REND LAKE
MASTER PLAN - 2018

BIG MUDDY RIVER WATERSHED
BENTON, ILLINOIS

CHAPTER 1
INTRODUCTION

1.1. PROJECT AUTHORIZATION

Rend Lake on the Big Muddy River, Illinois, was authorized by the Flood Control Act of 23 October 1962, Public Law (PL) 87-874, 87th Congress, House Resolution (HR) No. 13273, in accordance with the Chief of Engineers' recommendation, contained in House Document No. 541, 87th Congress, Second Session.

1.2. PROJECT PURPOSES

The authorized project purposes for Rend Lake are:

A. Flood Risk Management. Authorized by Public Law (PL) 75-761, June 28, 1938, Flood Control Act of 1938 and PL 85-500, July 3, 1958, Flood Control Act of 1958 (Title II). The primary mission of Flood Risk Management is to save lives and reduce property damage associated with storms and floods.

B. Water Supply. Authorized by PL 85-500, July 3, 1958, Water Supply Act of 1958 (Title III). The primary mission of water supply is to develop, control, maintain, and conserve the Nation’s water resources.

C. Water Quality. Authorized by PL 78-534, December 22, 1944, Flood Control Act of 1944. The primary mission of water quality is silt control, soil erosion prevention, pollution abatement, improving water quality for municipal water supplies, recreation and fish and wildlife conservation.

D. Fish & Wildlife Conservation. Authorized by PL 85-500, July 3, 1958. The primary mission of fish & wildlife conservation 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.

E. Recreation. Authorized by PL 78-534, December 2, 1944, Flood Control Act of 1944 and PL 85-500, River and Harbor Act, Title 1. The primary mission of recreation is to provide a sustainable level of high quality water-oriented outdoor recreation opportunities within a safe and healthful environment that meets the needs of present and future generations.

F. Area Redevelopment. Authorized by 13 CFR 301, January 2, 1963, Area Redevelopment Administration, Department of Commerce,

A complete list of Legislative Acts and Public Laws associated with the authorized project purposes for Rend Lake can be found in **Chapter 2.15**

1.3. PURPOSE AND SCOPE OF MASTER PLAN

This Master Plan update was developed in accordance with guidance contained in Engineering Regulation (ER) 1130-2-550, Recreation Operations and Maintenance Policies and Engineering Pamphlet (EP) 1130-2-550, Recreation Operations and Maintenance Guidance and Procedures, Chapter 3, both dated 30 Jan 2013.

The Master Plan is the strategic land use management document that guides the comprehensive management and development of all recreational, natural and cultural resources located on fee and easement lands and water at Rend Lake

The Master Plan guides and articulates US Army Corps of Engineers (USACE) responsibilities pursuant to Federal Laws to preserve, conserve, restore, maintain, manage and develop project lands, waters and associated resources. The Master Plan is a dynamic operational document projecting what could and should happen over the life of the project and is flexible based upon changing conditions. The Master Plan deals in concepts, not in details, of design or administration. Detailed management and administration functions are addressed in the Operational Management Plan (OMP), which implements the concepts of the Master Plan into operational actions.

USACE Environmental Operating Principals were used as an overarching guide in developing this Master Plan update. The Environmental Operating Principals[1] are:

A. Foster sustainability as a way of life throughout the organization.

[1] USACE Environmental Operating Principals, 2012

B. Proactively consider environmental consequences of all USACE activities and act accordingly.
C. Create mutually supporting economic and environmentally sustainable solutions.
D. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the USACE, which may impact human and natural environments.
E. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
F. Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
G. Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

A Master Plan is developed and kept current for all Civil Works projects operated and maintained by the USACE and includes all land and water (fee, easement, or other interests) originally acquired for the project and any subsequent land and water (fee, easement, or other interests) acquired to support the operations and authorized purposes of the project.

The Master Plan is not intended to address the specifics of regional water quality, shoreline management, or water level management. These activities are covered in other project plans. However, specific issues identified through the Master Plan update process can still be communicated and coordinated with the appropriate internal USACE entities or external resource agencies.

1.4. WATERSHED & PROJECT DESCRIPTION

1.4.1. Watershed Description

A. Big Muddy River Watershed[2]

The Big Muddy River Watershed is located in Southern Illinois and encompasses a drainage area of approximately 2,390 square miles within the following counties:

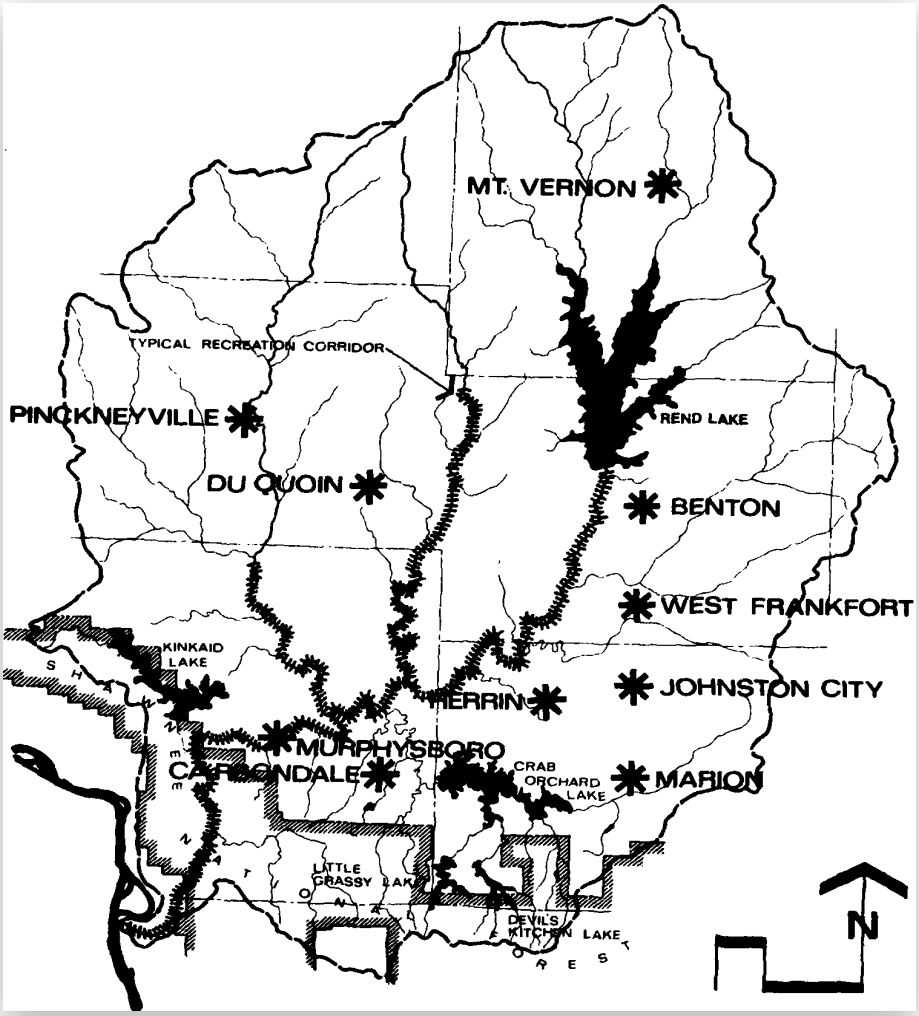
- Franklin
- Jackson

[2] Wikipedia

- Jefferson
- Marion
- Perry
- Union
- Washington
- Williamson

Figure 1-1 is a map depicting the Big Muddy River Watershed.

Figure 1-1: Big Muddy River Watershed Map[3]



[3] Map from Rend Lake EIS, 1974

The Big Muddy River originates in Jefferson County, southeast of Centralia, Illinois and flows southward for approximately 156 miles, where it joins the Mississippi River, just south of Grand Tower, Illinois in Jackson County. Major tributaries of the Big Muddy River include:

- Beaucoup Creek
- Little Muddy River
- Casey Creek
- Middle Fork of the Big Muddy
- Crab Orchard Creek

Lakes and reservoirs within the Big Muddy River Watershed include:

- Kinkaid Lake (2,750 surface acres)
- Rend Lake (18,000 surface acres)
- Crab Orchard Lake (6,965 surface acres)
- Devil's Kitchen Lake (810 surface acres)
- Little Grassy Lake (1,200 surface acres)
- Cedar Lake (1,750 surface acres)

The watershed of the Big Muddy was covered by the Illinoian Glacier, about 300,000 to 132,000 years before present. The Big Muddy basin formed after the retreat of that glacier. However, the Big Muddy was not covered by the Wisconsin Glacier, about 70,000 to 10,000 years before present.

During the Wisconsin Glacier, the level of the Mississippi River was much higher. Water backed up into the Big Muddy Basin, forming a large lake. The lake silted in, forming a flat bottom. After the melting of the Wisconsin Glacier, the level of the Mississippi dropped, allowing the lake to drain. A new channel slowly formed as it meandered through the ancient lake bed. This is why the Big Muddy River has a mud bottom for most of its length.

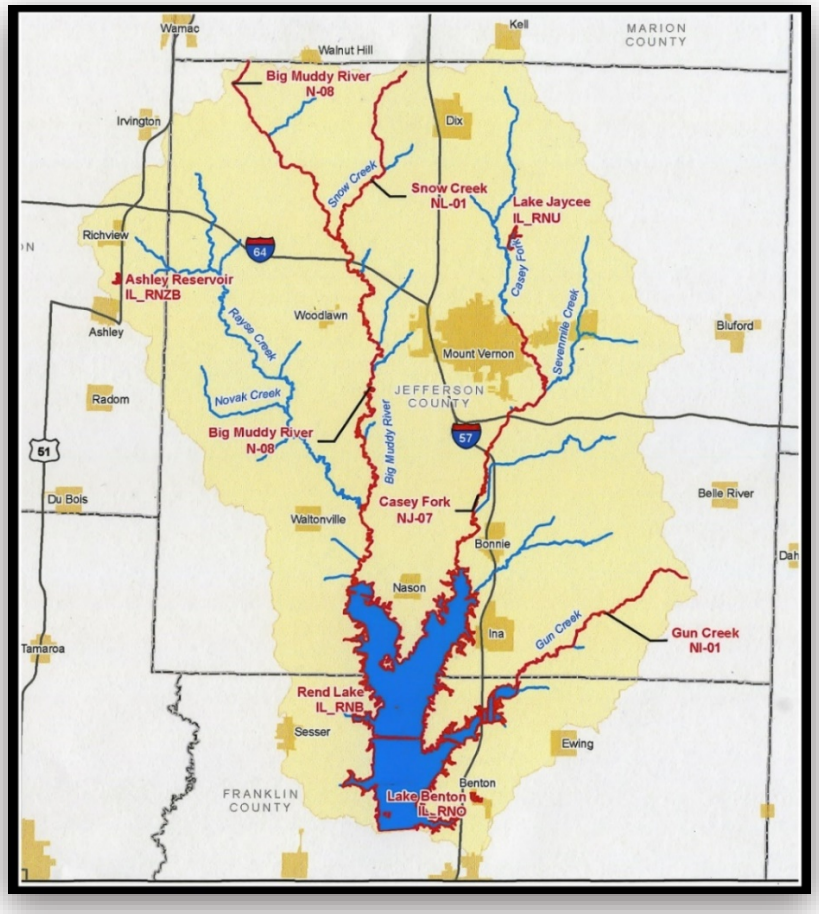
Much of the ancient lake bed was swamp: a forested area that was covered by water for most of the winter and during wet summers. When the Big Muddy flooded, the water covered the flat bottom of the ancient lake bed for miles in either direction from its meandering channel.

B. Rend Lake Watershed[4]

The Rend Lake Watershed **(Figure 1-2)** is located in south-central Illinois. It flows generally in a southerly direction and drains approximately 311,000 acres, located in the following four counties:

- Jefferson County 258,500 acres (83%)
- Franklin County 40,100 acres (13%)
- Washington County 11,400 acres (3.7%)
- Marion County 1,050 acres (0.3%)

Figure 1-2: Map of Rend Lake Watershed



[4] Rend Lake Watershed TMDL Final Report for USEPA Review, CDM Smith, July 2017

Elevation within the watershed ranges from 642.0 feet NGVD (National Geodetic Vertical Datum) in the northern portion of the watershed to 396.0 feet NGVD at the outfall of the Rend Lake dam at the southern extent of the watershed.

Approximately 37,400 people reside within the Rend Lake Watershed and the average precipitation is approximately 41.1 inches per year.

Land cover data for the watershed indicate the largest percentage of watershed area is used for crop production (35%). Approximately 27% of the watershed area is forest and 20% of the watershed area is pasture. **Table 1-1,** provides a breakdown of Land Cover and Use in the Rend Lake Watershed.

