 January 2013, and 30 September 2013).
- Engineer Manual 1110-1-400, Engineering and Design – Recreation Facility and Customer Service Standards, 1 November 2004.
- ER 200-1-5, Environmental Quality – Policy for Implementation and Integrated Application of the U.S. Army Corps of Engineers (USACE) Environmental Operating Principles (EOP) and Doctrine, 30 October 2003.
- ER 200-2-2, Research and Development – Procedure for Implementing NEPA, 4 March 1988.
- ER 1105-2-100, Planning Guidance Notebook, 22 April 2000.

1.4 Watershed and Project Description*

The Eau Galle Project is located in the Lower Chippewa River Watershed (Figure 1). The Lower Chippewa Watershed encompasses over 1.3 million acres in northwest Wisconsin. The two largest land uses in the watershed are agriculture (58.5 percent) and forestland (33.5 percent). The remaining land uses within the watershed comprise of wetlands, open water, and urban areas (Natural Resources Conservation Service, 2008).

The history of the Eau Galle Project can be traced back to 1942. During that year, two severe floods resulted in approximately $1,500,000 worth of damages to the city of Spring Valley, Wisconsin. Charged by Congress, the Corps completed a preliminary analysis of the flood problems within the Chippewa River watershed in May 1944 and released an interim report. This report was based on a review of the basin survey for flood risk management on the Eau Galle River and described the Project, associated features, resources of the region, and local cooperation required. The interim report was published in Senate Document 52, 84th Congress, 1st session. Design Memorandum No. 1: Hydrology and Hydraulic Analysis, No. 2: Site Selection, No. 3: General, No. 4: Mines Creek Improvements, and No. 5: Dam and Spillway, were submitted between November 1960 and June 1964.

Congress authorized the Eau Galle Dam, Eau Galle Reservoir, and downstream channel improvements via the Flood Control Act of 1958 (Public Law 85–500). The Corps began construction of the dam, reservoir, and ancillary facilities on July 9, 1965 and completed the work in October 1968. The reservoir first reached the conservation pool elevation of 940.0 feet National Geodetic Vertical Datum of 1929 (NGVD 29)[1] on March 24, 1969. Final inspection of the Project was in September 1969. The Corps has developed various recreation facilities, which are described in Section 1.6.4, Recreation Facilities.

[1] All elevations in this report are relative to NGVD 1929 datum unless otherwise noted.

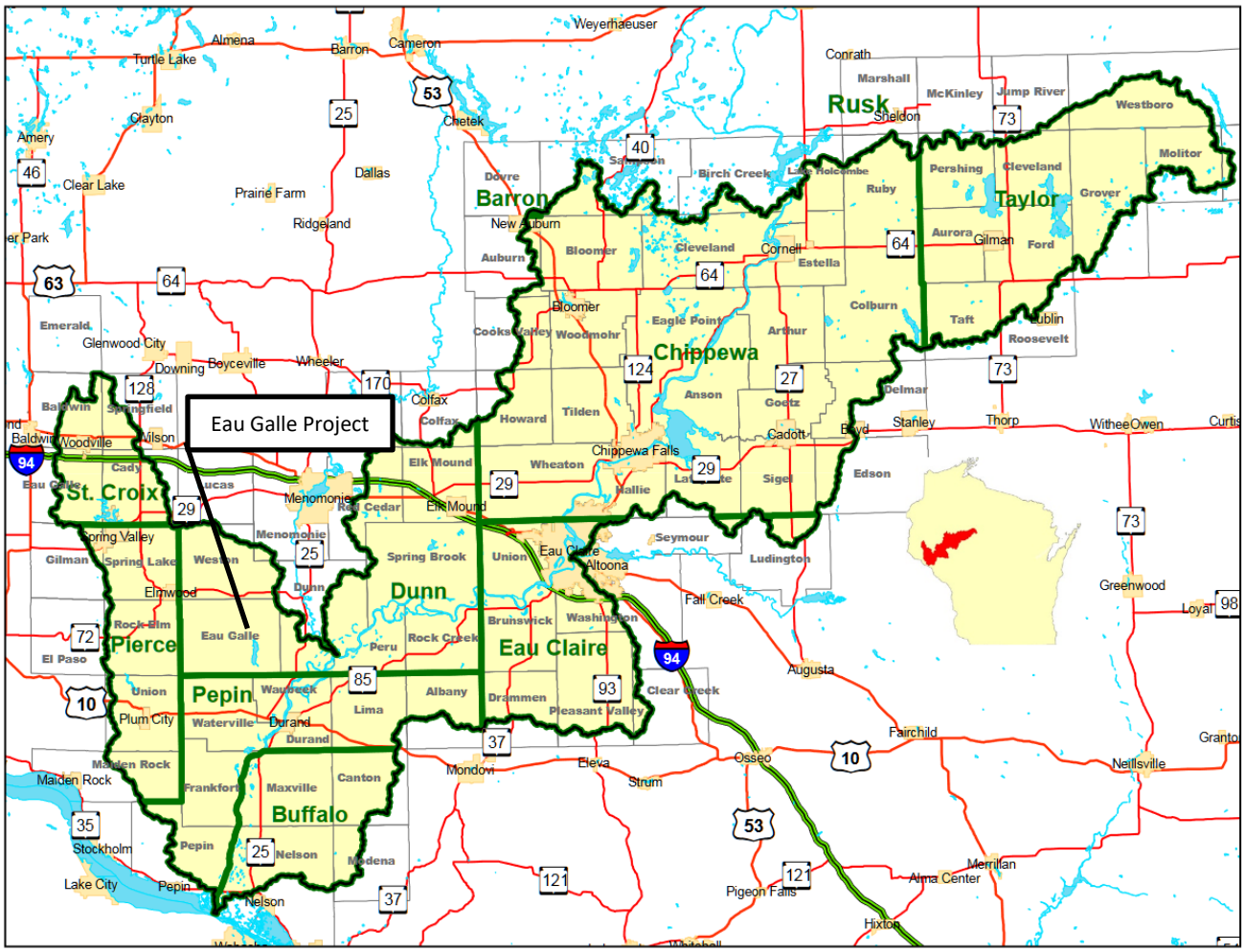

Figure 1. Lower Chippewa River Watershed (Natural Resources Conservation Service, 2008).

The Project lands of 644.5 acres are held in fee by the Corps. A flowage easement is held in an additional 519.5 acres, which encompasses the area surrounding the reservoir to an elevation of 1020 feet. The property boundary is shown in Figure 2. This area includes all operation, maintenance, and recreation uses within the Project. The reservoir covers 139 surface acres and has a shoreline about 8.29 miles long at conservation pool (940.0 feet).

The represented mapped acreages on figures and plates are calculated from geographic information system (GIS) polygon data. GIS acres are not the deeded legal acreage. All figures in the report show fee title as 649 acres and flowage easement as 514 acres. This difference is shown in Table 1. For information on the deeded legal acreage of the Project see Table 2 and section 2.16, Real Estate & Acquisition Policy *.

Table 1. Deeded and GIS acreages for Eau Galle Project.

		Deeded Acres	GIS Acres
Fee Title		644.5	649
Flowage Easement		519.5	514

1.4.1 Existing Outgrants, Leases, and Concessionaires

Currently 16 outgrants exist at the Project, including, an easement for access roads to adjoining property; an easement to St. Croix Electric Company for a power line; Northern States Power Company for power lines; Spring Valley roadway for 6th Street Bridge; Spring Valley Police Department warning siren; and an easement to Williams Pipeline Company for an oil pipeline route.

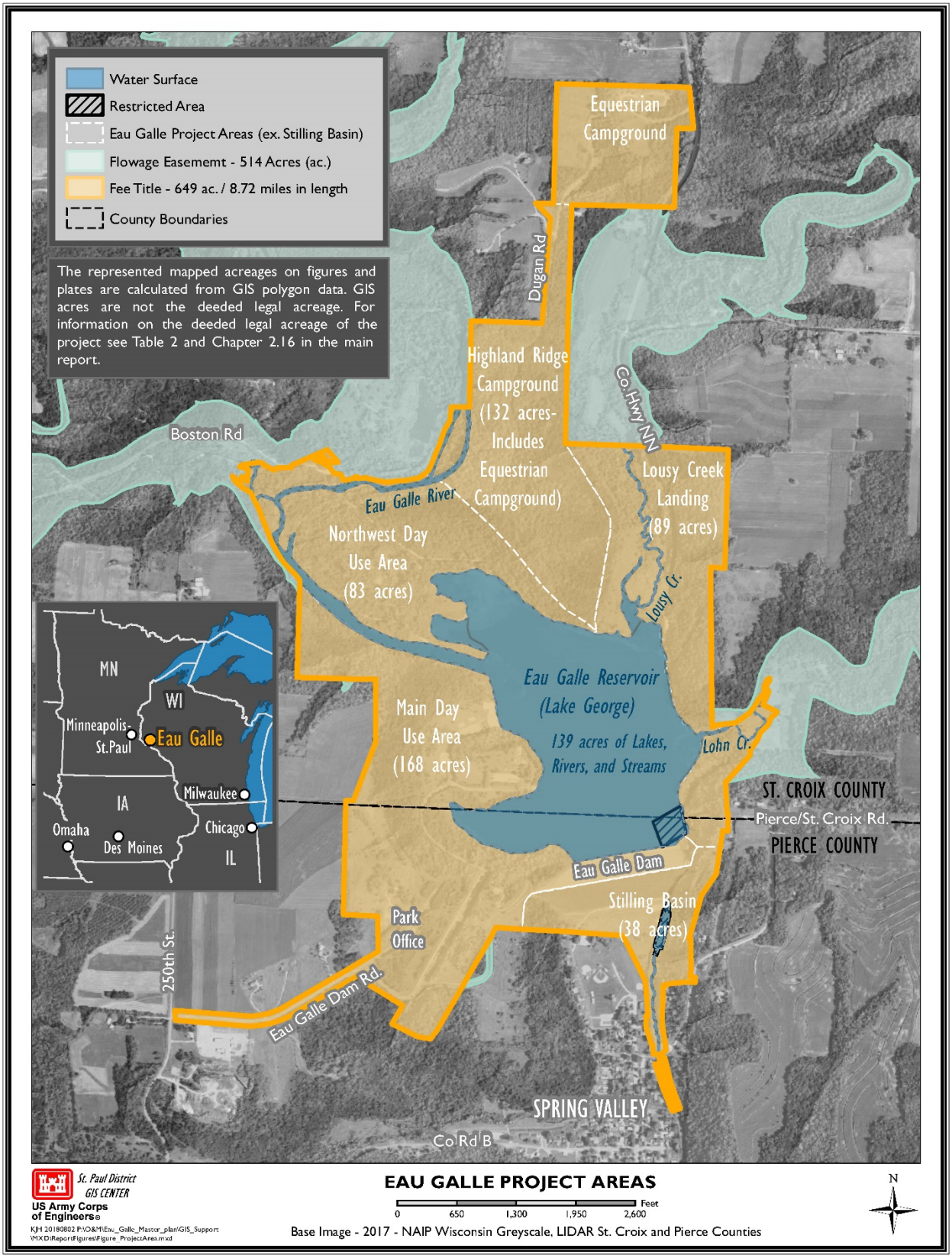

Figure 2. Eau Galle Project areas.

1.5 Listing of Prior Design Memorandums*

The Corps developed the original Master Plan in 1964 under the title Design Memorandum No. 6, approved an updated Master Plan in 1990, and created a supplemental plan in 1999 to include the development of an equestrian campground located on Dugan Road at the Eau Galle Project.

This Master Plan supersedes all previous Eau Galle Project master plans and supplemental documents.

1.6 Listing of Pertinent Project Information*

Basic Project information is summarized in Table 2 below.

1.6.1 Dam

The principle Project structure is the rolled-earth and rock filled dam having a maximum height of approximately 122 feet and a top length of 1,800 feet (Photo 1).An auxiliary overflow (aka emergency) spillway is located in a natural saddle in the valley bank near the right (western) abutment of the dam (Photo 2). The auxiliary overflow spillway consists of an unlined chute approximately 1,930 feet long, excavated almost entirely in dolomite bedrock, and a 100-foot long concrete weir embedded in dolomite at elevation 1,020 feet. Spillway discharges are contained by the rock cut for about 1,500 feet and then released into Mines Creek roughly 2,000 feet southwest of the dam (Figure 3)

A concrete morning glory intake structure for a horseshoe-shaped conduit, which is 9 feet 9 inches high through the dam embankment, automatically maintains a nearly uniform conservation pool level of 940 feet (Photo 3 and Figure 4). The inlet crest is fitted with a cylindrical cage to prevent trash and other objects from entering the conduit. A low-level gated entrance to the outlet conduit served for diversion of river flow during construction of the dam embankment and is also used as a low flow release for dewatering or drawdown of the conservation pool. Excavated trapezoidal channels lead from the conservation pool borrow area to the low-level intake from the outlet conduit-stilling basin to the existing river channel (Photo 4).

Photo 1. Eau Galle Dam.

Photo 2. Auxiliary overflow (aka emergency) spillway.

Figure 3. Potential flow of water from emergency spillway into Mines Creek, then into the Eau Galle River.

Photo 3. Morning glory.

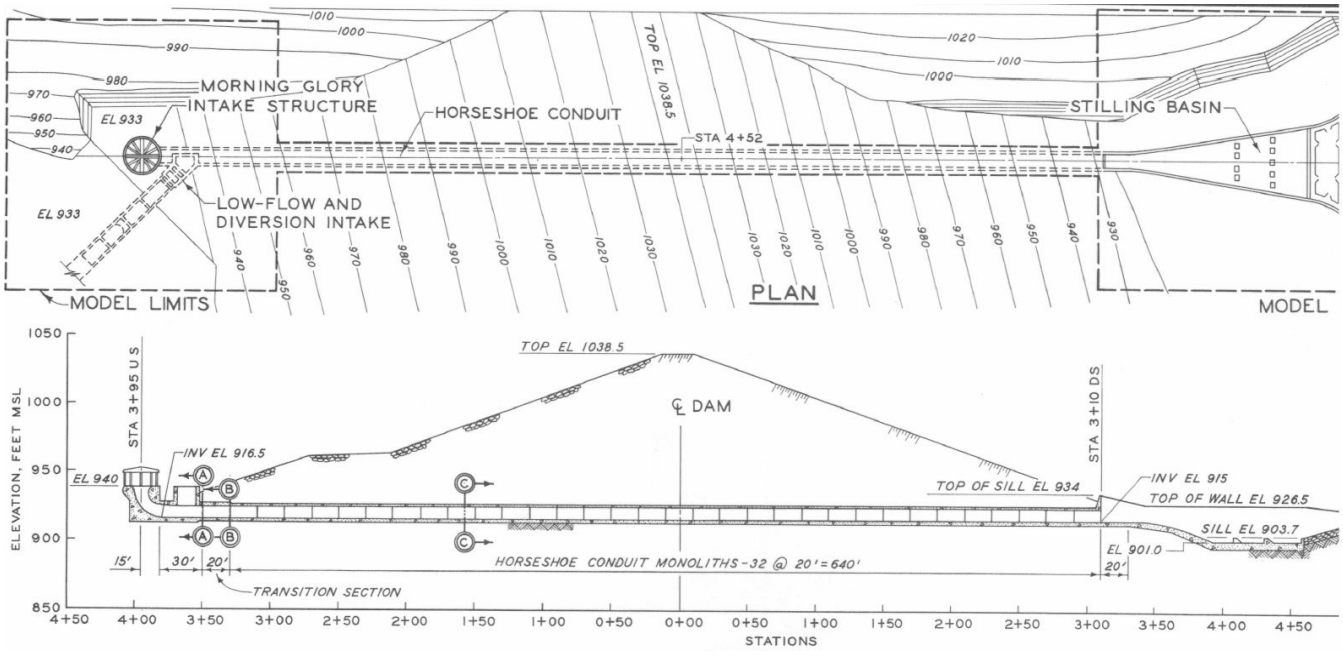

Figure 4. Horseshoe shaped conduit through the dam.

Photo 4. Stilling basin.

1.6.2 Channel Improvements

Due to the limited flow capacity of Eau Galle River in the Spring Valley vicinity, channel improvements were required, in addition to reservoir storage, to more effectively pass the floodwaters. A discharge channel was excavated from the outlet works to the main stem of Eau Galle River, a distance of about 2,000 feet. Together with a 1,300 foot connecting channel from the spillway to the river, this channel provides the hydraulic efficiency necessary to pass the flood flows. In addition, Mines Creek, a tributary entering the Eau Galle River at Spring Valley, was channelized and straightened 1,450 feet adjacent to its mouth (Figure 5). A 1,200-foot section was also straightened 1,300 feet further upstream from a point beginning at the Chicago and Northwestern Railway Bridge. Although separate from the Eau Galle Dam and Eau Galle Reservoir, the stream channelization and straightening features on the Eau Galle River and on Mines Creek are integral components of the total plan of flood risk management for Spring Valley and vicinity.

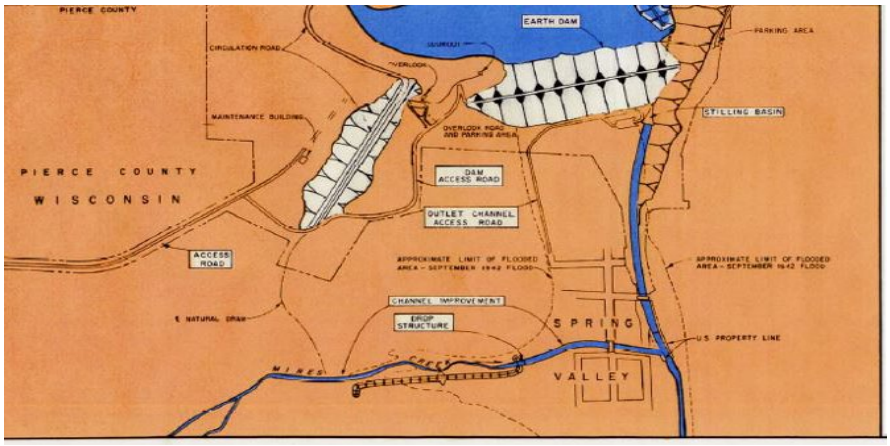

Figure 5. Mines Creek flowing in to the Eau Galle River.

1.6.3 Reservoir

The reservoir formed by the dam is called Lake George or Eau Galle Reservoir. The Corps maintains the conservation pool level near elevation 940 feet. The reservoir functions automatically for flood risk management. Fluctuation of the conservation pool level is held to a minimum by the uncontrolled crest of the morning glory intake of the outlet conduit. Draining of the pool to levels below the drop inlet crest can be accomplished through the low-level gated inlet of the conduit outlet structure.

Table 2. Eau Galle Project data.

Construction	
Began	1965
Completed	1969
Cost	
Dam Construction Cost (1969)	$6,396,303
Watershed	
Area	63.9 square miles
Reservoir Data	
Conservation Pool Elevation	940.0 feet
Total Project Area	644.5 deeded acres
Conservation Pool Area	139 acres
Maximum Depth of Conservation Pool	27 feet
Shoreline Length at Conservation Pool	8.29 miles
Maximum Pool Elevation[2]	1,036.2 feet, 56,9000 acre-feet
Record Pool Elevation	962.54 feet, August 11, 2010
Flowage Easement Level	1,020.0 feet, 519.5 deeded acres
Dam	
Type	Rolled-earth filled embankment
Length	1,800 feet
Width	Top-20 feet, bottom-650 feet
Height	122 feet (above valley floor)
Top of Dam Elevation	1,038.5 feet
Morning Glory Intake	
Type	Uncontrolled
Intake Crest Elevation	940.0 feet
Intake Throat Width	18.29 feet
Conduit	
Type	Horseshoe-shaped conduit
Diameter – Original	9.75 feet
Diameter – Steel Liner	9.25 feet
Length	698 feet

[2] All elevations in this report are relative to NGVD 1929 datum unless otherwise noted.

Modified Discharge Capacity – Pool 1,020.0	3,800 cfs
Low Flow Conduit	
Type	48" diameter steel pipe
Elevation of Intake	916.5
Length	80 feet
Stilling Basin	
Type	Trapezoidal, conventional with dissipating 11 baffle blocks
Length	150 feet
Width – Downstream End	53.33 feet
Outlet Channel	
Length to Original Channel	2,460 feet
Width	70 feet
Elevation of Riprap Protection	921.7 feet
Emergency Spillway	
Location	650 feet west of right abutment
Type	Uncontrolled, concrete sill at crest, unlined rock chute
Elevation at the Base	1,019.53 feet
Spillway Crest Area	880 acres
Length	1,930 feet
Width	100 feet
Maximum Discharge	25,000 cfs

1.6.4 Recreation Facilities

The recreation areas and recreation facilities are summarized in Table 3 (see plates 2-7 in Appendix B for details on each recreation area). Following are brief descriptions and views of the five developed areas.

Table 3. Eau Galle Project recreation area acreage.

AREA	ACRES
MAIN DAY USE AREA	168
NORTHWEST DAY USE AREA	83
HIGHLAND RIDGE CAMPGROUND	132
LOUSY CREEK LANDING	89
STILLING BASIN AREA	38

Main Day Use Area: This area consists of 168 acres with rolling terrain and has some relatively low land subject to occasional inundation. The general facilities include picnic areas, three shelters (Photo 5), boat landing, boat dock, life jacket loaner station, universally accessible fishing pier (Photo 6), three playgrounds (Photo 7) and approximately two miles of hiking trails. The beach area and overlook area are also encompassed within the Main Day Use Area.

The beach area is a short distance north of the picnic and boat launch area and contains a swimming beach (Photo 8), restrooms with changing facilities, a life jacket loaner station, and three volleyball courts (Photo 10). Between

the two areas is a 300-foot long walking path through a forest of mature tree species including aspen, bur oak, paper birch, bitternut hickory, basswood, black cherry, and white pine.

The overlook area is located on the hillside west of the dam and has been developed as a scenic overlook. It contains a parking area, sheltered overlook structure, and trail leading to a second overlook closer to the dam (Photo 9).

Photo 5. East Shelter at the Main Day Use Area.

Photo 6. Accessible fishing pier at Main Day Use Area.

Photo 7. Playground at Main Day Use Area.

Photo 8. Beach area.

Photo 9. Overlook shelter.

Photo 10. Volleyball court at beach area.

Northwest Day Use Area: This area consists of 83 acres north and west of where the Eau Galle river enters Lake George (Photo 11). The area is within the flood storage area and thus is suitable for only day use. The terrain is comparatively level and covered with overstory vegetation including: American basswood, white oak, elm, and boxelder. Honeysuckle, prickly ash, and sugar maple comprise the understory. The present facilities consists of a road bridge over the Eau Galle River (Photo 12), picnic areas along the shoreline, a shelter (Photo 13), and a portable toilet.

Photo 11. Eau Galle River entering Lake George.

Photo 12. Bridge over the Eau Galle River at Northwest Day Use Area.

Photo 13. Ox Trail Shelter at Northwest Day Use Area.

Highland Ridge Campground: This area consists of 132 acres and is located on the north side of the reservoir on a plateau approximately 100 feet above the conservation pool. The plateau terrain is relatively level and covered with mature trees. This area is forested with a variety of tree species that include sugar maple, American basswood, ironwood, bur oak, American elm, red elm, and black cherry. The understory consists mostly of sugar maple, ironwood, and prickly ash due to previous heavy grazing of the area. Bluffs are located on three sides of the area and enhance the scenic value of the site (Photo 14). Interpretive programs are presented on the weekends during the summer, and there are several multi-use hiking and equestrian trails for visitors to use. Electric, non-electric, walk-in tent campsites, group campsites, an interpretive building (Photo 15), playground, dump station, toilets, and water facilities are provided.

The Equestrian Campground Loop is at the north end of the Highland Ridge Campground Area. This area consists of 10 non-electric sites, fire pits, lantern posts, hitching posts, pump house with potable water, two portable toilets, and access to seven miles of hiking and equestrian trails (Figure 6). This area is used by equestrian riders, overflow campers from Highland Ridge, and youth groups.

Photo 14. Overlook at Highland Ridge Campground.

Photo 15. Interpretive building at Highland Ridge Campground.

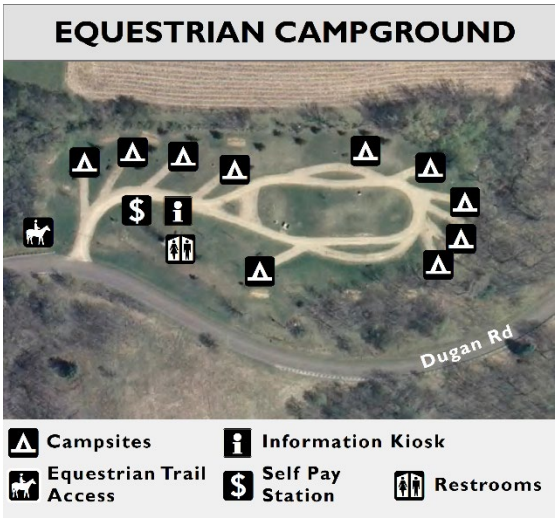

Figure 6. Overview of Equestrian Campground Loop.

Lousy Creek Landing: The boat launch is located on the east shore of Lake George and is close to the campground at the end of County Road NN. The present facilities consist of a trailhead for hiking and equestrian trails, a pier, and a boat ramp. Gasoline powered motors are not allowed to be operated on Lake George.

Stilling Basin Area: This area is located on the downstream side of the dam in the town of Spring Valley. It consists of a small parking lot, picnicking area, and access to fishing along the Eau Galle River (Photo 16).

Photo 16. Visitors fishing at the Stilling Basin.

2 Project Setting and Factors Influencing Management and Development

2.1 Description of the Reservoir*

The Eau Galle Project consists of a reservoir impounded by a dam and control structure along with an outlet works, public use lands and facilities, and flowage easement rights. The reservoir includes 644.5 acres held in fee and 519.5 acres of flowage easement lands. Additional information can be obtained within the Water Control Manual, Eau Galle Project (U.S. Army Corps of Engineers, 2003). See Section 1.6, Listing of Pertinent Project Information* in this document for additional detail.