Table 1-1: Land Cover and Use in Rend Lake Watershed[5]

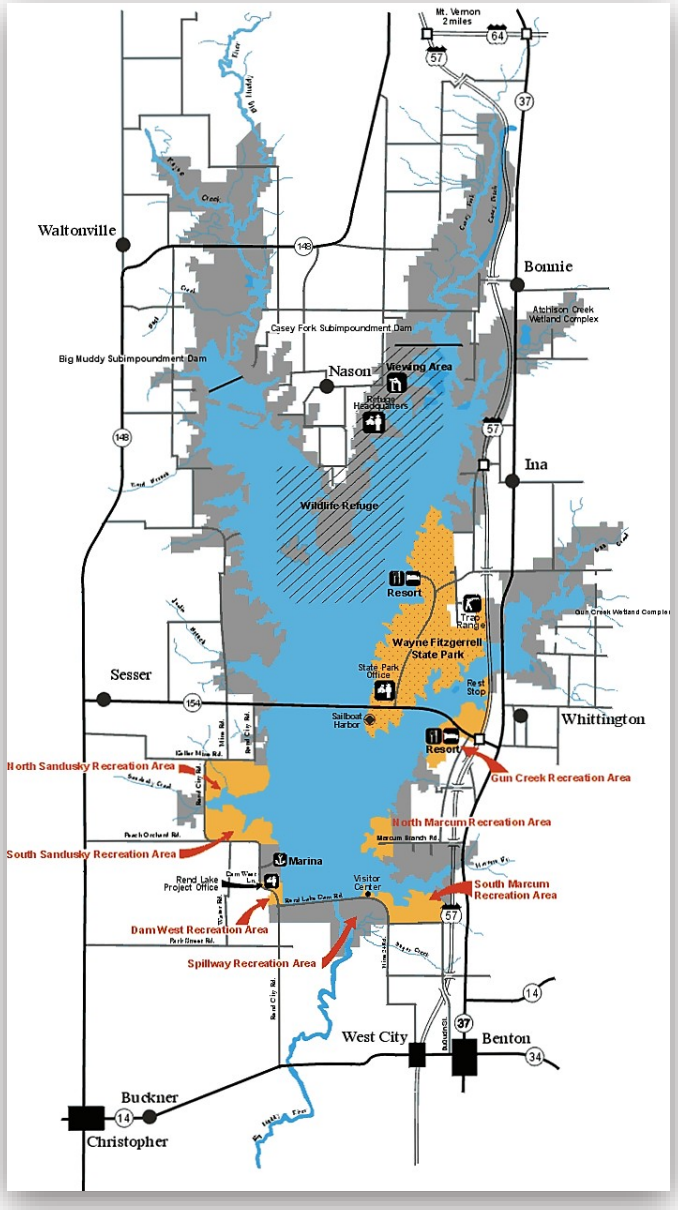
Land Cover Category	Area (Acres)	Percentage
Deciduous Forest	84,804	27.3%
Pasture/Hay	62,800	20.2%
Soybeans	46,504	14.9%
Corn	42,479	13.7%
Open Water	23,531	7.6%
Developed/Open Space	20,226	6.5%
Winter Wheat/Soybeans	13,615	4.4%
Developed/Low Intensity	9,699	3.1%
Other	7,481	2.4%
TOTAL	**311,139**	**100%**

1.4.2. Project Description

Rend Lake is located in Franklin and Jefferson counties, about three miles northwest of Benton, Illinois. The dam is located on the Big Muddy River, 103.7 miles upstream from its confluence with the Mississippi River. See **Figure 1-3** for a map of Rend Lake.

[5] Big Muddy TMDL Report, Illinois Environmental Protection Agency, Bureau of Water, 2004

Figure 1-3: Map of Rend Lake



The Rend Lake project is comprised of 40,840 acres of land and water, of which 40,153 acres is owned in fee title and 687 acres is flowage easement land. The lake has a water surface area of 20,633 acres at the normal operating pool elevation of 405.0 feet NGVD. At this pool elevation the shoreline of the lake is approximately 162 miles; and extends upstream from the dam approximately 13 miles. About 3.5 miles above the main dam, Illinois State Route 154 crosses the lake. Approximately 10 miles above the main dam are two sub-impoundment dams; one on the Big Muddy River and the other on the Casey Fork River. These sub impoundment dams are used for regulating water levels for fish and wildlife management activities.

The lake width varies from 1.5 to 3 miles. The depth of the lake is fairly shallow, with a maximum depth of about 35 feet near the main dam, when the pool elevation is at 405.0 feet NGVD.

The Rend Lake project contains 53 recreation areas, with 756 campsites, 104

picnic sites, 30 boat ramps, 235 marina slips and over 34 miles of trails. Each year, on average, over two-million people visit the lake, which annually generates nearly $35 million in visitor spending within 30-miles of the project.[6]

1.5. LISTING OF PRIOR DESIGN MEMORANDA (DM)

This Master Plan (2018) replaces all previous Master Plans and Master Plan updates for Rend Lake. The original Master Plan was approved in January 1966 and revised in 1976. The plan was updated in 1983, 1993, 2009 and 2018. **Table 1-2**, provides a summary of previous Master Plans, Supplements and Letter Reports for Rend Lake.

Table 1-2: Previous Master Plans, Supplements, Letter Reports and Approval Dates

Master Plan Year	Supplement/ Letter Report Number	Title & Brief Description	Date Approved
1964		Preliminary Master Plan	1 Jul 1964
1966		Original Master Plan	Jan 1966
1966	LR-1	Request for Change in Land Use - The change was necessitated by a need for more land by the Rend Lake Conservancy District (RLCD). The land was to be used for the Intercity Water Transmission System Treatment Plant, and the administrative complex for RLCD.	30 Oct 1967
1966	LR-2	Request for Change in Land Use - A small tract adjacent to the location of the Intercity Water Treatment complex was required by RLCD for their administration building.	16 Feb 1968
1966	Suppl. No.1	Proposed the excavation, shaping, and protection of nine selected boat harbor sites. The work was required to ensure adequate and safe mooring and maneuvering areas for commercial concession operations.	26 Feb 1970