2.2 Hydrology*

The Eau Galle River has a drainage area of about 230 square miles and is a tributary to the Chippewa River. Eau Galle Dam is located at river mile 30.3 and has a drainage area of 63.9 square miles. The watershed consists of a relatively well-entrenched valley and river system. The slope of the Eau Galle River averages 11 feet per mile on the main stem of the river (0.2 percent). Tributaries are substantially steeper.

Floods on the Eau Galle River are flashy in character and are associated with periods of rapid snowmelt, high intensity rainstorms, or both. River stages above the reservoir normally fluctuate within a range of about 5 feet and can rise 10 to 15 feet in a few hours, receding almost as quickly. Because of the steep topography along the valley, the smaller tributary streams carry flood flows at high velocities and frequently exceed channel capacities (U.S. Army Corps of Engineers, 2003).

The reservoir is designed for automatic flood risk management operation. Release of water from the reservoir is controlled by the dam by means of a “morning glory” intake structure. Under normal conditions, the morning glory is used to maintain a permanent conservation pool at 940 feet. Based on historical flow data from Spring Valley from 1944 to 1959, the average annual release is about 25 cubic feet per second (cfs). A low flow control gate was opened in 1970 to provide a draw of cool, oxygen depleted waters from a depth of 20 feet. This draw provides a continual release of 10 cfs.

The low flow release was initiated by the Corps at the request of the Wisconsin Department of Natural Resources (WIDNR). The two objectives for providing a low flow release were:

1. To achieve an increase in dissolved oxygen concentrations in deeper water of the reservoir, thereby expanding fisheries habitat.
2. To lower stream water temperatures in the Eau Galle River below the dam to preserve and/or improve trout habitat.

The standard Project flood is estimated to reach an elevation of 997 feet. This elevation is about 22 feet below the crest of the spillway on the dam (elevation 1,019.5 feet). This flood level would result in a surface pool occupying 695 acres with a volume of 26,200 acre-feet. Design discharge capacity is 3,700 cfs. In contrast, the conservation pool (940 feet) occupies 139 acres and stores only 876 acre-feet of water.

The standard Project flood may be compared with a number of other probable flood events (see Table 4). During a 1% annual exceedance probability (AEP) flood event the reservoir pool would occupy 880 acres and store 44,000 acre-feet of water (see Table 5).

Table 4. Annual exceedance probability and corresponding pool elevation.

ANNUAL EXCEEDANCE PROBABILITY FLOOD EVENT	POOL ELEVATION
20% (5 YEAR)	949
2% (50 YEAR)	965
1% (~100 YEAR)	1019.5
RECORD POOL ELEVATION (AUGUST 11, 2010)	962.54

Table 5. Area-capacity data.

FEATURE	ELEVATION (FT NGVD29[1])	AREA (ACRES)	TOTAL VOLUME[2] (ACRE-FEET)	AVAILABLE FLOOD STORAGE (ACRE-FEET)
Embankment Overbuild	1,040.25	1070	63,700	--
Embankment Design Crest	1038.5	1050	62,000	--
Design Flood (PMF)	1,036.2	1020	59,700	--
Flowage Easement	1,020.0	870	44,000	0
Emergency Spillway Crest	1,019.5	860	43,550	450
Record Pool (8/11/2010)	962.5	370	8050	35,950
Fee Title Land	949.0	250	3750	40,250
Conservation Pool (Morning Glory Crest)	940.0	150	1536	42,464
Maximum Drawdown (Dead Storage)	916.5	0	68	43,932

1. National Geodetic Vertical Datum of 1929. NAVD88 = NGVD29 + 0.15 feet.
2. Total Volume neglects sedimentation. Sediment surveys in 1960 and 1987 show loss of 44 AC-Ft.

2.3 Sedimentation and Shoreline Erosion

Sedimentation, an important process to note, results in the accumulation of materials in reservoirs like Lake George. Not only can sedimentation lead to a loss of water storage capacity, deposited sediment and associated nutrients can also have an impact on water quality. The amounts of phosphorous, nitrogen, and organic carbon in Lake George are consistent with the current trophic state and land use patterns in the surrounding watershed.

When a dam is constructed on a river, there is always concern that sediment will eventually fill the reservoir formed by the dam, although the rate of filling is a function of time and flows. Bathymetry data has been acquired for Lake George (Figure 7). This information will be used to track the progress of the sedimentation over the years.

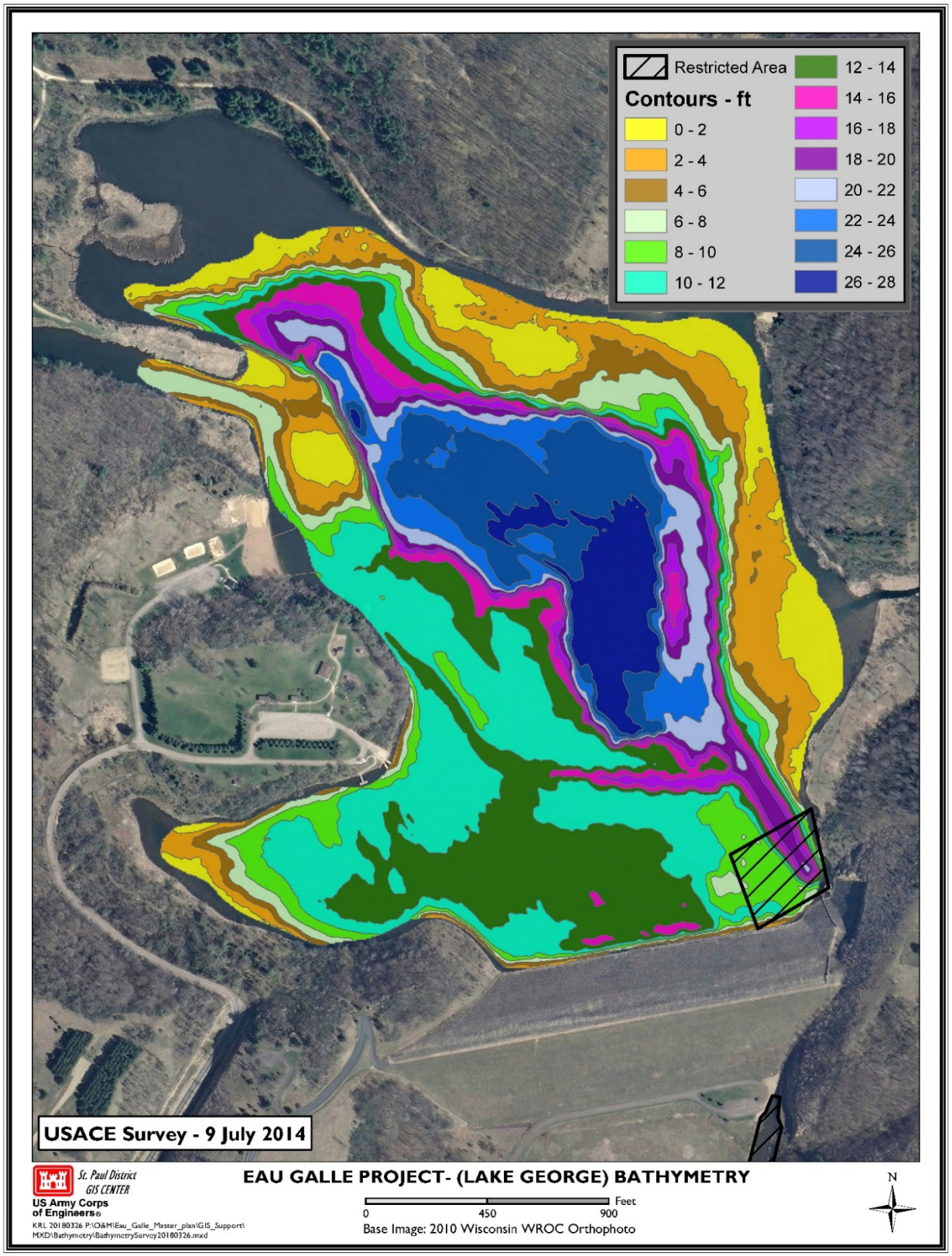

Figure 7. Eau Galle Project (Lake George) bathymetry.

2.3.1 Sediment Study

The original capacity curve for storage was determined in 1960 from studies by A.M. Kinney Inc. Consulting Engineers of Cincinnati, Ohio. The dataset started at elevation 935.0 feet with a capacity of 850 acre-feet and ended at elevation 1,043.0 feet with a capacity of 66,500 acre-feet. Elevation data was again collected in 1970 but only to elevation 940.0 feet. Because the capacity at elevation 940.0 feet agreed with the original survey, the surveys were merged such that quantities below elevation 940.0 were from the 1970 survey and quantities above elevation 940.0 feet were from the original survey. In 1978 and again in 1987, new surveys were taken. These two surveys also only went to elevation 940.0 feet; however, there was no longer agreement in the water storage capacity at elevation 940.0 feet. Therefore, the new curves were adjusted above this elevation by the difference at the 940.0-foot elevation. Table 6 shows the relationship.

Table 6. Comparison of surveys at elevation 940.0 feet.

Year of Survey	Capacity at Elevation 940.0 ft	Difference from Original Survey
1960	1,550 ac-ft	
1970	1,552 ac-ft	+ 2 ac-ft
1978	1,576 ac-ft	+ 26 ac-ft
1987	1,506 ac-ft	- 44 ac-ft

A comparison of the surveys of 1970 and 1987 shows 46 acre-feet of storage has been lost to sedimentation. This averages out to 2.7 acre-feet per year lost to sedimentation. Based on drainage area of 63.9 square-miles, the sedimentation rate is 0.04 acre-feet/square-mile per year. Shoreline erosion has not been a concern for this area.

2.4 Water Quality

Eau Galle Reservoir is a shallow flood control reservoir that has four tributaries: (1) Eau Galle River, (2) Lousy Creek, (3) Lohn Creek, and (4) French Creek. These tributaries deliver abundant nutrients mainly from agricultural sources. The Eau Galle Reservoir exhibits the classical signs of eutrophication. Parameters that were sampled during the 2003 season include water clarity, temperature, dissolved oxygen, total phosphorous, and chlorophyll. Phosphorus loading is overwhelmingly dominated by external sources, making it difficult to reduce epilimnetic (i.e., upper layer of water in a lake) phosphorus and phytoplankton growth within the reservoir. The summer total phosphorous average was 67 micrograms/liter(µg/L). Lakes that have more than 20 µg/L and impoundments that have more than 30 µg/L of total phosphorous may experience noticeable algae blooms.

Since Lake George has high phosphorus levels, WIDNR has given it an “Impaired Water” status. Algal blooms are common in the summer (Wisconsin Department of Natural Resources, 2010).

Algae and suspended particles from erosion make water cloudy and decrease the Secchi transparency in a lake; therefore, the lower the Secchi depth, the higher the algal concentration and lake productivity. The Wisconsin DNR measured the water clarity of Lake George via Secchi disk in 2003 (Wisconsin Department of Natural Resources, 2019). The average summer (July–August) Secchi disk reading for Lake George was 3.28 feet, which is slightly less than the average for this georegion (4.7 feet).

The overall Trophic State Index (TSI) (based on chlorophyll) for Lake George was 65. The TSI suggests that Lake George is very eutrophic (i.e., blue-green algae may become dominant with possible algal scums). As a result, problems with extensive plant overgrowth are likely to occur. Average summer chlorophyll was 54.3 µg/l (compared to a Southwest Georegion summer average of 45 µg/l).

On October 10, 2000, the Beaches Environmental Assessment and Coastal Health Act (BEACH Act) was signed into law, amending the Clean Water Act. Mandated by the BEACH Act, the state of Wisconsin started full implementation of its coastal beach program in 2003. The Wisconsin coastal beach program is a collaboration between state and local environmental and health agencies to monitor recreational waters for health risks to help people make informed choices when they go to the beach. WIDNR coordinates the program, but local health departments have authority over public beaches within their jurisdictions.

The statewide beach monitoring program is funded by the U.S. Environmental Protection Agency (EPA) by a grant under the federal BEACH Act of 2000. A Wisconsin state statute mandates that public beaches and adjoining lands be monitored for environmental hazards. The EPA requires that beaches be posted with an advisory sign informing the public of increased health risk when water sample exceeds 235 colony-forming units (CFU)/100 milliliter (mL) (E. coli). A closed sign shall be posted when a water sample shows more than 1,000 CFU/100 mL.

The Eau Galle beach has been closed five times over the past 10 years because levels exceeded 1,000 cfu/100 mL (E. coli). Additional information on the BEACH Act, the Beach Health Program, and data specific to the Eau Galle Recreation Area Beach can be viewed at the Wisconsin Beach Health website: https://www.wibeaches.us.

The St. Croix County Public Health Department tested the Eau Galle beach four times in 2018, and the E. coli results were 4 cfu/100 mL on June 5th, 10 cfu/100 mL on June 27th, 1 cfu/100 mL on July, and 21 cfu/100 mL in August. These tests are conducted annually before Memorial Day weekend, July 4th weekend, Labor Day weekend, and after receiving a significant rain event. Historic test results can be found at,

https://www.wibeaches.us/apex/f?p=181:18.

2.5 Climate

The climate at Spring Valley is temperate with hot summers and cold winters. The nearest long-term National Weather Service station with temperature data is located in Ellsworth, Wisconsin, approximately 15 miles southwest of Eau Galle Dam. The average daily maximum temperature varies from 83 °F in July to 2 °F in January. Temperature extremes of 102 °F and -40 °F have been recorded. Average temperature data from 1987 to 2017 is presented below (Table 7). The annual average precipitation for Spring Valley, Wisconsin, is about 31 inches. About 60 percent of the precipitation occurs from May to September. More than 41 inches of snowfall typically falls annually at Spring Valley (Table 8). Evaporation from the reservoir during the summer months is estimated and presented below (Table 9).

Table 7. Monthly mean average temperature in degrees Fahrenheit for Ellsworth, WI (1987 to 2017).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
14.3	18.9	31.4	45.4	57.1	66.7	70.7	67.9	60.8	47.8	33.4	19.7	44.2

Table 8. Average total snowfall in inches (1949 to 2010).

October	November	December	January	February	March	April	May	Annual
0.3	4.3	9.1	9.1	7.5	9.5	1.7	0.0	41.4

Table 9. Estimated average monthly reservoir evaporation in inches.

May	June	July	August	September	October
4.70	4.70	5.05	4.24	3.23	2.05

2.5.1 Climate Change

No specific climate change analysis has been done for the Eau Galle Project, but numerous studies and literature reviews have been completed and are referenced in this Master Plan.

The 4th Assessment Report (Core Writing Team, 2007) by International Panel on Climate Change (IPCC) found that global climate warming is "unequivocal" and largely attributable to human activities. Despite the certainty that climate change is currently underway and having an impact on natural resources, there are still many unanswered questions about how these climate impacts would play out at the local, state, and regional level and how ecosystems would respond to those changes. According to the IPCC, global average temperatures have risen by 1.5 degrees and can be expected to raise another 2–11 degrees by 2100, depending on future emission levels.

For the Upper Mississippi Region, there is a general consensus among scientists that, during the last century, there has been a moderate to large upward trend in average temperature, minimum temperatures, average precipitation, and streamflow. A recent review of studies by the Corps (U.S. Army Corps of Engineers, 2015) summarized these findings:

> *The general consensus in the recent literature points toward moderate increases in temperature and precipitation, and streamflow in the Upper Mississippi Region over the past century. In some studies, and some locations, statistically significant trends have been quantified. In other studies and locales within the Upper Mississippi Region, apparent trends are merely observed graphically but not statistically quantified. There has also been some evidence presented of increased frequency in the [occurrence] of extreme storm events (Villarini et al., 2013). Lastly, a transition point in climate data trends, where rates of increase changed significantly, was identified by multiple authors at approximately 1970.*

The same study goes on to project future climate conditions:

> *There is strong consensus in the literature that air temperature will increase in the study region, and throughout the country, over the next century. The studies reviewed here generally agree on an increase in mean annual air temperature of approximately 3.6 to 10.8 degrees by the latter half of the 21st century in the Upper Mississippi Region. Reasonable consensus is also seen in the literature with respect to projected increases in extreme temperature events, including more frequent, longer, and more intense summer heat waves in the long term future compared to the recent past.*

A summary of the findings of observed and projected trends based on this review are shown graphically below (Figure 8). Implications for climate change effects to socioeconomic and natural resources are discussed in the EA (see Appendix A).

Executive Order (EO) 13834 sets forth requirements to be met by federal agencies. EO 13834 affirms that it is the policy of the United States that agencies meet energy and environmental performance statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, agencies are tasked to prioritize actions to reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of its mission. The Corps has prepared an Adaptation Plan in response to previously existing related EOs and Climate Action Plan. The Adaptation Plan includes the following USACE policy statement:

"It is the policy of USACE to integrate climate change preparedness and resilience planning and actions in all activities for the purpose of enhancing the resilience of our built and natural water-resource infrastructure and effectiveness of our military support mission, and to reduce the potential vulnerabilities of that infrastructure and those missions to the effects of climate change and variability."

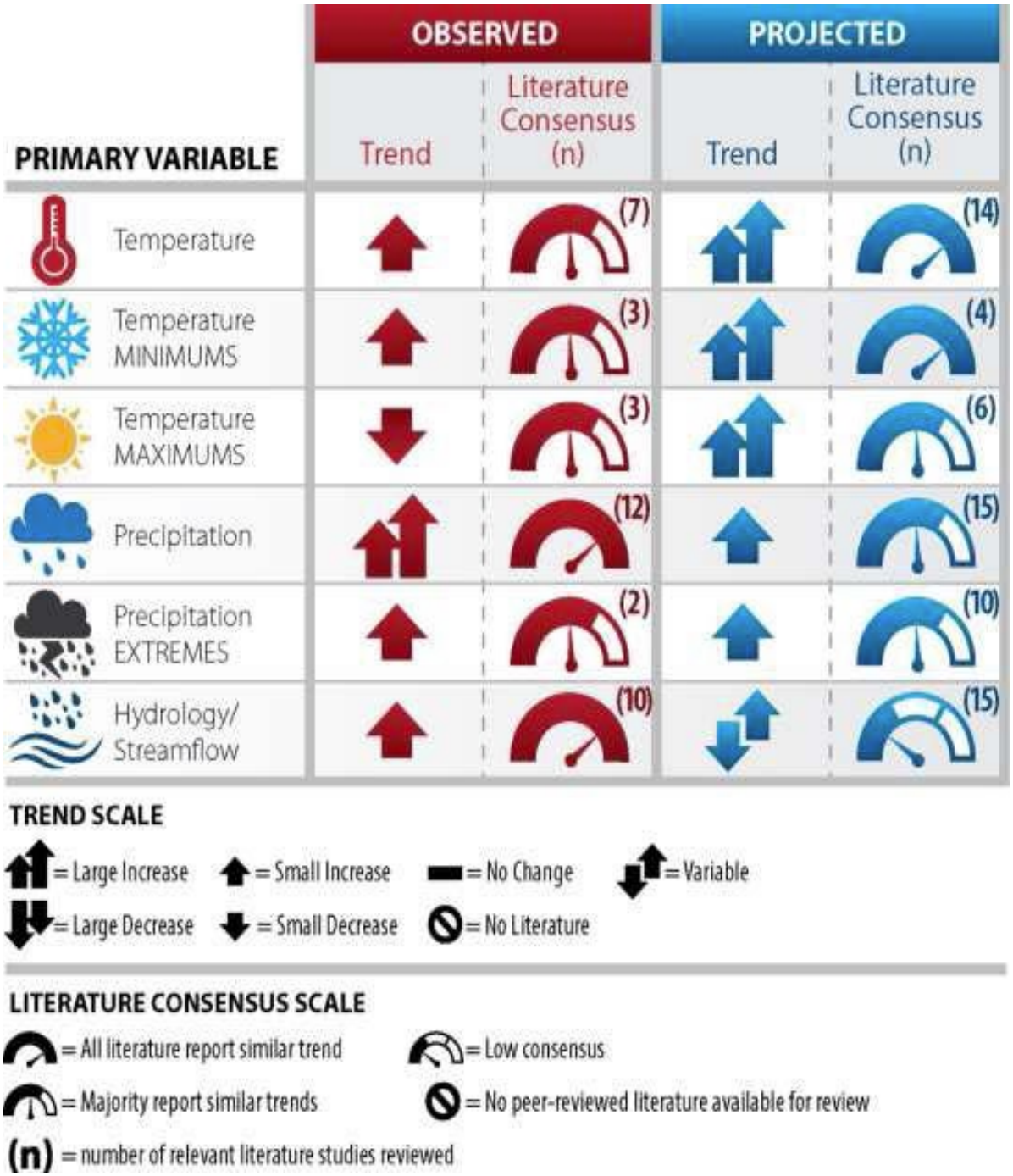

Figure 8. Observed and projected climate trends (U.S. Army Corps of Engineers, 2015).

2.6 Topography, Geology, and Soils*

The Eau Galle Project lies in a deeply incised bedrock valley immediately upstream of the village of Spring Valley, Wisconsin, which is approximately 50 miles east of St. Paul, Minnesota. The Eau Galle River valley is about 1,800 feet wide and 200 feet deep at the dam site. North of the dam, the valley widens to a width of approximately 4,000 feet. The steep bedrock valley walls are covered by a scattering of trees, brush, and grasses. Upstream (north of the dam), three deeply incised tributary streams enter the reservoir: French Creek, Lousy Creek, and Lohn Creek.

The pre-glacial river valley was carved by the erosional process of river meanders working back and forth laterally. Further widening of the valley was accomplished by the scouring action of glacial ice. Glacial meltwaters cut the valley approximately 50 feet deeper than its present level. Since the glacial melt, the valley has been filled principally with a mixture of alluvial and colluvial deposits from surface flows. The valley fill consists of a thin cap of clays and silty clays overlying granular soils. The soils in the Project area have been mapped by the Natural Resources Conservation Service (NRCS) (Langton, 1978) (National Resources Conservation Service, 2015), see Figure 9. Loess-based soils that formed in a forested environment are dominant. Mapped soils range from former river channel filled with recent alluvium to upland landforms with varying degrees of slope from moderate to steep. Some areas have thin to absent loess cover above glacial till, and bedrock and glacial till outcrops are indicated to be located on steeper slopes. Irregular pieces of dolomite are scattered throughout the granular material. A major portion of the random fill used for the embankment construction came from the valley fill material.

Uplands surrounding the valley are mantled by stony glacial till and loess typical of the area. Maximum thickness of these glacial and wind-blown deposits is approximately 165 feet with an average thickness of 53 feet. The relatively impervious nature of the till-loess blanket allows for rapid runoff of surface waters. Immediately below the till and loess lie the Ordovician and Cambrian period bedrock formations on which the dam is constructed.

The uppermost bedrock unit is the Oneota Dolomite formation of the Prairie du Chien group. At the Project location, the Oneota Dolomite is a hard, well cemented, jointed rock approximately 75 feet thick. The emergency spillway is cut into this dolomite.

Underlying the dolomite is a quartz-rich, alternately hard to soft, jointed rock known as the Jordan Sandstone, a formation in the Trempealeau group and Cambrian period. Total sandstone thickness at the Project location is approximately 137 feet. The uppermost 30 feet of the Jordan Sandstone is better cemented than the underlying 100 feet. Minor water loss by seepage will occur through the sandstone. The outlet conduit and the dam abutments are founded on the Jordan formation.

The base of the earthen embankment is keyed into the Lodi Siltstone member of the St. Lawrence formation, which is also in the Trempealeau group and Cambrian period. At the Project location, the Lodi Siltstone is a thin-bedded, sandy, hard rock, approximately 14 feet thick. Occasional thin, shaley, green laminae are found in the unit. The Lodi Siltstone is relatively impermeable so that only minor water seepage can be expected.

The bedrock at the site dips approximately S 25° W at a gradient of about 15 feet per mile. There is no known folding or faulting of the rocks in the area.

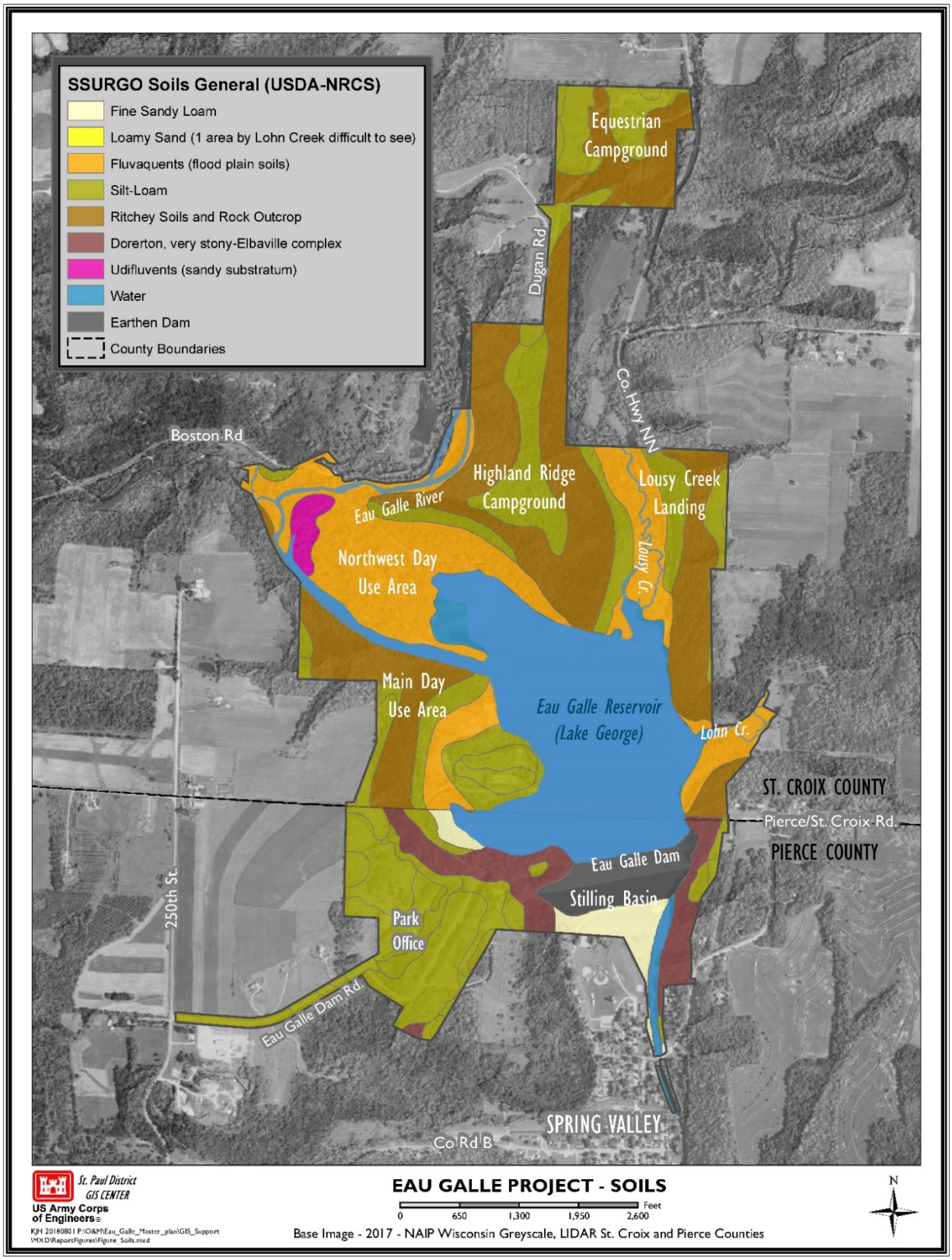

Figure 9. Soils data for Eau Galle Project.

2.6.1 Hydrogeology

Abundant groundwater is available in the vicinity of the Eau Galle Project in Spring Valley, Wisconsin. The general movement of groundwater is south and west along the strike and dip of the sedimentary rock units that form the valley walls and dam foundation. The bedrock abutments adjacent to the earthen embankment are highly jointed, and groundwater in the abutments flows along bedding planes and joints, which discharge as springs at the base of the valley walls.

Flowing springs existed near the east and west abutments of Eau Galle Dam prior to construction. The village name of "Spring Valley" is likely the result of early settlers taking note of these springs. After groundwater exits the bedrock it flows generally downstream within the relatively shallow alluvial valley fill. Depth to groundwater in the valley fill is typically less than 10 feet. Given the relatively porous nature of the dam abutments, any permanent adjustment of the conservation pool would be carefully studied in light of the potential long-term effects on local groundwater elevations.

Flooding in the rivers above the dam tend to be "flashier" than the Eau Galle River below the dam. For this reason, the conservation pool behind the dam will be much more responsive to precipitation driven events than the groundwater in the shallow alluvial aquifer below the dam. Although mineral rich, a majority of the water for residential, industrial, or municipal use is obtained from deeper sandstone aquifers.

2.7 Resource Analysis*

2.7.1 Fish and Wildlife Resources*

Lake George is a popular year-round fishing destination (Photo 17). Lake George has a maximum depth of 29 feet with 3.4 miles of shoreline at its conservation pool elevation. WIDNR performed the most recent fish survey in Lake George using fyke nets and electrofishing gear during spring 2017 (Figure 10). Fish species that were sampled in 2017 included Northern Pike (*Esox Lucius*), Largemouth Bass (*Micropterus salmoides*), Black Crappie (*Pomoxis nigromaculatus*), Yellow Perch (*Perca flavescens*), Bluegill (*Lepomis macrochirus*), Pumpkinseed (*Lepomis gibbosus*), Brook Trout (*Salvelinus fontinalis*), Common Carp (*Cyprinus carpio*), Creek Chub (*Semotilus*), and White Sucker (*Catostomus commersonii*). The lake is considered to be an exceptional largemouth bass fishery, with above average panfish fishery; however, overall quality size fish are limited.

Photo 17. Kayaker fishing in Lake George.

Fish Species Caught in Surveys by WDNR from 1978 - 2017				
Lake George	**Eau Galle River**	**Lousy Creek**	**Lohn Creek**	**French Creek**
	(upriver of reservoir)			
Black Bullhead	Black Bullhead	American Brook Lamprey	Brook Stickleback	Blacknose Dace
Black Crappie	Black Crappie	Bluegill	Fathead Minnow	Bluegill
Bluegill	Blacknose Dace	Brook Stickleback	Mottled Sculpin	Brook Stickleback
Brook Trout	Bluegill	Brook Trout	Slimy Sculpin	Brook Trout
Brown Trout	Brook Stickleback	Brown Trout		Fathead Minnow
Common Carp	Central Stoneroller	Fathead Minnow		Johnny Darter
Common Shiner	Common Shiner	Mottled Sculpin		Mottled Sculpin
Creek Chub	Creek Chub	White Sucker		Northern Redbelly Dace
Largemouth Bass	Fantail Darter			Rainbow Darter
Largescale Stoneroller	Fathead Minnow			White Sucker
Mottled Sculpin	Green Sunfish			
Northern Pike	Hornyhead chub			
Pumpkinseed	Iowa Darter			
White Sucker	Johnny Darter			
Yellow Perch	Largemouth Bass			
	Largescale Stoneroller			
	Longnose Dace			
	Mottled Sculpin			
	Northern Redbelly Dace			
	Rainbow Darter			
	Southern Redbelly Dace			
	White Sucker			
*30 different species found but some might not still be present				

Figure 10. Fish species caught by Wisconsin Department of Natural Resources from 1978 to 2017.

A review of the Wisconsin Natural Heritage Inventory was conducted on July 13, 2018 (Wisconsin Department of Natural Resources, 2018). No records of mussels were identified within the inventory, which was confirmed by WIDNR. Even though there are no records, the reservoir and adjacent streams may support mussel populations. In 1974, an environmental impact assessment by Don Vogtman Associates recorded observations of 22 species of mammals, 12 species of amphibians and reptiles, 29 species of fish, and 143 species of birds in the Eau Galle Project Area (Don Vogtman Associates, 1974). It is recommended that a Multiple Species Inventory and Monitoring program be conducted to get up-to-date data.

The Eau Galle River upstream and downstream of the reservoir is designated a trout stream by WIDNR. Since construction of the dam, the trout fishery has declined dramatically. The Corps, in cooperation with WIDNR completed a study in 2000 on the influence of hypolimnetic releases on downstream thermal conditions in the Eau Galle River. This study was conducted because it was speculated that the decline in trout population downstream of the dam was due to the warm water being released from the dam. Two sample sites were established: one at the morning glory spillway and one at “Site 20” of the 1980 to 1981 pool study.

Under normal operations, the low flow gate is set to pass about 13 cfs while the remainder of the outflow is through the morning glory spillway. A request to modify the operating plan was made to the Corps’ Mississippi

Valley Division (MVD) in the spring of 2000. The objective of the plan was to provide cooler water downstream through an increase in the outflow through the low flow structure. If necessary, the pool was allowed to be drawn down below Project pool by 0.5 feet during the test cycle. The test period was from June to September 2000.

The trout population measured after September 2000 showed increased numbers not seen in the previous five years.

Results of the 2000 study supported continued releases of hypolimnetic waters from the Eau Galle Reservoir. In 2001, a hypolimnetic release plan was formulated for improving downstream thermal conditions in the Eau Galle River. An environmental assessment of the operation was performed. Coordination with all necessary agencies was accomplished (i.e U.S. Fish and Wildlife Service [USFWS], WIDNR, and EPA). Based on the assessment, a Finding of No Significant Impact (FONSI) was signed. Therefore, a request for deviation was sent to MVD. The request was to operate the low flow outlet to bring water temperatures down to 65 °F at the temperature probe located at the tailwater gage site. Site staff would regulate the gates to maintain a stream temperature between 65 °F and 68 °F. Drawdown of the pool below Project pool was limited to 0.5 feet. The test period was from July 1 to September 30, 2001. The trout count following the operation was similar to the count in 2000.

After examining the results, more consideration was given to the pool of water that was formed upstream of the v-notch weir near the tailwater gage house. The metal sheet pile v-notch weir was three-feet high and was located about 1,000 feet downstream of the dam. Comparisons of the water temperature at the dam outlet and at the tailwater gage showed that the ponded water upstream of the weir was heated by the sun, making it difficult to maintain cooler water temperatures. The situation was studied under authority of the Corps' Section 1135 Continuing Authorities Program, and a project was recommended to modify the weir. On August 26, 2003, the St. Paul District removed the metal sheet pile v-notch weir and replaced it with a rock weir located 410 feet downstream of the stilling basin, along with channel modification for a short distance downstream. The new weir is two feet in height and has a two-foot-wide notch extending down to the streambed elevation. The rock weir impounds less water over a shorter river reach than the v-notch weir did. Coordination with U.S. Geological Survey is ongoing to determine necessary changes to the tailwater gage.

The monitoring of pool and tailwater temperatures continues today as does the release of additional subsurface waters at the dam to maintain better trout habitat. After completion of the Study of the Thermal Effects of Increased Hypolimnetic Discharge from Eau Galle Reservoir during June 2000 through September 2000, a permanent change in the operating plan was recommended by the Corps and WIDNR and put into practice March 9, 2001.

2.7.2 Vegetative Resources*

Lands at the Eau Galle Project are designated for stewardship of forest, prairie, and other native vegetative cover. Management activities in these areas focus on the protection and development of vegetative wildlife resources. With proper management, these areas also provide valuable habitat for a wide range of species (Photo 18 and Photo 19).

A detailed vegetation inventory was completed in 2005 to determine specie diversity, stand density, and general health of vegetation. This inventory was used along with site visits in 2018 to determine the existing vegetation at the Project. Figure 11 shows the Level 1 Inventory completed using existing information and new survey results.

Photo 18. Springbeauty wildflower in the Highland Ridge Campground.

The majority of the lands at the Project are forested and include a wide variety of tree species depending on the location and topography of the forest:

- aspens, including quaking and big tooth
- oaks, including bur, white, and red
- elms, including red and american
- maples, including boxelder and sugar
- birches, including paper and river
- bitternut hickory
- black cherry
- white pine
- american basswood
- hawthorn
- ironwood

Understory vegetation mainly consists of ironwood, dogwoods, bloodroot, wild ginger, sweet cicely, green briar, grape species, hepatica, black snakeroot, jewelweed, jack in the pulpit, trillium, wood nettle, smartweed, joe pye weed, a variety of ferns, various sedges, asters, honeysuckle, nannyberry, prickly ash, buckthorn, and seedlings and saplings of many of the tree species listed above.

Overall, the natural regeneration of vegetation is very successful, with very little human intervention necessary to maintain them into the future. In addition to the forested land, there are some small prairie areas and other wetland areas throughout the Project. The prairie areas include black eyed susans, goldenrods, coneflowers, asters, big blue stems, and turtleheads. The wetlands at the Project were deliniated in summer 2018 and can be found in Figure 12. The wetland areas are described in more detail in section 2.7.6, Wetlands* and Appendix D.

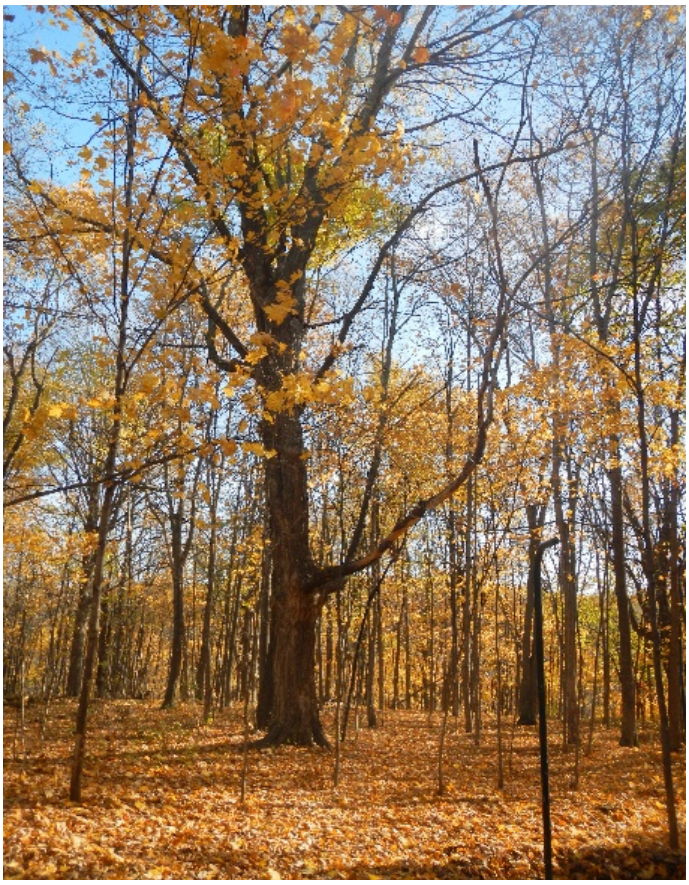

Photo 19. Forest view from campsite 21 in Highland Ridge Campground.

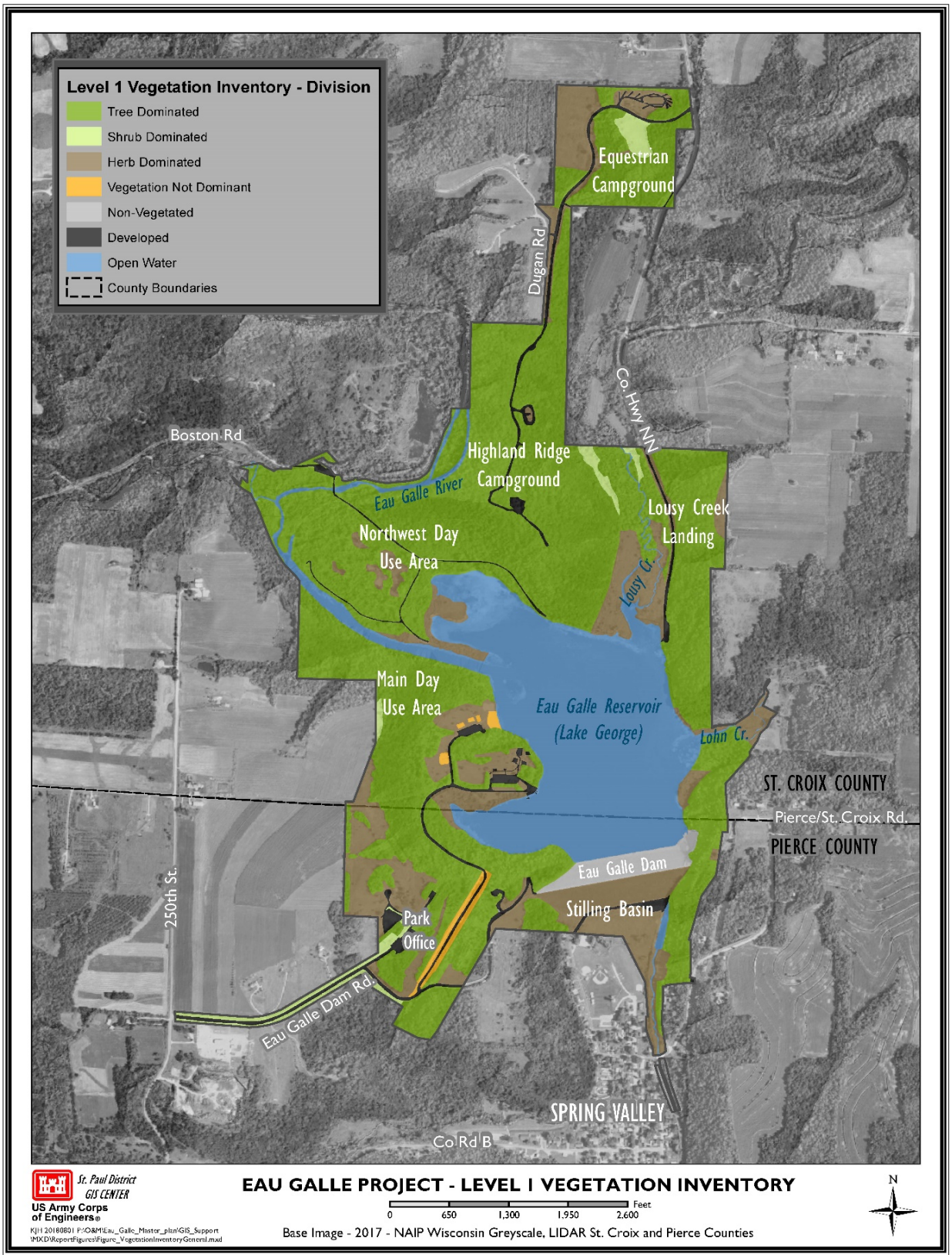

Figure 11. Eau Galle level one vegetation inventory.

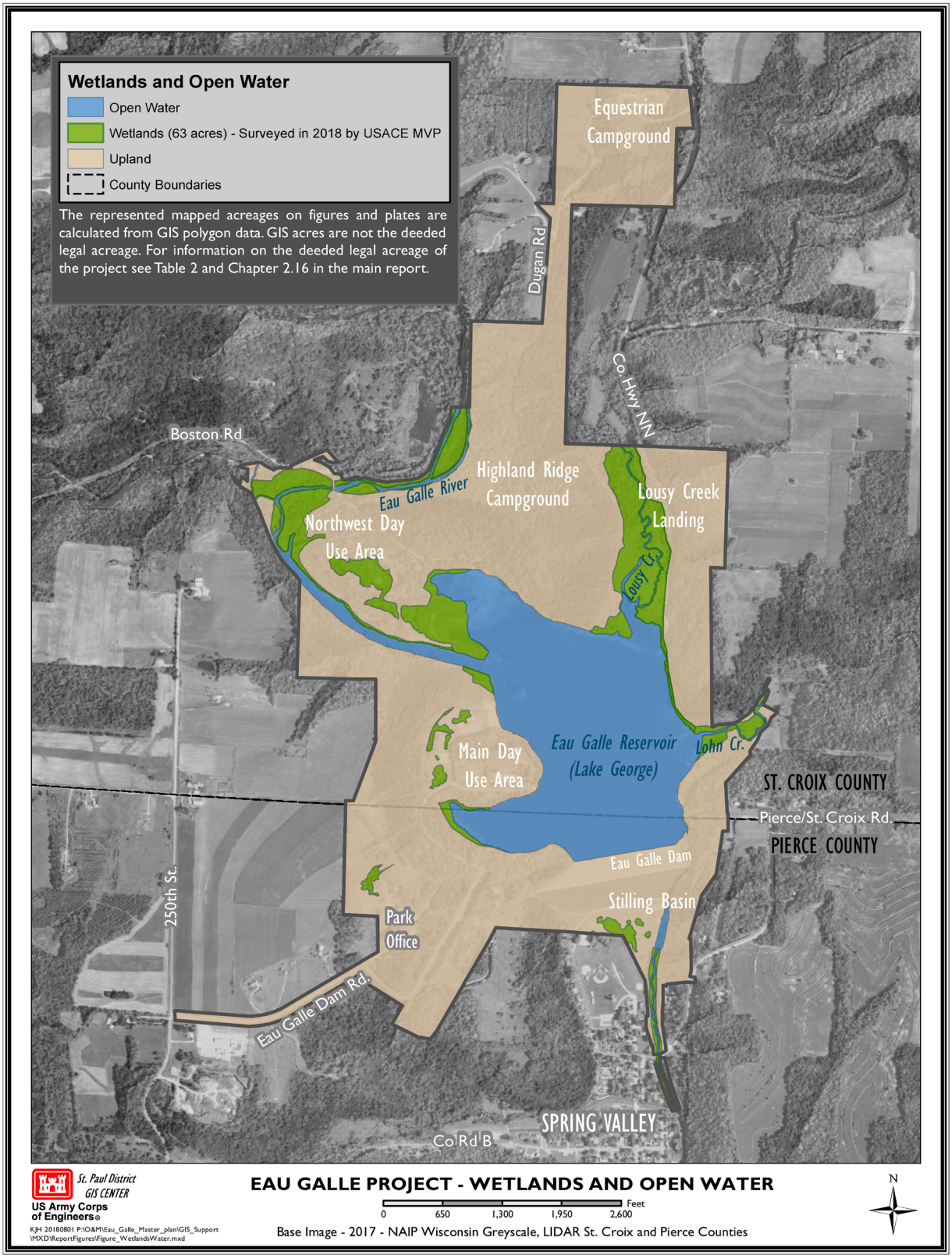

Figure 12. Eau Galle wetlands.

2.7.3 Threatened and Endangered Species*

The Endangered Species Act (ESA) states that all federal agencies must seek to conserve endangered species and threatened species and must utilize their authorities in furtherance of the purposes of the act. The purpose of the ESA is to provide a means to conserve the ecosystems upon which endangered species and threatened species depend and to provide a program for the conservation of such federally-listed species. The Corps manages and implements the program under the Endangered Species Act in accordance with ER 1130-2-540, Project Operations – Environmental Stewardship Operations and Maintenance Policies.

A review of the USFWS Information for Planning and Conservation (IPac) website (U.S. Fish and Wildlife Service, 2018), was conducted on July 10, 2018 to determine whether any federally-listed threatened and endangered species may occur within or near the Project area. A search of the IPaC database indicated the potential occurrence of four federal-listed species: the gray wolf (*Canis lupus)* endangered, the northern long-eared bat (*Myotis septentrionalis)* threatened, the Karner blue butterfly (*Lycaeides Melissa samuelis*) endangered, and the prairie bush clover (*Lespedeza leptosfachya)* threatened. In addition, the search of the IPaC database indicated the occurrence of the Bobolink (*Dolichonyx oryzivorus*) and the Wood Thrush (*Hylocichla mustelina*), which are listed as Birds of Special Concern by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service, 2015).

The gray wolf (*Canis lupus*) is currently listed as endangered. The gray wolf was federally delisted in January 2012, but relisted in December 2014. Gray wolves prefer forested areas and prey on deer, moose, beavers, and small mammals. The gray wolf is found in almost all habitat types: prairie, forest, mountains, and wetlands. In the conterminous 48 states today, they are found in mostly forested lands in Minnesota, Wisconsin, Michigan, Montana, Idaho, Oregon, Washington, and Wyoming. Although wolves in the western Great Lakes area primarily use northern woodlands, they have expanded their range into areas that are a mix of forest and agriculture in Minnesota and Wisconsin, to include St Croix County.

The northern long-eared bat (*Myotis septentrionalis*) is currently listed as threatened. It was listed on April 2, 2015. This species hibernates in caves and mines with constant temperatures, high humidity, and no air currents. There are three hibernacula located around the Eau Galle Project in which northern long-eared bats are known to hibernate. They roost and forage in upland forests during spring and summer months, and they swarm in the surrounding wooded areas in autumn. Northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. They are impacted by the white-nose syndrome, which causes hibernating bats to frequently wake, depleting their energy and causing them to starve from dehydration or exposure to the elements, which has caused a dramatic decline in their numbers (Wisconsin Department of Natural Resources, 2018).

The Karner blue butterfly (*Lycaeides melissa samuelis*) is currently listed as endangered. It was listed on December 14, 2009. It is found in the northern range of wild lupine habitat. Wild lupine (*Lupinus perennis*) is a flowered plant that occurs in Pine Barrens and oak savannas in Indiana, Michigan, Minnesota, New Hampshire, New York, and Wisconsin. The Karner blue's habitat is a patchwork of pine and scrub oak scattered among open grassy areas. Karner blue caterpillars feed only on the leaves of the wild lupine plant. Adults feed on the nectar of flowering plants. Historically, a network of habitat was maintained by wildfire. With the suppression of wildfire and loss of their habitat, Karner blue is severely restricted to where they can survive.

Prairie bush-clover (*Lespedeza leptosfachya)* is currently listed as threatened. It was listed February 1987. It is found only in the tallgrass prairie region of four Midwestern states: Wisconsin, Minnesota, Illinois, and Iowa. It is a member of the bean family and a Midwestern "endemic" — known only within the tallgrass prairie region of the Upper Mississippi River Valley. Like all native species, prairie bush clover has its own specific niche in the ecosystem and its own unique relationship to other plants and animals with which it lives. The loss of prairie bush

clover could result in the disappearance of an as yet unknown dependent species such as tiny predatory insects specialized to live on its seeds.

The Bobolink (*Dolichonyx oryzivorus*) is currently listed as a bird of conservation concern and is found in hayfields and meadows. Migrants stopover in fields and marshes, often feeding in rice fields. It is a member of the blackbird and oriole families. The Bobolink forages for insects and seeds both on the ground and while perched up in grass and weed stalks.

The Wood Thrush (*Hylocichla mustelina*) is currently listed as a bird of conservation concern. It is found mainly in deciduous woodlands where it breeds in the understory of woodlands, mostly deciduous but sometimes mixed, in areas with tall trees. In migration, the Wood Thrush is found in various kinds of woodland. The Wood Thrush forages for insects and berries mostly on the ground in forest undergrowth but occasionally on open lawns.

The Bald Eagle (*Haliaeetus leucocephalus*) (Photo 20) was previously listed as threatened and is found throughout the Project area. The Bald Eagle was delisted on March 12, 2007, but it is still protected under the Bald and Golden Eagle Protection Act. Bald Eagles generally nest near coastlines, rivers, and large lakes where there is an adequate food supply. They nest in mature or old-growth trees, snags (dead trees), cliffs, and rock promontories. Nest sites typically include at least one perch with a clear view of the water where they forage. Bald Eagles overwinter throughout the country but are most abundant in the West and Midwest. The two primary characteristics of Bald Eagle winter habitat are an abundant, readily-available food supply with one or more suitable night roost sites. The majority of wintering eagles are found near open water where they feed on fish and waterfowl, often taking dead, crippled, or otherwise vulnerable animals. Mammalian carrion is an important alternate source of food at some locations. In addition, many Bald Eagles spend a substantial portion of the non-nesting period in terrestrial habitats far from open water, relying on prey that they can easily catch, such as small mammals, or scavenge, such as big game or livestock. Eagle numbers have been steadily increasing since a ban on the chemical DDT (dichloro-diphenyl-trichloroethane) was enacted in 1974.