[6] USACE – Value to the Nation website

Master Plan Year	Supplement/ Letter Report Number	Title & Brief Description	Date Approved
1966	Suppl. No. 2	Proposed the installation of certain facilities at the commercial concession site in the West Recreation Area. The facilities proposed were of a non-revenue producing nature, and were needed to attract a concession operator capable of developing a first-rate commercial marina operation.	28 Jan 1972
1966	Suppl. No. 3	Proposed installation of basic non-revenue producing facilities at the commercial concession site located in the Jackie Branch Recreation Area	24 Oct 1972
1966	Suppl. No. 4	Proposed construction of miscellaneous facilities, upgrading of sanitary facilities, and modification of some existing facilities at the South Sandusky and the North Sandusky recreation areas. Major improvements included: Fifty additional campsites, conversion of three picnic shelters to group use, construction of two washhouses, a sewage treatment system and distribution lines, and electric services to 250 campsites.	7 Sep 1973
1966	Suppl. No. 5	Proposed a change in land use to" Recreation – Intensive Use" for approximately 90 acres of land near the City of Ina, on the northeastern shore of the lake. The requested classification was "Recreation - Intensive Use." In addition, it requested provisions for a commercial concession site to include some boat harbor excavation work.	26 Mar 1974

Master Plan Year	Supplement/ Letter Report Number	Title & Brief Description	Date Approved
1966	Suppl. No. 6	Proposed improving certain access roadways for North and South Sandusky, North Marcum recreation areas, and the Casey Fork Wildlife Management Area. Existing county roadways were considered inadequate and unsafe for recreation traffic. Franklin and Jefferson Counties agreed to furnish all rights-of-way, relocate utilities as necessary, establish turf, remove and replace culverts, apply striping and maintain the roads after construction.	4 Apr 1975
1966	Suppl. No. 7	Proposed the development of a visitor center in the Spillway Recreation Area and the provision of campsite electrical units in the South Marcum Recreation Area.	5 Jan 1977
1976		Revised Master Plan	1976
1976	Suppl. No. 1	Provided an update of all obsolete material in the main text of the Master Plan and revised the site plan drawings to reflect the current as-built conditions.	22 Jul 1983
1976	Suppl. No. 2	Proposed modification of three comfort stations in the Sandusky Creek Area to provide shower facilities; construction of a new shower building and pressure sewer system in the South Marcum Recreation Area; converting Sleepy Hollow Youth Area comfort station at South Marcum to waterborne and construction of an adjoining shower addition.	9 Sep 1988
1976	Suppl. No. 3	Proposed the restoration of high-quality wetland habitat in the Atchison Creek area of Rend Lake with placement of an earthen dike and water control structure.	28 Jul 1992
1993		Updated Master Plan	1993

Master Plan Year	Supplement/ Letter Report Number	Title & Brief Description	Date Approved
1993	Suppl. No. 1	Proposed the restoration of high-quality wetland habitat in the Big Muddy River Floodplain near the Rend City area of Rend Lake with the placement of earthen dikes and water control structures.	16 May 1995
1993	Suppl. No. 2	Proposed the connection of the North Marcum sewer line to the RLCD sewer line which was installed on adjacent private land.	25 Aug 1995
1993	Suppl. No. 3	Proposed the construction of a 23 mile bicycle trail around Rend Lake, with 13.5 miles located on Corps property.	22 Feb 1999
1993	Suppl. No. 4	Proposed sanitary facilities, fee booths, and the addition of 37 sewer and water hookups in several recreation areas.	29 Sep 2000
2009		Master Plan Update	23 Dec 2009
2009	Suppl. No. 1	Proposed construction of up to twenty Volunteer Village campsites in South Marcum CG; Rend Lake Resort expansion to include restaurant expansion, outdoor dining area, outdoor event area and construction of a Boatel (a building that will contain approximately twelve double bedroom units and six kitchenette's; potential future development of the Ina Recreation Area as a Resort and Marina Complex; and expansion of disc golf course to 18 holes, and removal of shelters #4 & #5	Jan 2014

1.6. LISTING OF PERTINENT PROJECT INFORMATION

Table 1-3, provides a listing of pertinent project information. ***Please note under the "Lake" section in Table 1-3, storage acre-feet and Joint Use Pool, acres, has been adjusted to reflect the findings from the 2009 Sedimentation Re-survey for Rend Lake and more accurate measurements obtained from use of GIS data.***

TABLE 1-3: Pertinent Project Information

General	
Location of Dam	
Stream	Big Muddy, Illinois
River mile, above mouth	103.7
County	Franklin
Nearest town	Benton, Illinois
Location of Lake	
River mile above mouth	103.7 to 120
Counties	Franklin and Jefferson
Drainage area	
Upstream from dam site (sq. mi.)	488
Upstream from mouth (sq. mi.)	2,360
Lake	
Inactive pool	
Top elevation, feet NGVD	391.3
Area, acres	5,400
Storage, acre-feet	21,837
Depth of water, maximum	21
Joint-use pool	
Top elevation, feet NGVD	405.0
Area, acres	20,633
Total joint-use storage, acre-feet	154,560
Water supply storage, acre-feet	109,000
Depth of water, maximum	35
Shoreline, miles	162
Flood Control Pool	
Top elevation, feet NGVD	410
Area, acres	24,000
Storage, acre feet	115,540
Depth of water, maximum	40
Shoreline, miles	219
Main Dam	
Type	Earth fill dam
Elevation, top of dam, feet NGVD	424.0
Height above streambed, feet	54
Length of crest, feet	10,600

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Main spillway	
Type	Concrete, ungated
Width, feet	435
Elevation of crest, feet NGVD *	410
Channel Bridge length, feet	605
*31-foot notch at elevation 405 feet NGVD	
Auxiliary Spillway	
Type	Concrete crest, ungated
Width, feet	800
Elevation of crest, feet NGVD	415
Outlet Works	
Size, feet	Double 4 x 6 reinforced concrete box
Flowline, feet NGVD	373.5
Sub impoundment Dams	
Big Muddy	
Type	Earth fill dam with ungated overflow section
Total length, feet	3,740
Overflow length, feet	2,435
Non-overflow section, feet NGVD	416.0
Overflow section, feet NGVD	412.0
Outlet conduit, feet	8 x 8 reinforced concrete box
Flowline of conduit, feet NGVD	396.2
Casey Fork	
Type	Earth fill dam with ungated overflow section
Total length, feet	7,650
Overflow length, feet	4,485
Non-overflow section, feet NGVD	416.0
Overflow section, feet NGVD	412.0
Outlet conduit, feet	6 x 6 reinforced concrete box
Flowline of conduit, feet NGVD	396.2
Approximate fee-taking line, feet NGVD	410 + 300 feet horizontal or 416, whichever is higher
Project Acreage	40, 843
Project Boundary Line Length, miles	121

CHAPTER 2
PROJECT SETTING & FACTORS INFLUENCING MANAGEMENT & DEVELOPMENT

2.1. DESCRIPTION OF RESERVOIR

Rend Lake is located in Southern Illinois at river mile 103.7 on the Big Muddy River, upstream from its confluence with the Mississippi River and about three miles northwest of Benton, Illinois. The lake is located in Franklin and Jefferson Counties. Rend Lake is the second largest man-made lake in the state and is approximately 13 miles long and 1.5 to 3 miles wide and has approximately 20,633 surface acres at elevation 405.0 feet NGVD, which is the top of the Joint-use pool. At this elevation, there are 162 miles of shoreline and approximately 19,480 acres of public land associated with the project.