Photo 20. Bald Eagle.

Wisconsin has numerous species identified on its state endangered, threatened, and special concern species list. Some of these species have the potential to live on Corps' land, and some have been previously observed along the Eau Galle River, in the Northwest Day Use Area, and along Lousy Creek. The following species from Wisconsin's endangered, threatened, and special concerns species list have been identified within one-mile of the Eau Galle Project (Table 10).

Table 10. Endangered, threatened, and special concern species of Wisconsin observed at the Eau Galle Project.

Name	Scientific Name	Status
Mammals		
Northern Long-Eared Bat	*Myotis septentrionalis*	Threatened
Big Brown Bat	*Eptesicus fuscus*	Threatened
Eastern Pipistrelle (Bat)	*Perimyotis subflavus*	Threatened
Little Brown Bat	*Myotis lucifugus*	Threatened
Birds		
American Woodcock	*Scolopax minor*	Special Concern
Bald Eagle	*Haliaeetus leucocephalus*	
Black-Crowned Night-Heron	*Nycticorax nycticorax*	Special Concern
Brown Thrasher	*Toxostoma rufum*	Special Concern
Common Loon	*Gavia immer*	Special Concern
Common Nighthawk	*Chordeiles mino*	Special Concern
Eastern Whip-Poor-Will	*Antrostomus vociferous*	Special Concern
Golden-Winged Warbler	*Vermivora chrysoptera*	Special Concern
Least Flycatcher	*Empidonax minimus*	Special Concern
Palm Warbler	*Setophaga palmarum*	Special Concern
Red-Headed Woodpecker	*Melanerpes erythrocephalus*	Special Concern
Ruby-Crowned Kinglet	*Regulus calendula*	Special Concern
Yellow-Billed Cuckoo	*Coccyzus americanus*	Special Concern
Wilson's Warbler	*Cardellina pusilla*	Special Concern
Wood Thrush	*Hylocichla mustelina*	Special Concern
Amphibians and Reptiles		
Wood Turtle	*Glyptemys insculpta*	Threatened
Invertebrates		
Cherrystone Drop (Snail)	*Hendersonia occulta*	Threatened
Plants		
Butternut	*Juglans cinerea*	Special Concern
Great Water-Leaf	*Hydrophyllum appendiculatum*	Special Concern
Northern Yellow Lady's Slipper	*Cypripedium parviflorum var. makasin*	Special Concern
Putty Root	*Aplectrum hyemale*	Special Concern

2.7.4 Invasive Species*

Invasive species are any kind of living organism, which, if uncontrolled, causes harm to the environment, economy, or human health. Invasive species generally grow and reproduce quickly and spread aggressively. Non-native, or exotic, species have been introduced, either intentionally or unintentionally, and can out-compete native species for resources or otherwise alter the ecosystem. Native invasive species are those species that spread aggressively due to an alteration in the ecosystem, such as lack of fire or the removal of a predator from the food chain.

At this time, the major invasive species of concern found at the Eau Galle Project include:

- Common Carp (*Cyprinus carpio)*. Common carp are native to Europe and Asia and were intentionally introduced into the Midwest waters as a game fish in the 1880s. Common carp are one of the most damaging aquatic invasive species due to its wide distribution and severe impacts in shallow lakes and wetlands. Additionally, their feeding disrupts shallowly rooted plants muddying the water, and they release phosphorus, which increases algae abundance.
- Jumping worm (*Amynthas* or *Amynthus* species). Jumping worm is an invasive earthworm native to East Asia. This active and damaging pest was found in Wisconsin in 2013. Jumping worms change the soil by disrupting the natural decomposition of leaf litter on the forest floor. They turn good soil into grainy, dry worm castings (feces) that cannot support the understory plants of our forests, (e.g., ferns, wildflowers), which impacts those animals and species that depend on these understory plants.
- Common buckthorn (*Rhamnus cathartica*). Buckthorn is a tall understory shrub or small tree with several stems arising from the base and spreading crown. They have a broad environmental tolerance and have a longer growing season than native plants. Buckthorn creates dense shade, eliminating regeneration of tree seedlings and understory species.
- Tartarian honeysuckle (*Lonicera tatarica*). Tartarian honeysuckle is a dense, multi-stemmed shrub. It thrives in a range of habitats, including forest edges, open woods, fens, bogs, lakeshores, roadsides, pastures, and old fields. It alters habitats by decreasing light availability, depleting soil moisture and nutrients, and possibly releasing allelopathic chemicals that inhibit growth of other plants.
- Garlic mustard (*Alliaria officinalis*).(Photo 21) Garlic mustard is an herbaceous biennial plant that invades high quality upland and floodplain forests and savannas, as well as disturbed areas, such as yards and roadsides. It is sometimes found in full sun, though most often it grows in areas with some shade, and it does not do well in acidic soils. Garlic mustard exudes antifungal chemicals into the soil that disrupt associations between mycorrhizal fungi and native plants, suppressing native plant growth.
- Emerald ash borer (*Agrilus planipennis*). The emerald ash borer (EAB) is an exotic insect that was first identified in southeast Michigan in 2002. EAB kills all true ash tree species (*Fraxinus spp.*) that are native to Wisconsin, and even healthy ash trees decline and die within a few years of becoming infested. EAB has NOT been found in the Eau Galle Project. According to the city of Hudson, Wisconsin EAB was detected in July 2018. Hudson is approximately 33 mile west of Spring Valley. Currently all Wisconsin counties are now under quarantine for EAB. Firewood brought into the Eau Galle Project must have been purchased within 10 miles of the Highland Ridge Campground or be certified by the Wisconsin Department of Agriculture, Trade and Consumer Protection. The Highland Ridge Campground is at high risk of introduction of the EAB because of campers potentially bringing in contaminated firewood. The U.S. Department of Agriculture and Eau Galle Project staff will continue to monitor the ash trees for any signs of EAB.

Photo 21. Eau Galle staff and volunteers removing invasive garlic mustard in the campground.

These seemingly unrelated invasive species share a common and disturbing trait: they lack disease and predator controls in the ecosystem, so they reproduce and spread at alarming rates. The preservation and incentive to stop the spread of these invasive species takes coordination efforts from federal, state, and local agencies and non-profit organizations.

The Eau Galle Project will continue to monitor the land and waters for invasive, non-native and aggressively spreading native species. Project staff will take action to prevent and reduce the spread of those species by implementing measures such as prescribed fire, chemical control, mechanical control, and public education.

2.7.5 Ecological Setting*

An ecosystem is a dynamic community of biological organisms, including humans, and the physical environment in which they interact. Ecosystem management by the Corps is a proactive, goal-driven approach to sustaining ecosystems and their values. The Corps will manage ecosystem communities on Project lands with a view toward sustaining the ecosystems and promoting regional environmental values. Such ecosystems and communities will be identified in resource objectives and/or land use classifications contained in the Master Plan. Preferential treatment will be given to the management of ecosystems, communities, and habitats identified as having special status species.

According to the Wisconsin Department of Natural Resources Ecological Landscapes of Wisconsin (Wisconsin Department of Natural Resourced, 2012), the Eau Galle Project is located between the Western Prairie and Western Coulees and Ridges ecological landscape types. The Western Prairie landscape type is to the north and west of the Eau Galle Project area, and the Western Coulees and Ridges landscape type is immediately to the south of the Eau Galle Project area.

The Western Prairie ecological landscape type consists of a landscape that was entirely glaciated. Major landforms are rolling till plain with end moraine and small areas of outwash. The Lower St. Croix River forms the western boundary of this ecological landscape.

The Western Coulee and Ridges ecological landscape immediately south of Eau Galle Project is characterized by highly eroded, un-glaciated topography with steep sided valleys and ridges, high gradient headwaters streams, and large rivers with extensive, complex floodplains and terraces. Ancient sand dunes occur on some of the broader terraces along the Mississippi and Wisconsin Rivers. Cool water streams like the Eau Galle River are common in this ecological landscape.

2.7.6 Wetlands*

A wetland is an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation adapted to life in saturated soil conditions. Wetlands are distinguished not only from uplands, which do not hold sufficient water to support wetland functions, but also deepwater habitats, with water depths greater than 2 meters (6.6 feet) deep. The Eau Galle Project includes examples of fresh wet meadow, sedge meadow, shrub-carr, floodplain forest, shallow to deep marsh and shallow open water wetland communities (Reed, 2016).

The vast majority of the wetland communities are associated with the valley floor and floodplain areas of the tributaries, as the steep bedrock valley walls create abrupt boundaries between the wetlands and uplands. These wetland areas formed through natural processes within the valleys and show very minimal signs of human disturbance.

A wetland inventory was completed in summer 2018 by the Corps' St. Paul District personnel (see Appendix D). In summary, Lohn Creek has a limited wet meadow and shrub-carr wetland floodplain, with a steep grade into the reservoir. Within its bedrock valley, Lousy Creek flows through a broader wetland, consisting of fresh wet and

sedge meadow, shrub-carr and floodplain forest, while it also remains in contact with a slightly higher floodplain terrace during spring snowmelt and other high flow events. The Eau Galle River flows around the Northwest Day Use Area, through a forested mosaic of wetland and non-wetland floodplain; additional shallow and deep marsh wetlands are located within the remainder of the forested Northwest Day Use Area. Each of the tributaries has shallow and deep marsh communities at their entry into the reservoir. Portions of the reservoir pool that supports aquatic vegetation are also wetlands. Portions of the reservoir pool that are less than 6.6 feet deep are also wetland communities; shallow marsh up to 6 inches, deep marsh up to 3 feet and shallow open water up to 6.6 feet. Refer to Figure 7 for reservoir bathymetry information.

Wetlands are also present in areas resulting from or impacted by human activities, generally associated with construction of the dam. A small wetland consisting of wet meadow, shrub-carr, and forested communities is located behind the Eau Galle Dam maintenance facilities office. This wetland appears to have resulted from borrow for the dam and sits atop dense, poorly drained glacial till. Additional wet meadow wetlands are located along the final entrance road to the swimming beach and behind the volleyball courts. Finally, wet meadow, sedge meadow, and shrub-carr wetlands are found in the flats adjacent to the stilling basin and outlet of the Eau Galle River. These wetlands have in some way been impacted or created by human activities and range in vegetative condition from fair (some invasive species) to good (minimal invasive species).

2.8 Utilities

Utility placement requests on Corps' lands are processed through the St. Paul District's Real Estate section. The Real Estate section evaluates requests on a case-by-case basis to ensure utilities are placed in areas most suitable for development. The Real Estate section will consider protection and preservation of the natural environment, cultural resources, and the type of land classification when making its decision.

Currently there are two major utilities easements that are on the Eau Galle Project. One is for Magellan Pipeline, a petroleum line that starts on the west side of the Project and runs through the Northwest Day Use Area, Highland Ridge Campground, and Lousy Creek Landing. Magellan frequently requests to clear trees and brush from a 100-foot wide strip through the entire Project so they can inspect the line from overhead. The other major utility is Northern States Power Company's electrical power transmission line that starts on the west side of the Project and runs through the Northwest Day Use Area and continues south of the dam. When requests are made to clear trees and brush the effects on the environment and aesthetics of the Project need to be considered[3].

2.9 Mineral and Timber Resources

Public Law 86-717, codified in 16 U.S.C. § 580m-580n (within the Corps this is known as the "Forest Cover Act"), provides a statutory mandate for multiple use forest management, or other vegetative management, on Project lands and waters. Congress authorized the Chief of Engineers to protect and develop vegetative cover, such as wetland Forest and woodland management are aimed at developing, maintaining, protecting and/or improving vegetation conditions for timber, wildlife, soils, recreation, water quality, and other beneficial uses.

All of the forested land in the Eau Galle Project area was inventoried in 2005. This information can be made available upon request. A second forest land survey may be conducted within the next ten years. This information can be used for timber stand management in the future to include forest stand harvest prescriptions. The focus for timber stand management within the Eau Galle Project is to use timber stand management as a tool to enhance wildlife opportunities.

[3] Additional information related to such requests can be directed to Project staff.

2.10 Cultural Resources*

Historic properties are integral, nonrenewable elements of the physical landscape. A historic property is any precontact or historic district, landscape, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Used interchangeably with cultural resources, the term includes artifacts and materials, historic records, photographs, and other historic items that represent significant events or people, lifeways, traditions, and ceremonies of communities. Historic properties contribute to our understanding of the past, and preserving or minimizing the degradation of these important resources is one of the responsibilities of the Corps and other agencies.

Construction of the Eau Galle Project and its associated structures, reservoir operations, and recreation areas have negatively impacted cultural resources. Ongoing operation and maintenance activities have the potential to affect cultural resources today and into the future. Such effects would be limited due to the variety of federal and state laws and Corps' guidelines and regulations that mandate protection and preservation of historic properties.

Wisconsin has been shaped by the effects of several glacial advances and retreats through a complex sequence of climatic and geomorphic changes. Continued climatic alterations influenced geomorphic processes, vegetation changes, and ecotone shifts. Such events affected cultural development because they affected resources available to human populations.

Humans are thought to have arrived in the region shortly after the glacial ice retreated, approximately 15,000 to 12,000 years ago (ya). The Native American cultural history in the region is typically divided into three general precontact time periods or traditions: Paleo, Archaic, and Woodland. Archeological survey, testing and site excavation projects conducted within the Eau Galle Project area resulted in the recording and examination of 31 archaeological sites. All sites are associated with an unidentified precontact Native American period with two specifically being associated with the Archaic period (Blikre, 2017). The information provided below was collected from Wisconsin Historical Societies' short essays, *Ancient Land and First Peoples* and *Turning Points in Wisconsin History*.

The Paleo period is divided into Early (ca. > 13,000–12,500 ya) and Late (ca. 12,500–9,500 ya) stages and are defined by fluted and lanceolate shaped projectile points. During the Paleo period, groups of humans were few in number, widely scattered, and highly mobile hunter–gatherers. They specialized in hunting megafauna and large game species, (e.g., mammoth, giant bison). Paleo sites are rare and largely represented by individual find spots. To date, no Paleo age sites have been identified at Eau Galle Project.

The Archaic period is divided into Early (ca. 9,500–7,500 ya), Middle (ca. 7,500–3,000 ya), and Late (ca. 3,000-2,000 ya) stages, marked by diversification of the subsistence base and regional differences in material culture. Populations during the Archaic increased, and groups tended to be more sedentary. Material characteristics include notched and stemmed projectile points, ground stone tools, implements made of copper, long-distance exchange, and communal cemeteries. One NRHP eligible, Late Archaic site is located within the Eau Galle Project.

The Woodland Period is divided into Early (ca. 2,000–1,600 ya), Middle (ca. 1,600–1,000 ya), and Late (ca. 1,000–400 ya) stages, denoted by increased populations, a trend toward semi-sedentism, extensive construction of burial mounds, and widespread use of ceramics and domesticated plants. Material characteristics are defined by distinctive notched, stemmed, and triangular projectile points and a variety of decorated and undecorated ceramics.

Little is known of the Eau Galle Project area during the period of contact between Native Americans and Euro-Americans (starting ca. 400 ya). For the most part, the European presence was limited and scattered, although epidemics and the displacement of eastern native groups to the west created major upheavals to aboriginal ways of life which often resulted in warfare. By the late eighteenth century, the Dakota people, who had dominated

Wisconsin for hundreds of years, were displaced from the region by the Anishinabe (Ojibway) people.

The following information was collected from the *History of Pierce County and Spring Valley, Wisconsin* (Brown, 1971) and *Empire in Pine: The Story of Lumbering in Wisconsin, 1830–1900* (Fries, 1951). The historic period (ca. 200–50 ya) is dominated by lumbering, industrialization, agriculture, and transportation in the Project area. Euro-American settlement within the area increased rapidly after the war of 1812 between the Americans and British. Specific Euro-American settlement within the Eau Galle Project area began after statehood in 1848. The earliest industry attracting these settlers was logging. Lumbering started within the Chippewa River Valley and then continued upriver until it reached Eau Galle River, a tributary to the Chippewa River. By the 1850s, Spring Valley was a logging camp. By approximately 1890, it expanded into a center of farming and lumbering.

A second economic boom in the Eau Galle Project area was connected to iron ore when a large deposit of iron ore was discovered in 1890 two miles west of Spring Valley, and the Eagle Iron Ore Company was formed. In 1900, the company was bought and renamed to the Spring Valley Iron and Ore Company. The Chicago, St. Paul, Minneapolis, and Omaha Railway extended service to Spring Valley, which attracted more settlement to meet labor demands for the mines, smelter, and limestone quarries. The smelter officially closed in 1910. After mining operations ceased, the community became an agricultural center. Cultivation in the Eau Galle Project area itself ceased in about 1965 with the beginning of Eau Galle Dam construction. This construction lasted until 1969, and resulted in severe land disturbances at specific locations as a result of construction related activities including quarrying, filling, and temporary roads. Since its completion, the Eau Galle Project has contributed to the local history of the area and should be evaluated for inclusion in the NRHP.

2.11 Tribal Trust

As part of the Corps' tribal trust responsibility, the Corps takes into consideration the relationship between Native American tribes and the federal government on various operational elements of the Eau Galle Project area. All federally recognized tribes are sovereign governments and are responsible for their own governance and management. Sovereignty is the foundation of tribal governments, and their sovereign status gives them special recognition and treatment under federal law.

Lakes and streams, as well as the plants and animals associated with them, can hold spiritual, economic, and subsistence value to various tribes. Natural resources are a fundamental aspect of their cultural identity. Under the federal trust doctrine, the Corps owes a fiduciary duty to tribes. The nature of that duty depends on the underlying substantive laws (e.g., treaties, statutes, agreements) establishing the duty. Where Corps actions may affect tribal lands or off-reservation treaty rights, the trust duty includes a substantive duty to protect these lands and treaty rights "to the fullest extent possible."

2.12 Interpretation / Visual Qualities

The Interpretive Services and Outreach Program (ISOP) is an essential part of the Corps' Civil Works program. Through this program, the Corps can communicate missions and accomplishments, achieve management objectives, and foster environmental stewardship. ISOP aids in reaching diverse audiences and partners, which can improve visitor and employee safety, help with team cohesiveness, and enhance visitor experiences. It is one of the most effective tools the Corps has to connect with the general public, user groups, partners, and stakeholders (Photo 22).

The Corps defines interpretation as "communication and education processes provided to internal and external audiences which support the accomplishments of the agency's missions, tell the agency's story, and reveal the meanings of and the relationships between natural, cultural, and created environments and their features." The Corps' focus is to help people connect with the local environment, leading to their involvement and support. This outreach can be done through displays, brochures, visitor center exhibits, and interpersonal contacts.

Interpretive services are provided by highly trained park rangers, who have the skills to help visitors relate to Corps' sites, promote safety, encourage stewardship, and tell the Corps' story. Although park rangers traditionally use these skills for ISOP, communication between any Corps' employees and members of the public can benefit from interpretive techniques.

Photo 22. Eau Galle rangers performing water safety interpretive programs at the beach.

The Eau Galle Project has been working to communicate to the public through various resources, including interactive programs and displays. A new visitor display was installed in 2017 at the Highland Ridge Campground, bringing new interest and public involvement to the program. Reduced personnel and budget constraints have presented many challenges to providing interpretive services to the public. However, the increased popularity of social media has opened up many new possibilities to reach more people without direct interaction. Moving forward, the Corps understands that new technologies must be embraced to connect and communicate with the public. Although there are new ways to reach the public, face-to-face interaction remains one of the most effective means of communication.

2.13 Economics

Agriculture is one of the major industries in the Chippewa River Watershed. Land use within the area surrounding the Eau Galle Project is dominated by agricultural activity relating primarily to dairy products. The exception is the urban uses associated with the village of Spring Valley.

The Eau Galle Project also generates revenue from recreation. The money collected from the site is turned into the U.S. Department of Treasury. Table 11 shows revenues from the Eau Galle Project from 2008 to 2017.

Table 11. Eau Galle Project area recreation revenues from 2008 to 2017.

Year	Main Day Use Area	Highland Ridge Campground	Total
2008	$24,356	$50,221	$74,577
2009	$28,509	$52,396	$80,905
2010	$30,469	$41,608	$72,077
2011	$28,853	$48,393	$77,246
2012	$24,697	$54,667	$79,364
2013	$16,269	$61,091	$77,360
2014	$16,538	$61,202	$77,740
2015	$17,497	$71,650	$89,147
2016	$21,762	$80,997	$102,759
2017	$26,511	$93,235	$119,746

The natural and recreational resources at Corps' lakes provide social, economic, and environmental benefits for all Americans. The following are facts related to the Eau Galle Project for fiscal year 2016. Visitation per year resulted in the following (U.S. Army Corps of Engineers, 2017):

- $1,870,495 in visitor spending within 30 miles of the Corps' Project.
- $1,142,491 in sales within 30 miles of the Corps' Project.
- Twenty jobs within 30 miles of the Corps' Project.
- $453,913 in labor income within 30 miles of the Corps' Project.
- $581,275 in value added within 30 miles of the Corps' Project.
- $849,377 in National Economic Development benefits.

With multiplier effects, visitor trip spending resulted in:

- $1,632,315 in total sales.
- Twenty-four jobs.
- $590,048 in labor income.
- $851,175 in value added (wages and salaries, payroll benefits, profits, rents, and indirect business taxes).

2.14 Recreation Facilities, Activities, and Needs*

See Section 1.6.4, Recreation Facilities for a description of the recreation facilities at the Eau Galle Project.

2.14.1 Zones of Influence

The majority of recreational participants at the Eau Galle Project originates from two distinct areas: Minnesota's Minneapolis–St. Paul Metropolitan Area and Wisconsin's West Central District (specifically St. Croix, Chippewa, Dunn, Eau Claire, Pepin, and Pierce counties). The proximity of the Eau Galle Project to a major metropolitan area and the regional impact of the Interstate 94 corridor contribute greatly to the non-resident participation pattern.

The Minneapolis–St. Paul Metropolitan Area can be characterized as heavily populated (3.8 million according to 2015 Census) with a high per capita income in an intensely urbanized environment. The metropolitan area has potential for supplying a large number of visitors to the Eau Galle Project.

The Eau Galle Project is located mostly in St. Croix County but is also in Peirce County. As of 2016, the total St. Croix County population was 86,726. The total Pierce County population was 40,881. Both counties continue to see a rise in population growth.

Spring Valley, Wisconsin, located immediately south of the Eau Galle Project, accounts for much of the day use visitation to the area.

The Eau Galle Project serves primarily two populations: residents of the surrounding communities who would be interested in using the day use areas and residents from the Minneapolis–St. Paul Metropolitan Area who are able to use the day use areas as well as use the campground facilities for overnight or weekend camping.

Review of the U.S. Census Bureau, American Community Survey (ACS) for 2016 was conducted August 1, 2018 (U.S. Census Bureau, 2018). The ACS survey identified the average age for Wisconsin (2016) being 39.1 years. Average age for the counties adjacent to the Eau Galle Project was 36 for Pierce County (2016) and 37.9 for St. Croix County (2016). The population for Spring Valley village in 2016 was estimated at 1,497 with the average age being 35.9 years.

2.14.2 Visitation Profile

The Eau Galle Project has been found to be a very popular recreational location due to its close proximity to the

Minneapolis–St. Paul Metropolitan Area. The majority of the visitors to the Eau Galle Project come from within a 60-mile radius. The Eau Galle Project averages 40,000-85,000 visits per year, with peak visitation occurring between May and September (Table 12).

Table 12. Visitation numbers from Fiscal Year 2014 to 2018.

Visitation	**Day Use Areas –** Main Day Use, Northwest Day Use, Lousy Creek, Stilling Basin	**Campgrounds –** Highland Ridge, Equestrian Loop	**Total**
FY18	70,590	12,635	83,225
FY17	67,162	14,220	81,382
FY16	75,451	11,365	86,816
FY15	38,086	10,465	48,551
FY14	35,604	8,171	43,775

Source: National Recreation Reservation Service Annual Facility Utilization Reports

The visitor population at the Eau Galle Project consists of those who utilize day use areas and the campgrounds. Lake George provides access to non-motorized boating, such as kayaking, paddle boarding, fishing, and swimming. The day use areas of the Eau Galle Project provide access to hiking, picnicking, camping, equestrian trail riding, and equestrian camping.

Minnesota residents made 34 percent of camping reservations, and Wisconsin residents made 48 percent of camping reservations in 2017 (see Table 13). The 18 percent in the “other” category listed in the table below consists of reservations made by residents in other states or countries. Figure 13 documents camping visitation numbers at Eau Galle from 2008–2017. The figure shows there has been a steady increase in the number of camping reservations over time. The procedure for estimating visitation numbers were changed in 2012 to more accurately track visitation.

Table 13. Reservations made by residents in each state.

State/Province	**% Reservations**	**# Nights**	**Average # of Nights**	**# of Occupant**	**Average # of Occupants**
Wisconsin	48%	2,012	2.37	2,812	3.31
Minnesota	34%	1,314	2.21	2,141	3.60
Other	18%	896	NA	821	NA
	100.00%	**4,222**	**2.40**	**5,774**	**3.28**

Source: (USA Government, 2017)

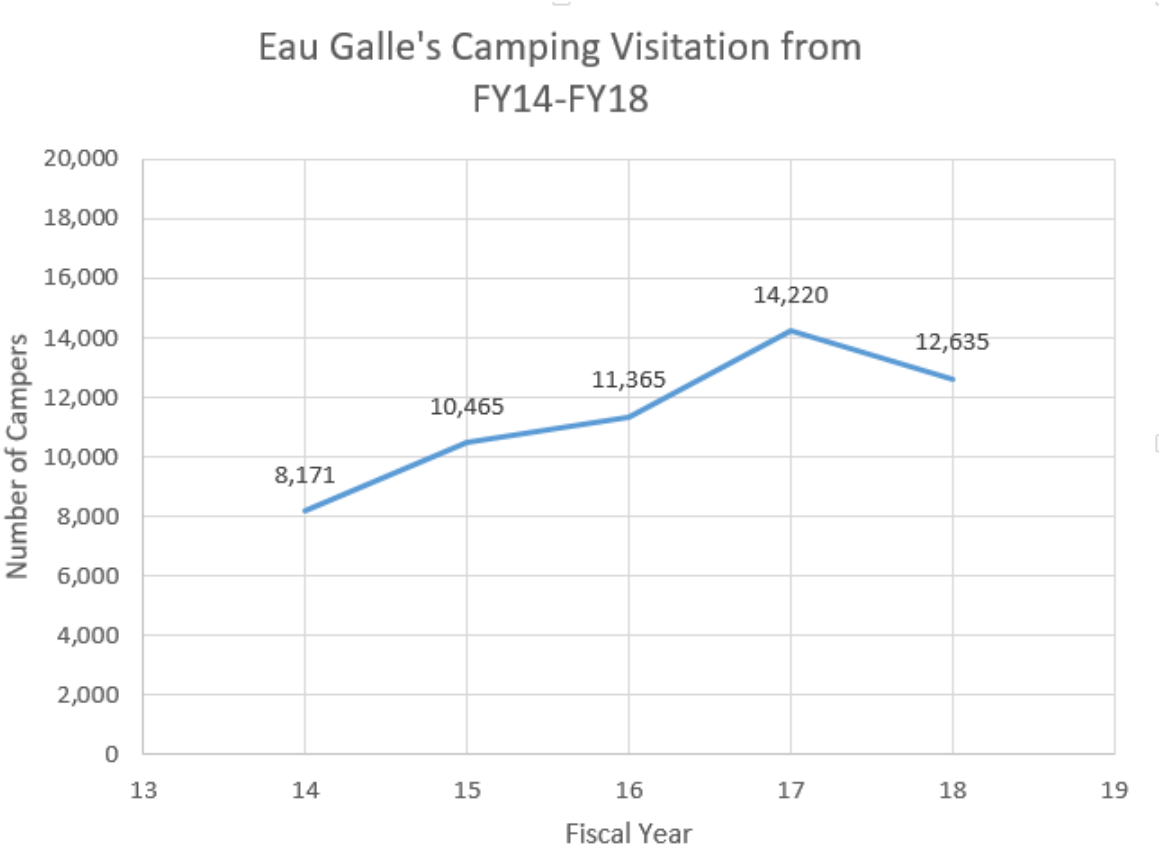

Figure 13. Eau Galle camping visitation from Fiscal Year 2014-2018.

Table 14 shows the top 10 cities with residents who camp at the Eau Galle Project. All 10 of these cities are within 60 miles of the Eau Galle Project.

Table 14. Top ten cities with residents who camp at Eau Galle based on number of nights in 2017.

	City, State	# Nights	Avg # Nights	# Occupant	Avg # Occupants per Reservation
1	Menomonie, WI	176	2.12	279	3.36
2	River Falls, WI	137	2.25	189	3.10
3	Hudson, WI	128	2.10	223	3.66
4	New Richmond, WI	125	2.02	210	3.39
5	Minneapolis, MN	122	1.74	237	3.39
6	Saint Paul, MN	105	1.88	182	3.25
7	Woodville, WI	105	3.50	106	3.53
8	Spring Valley, WI	76	2.30	133	4.03
9	Baldwin, WI	73	2.28	92	2.88
10	Hammond, WI	62	2.38	76	2.92

Source: (USA Government, 2017)

In 2012 the Corps launched an agency wide initiative to improve the accuracy of project visitation estimates and reporting. This effort, known as the VERS (Visitation Estimation and Reporting System) Modernization, takes new visitor monitoring technologies and estimating methods into account, which were previously unavailable or unevaluated in the original VERS system established in the 1990s. The VERS Modernization is ongoing and incorporates best practices and estimation methods that ensure the number of visitors to Corps' parks are being accounted for in an accurate, transparent, and defensible manner.

2.14.3 Recreation Analysis

The Eau Galle Project's recreation areas, trails, campgrounds, and water features give visitors an appreciation for the outdoors. These areas provide a sense of place and allow a growing population to enjoy outdoor recreation opportunities. While visitation in recreation areas remains strong, a new demand for upgraded facilities and non-traditional recreation opportunities exists. Recreation has evolved into a modernized, high-tech activity since the construction of the Eau Galle Project. For example, 50 amp electrical and wireless internet services are becoming the new standard for campers. The popularity of cabins, biking, natural surface trails, dog parks, and educational centers have also become apparent in other federal, state, county, and municipal parks in the region. Over 87 percent of Wisconsin residents enjoy some form of outdoor recreation, and recreation participation rates within the state are higher than most other regions in the country (Wisconsin Department of Natural Resources, 2012).

Written comments are collected from visitors in Corps parks via the Corps administrated Comment Card Program. A summary of customer satisfaction level comments received in 2017 and 2018 is provided below in Table 15. The summary shows that visitors are satisfied with the current facilities; however, some individual comments indicate areas where improvements could be made, including:

- Roof on fishing dock
- Additional campsites
- Additional picnic tables
- More shade
- Kiosk with historic information at Stilling Basin
- Lake algae is a problem
- Boat rental
- Better fishing
- Upgrade restrooms throughout
- Bring back the PVC swim perimeter
- Upkeep of and additional trails throughout
- Improve Lousy Creek boat landing

Table 15. 2017 and 2018 Eau Galle Project comment card responses.

	Very Good (5)	Good (4)	Neither Good nor Poor (3)	Poor (2)	Very Poor (1)	Doesn't Apply	Total
Facilities:							
Suitability of park facilities for my recreational equipment and activities	74%	24%	0%	2%	0%	0%	46
Restroom cleanliness and availability of conveniences	63%	26%	4%	0%	0%	7%	46
Appearance of park grounds	76%	20%	0%	0%	0%	0%	44
Adequacy of signs providing directions and information	67%	24%	4%	0%	0%	2%	45
Parking space availability during the visit	83%	15%	0%	0%	0%	0%	45
Condition of roads and parking areas in the park	76%	17%	4%	0%	2%	0%	46
Employees:							
Availability of park rangers and staff	63%	11%	2%	0%	2%	20%	45
Helpfulness of park rangers and staff	65%	9%	2%	0%	2%	20%	45
Environmental Setting:							
Attractiveness of surrounding scenery and landscape	83%	17%	0%	0%	0%	0%	47
Quality of land and water resources for my activities	80%	13%	4%	2%	0%	0%	46
Overall:							
Waiting times needed to access park facilities and services	78%	15%	0%	0%	0%	7%	46
Feeling of safety and security in the park	89%	11%	0%	0%	0%	0%	44
Value received for any visitor fees paid	74%	13%	2%	2%	0%	9%	47
Overall satisfaction with your visit to this area	83%	17%	0%	0%	0%	0%	47

50 comments cards were received, not all were completely filled out.

2.14.4 Recreation Trends

While the comment cards provide some indication of the current recreation needs at the Eau Galle Project, the trends identified in the Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicate new and emerging trends within Wisconsin (Wisconsin Department of Natural Resources, 2012). It serves as a management tool to help decision-makers by providing information that promotes better understanding and prioritizes the use of recreational resources statewide. The SCORP is used by the Corps to better understand and adapt to the current and future recreation trends and needs specific to the state of Wisconsin.

The 2019–2023 Wisconsin SCORP divided the state into eight regions based on similarities in their recreation attributes, visitation patterns, natural resources, and general features. The Eau Galle Project is located in St. Croix and Pierce counties, which are both in the Mississippi River Corridor Region (Figure 14). Findings from the SCORP showed that campsites and dog parks are in high demand in our region (Figure 15). It also showed that hiking/walking/running trails, biking trails, public shore access, and boat launches are in moderate demand. The strongest trends are biking (winter/fat tire and mountain), camping (RV/pop-up), and riding ATVs or UTVs (Figure 16).

Figure 14. Recreation regions of Wisconsin (Wisconsin Department of Natural Resources, 2019)

Activity	REGION: Great Northwest	Northwoods	Upper Lake MI Coastal	Lake Winnebago Waters	Western Sands	Mississippi River Corridor	Southern Gateways	Lower Lake MI Coastal	STATE average
Campsites	57%	67%	50%	50%	57%	100%	71%	29%	58%
Hiking/walking/running trails	43%	44%	50%	80%	57%	50%	29%	57%	53%
Bicycling trails - mountain biking	57%	56%	67%	50%	43%	50%	29%	57%	51%
Bicycling trails - recreational/rail-trail	29%	33%	50%	50%	29%	50%	57%	71%	46%
Motorized recreation trails	86%	89%	17%	50%	43%	0%	0%	14%	42%
Public shore access	29%	11%	67%	60%	43%	50%	14%	71%	42%
Dog parks	0%	0%	17%	30%	29%	75%	57%	71%	32%
Boat launches	43%	22%	33%	30%	14%	50%	14%	14%	26%
Playgrounds	29%	22%	50%	10%	43%	25%	29%	0%	25%
Hunting opportunities	0%	22%	0%	40%	57%	0%	14%	14%	21%
Picnic areas	29%	0%	17%	10%	14%	25%	29%	43%	19%
Disc golf courses	14%	11%	0%	0%	14%	25%	43%	29%	16%
Equestrian trails	14%	22%	33%	0%	14%	0%	14%	0%	12%
Shooting ranges	14%	11%	0%	10%	14%	0%	0%	0%	7%
Sports fields	0%	0%	17%	0%	0%	0%	0%	29%	5%
Sports courts	0%	11%	0%	0%	14%	0%	0%	0%	4%
Number of counties providing input	7	9	6	10	7	4	7	7	

This table is based on responses to a questionnaire sent to all county park systems in 2018.

The values are the percent of counties identifying the recreation activities as a top 5 need on their properties.

Percent of responding counties that identified the activity as being a top need on their properties	
High demand in the region	67% to 100%
Moderate demand in the region	33% to 66%
Low demand in the region	0% to 32%

Figure 15. Top Recreation needs at Wisconsin county park properties (Wisconsin Department of Natural Resources, 2019).

This table is based on responses to a questionnaire sent to all county park systems in 2018.

The values are mean responses of trends in participation at county park properties where opportunities are available.

Activity	REGION								STATE
	Great Northwest	Northwoods	Upper Lake MI Coastal	Lake Winnebago Waters	Western Sands	Miss. River Corridor	Southern Gateways	Lower Lake MI Coastal	
Bicycling - winter/fat tire biking	↑↑	↑↑↑	↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑↑	↑↑↑
Camping - RV/pop-up	↑↑	↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑	↑↑↑
Bicycling - mountain biking	↑↑	↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑↑	↑↑↑
Riding ATVs or UTVs	↑↑↑	↑↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑↑	*	↑↑↑
Canoeing/kayaking	↑	↑↑	↑↑	↑↑↑	↑↑	↑↑	↑↑↑	↑↑	↑↑
Bicycling - recreational/rail-trail biking	↑↑	↑	↑↑	↑↑↑	↑↑	↑↑	↑↑↑	↑↑	↑↑
Use of picnic areas/day use areas/beach areas	↑↑	↑	↑↑	↑↑	↑↑	↑↑	↑↑↑	↑↑	↑↑
Paddle boarding	↑↑	↑	↑↑	↑↑	↑↑	↑↑	↑↑↑	↑↑	↑↑
Dog walking on trails	↔	↑	↑↑	↑↑↑	↑↑	↑↑	↑↑↑	↑	↑↑
Hiking/walking/running on trails	↑	↑	↑↑	↑↑↑	↑↑	↑↑	↑↑↑	↑	↑↑
Fishing	↑	↔	↑↑	↑↑	↑	↑	↑↑	↑	↑↑
Motor boating (including pontoon boats)	↑	↔	↑↑	↑↑	↑	↑	↑↑	↔	↑
Snowshoeing	↔	↑↑	↑	↑	↑	↑	↑↑	↔	↑
Target firearm shooting at designated ranges	↑↑	↑	↔	↔	↑↑	↑↑	*	*	↑
Target archery at designated ranges	↑	↑	↑	↑↑	↔	↔	*	↑↑	↑
Bird/wildlife watching	↑	↔	↔	↑	↔	↔	↑↑	↑↑	↑
Nature photography	↑	↔	↔	↑↑	↔	↔	↑↑	↑	↑
Swimming in lakes/ponds/rivers	↑	↔	↑	↑↑	↔	↔	↑↑	↑	↑
Cross-country skiing - on groomed trails	↑	↑↑	↑↑	↔	↑	↑	*	↓	↑
Driving 4WD vehicles	↔	↔	↑	*	↑	↑	*	*	↔
Horseback riding	↑	↑↑	↑	↔	↑	↑	*	↓↓	↔
Gathering berries, mushrooms, etc.	↑	↔	↔	↔	↔	↔	↑↑	↔	↔
Hunting - turkey	↑	↑	↔	↔	↔	↔	↑↑	↓	↔
Camping - tent	↑	↔	↓↓	↑	↓	↓	↑↑↑	↑	↔
Hunting - small game	↔	↔	↓	↓	↔	↔	↑↑	↓	↔
Hunting - migratory birds	↔	↔	↑	↓	↔	↔	↔	↔	↔
Riding dual-sport motorcycles	↑	↑	↔	*	↓	↓	*	*	↔
Hunting - big game	↓	↓	↓	↓	↔	↔	↑↑	↓	↔
Cross-country skiing - on ungroomed trails	↔	↔	↔	↔	↔	↔	↓↓	↓↓	↓
Trapping	↔	↓	↔	↓	↔	↔	↓↓	↓↓	↓
Snowmobiling	↔	↑	↓	↓↓	↓↓	↓↓	↓↓	↓↓	↓↓

On County Park properties:	
Strong increase	↑↑↑
Moderate increase	↑↑
Slight increase	↑
About constant	↔
Slight decrease	↓
Moderate decrease	↓↓
Few or no opportunities	*

Figure 16. All Trends in recreation participation at Wisconsin county parks properties (Wisconsin Department of Natural Resources, 2019).

2.14.5 Recreational Carrying Capacity

In recreation management, carrying capacity refers to the level of use that a recreation area can receive without suffering negative impacts to its environmental resources or the visitor experience. Overcrowding and overuse of lakes are also a concern for the water-based recreation opportunities. At this time, the carrying capacity is unknown for the recreation facilities at the Eau Galle Project. Wisconsin's total population in 2040 is projected to be nearly 6.5 million people, a gain of more than 800,000 people (Table 16).

Table 16. County Population Projections to 2040 (source: https://doa.wi.gov/DIR/FinalProjs2040_Publication.pdf)

			Change from 2010 to 2014	
County	Estimated population 2010	Estimated population 2040	Projected Change in population	Projected percent change in population
Saint Croix	84,345	119,010	34,665	41%
Pierce	41,019	46,825	5,806	14%

With the population increasing, more demand for public access to lake and recreation areas may increase. Presently, the Eau Galle Project manages recreation areas using historic visitation data combined with best professional judgment to address recreation areas considered to be overcrowded, overused, underused, or well balanced. The Eau Galle Project will continue to identify possible causes and effects of overcrowding and overuse and apply appropriate best management practices and campsite management using data from the Recreation Information Database, which is part of the Recreation One Stop project — a web-based resource for information about recreational opportunities. Project staff will continue to evaluate the carrying capacity of the recreation areas as the surrounding population increases.

2.15 Related Recreational and Interpretive Areas Near Eau Galle Project

Wildwood Trail: The Wildwood Trail is a seven-mile off-road hiking, biking, and snowmobiling trail on a former railroad right-of-way, which runs from the village of Woodville, south to the St. Croix and Pierce county line, and through the town of Eau Galle. St. Croix County purchased the railroad grade from the St. Paul, Minneapolis and Omaha Railway Company in 1970. This is a year round recreation trail open to the public. There has been strong interest expressed by local residents to connect the Wildwood Trail (a county trail) to the village of Spring Valley and the Eau Galle Project. With appropriate signage, town roads could easily provide direction that connects the Wildwood Trail to the Eau Galle Project. The connection is identified in the Pierce County Outdoor Recreation Plan. The Eau Galle staff and the community should continue to develop the trail connection.

Crystal Cave: Crystal Cave is Wisconsin's longest cave and is open to tours, picnicking, hiking, bat viewing, and shopping. Crystal Cave is located in Spring Valley, Wisconsin and is 5 miles south of the Eau Galle Project.

Laura Ingalls Wilder Museum: The Laura Ingalls Wilder Museum is dedicated to the life and family of Laura Ingalls Wilder. The museum is located in Pepin, Wisconsin and is 34 miles south of the Eau Galle Project.

2.16 Real Estate & Acquisition Policy *

Under Public Law 85–500, Congress authorized the U.S. Army Corps of Engineers to construct and operate the Eau Galle dam, reservoir, and downstream channel improvements. The city of Spring Valley, Wisconsin acquired the lands and real estate interests deemed necessary for construction of the dam and reservoir and subsequently transferred title to the Corps. Over the life of the Project, the Corps analyzes lands for its needs in relation to the

Project. No land divestitures have occurred on the Project.

The U.S. Government currently owns 644.5 acres in fee within the Project boundary and holds flowage easements on 519.5 acres. The Corps has management rights and responsibilities on these U.S. Government owned lands and interests.

2.16.1 Fee Title

Land where the federal government holds the fee-simple title to a specific legal description, subject to existing easements for public roads, highways, public utilities, railroads, and pipelines. Fee title is a permanent and absolute tenure of an estate in land with freedom to dispose of at will.

2.16.2 Real Estate Outgrants

The purpose of an outgrant is to allow other agencies or individuals use of Project lands. These outgrants are issued by easement, license, or lease. They are issued if the land is available and if the proposed use is consistent with operational needs and resource management objectives. Other outgrants may be issued or existing outgrants may be terminated or amended, as circumstances warrant. There are currently 16 outgrants on Project lands. The Corps must also recognize "reservations," which are pre-existing less-than-fee interests. These are typically not included in Real Estate databases, as the Corps did not grant them. The Real Estate Division of the St. Paul District maintains all current information on outgrants and reservations.

2.16.3 Corps-Held Easements

Corps-held easements are lands for which the Corps holds an easement interest, but not the fee title. The Corps has the right to enter the property in connection with the operations of the Project. In most cases, the Corps has the right to occasionally or permanently flood these properties. Planned use and management is in strict accordance with the terms and conditions of the easement estate acquired for the Project. The Corps holds easements on 519.5 acres of land throughout the Project area.

2.17 Pertinent Public Laws*

Public laws and regulations that are most frequently referenced in planning and operational documents are listed below. Additional information on federal statutes applicable to the Eau Galle Project can be found in the environmental assessment for the Eau Galle Project Master Plan (Appendix A).

Public Law 59–209, June 1906 – Public Law 59–209, the Antiquities Ace of 1906 (34 Stat. 225), 8 June 1906. Provides for the privation and protection of antiquities on public lands. This includes archeological remains and historic sites.

Public Law 534–1944 – Flood Control Act of 1944. The 78th Congress Flood Control Act of 1977. Provides authority for the U.S. Army Corps of Engineers to develop and maintain power and recreation facilities at water resources projects. Section 4 of Public Law 534 was amended in 1962 by Section 201 of Public Law 87–874. Section 1 of this law and Section 1 of Public Law 14, Seventy-Ninth Congress (known as the Rivers and Harbor Act of 1945); specify coordination with state agencies in planning for flood control and watershed development.

Public Law 85–624, 12 August 1958 – The Fish and Wildlife Coordination Act of 1958. The Fish and Wildlife Coordination Act 1958, amended in 1965, sets down the general policy that fish and wildlife conservation shall receive equal consideration with other Project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources must be examined along with other purposes that might be served by water resources development.

Public Law 86–717 – Forest Conservation. This act provides for the protection of forest and other vegetative cover for reservoir areas under this jurisdiction of the Secretary of the Army and the Chief of Engineers.

Public Law 89–72 – 9 July 1965 – The Federal Water Project Recreation Act of 1965. Established development of the recreation potential as a full project purpose. Section 2 specifies that benefits for recreation should be included in the economics of a project. Section 77 of the Water Resources Development Act of 1974 (P.L. 93–251) required cost sharing for recreation and Fish and Wildlife enhancement at reservoir projects authorized after 1 January 1965.

Public Law 89–665 – National Historic Preservation Act of 1966, as amended. This act provides for (1) an expanded National Register of significant sites and objects, (2) matching grants to states undertaking historic and archeological resource inventories, (3) a program of grants-in aid to the National Trust for Historic Preservation, and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires federal agencies to consider the impact of their actions on historic properties and provide the Advisory Council with an opportunity to comment on projects before implementation.

Public Law 91–190 – National Environmental Policy Act of 1969 (NEPA). NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment. Specifically, it declared a "continuing policy of the Federal Government… to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. Section 102 requires consideration of environmental impacts associated with federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

Public Law 95–632. This law amends the Endangered Species Act Amendments of 1973. Section 7 directs agencies to conduct a biological assessment to identify threatened or endangered species that may be present in the area of a proposed Project. This assessment is conducted as part of a federal agency's compliance with the requirements of Section 102 of NEPA.

2.18 Management Plans

2.18.1 Historic Properties Management Plan

The purpose of the Historic Properties Management Plan (HPMP) is to support a comprehensive program directing the historic preservation activities and objectives at each Project site and to effectively manage and protect each historic property. The HPMP provides a working document for resource managers to promote the goals of consistency, efficiency, and continuity in cultural resources management. In order to accomplish this purpose, the HPMP provides information about the missions of the Corps, relationship to other plans, federal laws and regulations guiding cultural resources management, previous investigations, and a summary of the resources base and threats to that resource base. The HPMP was used to guide the cultural resources component of this Master Plan.

2.18.2 Statewide Historic Preservation Plan

The Wisconsin Historic Preservation Plan (WSHPO) identifies goals and objectives for historic preservation in Wisconsin. This plan identifies broad historical themes under which detailed historic contexts are developed for specific study units within each theme. The plan allows the WSHPO to better evaluate National Register nominations, establish priorities for conducting historic research with limited funding, and establish criteria for Historic Preservation Fund subgrant projects.

3 Management Goals and Resource Objectives*

The Corps' vision for the future management of land, water, and recreational resources of the Eau Galle Project is to manage flood risk and provide quality outdoor recreation opportunities while protecting, conserving, and sustaining Project resources for the benefit of present and future generations.

This vision is supported by the following broad management goals:

- Practice professional environmental stewardship of the Corps' lands and waters consistent with the primary mission of flood risk management.
- Identify and protect environmentally sensitive species, habitats, and landscapes.
- Identify and protect cultural resources.
- Protect and improve water quality in the lake.
- Identify outdoor recreation needs and provide those that complement the natural resources.
- Manage public use areas to provide safe and enjoyable opportunities.
- Collaborate with community stakeholders.
- Maintain open communication with the public at large.
- Create partnerships to leverage fiscal resources.
- Incorporate sustainability in all activities to the greatest extent possible.
- Strive to maintain a highly qualified staff.

3.1 Resource Objectives

The following resource objectives set forth specific objectives for recreation, environmental stewardship, and general resources. The resource objectives are intended to guide the future management of the Eau Galle Project.

Implementation of these objectives is based upon time, manpower, and budget. The objectives provided below are established to provide high levels of stewardship to lands and resources managed by the Corps while still providing a high level of public service. These objectives will be pursued using a variety of mechanisms, including assistance from volunteer efforts, partnership agreements, hired labor, contract labor, permit conditions, remediation, and special lease conditions. In all management actions, the Corps will strive for a reasonable and pragmatic approach to the management of resources.

ER 1130-2-550, Recreation Operations and Maintenance Policies establishes the policy for the administration and management of Corps' recreation programs and facilities. ER 1130-2-540, Project Operations – Environmental Stewardship Operations and Maintenance Policies establishes the policy for the administration and management of natural resource activities. The rules and regulations governing public use at Corps' water resources development projects are published as Title 36 of the Code of Federal Regulations, Chapter III, Section 327.0–327.30 and enforced by Corps' personnel with Title 36 citation authority.

3.1.1 Environmental Stewardship Resource Objectives

- Proactively manage habitats to protect Special Status Species, which include federal and state listed endangered and threatened species, birds listed by USFWS as Birds of Conservation Concern and other species and their habitats identified in listings compiled by the Wisconsin Natural Heritage Inventory (NHI) as declining or potentially endangered.
- Monitor lands and waters for invasive and exotic species, and take action to prevent and/or reduce their spread and impact.
- Identify, protect and/or restore important native vegetation ecosystems where they occur, or historically occurred, on Project lands.
- Inventory, protect, and interpret cultural resources.

- Carefully evaluate land use requests such as road and utility easements to avoid unnecessary resource damage or negative effects on public use. Ensure that all alternatives are considered.
- Improve water quality by participating in watershed management efforts primarily through the use of partnerships.

3.1.2 Recreation Resource Objectives

- Improve, modernize, and maintain day use and campground facilities through additional amenities, including, but not limited to: road improvements, sewer hook ups, increased electrical service, concrete or asphalt RV pads, group campsites, picnic sites, wireless internet access, amphitheaters, educational centers, pavilions, restrooms, trails, interpretive signage, playgrounds, and camper cabins.
- Maintain, improve and/or expand existing trails within the Project; connect to adjacent trail systems; and create more opportunities for hiking, birding, and nature study by providing and maintaining high quality trails and wildlife viewing stations.
- Carefully monitor public hunting activities to ensure public safety and resource protection.
- Work toward universal accessibility in all aspects of the recreation mission. Provide access opportunities that contribute to the quality of life for all ages, ethnic backgrounds and for those with physical limitations.
- Evaluate and maintain high quality public water access points.
- Evaluate recreational experiences using comment cards and other methods.
- Evaluate current land use and ensure proper balance between impacts of visitors and the resources.
- Maintain, design, and construct sustainable and resilient infrastructure. Use energy-efficient, easy-to-maintain and recycled/recyclable materials. Conserve the use of water at the facilities and reuse when possible.
- Improve and expand public outreach and education about the history of the area, Project resources, and the Corps' role in developing and managing these resources to foster a sense of ownership and responsibility.