Approximately 3.5 miles upstream from the main dam, the lake is intersected by Illinois State Route 154, which includes three bridges that provide boating access between the upper and lower portions of the lake. Approximately 10 miles upstream from the main dam are two sub-impoundment dams; one across the Big Muddy River, the other across Casey Fork Creek, the two major tributaries of the lake. The primary purpose for these sub-impoundment dams is enhancement of fish and wildlife management activities.

2.2. HYDROLOGY (Surface Water & Groundwater)

Rend Lake encompasses portions of Franklin and Jefferson Counties in Southern Illinois. The majority of ground water in Southern Illinois is supplied by rain and snow that permeates into the ground. The primary geologic features relating to hydrology, are deposits of sand and gravel and from glacial deposits.

Groundwater for domestic and farm purposes is fairly easily obtainable by drilling wells into the sand/gravel deposits or bedrock. However, likelihood of obtaining water supplies for municipal or industrial purposes from groundwater sources is considered to be poor to fair.

There is virtually no municipal or industrial use of groundwater in the area because of the abundant water supply provided by Rend Lake, which serves as the major municipal water supply for approximately 300,000 residents in Southern Illinois. This water supply system is managed by the Rend Lake Conservancy District (RLCD), which is the largest public water supply system (1,800 square miles) in the State of Illinois and draws nearly 13 million gallons of water per day from Rend Lake. Also, the lake provides industrial water supply for a coal mine in the area, which is managed by Adena Resources.

Primary surface streams, tributaries and rivers that flow into Rend Lake include:

- Big Muddy River
- Casey Fork Creek
- Hurricane Creek
- Jackie Branch Creek
- Gun Creek
- Rayse Creek
- Buck Creek
- Ward Branch Creek
- Sandusky Creek
- Marcum Branch Creek

2.3. SEDIMENTATION AND SHORELINE EROSION

2.3.1. Sedimentation[7]

Sedimentation is the natural process in which material (such as stones, soil, and sand) is carried to the bottom of a body of water and forms a solid layer. The initial sedimentation survey for Rend Lake occurred between May 1969 and January 1971. Since then, sediment resurveys were performed in 1974, 1980, 1986 and 2009.

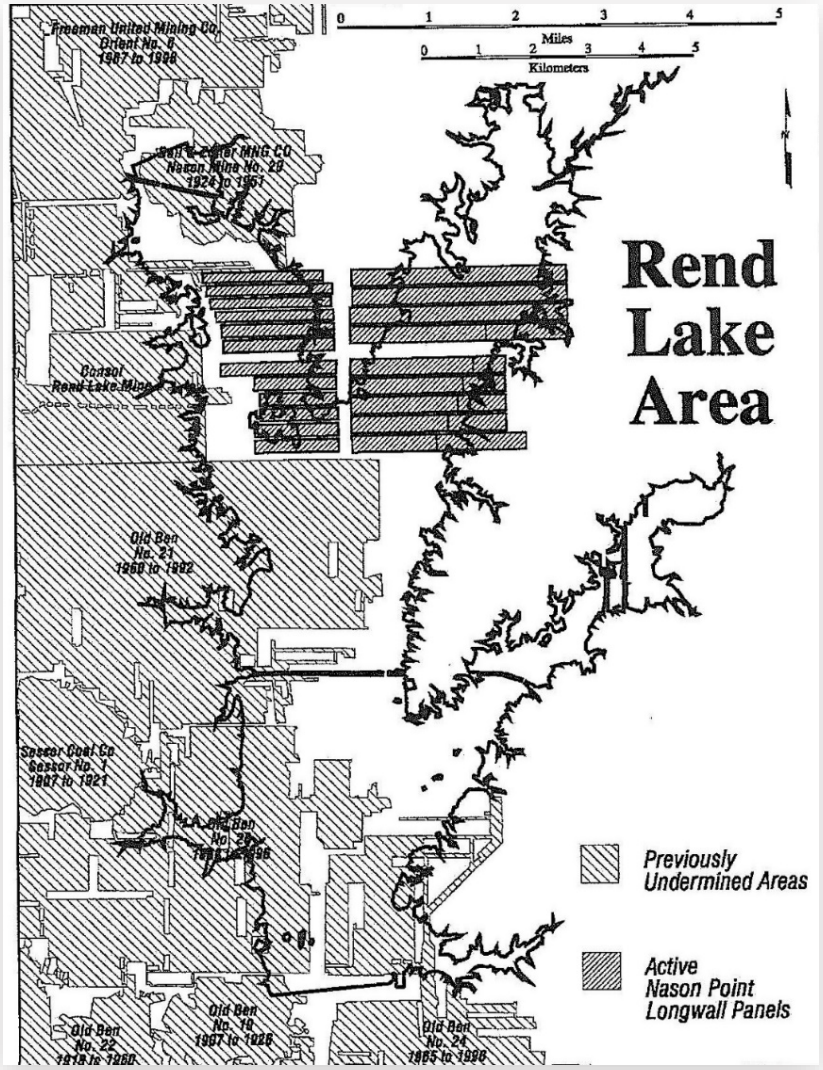
There are 23 sediment ranges established for Rend Lake that are used during sedimentation surveys and resurveys to measure the amount of sediment deposition that has occurred since the previous survey. By measuring the sediment at these sites the approximate rate of deposition can be determined and impacts to storage capacity can then be established and forecast.