3.1.3 General Resource Objectives

- Comply with all applicable federal laws, regulations and policies.
- Foster public and employee safety through education, training, research, and proactive visitor assistance activities, such as personal visitor contact, water safety patrols, and timely maintenance of signs and public use facilities. Establish carrying capacities for all activities through a process of public involvement and scientific analysis as needed.
- Maintain regular contact with community members and agency stakeholders and partners. Host and attend periodic information exchange meetings and public workshops to ensure open communication on all activities.
- Conduct periodic boundary inspections. When encroachments are discovered, Eau Galle Project personnel will attempt to resolve the issue at the Project level. Where no resolution is reached, or where the encroachment is a permanent structure, the method of resolution will be determined by Real Estate Division, with recommendations from Operations Division and Office of Counsel. The Corps' general policy is to require removal of encroachments, restoration of the premises, and collection of appropriate administrative costs and fair market value for the term of the unauthorized use.
- Real estate proposals and requests will be compatible with Project purposes and minimize impacts to environmental and cultural resources.

4 Land Allocation, Land Classification, and Project Easement Lands

This Master Plan is essentially a land use plan, meaning specific parcels of land are classified into land use categories based on resource capability. This plan provides a conceptual guide for use, management, and development of all Corps' lands, which are divided into management areas. The boundaries of the management areas are based on physical, administrative, and operation characteristics.

This section briefly describes the types of land classifications that are used within the Corps, however, not all classifications occur within the Eau Galle Project. Section 5, Resource Plan* contains both descriptions of each category of classification and details on the management activities undertaken for each.

4.1 Land Allocation*

In accordance with EP 1130-2-550, Project Operations – Recreation Operations and Maintenance Guidance and Procedure, land allocations identify the authorized purposes for which Corps' lands were acquired. There are four categories of allocation:

- Operations
- Recreation
- Fish and Wildlife
- Mitigation

All of the Corps' land at the Eau Galle Project were allocated for Operations. Operation lands were acquired to provide safe, efficient operation of the Project for its authorized purpose of flood risk management.

4.2 Land Classification*

All lands acquired for the Eau Galle Project are further classified to guide development and resource management consistent with authorized purposes and other federal laws. There are six categories of classification:

- Project Operations
- High Density Recreation
- Mitigation
- Environmentally Sensitive Areas
- Multiple Resource Management Lands
- Water Surface

The classification process refines the land allocation to fully utilize Project lands and considers public desires, legislative authority, regional and Project-specific resource requirements, and suitability. Land classification indicates the primary use for which Project lands are managed.

4.2.1 Project Operations

This classification includes lands required for the Eau Galle Projects' dam, stilling basin, emergency spillway, administrative offices, maintenance facilities, and other areas that are used to operate and maintain the Project. When compatible with operational requirements, Project operations lands may be used for wildlife habitat management or recreational use. Licenses, permits, easements, or other outgrants are issued only for uses that do not conflict with operational requirements. Public access to these areas is restricted in some locations.

4.2.2 High Density Recreation

These lands are designated for intensive levels of recreational use to accommodate and support the recreational needs and desires of visitors. They include lands on which existing major recreational facilities are located and allow for developed public recreation facilities, commercial concessions (e.g., marinas), quasi-public development,

and high-density or high-impact recreational use. In general, any uses of these lands that interfere with public enjoyment of recreation opportunities are prohibited. Low-density recreation and wildlife management activities compatible with intensive recreation use are acceptable, especially on an interim basis. No agricultural uses are permitted on those lands except on an interim basis for maintenance of scenic or open space values. Permits, licenses, and easements are not issued for non-compatible man-made intrusions, such as pipelines, overhead transmission lines, and non-Project roads, except where warranted by the public interest and where no viable alternative area or route is available.

4.2.3 Mitigation

This classification is for lands that were acquired specifically for the congressionally authorized purpose of offsetting losses associated with development of the Project. The Eau Galle Project does not have any lands under this classification; therefore, there is no management plan related to mitigation.

4.2.4 Environmentally Sensitive Areas

This classification describes areas where scientific, ecological, cultural, or aesthetic features have been identified. These areas must be considered by management to ensure they are not adversely impacted. Typically, there is limited-to-zero public use development on lands within this classification to ensure these sensitive areas are not adversely impacted. Agricultural or grazing uses are not permitted on lands with this classification. These areas are typically distinct parcels located within another land classification area which is sometimes larger than the environmentally sensitive area.

4.2.5 Multiple Resource Management Lands

This classification allows for the designation of a predominate use as described below, with the understanding that other compatible uses described below may also occur on these lands:

- **Low Density Recreation:** These lands are designated for dispersed and/or low-impact recreation use. Development of facilities on these lands is limited. Emphasis is on providing passive recreational opportunities such as walking, fishing, hunting, or nature study. Site-specific, low-impact activities like primitive camping and picnicking are allowed. Facilities may include boat ramps, boat docks, trails, parking areas and vehicle controls, vault toilets, picnic tables, and fire rings. Man-made intrusions, including power lines, non-project roads, and water and sewer pipelines, may be permitted under conditions that minimize adverse effects on the natural environment. Vegetation management, including agricultural activities that do not greatly alter the natural character of the environment, are permitted for a variety of purposes, including erosion control, retention and improvement of scenic qualities, and wildlife management. Hunting and fishing are allowed in some locations pursuant to tribal or state fish and wildlife management regulations where these activities are not in conflict with the safety of visitors and Project personnel.
- **Wildlife Management General:** These lands are designated for stewardship of fish and wildlife resources. They contain valuable wildlife habitat components that are maintained to yield habitat suitable for a designated wildlife species or group of species. Private use of wildlife lands is prohibited except for agricultural activities undertaken to improve wildlife habitat. Licenses, permits, and easements are not allowed for man-made intrusions, for example: pumping plants, pipelines, cables, transmission lines, or non-Project roads. Exceptions to this policy are allowable where necessary for the public interest and where no viable alternative location or route exists. Wildlife lands are available for sightseeing, wildlife viewing, nature study, and hiking. Consumptive uses of wildlife, including hunting, fishing, and trapping, are allowed when compatible with the wildlife objectives for the area and with both federal and state fish and wildlife management regulations.
- **Vegetation Management:** Management activities in these areas focus on the protection and development

of forest resources and native vegetative cover.

- **Future or Inactive Recreation Areas:** This sub-classification consists of lands on which recreation areas are planned for the future or lands that contain existing recreation areas that have been temporarily closed.

4.2.6 Water Surface

There are four possible sub-classifications.

- **Restricted:** Water areas restricted for Project operations, safety, and security purposes.
- **Designated No-Wake:** To protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, public safety, or some combination.
- **Fish and Wildlife Sanctuary:** Annual or seasonal restrictions on areas to protect fish and wildlife species during periods of migration, resting, feeding, nesting, spawning, or some combination.
- **Open Recreation:** Those waters available for year round or seasonal water-based recreational use.

4.3 Project Easement Lands*

Easement lands are all lands upon which the Corps holds an easement interest but no fee title. Planned use and management of easement lands will be in strict accordance with the terms and conditions of the easement estate acquired for the Project. Easements were acquired for specific purposes and do not convey the same rights or ownership to the Corps as other lands.

- **Operations Easement:** Corps retains rights to these lands necessary for operations.
- **Flowage Easement:** Corps retains the right to inundate these lands for Project operations. There are 519.5 acres of flowage easement lands located at the Eau Galle Project.
- **Conservation Easement:** Corps retains the rights for aesthetic, recreational, and environmental benefits.

5 Resource Plan*

5.1 Management by Classification

The management plan is based on resources available and public needs and will provide for full utilization while protecting Project resources. This plan provides guidance on what types of development and activities are permitted.

5.1.1 Classification and Justification

To reiterate, the Eau Galle Project land classifications are the following:

- Project Operations
- High Density Recreation
- Environmentally Sensitive Areas
- Multiple Resource Managed Lands
- Water Surface

The management plans identified are presented in broad terms. A more descriptive plan for managing these lands can be found in the Eau Galle Project Operational Management Plan (OMP). Management tasks described in the OMP must support the resource objectives, land classifications, and resource pan set forth in this Master Plan.

Changes to land use and classification have occurred from what was documented in the 1990 Master Plan and what is currently occurring at the Eau Galle Project today. The calculated acreages for land classifications shown in this plan are based on GIS polygon data, which is not as accurate as a legal survey. Though GIS technology has improved, there are inherent errors in the calculations. In 1990, the Eau Galle Project held 631.5 acres in fee and 519.5 acres in flowage easement. The land classifications based on the 1990 Master Plan are shown in Figure 17. Today, the Eau Galle Project holds 644.5 acres fee title land and 519.5 acres in flowage easement. Approximately 13 acres were acquired in fee in 2005 (Figure 18). The new land classifications and brief descriptions of proposed changes are documented below. See Appendix B for plates showing the various land classifications found throughout the Eau Galle Project. Figure 19 shows the 1990 and 2018 land class allocations. Table 17 provides a breakdown of land classifications by approximate acres based on GIS. A description of each type of land classification is described below.

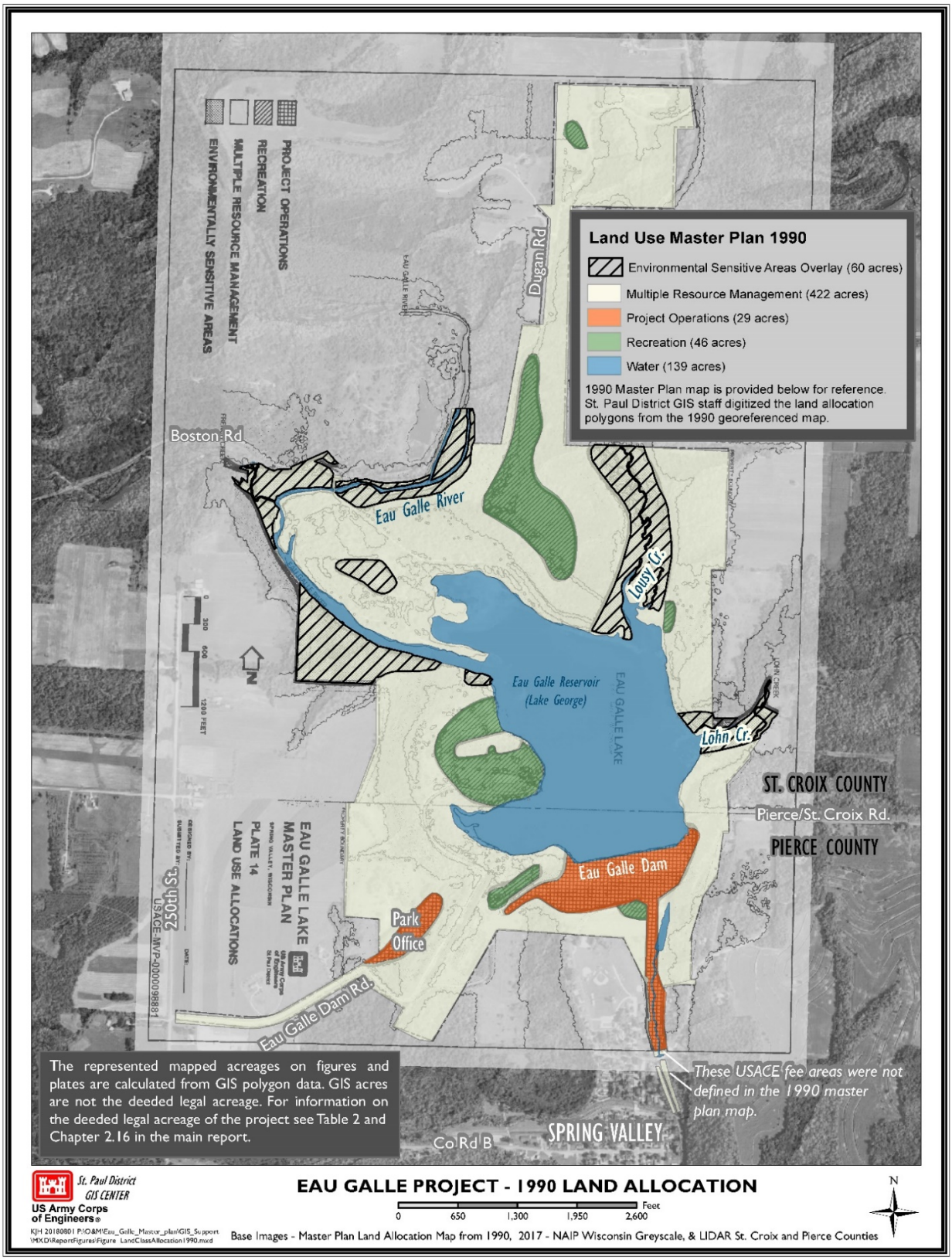

Figure 17. 1990 Master Plan land allocation.

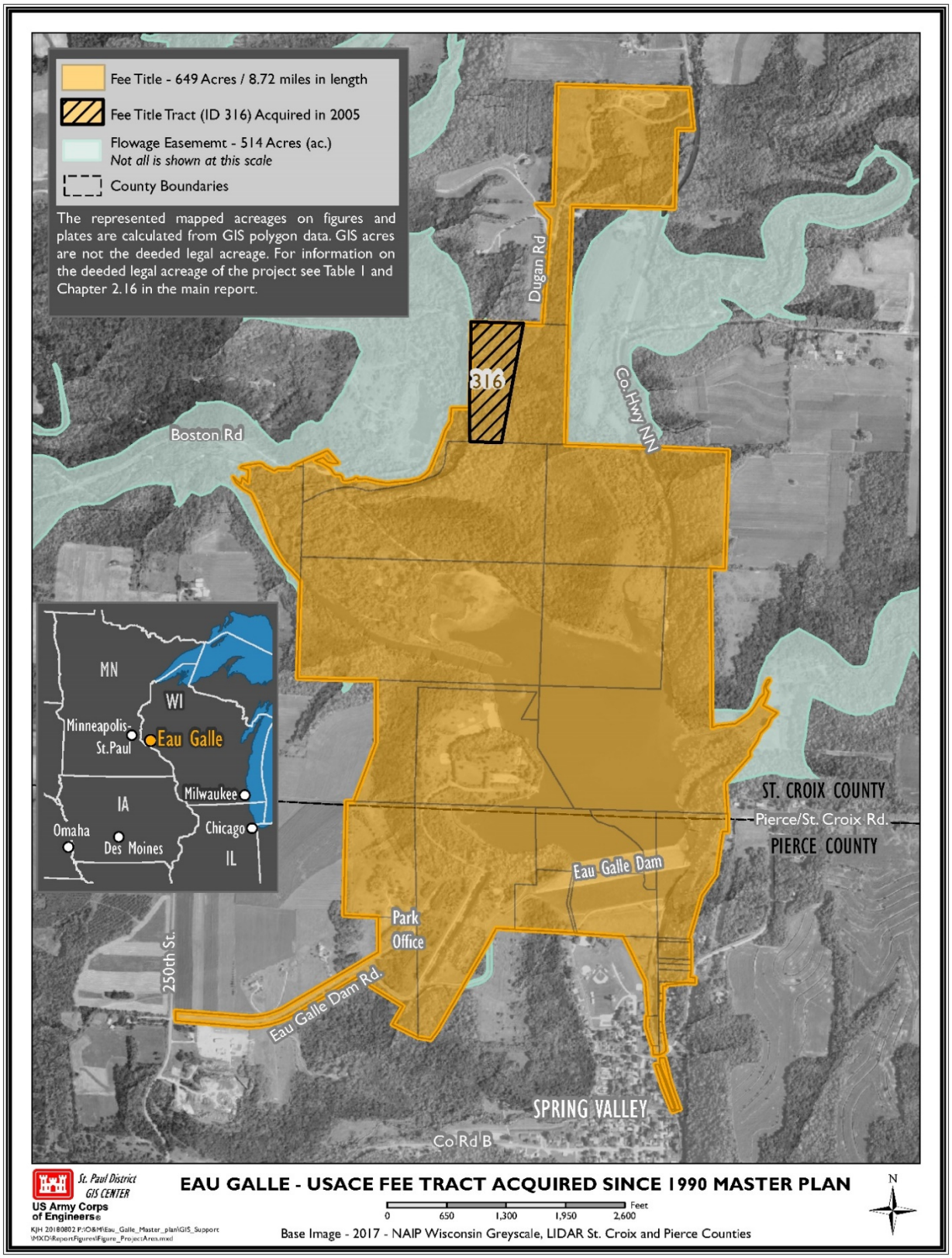

Figure 18. Fee title land acquired in 2005.

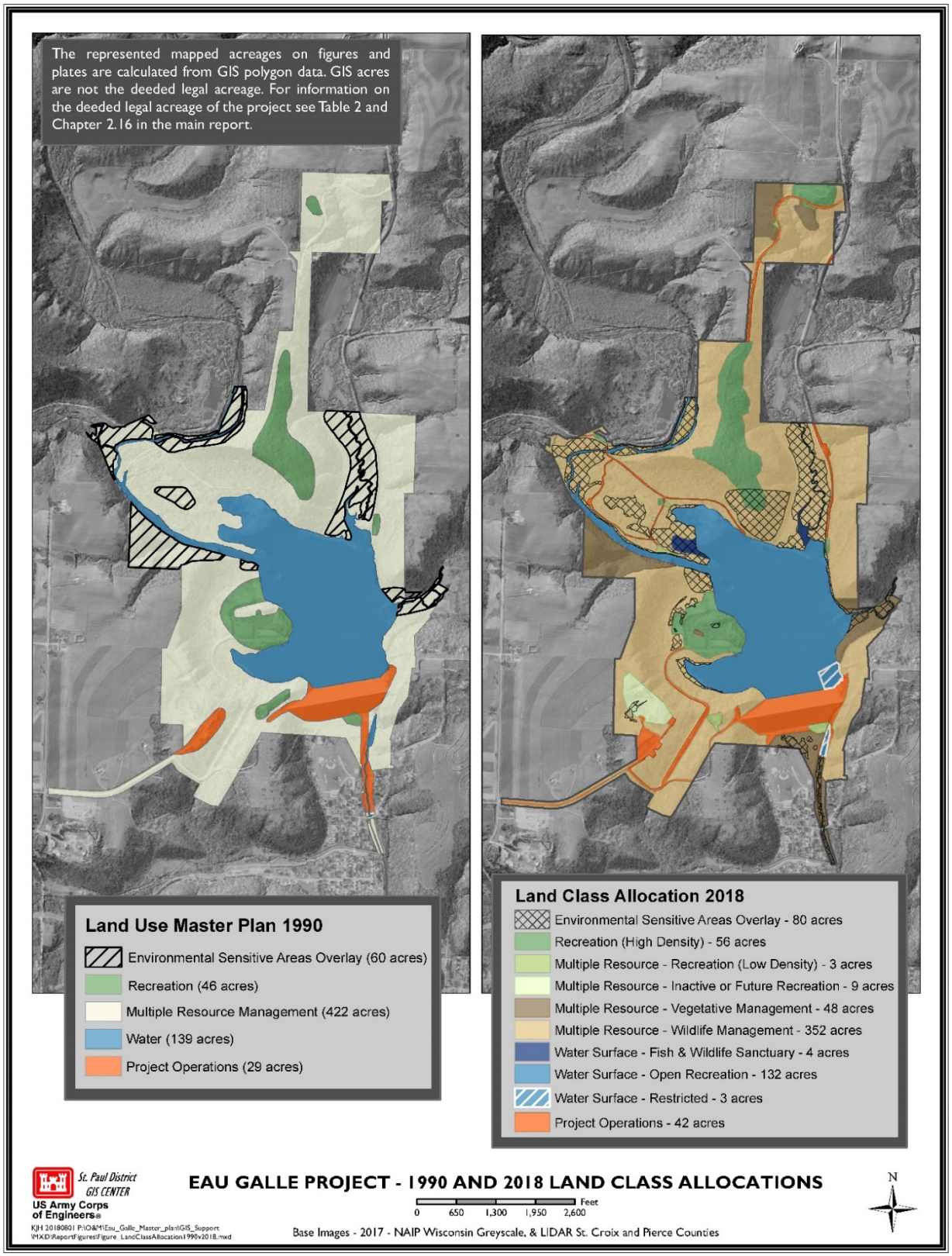

Figure 19. Eau Galle 1990 and 2018 land class allocations.

Table 17. Change from prior to new land classification.

Prior (1990) Land Classifications	Acres	New (2018) Land Classifications	Acres
Project Operations	29	Project Operations	42
Recreation	46	High Density Recreation	56
Environmentally Sensitive Areas*	60	Environmental Sensitive Areas*	80
Multiple Resource Management	422		
Multiple Resource Managed Lands – Low Density Recreation		Multiple Resource Managed Lands – Low Density Recreation	3
Multiple Resource Managed Lands – Wildlife Management		Multiple Resource Managed Lands – Wildlife Management	352
Multiple Resource Managed Lands – Vegetation Management		Multiple Resource Managed Lands – Vegetation Management	48
Multiple Resource Managed Lands – Inactive or Future Recreation		Multiple Resource Managed Lands – Inactive or Future Recreation	9
Water Surface	139		
Water Surface – Open Recreation		Water Surface – Open Recreation	132
Water Surface – Fish/Wildlife Sanctuary		Water Surface – Fish/Wildlife Sanctuary	4
Water Surface – Restricted		Water Surface – Restricted	3
Total	636		649

*Environmentally Sensitive Area acreages can be found within other land classifications and are not included in the total.

5.1.2 Project Operations (42 acres)

This category includes those lands required for the dam, stilling basin, emergency spillway, office, maintenance facilities, and other areas that are used solely for the operations of the Project. The management plan reinforces that physical security is necessary to continue operations of the dam and related facilities. Examples of management activities for these lands include renovating and updating facilities and aging infrastructure with modern, energy efficient technology.

Management for wildlife, natural resources, and recreational use will remain a priority in these lands as long as there is no conflict with operational requirements. Examples of wildlife, natural resources, and recreational use management include modernizing interpretive buildings, trails, or interpretive information and protecting culturally sensitive areas.

The new proposed land classifications reflect actual use and management of the land today. There are no proposed changes to this land classification.

5.1.3 High Density Recreation (56 acres)

Lands developed for intensive recreational activities include day use areas and campgrounds. The facilities in these areas will accommodate the recreation needs of visitors in concentrated numbers while also offering open space lands to provide more complete and attractive recreation areas. Table 18 shows the high density recreation areas of the Eau Galle Project.

Table 18. Eau Galle Project high density recreation areas and acres.

Recreation Area	Total Acres
Main Day Use Area	18.5
Northwest Day Use Area	0.5
Highland Ridge Campground (includes Equestrian Campground)	36
Lousy Creek Landing	0.5

The majority of the high density recreation lands were similarly classified in the 1990 Master Plan. The management plan for these areas maintains and modernizes these land for public use and enjoyment. Public comments, via comment cards and personal communication with Project visitors, show that visitors would like upgrades and modernization of facilities throughout Eau Galle. Comment cards and personal communication with Eau Galle visitors have documented improvements that they would like to see. Improvement recommendations include adding Wi-Fi and cell phone boosters, providing additional electric/sewer hook ups, and installing camper cabins. Comment cards also identify areas for facility upgrades such as installing new restrooms, shelters, picnic areas, and play structures, and improving boat ramps and parking areas. Any improvements to high density recreation areas would be specifically addressed in future OMPs.

The new proposed land classifications reflect actual use and management of the land today. There are no proposed changes to this land classification.

5.1.4 Environmentally Sensitive Areas (80 acres)

The goal of environmentally sensitive area (ESA) management is to protect and preserve known areas that contribute to the diversity and health of the Eau Galle Project. The program should be beneficial to plants, animals, and the people that enjoy the resource.

The Corps defines, maps, and manages these areas. Defining environmentally sensitive areas assists in the protection of valuable resources. Many factors contribute to defining an ESA including locations of threatened and endangered species and cultural resources. Many species in need of conservation are found on Corps' lands and are identified in various conservation plans, including the Wisconsin Wildlife Action Plan.

Areas are managed in concert with an ESA and its degree of sensitivity. For example, if a location is identified as an environmentally sensitive area, it may also be managed for low density recreation and available for the construction and management of hiking trails or actively managed for timber improvement without impacting the ESA. Some locations identified as an ESA can be very sensitive to human disturbance and need adequate protection from development. Examples of these highly sensitivity areas are eagle nests, osprey nests, and heron rookeries. These animals are threatened by human activities, especially during active breeding seasons, and a protective buffer zone around nests would help avoid potential disturbance.

Areas designated as sensitive can change over time and continued monitoring through programs like Multiple Species Inventory and Monitoring provide valuable data to retain information regarding sensitive areas relevant for management. Some areas are more sensitive to change while other areas need a prescribed management approach such as invasive species control, prescribed fire, or plantings to remain viable. Through the use of GIS an ESA can be managed more effectively and consistently.

The identification of an ESA falls into two broad categories: (1) cultural sites and historic properties, and (2) sensitive species habitat or wetlands. Management plans for cultural sites and historic properties may include developing and maintaining a Historic Properties Management Plan and providing educational interpretive displays. Management plans for sensitive species habitat or wetlands may include protecting and restoring

shoreline, developing forestry plans, monitoring and preventing the spread of invasive species, invasive species outreach efforts, prescribed burns, and restoration of lands to natural habitat.

The new proposed land classifications reflect actual use and management of the land today. There are no proposed changes to this land classification.

5.1.5 Multiple Resource Management Lands

These lands are classified by their predominate use; however, these lands can also have other compatible, simultaneous uses that do not impact the predominate use. These lands can be divided into four sub-categories:

- Wildlife Management
- Low Density Recreation
- Vegetative Management
- Future/Inactive Recreation Areas

The following is a description of the resource objectives, acreage, and description of use pertaining to each sub-category.

The 1990 master plan did not break out Multiple Resource Management Lands into subcategories, which are now accepted practice.

5.1.5.1 Wildlife Management (352 acres)

These lands are designated for stewardship of fish and wildlife resources. However, areas of low density recreation, environmentally sensitive areas, and vegetative management all support wildlife. Management efforts focus on producing native wildlife food and habitat. The Corps also manages non-game wildlife. Other non-game programs are performed on an intermittent basis, such as songbird house, duck house, and bat box installations along with prairie plantings for the benefit of butterflies and other pollinators. The plan is to continue these initiatives in order to provide some form of management for non-game species.

The new proposed land classifications reflect actual use and management of the land today. There are no proposed changes to this land classification.

5.1.5.2 Low Density Recreation (3 acres)

Low density recreation refers to lands with minimal development or infrastructure that supports passive public recreational use, for example: hiking trails, fishing, hunting, and wildlife viewing. Existing or future development may occur within these areas, however, it is limited and not to the extent of development in high density recreation areas.

Accordingly, wildlife management and vegetation management can easily coexist with the recreational accommodations. Other factors that may determine this classification include access, past use, and the level of development on neighboring private lands. Resource objectives for low density recreation include environmental stewardship activities that achieve natural resource management goals while also recognizing the compatibility of limited development for recreational pursuits.

The management plan for low density recreation areas is to maintain and modernize where appropriate for public use and enjoyment. This may include constructing trails, developing partnerships to enhance passive recreation areas, and providing recreational opportunities like geocaching, birding clubs, and other wildlife viewing.

The new proposed land classifications reflect actual use and management of the land today. There are no proposed changes to this land classification.

5.1.5.3 Vegetative Management (48 acres)

These lands are designated for stewardship of forest, prairie, and other native vegetative cover. Management activities in these areas focus on the protection and development of vegetative wildlife resources. With proper management, these areas also provide valuable habitat for a wide range of species. These lands are available for sightseeing, wildlife viewing, nature study, hiking, and horseback riding. Consumptive uses of wildlife, including hunting, fishing, and trapping, are allowed when compatible with the objectives for a given area and with both federal and state fish and wildlife management regulations. Examples of management activities compatible with both vegetative development and low density recreation may include developing self-guided interpretive trails, creating wildlife viewing stations, updating scenic viewing areas, planting trees and native vegetation, limited timber harvesting, thinning, and other forest management activities.

Invasive species pose a significant threat to the Eau Galle Project landscape. Vegetative threats include garlic mustard, crown vetch, and honeysuckle. These species have the ability to significantly alter native ecosystems. Trees are also very susceptible to invasive species, as evidenced by the emerald ash borer, gypsy moth (oak), and Dutch elm disease. Diligent monitoring and swift reaction are key to successful invasive species management. Eradication is rarely attainable, but control is critical to managing invasive species.

The new proposed land classifications reflect actual use and management of the land today. There are no proposed changes to this land classification.

5.1.5.4 Future/Inactive Recreation Areas (9 acres)

These areas have site characteristics compatible either with future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources.

One future/inactive recreation area has been identified. The nine-acre area is adjacent to the park office and maintenance building. The management plan for this proposed area would be a campground with similar amenities as the Highland Ridge Campground. Demand for additional camping and modern amenities has been identified through suggestions on visitor comment cards and personal conversations with park staff and volunteers. The location of this future/inactive recreation area was sighted specifically for its proximity to the park office, existing sewer and electric lines, and suitable space for high density recreation development.

The 2019 Master Plan proposes changing nine acres of land currently classified as Multiple Resource Management and managed for Wildlife Management to Future/Inactive Recreation.

5.1.6 Water Surface Zoning (139 acres)

This section deals with water surface management needs, which ensures efficient operations. There are multiple surface water recreation and conservation zones on the Eau Galle Reservoir. There are two restricted areas where only shoreline access to the edge of the water is allowed and boats are prohibited. One area is located around the morning glory of the dam and the other is 600 feet downstream the dam. The purpose of these restrictions is to limit public access and ensure the security of the structures and public safety. These restricted areas account for three acres.

The majority of the reservoir is classified as open recreation (132 acres). The Eau Galle Reservoir provides an excellent opportunity for small paddling boats because it is very shallow and zoned for recreational boating. The entire reservoir does not allow the use of gas boat motors, meaning either manually driven or electric only watercraft can be used.

Four acres of the reservoir are classified as fish and wildlife sanctuary. Annual or seasonal restrictions on these two areas are to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and

spawning.

The 1990 Master Plan classified 139 acres as water; there was no subdivision for water classifications. The current management at Eau Galle further defines water into three basic categories: Fish and Wildlife Sanctuary (4), Open Recreation (132), and Restricted (3). There are no proposed changes to this land classification.

6 Special Topics*

6.1 Partnerships and Volunteers

In today's financial environment, volunteering and partnering allows the Corps to effectively manage recreational and environmental resources at lower costs, avoid any unnecessary duplication of efforts, and promote coordination and pooling of scarce resources. The Corps must work together with volunteers (Photo 23), state governments, private and public organizations, local communities, and other partners in order to successfully meet the agency's recreation and stewardship missions; foster shared values, visions, and a sense of ownership; and maintain or advance programs like wildlife protection, habitat improvement, and recreation facilities advancement.

The Eau Galle Project has multiple partnerships with various organizations (Boy Scouts of America, The Highland Ridge Equestrian Group, The Wisconsin Department of Natural Resources, Spring Valley School System and many others). The Corps is committed to fully exploring the potential development of new private-public partnerships to leverage limited appropriated funds and human resources.

Public Law 98–63, Supplemental Appropriations Act of 1983 authorized the Corps' Volunteer Program. At the Eau Galle Project, volunteers serve as campground hosts, conduct programs and tours, clean recreation areas, plant trees, restore fish and wildlife habitat, and maintain park trails and facilities, among other tasks. Corps' personnel can recruit their own volunteers from the Volunteer Clearinghouse[4], which is a national information center for individuals interested in volunteering at Corps' projects across the country. Eau Galle's partnering efforts in fiscal year 2017 totaled a value of $56,970.40 with 2,360 hours. In fiscal year 2018 the partnering efforts were valued at $52,416.89 and 2,123 hours. Figure 20 shows the total volunteer hours from fiscal year 2013 to fiscal year 2018. Figure 21 shows the total value that volunteers work contributed to Eau Galle for the fiscal years 2013 to 2018. The Corps plans to continue to work with partners and the public to continue to manage resources, provide high quality recreational opportunities, and reach desired management goals.

Photo 23. 2017 campground hosts Barry and Genette Dies.

[4] https://corpslakes.erdc.dren.mil/visitors/visitors.cfm

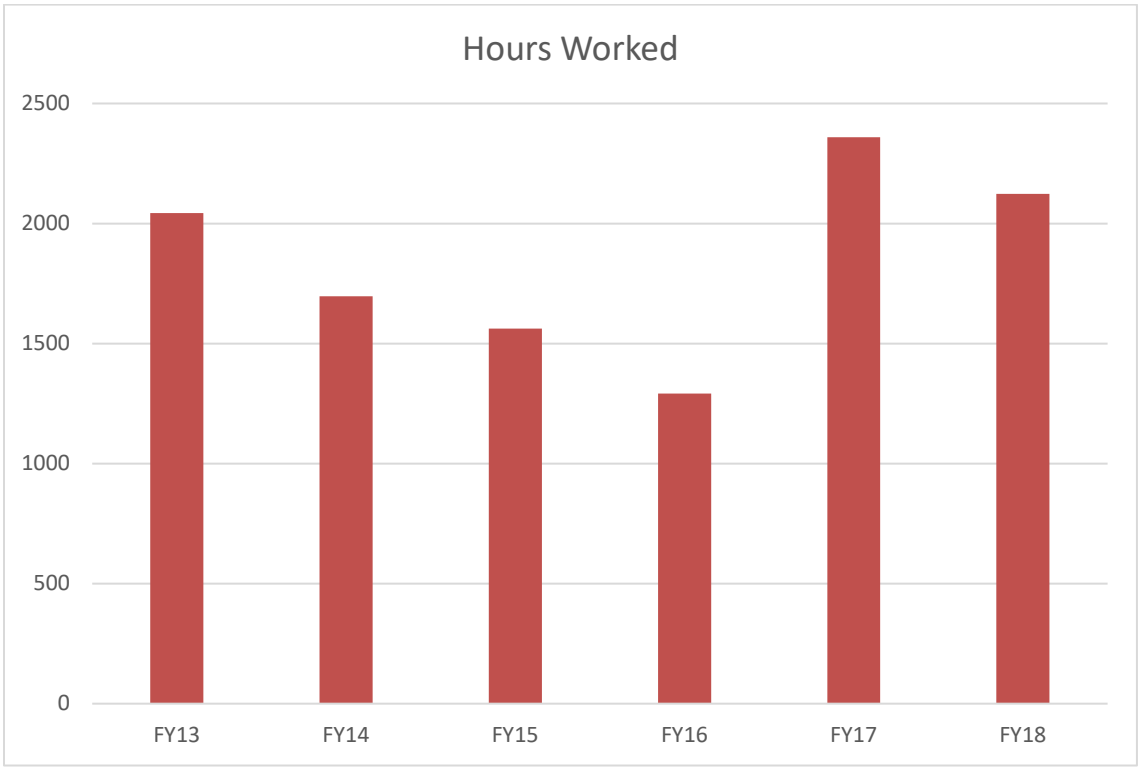

Figure 20. Total volunteer hours from fiscal years 2013 to 2018.

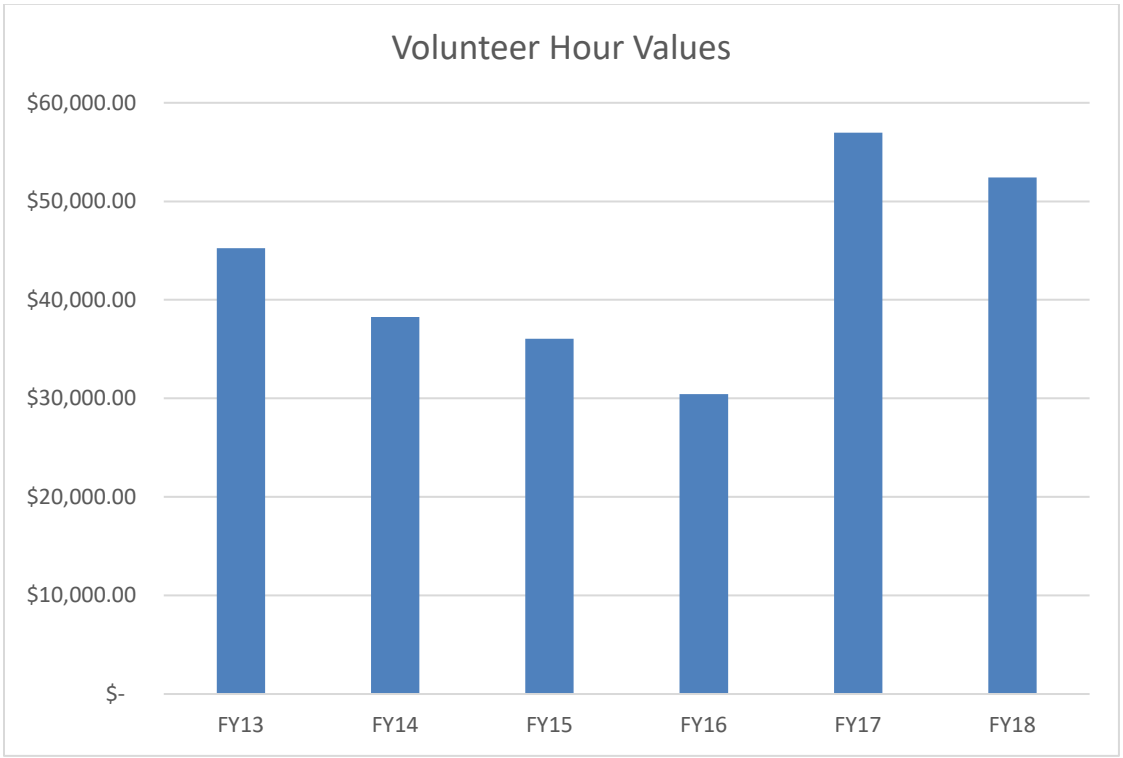

Figure 21. Total Value that volunteer work contributed to the Eau Galle Project for fiscal years 2013 to 2018.

6.2 Encroachments

The Corps' Natural Resources Management mission is to manage and conserve natural resources consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations. Encroachments on Corps-managed federal lands directly conflict with that mission. The Corps is, therefore, committed to resolving encroachments by the most expedient and effective means available. It is the intent of the St. Paul District to recapture use of encroached upon public lands for federal project operating purposes and general use and enjoyment of the public. The general policy is to require removal of encroachments, restore the premises, and collect appropriate administrative costs and fair market value for the term of unauthorized use.

6.3 Recreation Recommendations

The following recreation recommendations were identified for each area of the Eau Galle Project based on input received through comment cards, discussions at the initial Master Plan agency and public meeting, and needs/trends in the Wisconsin SCORP. Figure 22 through Figure 27 visually document these potential improvements. Any potential improvements are dependent upon future funding sources.

Main Day Use Area (Figure 22**)**

- Improve the existing trails and add additional hiking and biking trails.
- Construct a new campground north of the office area, giving campers easy access to the the Main Day Use Area. The campground would include electric sites, non-electric sites, group camping, and camper cabins.
- Construct a disc golf course.
- Construct a baseball or soccer field.
- Replace the day use bathroom with a larger bathroom facility.
- Construct a retention pond to capture the runoff from the parking lot.
- Provide picnic shelters at the beach area.
- Install a kayak launch.
- Install a fishing pier at the beach.
- Improve existing playgrounds and incorporate natural playground features.
- Add scenic overlook in the Main Day Use Area.
- Install solar panels at the office and on existing buildings throughout the area.
- Construct a bridge connecting the Main Day Use Area to the Northwest Day Use Area.
- Install fish cribs.
- Provide Wi-Fi.
- Install bluebird houses.

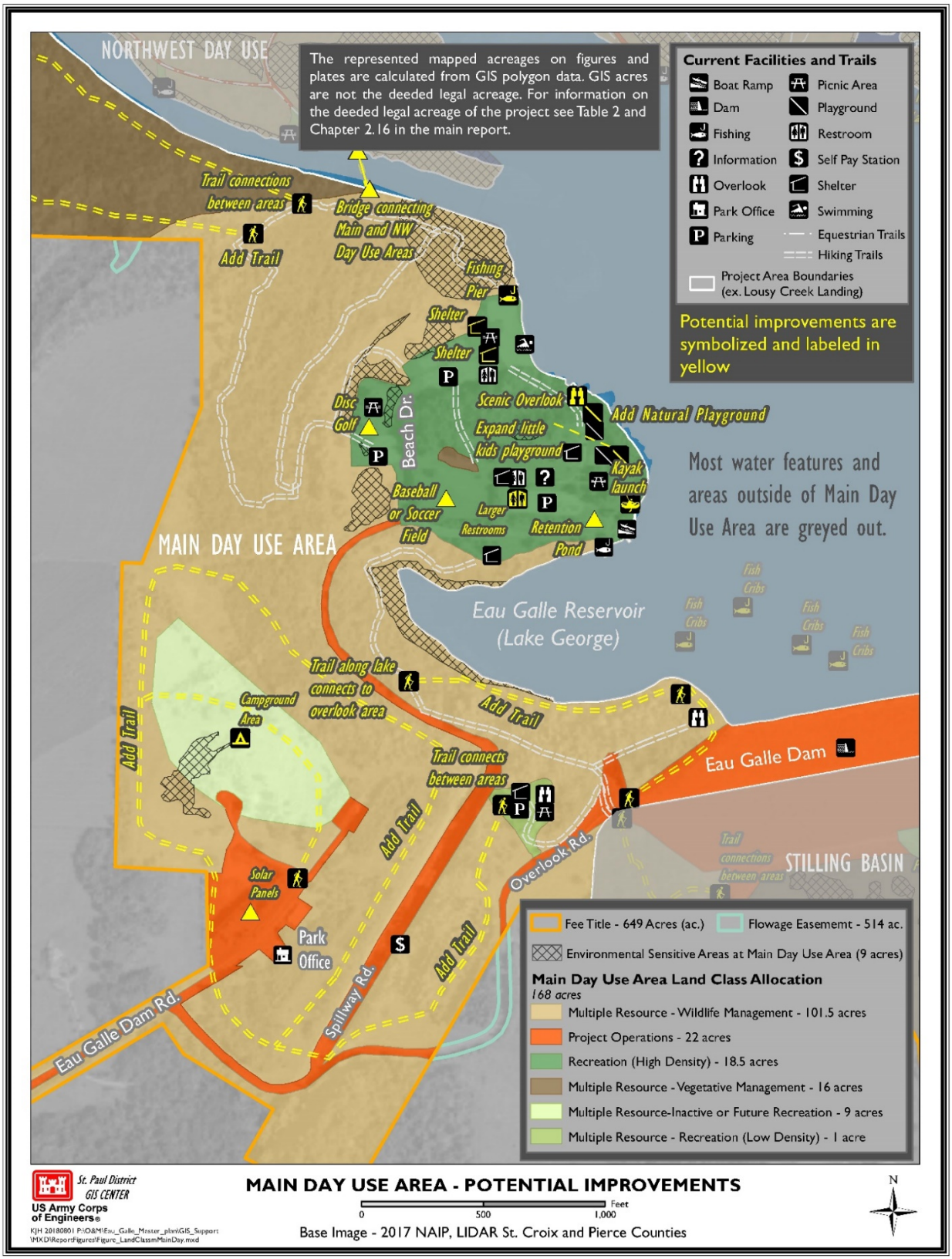

Figure 22. Main Day Use Area – potential improvements.

Northwest Day Use Area (Figure 23**)**

- Expand existing parking lot.
- Provide wildlife viewing platforms.
- Replace the exisisitng bridge with one that is at a higher elevation above the river to reduce the chance of water overflowing the bridge.
- Install fish cribs to improve fish habitat.
- Install duck houses.

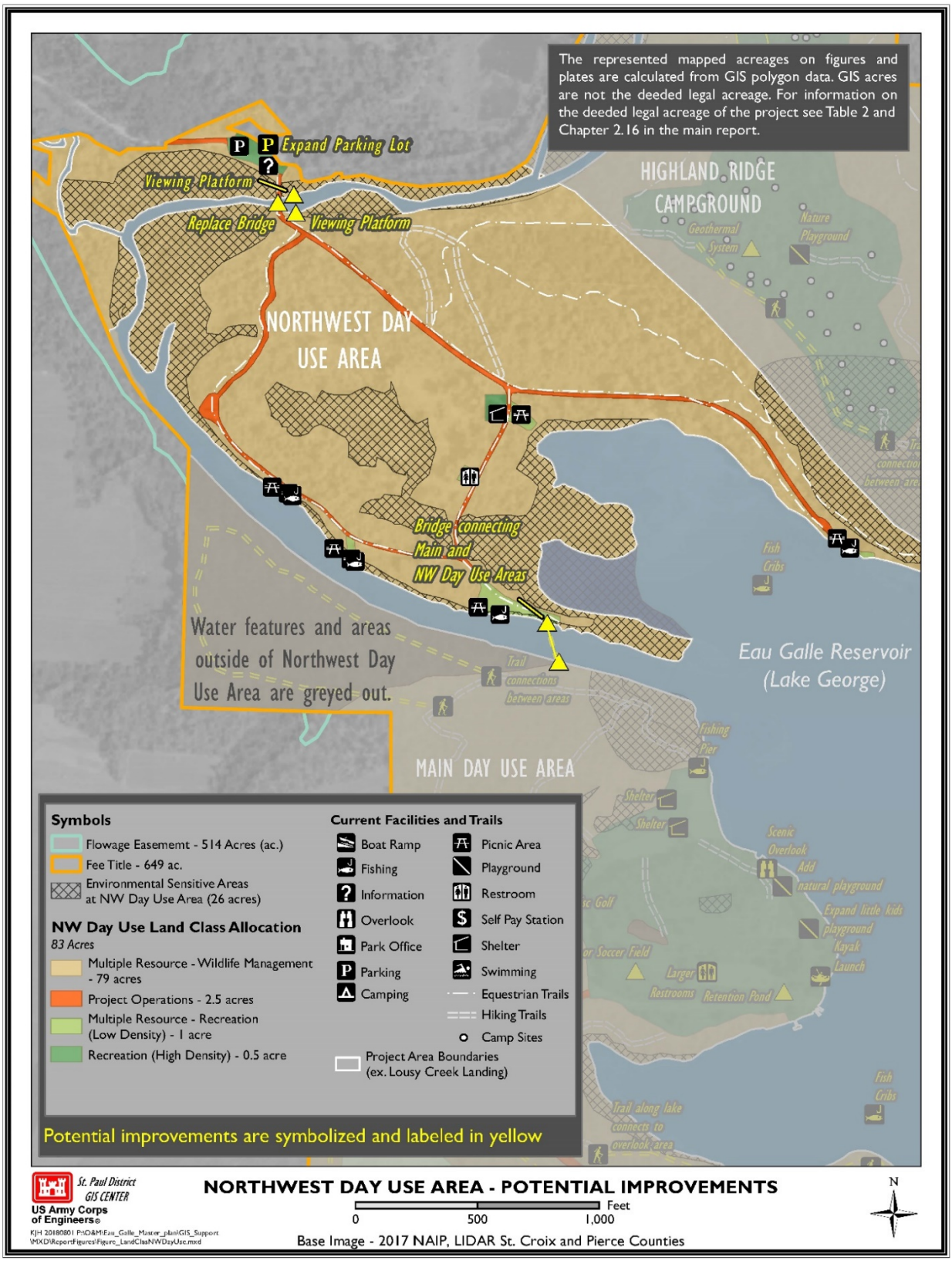

Figure 23. Northwest Day Use Area – potential improvements.

Highland Ridge Campground (Figure 24 and Figure 25**)**

- Install a geothermal system in the shower bulding that will heat and cool the building and heat the hot water tank.
- Improve existing playground area and incorporate natural playground features.
- Add more individual campsites and group sites.
- Expand the interpretive hiking trails so it creates a full loop around the campground.
- Provide additional sites that comply with the Americans with Disabilities Act (ADA).
- Add camper cabins.
- Add full hook up sites.
- Expand the current dump station or add an additional station.
- Provide Wi-Fi so visitors can make camping reservations using personal computers or mobile devices.
- Install solar panels.
- Install bat houses throught the area.

Equestrian Campground Loop (Figure 25**)**

- Rename this area to the Prairie Loop Campground.
- Add shower facilities.
- Construct a shelter.
- Add electricity to the individual campsites.
- Install solar panels.
- Add sites that comply with the Americans with Disabilities Act (ADA).
- Provide Wi-Fi so visitors can make camping reservations using personal computers or mobile devices.
- Install bluebird houses.

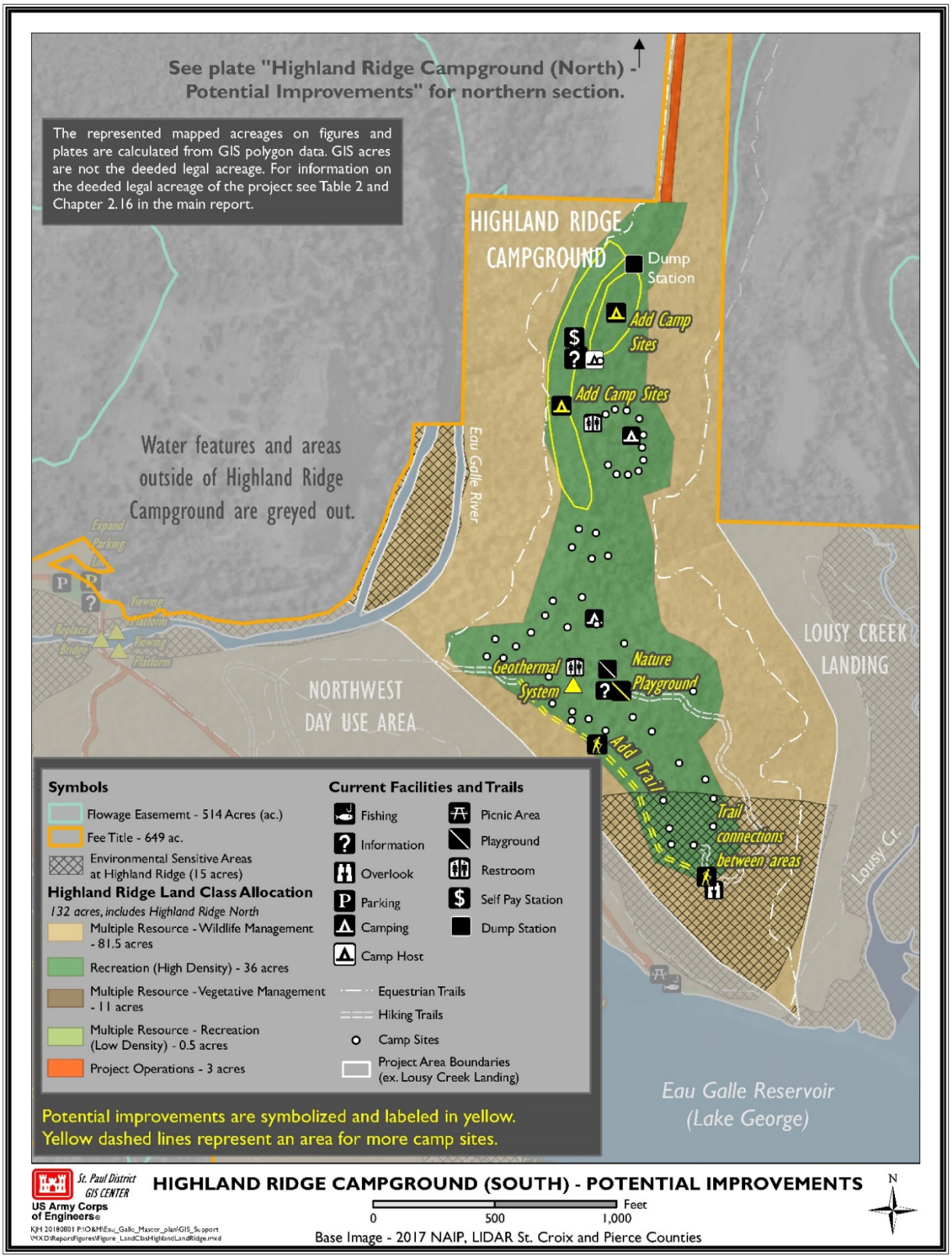

Figure 24. Highland Ridge Campground (South) – potential improvements.