At Rend Lake, obtaining precise measurements on the amount and rate of sedimentation is complicated because there are numerous coal mines that underlie the lake, which over time have collapsed, thus allowing an increase in storage capacity of the reservoir. This process is known as subsidence**. Figure**

[7] Rend Lake – Report of Sedimentation 2009 Resurvey, USACE, St. Louis District, September 27, 2010

2-1 is a diagram depicting the location of underground mines in the Rend Lake Area. As can be seen in the diagram, much of Rend Lake has underlying mines, where potential exists for subsidence to occur. When subsidence occurs under the lake, it increases the storage capacity of the reservoir.

Figure 2-1: Historical Underground Mining in the Rend Lake Area[8]

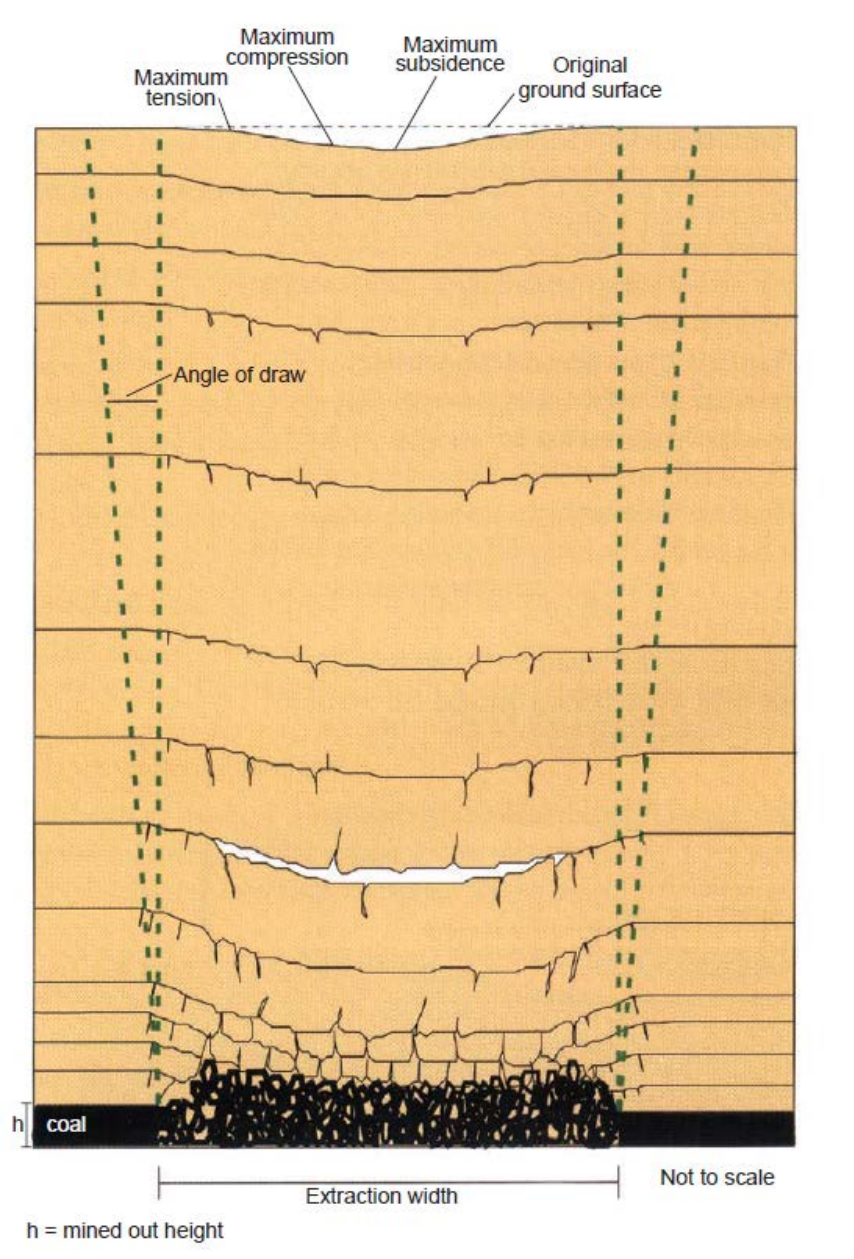


The two primary forces impacting the storage capacity of the lake are sedimentation (which reduces storage capacity) and subsidence (which increases storage capacity). A diagram depicting the process of subsidence is shown in **Figure 2-2.**

The most accurate assessment for determining the amount and rate of sedimentation in Rend Lake is to compare the data from the initial sedimentation survey from 1970 to the sedimentation resurvey in 2009. **Table 2-1** summarizes

[8] Longwall Mining Under a Public Lake and Wildlife Refuge: Planning for subsidence Impacts, Daniel Barkley, 2000

Figure 2-2: Diagram Depicting Subsidence[9]



the change in storage capacity from 1970 to 2009 for the various pools, main reservoir, and sub-impoundments. A period of 38.8 years was used in the calculations.

Because of apparent subsidence in some reaches of the main reservoir, it is impossible to accurately ascertain the actual amount of sediment accumulation that has occurred. For the total reservoir, the 2009 sedimentation resurvey indicates a rate of increase in storage capacity of approximately 204 acre-feet per year, while the predicted rate of sediment deposition (loss of storage) is approximately 244 acre-feet per year.

For the Casey Fork sub-impoundment, the computed sedimentation rate of 1 acre-foot per year, is much less than the expected rate of 49 acre-feet per year. For the Big Muddy sub-

[9] (Peng and Chiang 1984), New South Wales Coal Association 1989

impoundment, the 2009 resurvey showed an increase in storage capacity of 1,427 acre-feet per year, while the expected rate of sedimentation is 86 acre-feet per year.

Table 2-1: Changes in Storage Capacity from 1970 to 2009

Pool/Sub-Impoundment	Amount of Sediment Deposited (acre-feet)	Rate of Deposition (acre-feet/year)	Percent of Storage Capacity Lost
Inactive Storage Pool	3,693	95	14.7%
Joint-Use Storage Pool	5,445	140	3.4%
Flood Control Storage Pool	-6,552*	-169*	-6.0%*
Total Reservoir	-7,917*	-204*	-2.6%*
Main Reservoir	-1,820*	-47*	-0.6%*
Casey Fork Sub-Impoundment Storage Pool	22	1	3.2%
Big Muddy Sub-Impoundment Storage Pool	-1,427*	-37*	-13.6%*

**Negative values indicate an increase in storage capacity*

Note: Capacities for the total reservoir and main reservoir are at elevation 410.0 feet NGVD. Capacities for the sub-impoundments are at elevation 412.0 feet NGVD

At the computed sedimentation rate of 95 acre-feet per year, the inactive storage will have lost 4,750 acre-feet of capacity after 50 years of operation. It should be noted that the inactive pool was designed for 100 years of sedimentation. At the computed rate of 140 acre-feet per year, the joint-use pool will have lost 7,000 acre-feet of storage after 50 years of operation. At the computed deposition and subsidence rate of -204 acre-feet per year, about 10,200 acre-feet of storage capacity will be gained after 50 years of operation.