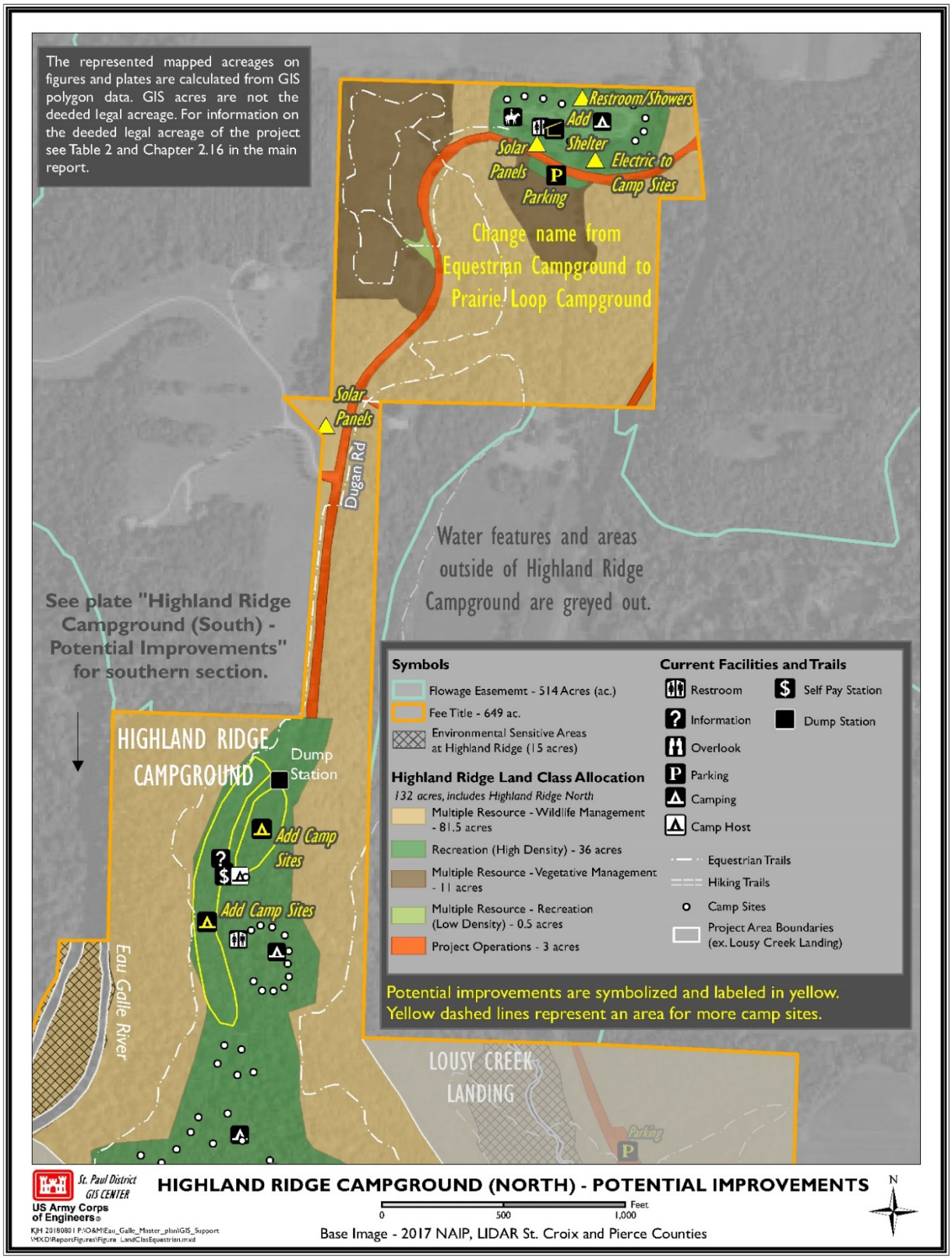

Figure 25. Highland Ridge Campground (North) – potential improvements.

Lousy Creek Landing (Figure 26**)**

- Install a boat dock and fishing pier.
- Replace the boat landing with new planks.
- Add a kayak launch.
- Install an informational kiosk.
- Add a life jacket loaner station at the boat landing.
- Expand existing parking lot.
- Install duck houses.
- Install an osprey platform.

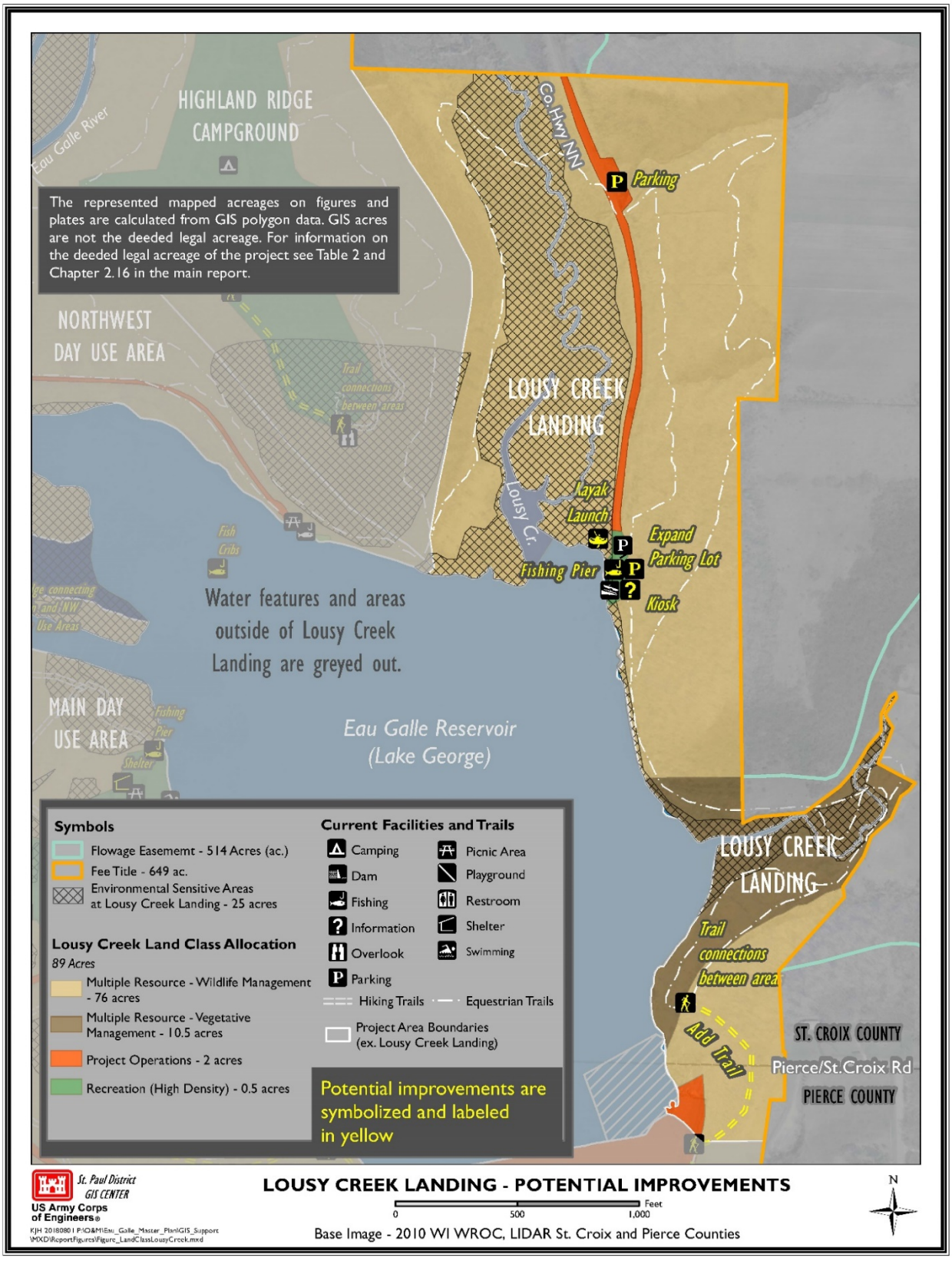

Figure 26. Lousy Creek Landing – potential improvements.

Stilling Basin (Figure 27**)**

- Add trails connecting the village of Spring Valley to the Eau Galle Recreation Area.
- Add additional picnic sites along the river.
- Add a trail along the river.
- Add an informational kiosk that includes information about the Eau Galle Project and history of Spring Valley.
- Install bluebird houses.

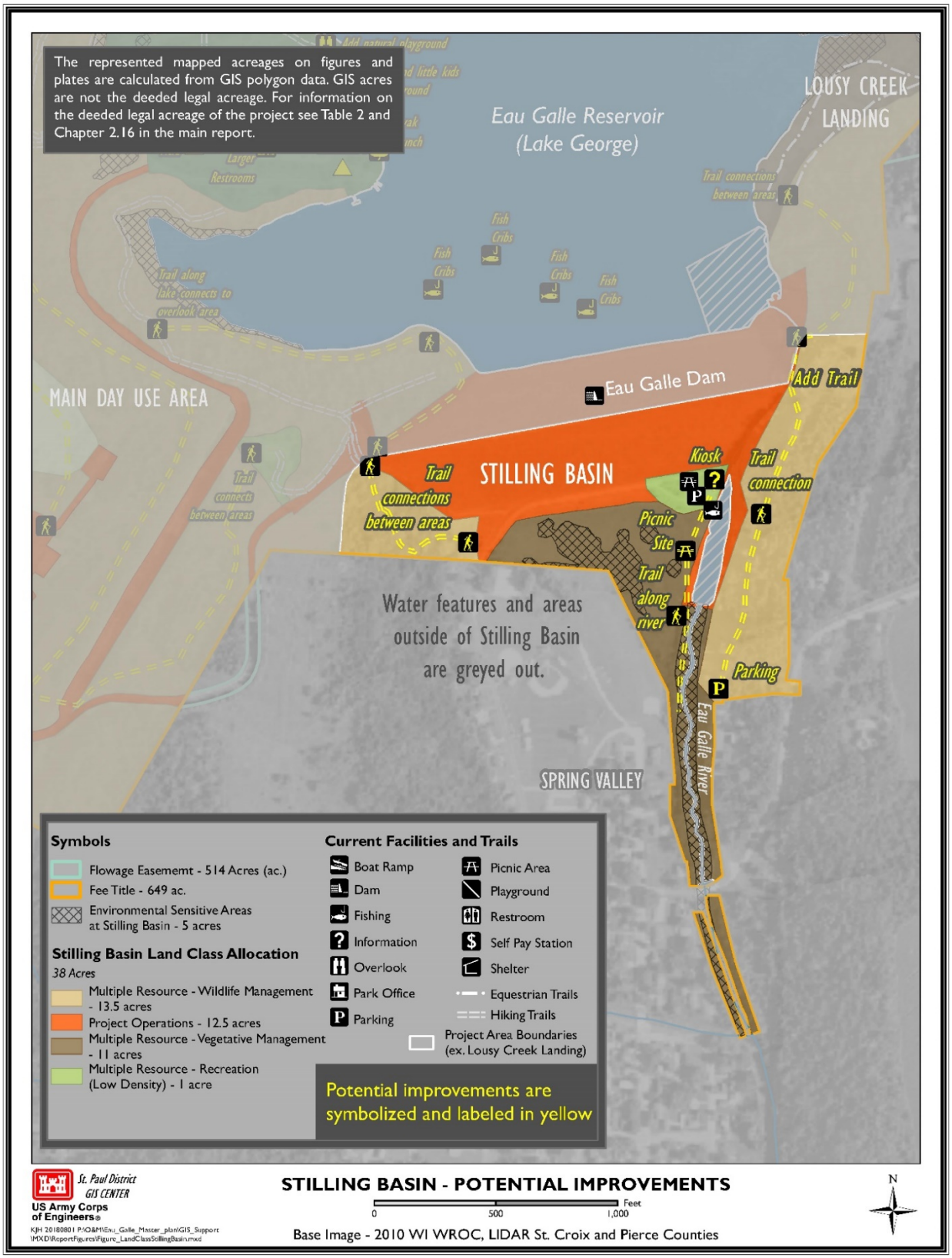

Figure 27. Stilling Basin – potential improvements.

7 Agency and Public Coordination*

In February 2018, the Corps announced its decision to revise the Eau Galle Master Plan, which was last revised in 1990. Throughout the process, the Corps involved the public and coordinated with tribes; federal, state, and local agencies; and communities. The following details the coordination that occurred as part of the master planning process.

7.1 Congressional Notification

Congressional representatives from the area were notified of the update to the Master Plan in February 2018. Copies of the letters can be found in Appendix C.

7.2 Public Coordination

A public scoping meeting was held on April 26, 2018 at the Spring Valley Emergency Services Center in Spring Valley, Wisconsin. The meeting was advertised via the St. Paul District webpage, a news release, and flyers distributed at Eau Galle Recreation Area.

Several different means were used to obtain public and agency input into the master planning process:

- **Webpage:** The Eau Galle Project Master Plan webpage invited comments using an online questionnaire. Fact sheets were posted along with a copy of the previous Master Plan.
- **News Releases:** These releases were mailed to local and state newspapers and radio stations in April 2018 in preparation for the public meeting.
- **Comment Boxes and One-on-One Communication:** Questionnaires and master planning fact sheets were handed out to the public at the Eau Galle Interpretive Building during interpretive programs and at campgrounds, boat ramps, and day use areas from winter 2017 to fall 2018.

Material from the public meeting is located in Appendix C.

Comments were submitted in writing, by email, or online to the Eau Galle Project office. All written and verbal comments received are provided in Appendix C. The following list[5] are issues or concerns identified during the scoping process:

- **Trail System:** Proper maintenance of trails, additional multi-use trails, additional connectivity.
- **Throughout the Project/Miscellaneous:** Make entire Project area smoke-free, offer additional programs by park rangers, provide additional trash cans, add a disc golf course, add primitive camping near the creek, add a dog park or designated dog area, build a waterslide down the dam, restroom upgrades, offer GPS programs, improve access throughout the Project (e.g., bridge from Northwest Day Use Area to Main Day Use Area), provide additional viewing platforms.
- **Highland Ridge Campground:** Make improvements (e.g., turning area, improved fire pits).
- **Equestrian Campground:** Make improvements (e.g., electricity, showers, potable water, additional parking, pens for horses).
- **Environment/Natural Resources:** Add fish cribs, provide invasive species control on land for plants (buckthorn, Tatarian honeysuckle, burdock, garlic mustard, Himalayan blackberry, creeping Charlie, and white sweet clover) and invertebrate animals (earthworms) and in the lake for fish (common carp), include storm water ponds, and balance recreation needs with the natural environment.
- **Northwest Day Use Area:** Offer kayak and canoes rentals ; add small boat launches, a fish cleaning station,

[5] This list in not in order of importance. The list is also not exhaustive but focuses on the issues that were mentioned the most during the scoping and/or were specifically addressed in the Master Plan and EA.

a swimming platform, concessions, a disc golf course, and new and upgraded playground equipment; improve the volleyball court; and build a basketball court.

- **Lousy Creek Landing:** Add a dock.

The comments received throughout the master planning process and from visitor comment cards collected were also translated to Project maps. Plates 12–17 in Appendix B document possible improvements.

The Draft Master Plan and Environmental Assessment was released for 30-day public review and comment (April 15 – May 17, 2019). The plan was posted on the Corps public website and a hard copy was available at the Spring Valley Public Library. One comment was received on the draft report and can be found in Appendix C.

7.3 Agency Coordination

An agency scoping meeting was held on April 26, 2018 at the Eau Galle Project Office in Spring Valley, Wisconsin. The following agencies were represented:

- Wisconsin Department of Natural Resources
- Spring Valley Police Department
- St. Croix Birders
- St. Croix County
- Boy Scouts of St. Croix Valley

Comments were submitted in writing, by email, and in person. Comments were received on a wide range of topics including endangered, threatened, and species of special concern in the state of Wisconsin and invasive species.

The Draft Master Plan and environmental assessment was released for a 30-day public review and comment period (April 15 – May 17, 2019). No comments from agency partners were received.

The Wisconsin State Historic Preservation Office (SHPO) was provided the Draft Master Plan and environmental assessment for comment. No concerns were raised by the SHPO office.

7.4 Tribal Coordination

Please change the paragraph to: The Corps is responsible for consultation with federally recognized tribes that have historical and cultural associations within the Project area. In accordance with 36 CFR 800.3(f)(2) of the Advisory Council on Historic Preservation's regulation implementing Section 106 of the National Historic Preservation Act of 1966, the Corps identified 13 tribes as potentially having historical and cultural associations with the Project's geographic location. An official letter was mailed to the Tribal Historic Preservation Officers (THPO) on January 26, 2018 detailing the Master Plan and requesting tribal comments. Of these 13 THPOs, the Upper Sioux Community and Mille Lacs Band requested to be consulting parties. Information in connection with the Master Plan and environmental assessment continued to be provided to both Tribal communities. No concerns were raised by THPO offices.

8 Summary of Recommendations*

The Eau Galle Project Master Plan conceptually establishes and guides the orderly administration, maintenance, preservation, enhancement, and management of all natural, cultural, and recreational resources at the Eau Galle Project. This plan is stewardship-driven, seeking to balance recreational development and use with protection and conservation of natural and cultural resources. Changes in population, demographics, recreation, climate, flora, and fauna are some of the influences affecting the resources, management decisions, and land use around the Eau Galle Project.

The following subsections describe focal points to assist the Corps when facing future challenges. The goals outlined in Section 3, Management Goals and Resource Objectives* define how the Corps plans to manage its lands and resources. These goals are conceptual, whereas implementation details will be provided in the Eau Galle Project's Operation Management Plan. Implementation of these recommendations requires time, manpower, and budget.

8.1 Monitor Changed Land Classifications

This Master Plan includes minor changes to land classifications. The majority of the acreage changes occurred due to changes in classification categories required by current Corps' regulations. Through updated mapping technology, the Corps was able to re-evaluate managed lands to determine the proper land classifications. A comparison of land classifications between the 1990 Master Plan and this Master Plan can be found in section 3 of the EA (Appendix A). Additional changes include recognizing the dynamic demands and needs of visitors and modernization.

8.2 Build Partnerships and Recruit Volunteers

The Corps must continue to build partnerships and develop opportunities for volunteers to sustain a high standard of service and expand programs within its authorized missions. The Corps must work with local, state, and other federal agencies, special interest groups, and individuals towards common goals. These goals can involve growing community events, expanding recreation opportunities, combating invasive species, and planning watershed based efforts to improve water quality. Partnerships and volunteering efforts provide benefits to all parties involved and, by collectively sharing knowledge and resources, all parties involved can do more with less.

8.3 Modernize Recreation Facilities

One of the goals of the Master Plan is to determine the appropriate balance between recreational development and protection of the resources. Modernization of recreation facilities provides people better access to water and more opportunities to enjoy the outdoors. The management goals and objectives outlined in section 3 provide both traditional and nontraditional users the chance to connect to the environment. They also help attract a more diverse user base so more people can benefit from accessing federal lands. Modernization of recreation facilities allows the Corps to adapt to the ever-changing recreation trends and demands, while better protecting the resources.

8.4 Further Management Studies

Further studies should focus on management of the Eau Galle Project and be conducted by staff. The Corps would need to work closely with its partners to determine a more in-depth natural resource inventory on Project lands, (e.g., vegetation and timber stand inventories). Once inventories are established, the Corps can develop plans to better manage lands for wildlife. A recreational carrying capacity study would help determine if existing visitation rates create an appropriate balance between recreation and environmental stewardship and identify what effects additional visitation may have on wildlife.

9 Bibliography*

Blikre, L. (2017). *Inensive Phase 1 Cultural Resources Survey of Portions of the Eau Galle Recreation Area.*

Brown, A. (1971). History of Pierce County and Spring Valley, Wisconsin. *History of Pierce County and Spring Valley, Wisconsin. Pierce County Heritage, Volume 1*. Bay City, Wisconsin : Pierce County Historical Society.

Core Writing Team, P. R. (2007). *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Geneva : IPCC.

Don Vogtman Associates. (1974).

Fries, R. (1951). *Empire in Pine: The Story of Lumbering in Wisconsin, 1830-1900.* State Historical Society of Wisconsin.

Langton, J. (1978). *Soil Survey of St. Croix County, Wisconsin.* Washington: U.S. Department of Agriculture.

National Resources Conservation Service. (2015). Soil Survey of St. Croix County, Wisconsin. Washington, D.C.

Natural Resources Conservation Service. (2008). *Rapid Watershed Assessment Lower Chippewa River Watershed.* U.S. Department of Agriculture.

Reed, S. D. (2016). *Wetland Plants and Plant Communities of Minnesota and Wisconsin, Version 3.2.*

U.S. Army Corps of Engineers. (2003). *Water Control Manual, Eau Galle Project.*

U.S. Army Corps of Engineers. (2015). *Recent US Climate Change and Hydrology Literature Applicable to US Army Corps of Engineers Missions - Water Resources Region 07, Upper Mississippi.* Washington, D.C.: U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers. (2017). *Value to the Nation Fast Facts.* Retrieved from http://www.corpsresults.us/recreation/fastfacts/lake.cfml?LakeID=129

U.S. Census Bureau. (2018, August 1). *American Fact Finder*. Retrieved from https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2016/.

U.S. Fish and Wildlife Service. (2015). *Birds of Special Concern*. Retrieved from https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

U.S. Fish and Wildlife Service. (2018). *2018 Information for Planning and Conservations*. Retrieved from https://ecos.fws.gov/ipac/

USA Government. (2017). *Recreation.gov*. Retrieved from https://www.recreation.gov/search?q=eau%20galle

Wisconsin Department of Natural Resourced. (2012, January 23). *Ecological Landscapes of Wisconsin*. Retrieved from https://dnr.wi.gov/topic/Landscapes/

Wisconsin Department of Natural Resources. (2010, 3 16). *Wisconsin Department of Natural Resources*. Retrieved from https://dnr.wi.gov/water/impairedDetail.aspx?key=15610

Wisconsin Department of Natural Resources. (2012). *Wisconsin Statewide Comprehensive Outdoor Recreation Plan*. Retrieved from https://dnr.wi.gov/topic/Lands/scorp/SCORP2011.html

Wisconsin Department of Natural Resources. (2018, May 8). Retrieved from https://dnr.wi.gov/news/weekly/article/?id=4254

Wisconsin Department of Natural Resources. (2018, July 13). *Natural Heritage Inventory*. Retrieved from https://dnr.wi.gov/topic/nhi/

Wisconsin Department of Natural Resources. (2019). Retrieved from https://dnr.wi.gov/lakes/waterquality/Station.aspx?id=483073

Wisconsin Department of Natural Resources. (2019). *Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2019-2013.* Wisconsin Department of Natural Resources.

10 Authorship

A Corps interdisciplinary team developed this Master Plan with input from local, state, and federal agencies; tribal representatives; and the public. The team consisted of the following personnel:

District Personnel	**Area of Expertise**
Brad Labadie	Natural Resource Specialist
William Schmidt	Natural Resource Specialist
Katie Opsahl	Planner
Kevin Sommerland	Real Estate
Jonathan Sobiech	Biologist, NEPA
Vanessa Alberto	Archaeologist and Tribal Liaison
Kevin Hanson	GIS

Input from outside the Corps helped identify significant resources, problems and opportunities, and resource objectives. The authors of this document are grateful for the participation of all parties in the document development process.

Acronyms and Abbreviations

AEP – annual exceedance probability

BEACH Act – Beaches Environmental Assessment and Coastal Health Act

BCC – birds of conservation concern

cfs – cubic feet per second

cfu – colony forming units

Corps – U.S. Army Corps of Engineers

EA – Environmental Assessment

EAB – emerald ash borer

EIS – Environmental Impact Statement

EM – Engineer Manual

EP – Engineer Pamphlet

EPA – Environmental Protection Agency

ER – Engineer Regulation

ESA – Endangered Species Act

ESA – environmentally sensitive areas

FONSI – Finding of No Significant Impact

FRM – flood risk management

GIS – geographic information system

HPMP – Historic Properties Management Plan

ISOP – Interpretive Services and Outreach Program

mL – milliliter

MSIM – multiple species inventory and monitoring

MVD – Mississippi Valley Division

NEPA – National Environmental Policy Act

NGVD – National Geodetic Vertical Datum

NRHP – National Register of Historic Places

OMP – Operational Management Plan

SCORP – Wisconsin Statewide Comprehensive Outdoor Recreation Plan

TSI – trophic state index

USACE – U.S. Army Corps of Engineers

USGS – U.S. Geological Survey

USFWS – U.S. Fish and Wildlife Service

WIDNR – Wisconsin Department of Natural Resources

WSHPO – Wisconsin Historic Preservation Office

Ya – years ago