The 2009 resurvey, as well as previous surveys, indicate the overall storage capacity of the lake is increasing. Subsidence is still occurring, but may stabilize as the reservoir ages, resulting in the expected overall deposition process. However, until that time, no significant sedimentation problems are anticipated.

The data reveals sediment accumulation (loss of storage capacity) had the greatest impact in the Inactive and Joint-Use Pools and in the Casey Fork sub-impoundment. Conversely, the Big Muddy sub-impoundment and the flood-control pool have been most affected by apparent subsidence (increase in storage capacity).

2.3.2. Shoreline Erosion

Shoreline erosion is prevalent in many areas at Rend Lake due to the relatively flat terrain surrounding the reservoir, prevailing winds and the presence of fine soils along the shoreline. Lack of sands and gravels in the soil provide little natural protection from wave erosion caused by consistent wind action.

Average wind speeds in the area range from 5-15 miles per hour. However, much higher wind speeds do occur during storms. The prevailing wind direction is from the south and southwest during most of the year, except in the winter, when prevailing winds are out of the north and northwest. The relatively wide open nature of Rend Lake and its North/South orientation in conjunction with moderate to high prevailing wind speeds has created significant shoreline erosion in some areas around the lake.

The embankment of the main dam and spillway are the critical operational features of the project that need shoreline protection. The main dam embankment is well armored on the upstream side with rip-rap, up to elevation 419.0 feet NGVD. The left and right sides of the main spillway are also armored with rip-rap to protect against erosion. Other areas in which extensive shoreline protection is provided is where I-57 and Illinois State Highways 37 and 154 cross the lake. These crossings are well protected with rip-rap on both sides, to prevent undercutting of the roadway.

Also, all Corps-operated boat ramps have rip-rap placed adjacent to them to prevent shoreline erosion. In addition, many exposed land areas located in public recreation areas have been rip-rapped to prevent further shoreline erosion

where potential exists for adverse impacts to recreation facilities, such as campsites. In addition, rip-rap has been placed to protect the Adena industrial water intake pipe, which was exposed as a result of shoreline erosion.

Shoreline erosion will continue to be an issue at Rend Lake. As additional areas are threatened, shoreline protection will be required.

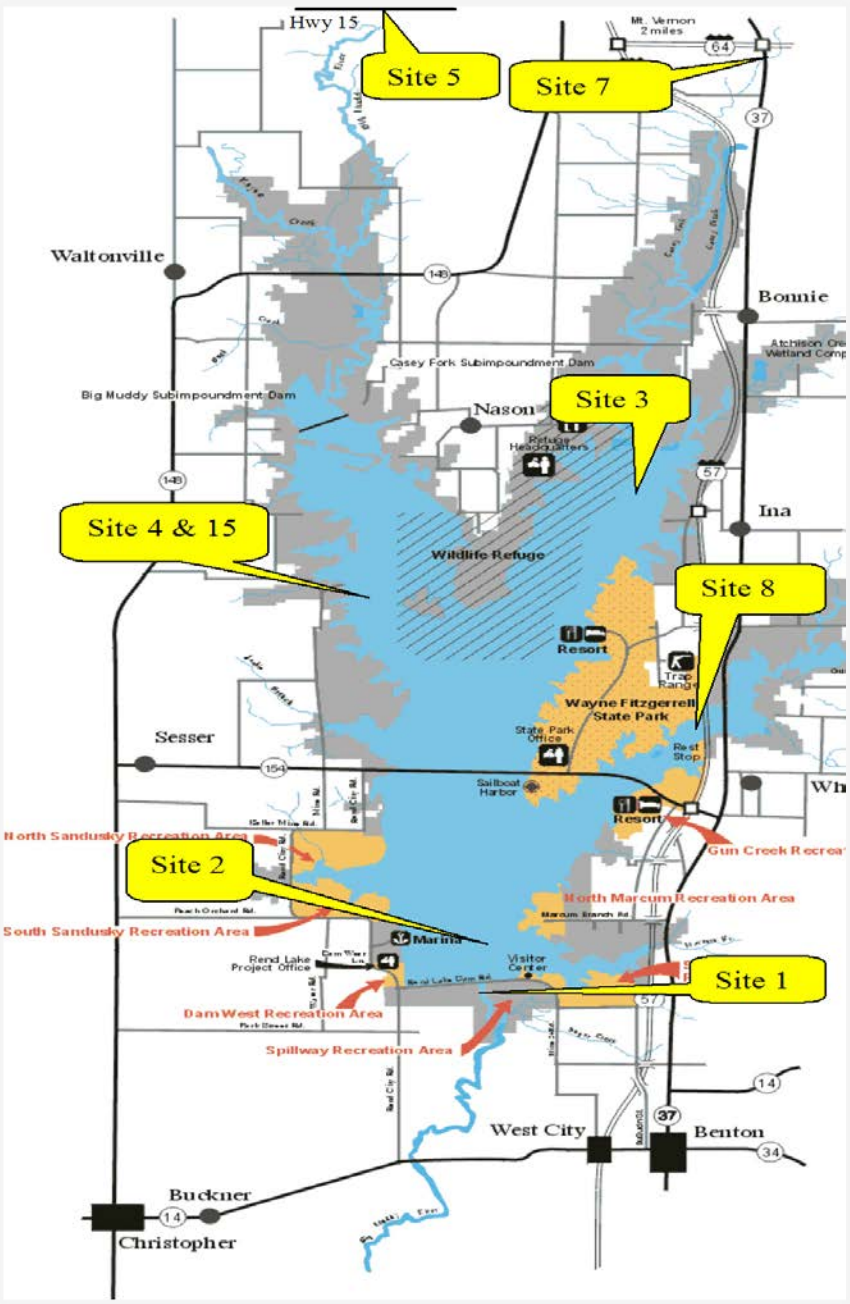
2.4. WATER QUALITY[10]

Good water quality is essential for Rend Lake, as it supplies fresh drinking water to over 300,000 residents in Southern Illinois. Water is pumped from the lake by the Rend Lake Conservancy District (RLCD), treated at their treatment facility and then distributed through pipelines to communities within the region. Water quality is carefully monitored by the USACE and the Illinois Environmental Protection Agency (IEPA), as required by Federal and State laws.

There are seven water quality monitoring locations on Rend Lake and they are identified in **Figure 2-3**.

[10] 2016 Rend Lake Water Quality Report, USACE St. Louis District, Environmental Quality Section – Water Quality

Figure 2-3: Water Quality Sampling Locations



A variety of substances and conditions are routinely tested to ensure they meet Water Quality Standards established by the State of Illinois. **Table 2-2** provides a summary of state water quality parameters and standards. Typically, water quality tests are conducted four times each year. However, water quality tests at designated swimming beaches are conducted weekly during the recreation season.

Table 2-2: State Water Quality Parameters and Standards[11]

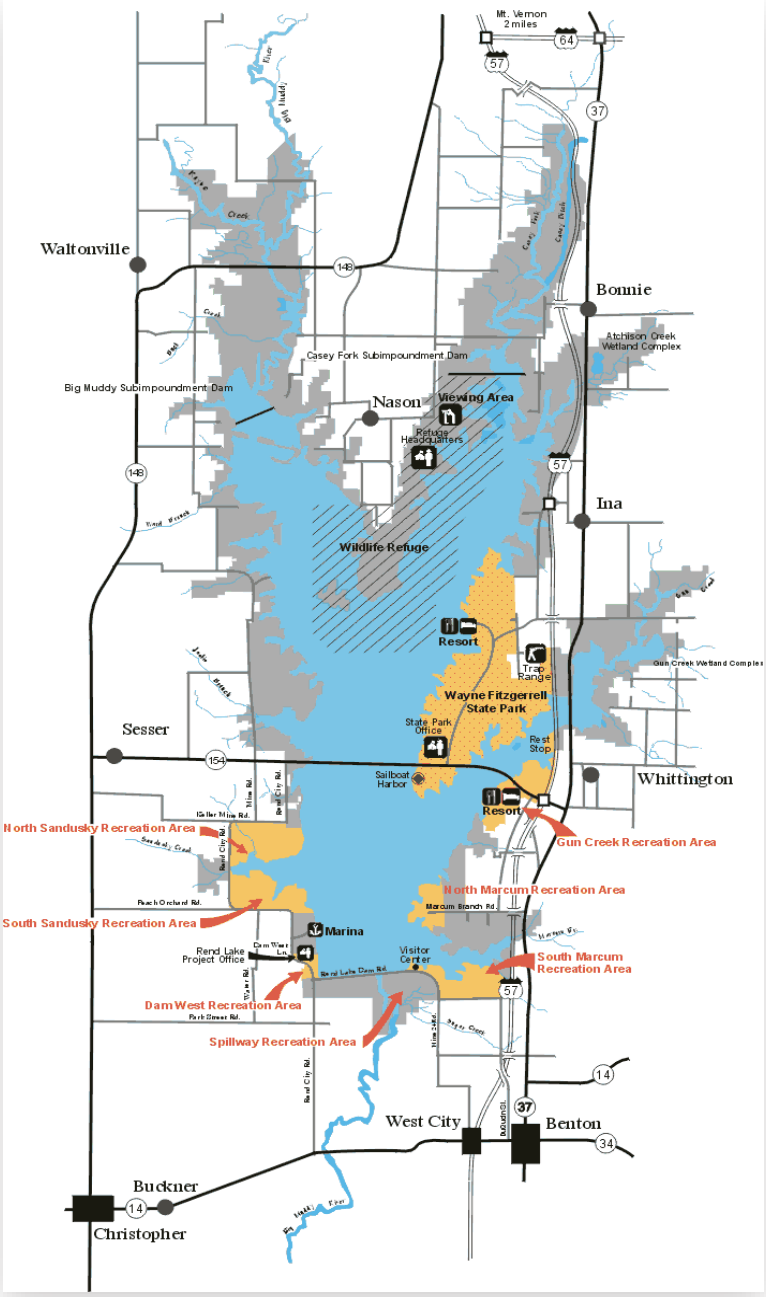
PARAMATER	STATE STANDARD
Temperature	Rise of 2.8oC above normal seasonal temp
Ammonia Nitrogen	15 mg/L
Nitrate Nitrogen	10 mg/L
Total Iron	2.0 mg/L (2nd Contact & Aquatic Life)
Manganese	1.0 mg/L
Total Phosphate	0.05 mg/L Lakes; 0.61 mg/L Streams
E. Coli	Illinois standard is 235 E. coli per 100ml for single sample or 126 for geometric mean.
pH	Range: 6.5 to 9.0
DO	> 5.0 mg/L
Conductivity	1,667 uS/cm≈TDS of 1,000 mg/L
Total Suspended Solids (TSS)	116mg/L (Streams); >=12mg/L (Lakes)
Atrazine	0.003 mg/L1; 82ug/L2; 9ug/L3
Alachlor	0.002 mg/L (Drinking Water Standard)
Cyanazine	370ug/L Acute; 30ug/L Chronic
Metolachlor	1.7mg/L Acute

A comprehensive water quality monitoring program is important at Rend Lake and will continue to be implemented in accordance with state and Federal requirements into the foreseeable future.

[11] 2017 Water Quality Report – Rend Lake, USACE, St. Louis District, Environmental Quality Section – Water Quality

2.5. PROJECT ACCESS

Access to Rend Lake is facilitated by a network of Interstate roadways, U.S. Highways, State Highways and county roads. The adjacent map identities major highways and roads around Rend Lake.



The lake is located within a 5-hour drive of seven major Midwestern cities:

- Chicago, Illinois
- Cincinnati, Ohio
- Indianapolis, Indiana
- Louisville, Kentucky
- Memphis, Tennessee
- Nashville, Tennessee
- St. Louis, Missouri

Interstate 57 (I-57) runs north and south along the east side of the lake and Interstate 64 (I-64) runs east and west, along the north side of the lake. State Highway 37, runs north and south along the east side of the lake and State Highway 148, runs north and south along the west side of the lake. State Highways 34 and 14, run east and west along the south side of the project, while State Highway 154, intersects the lake

about 3.5 miles upstream from the dam and runs east and west. Access to recreation areas and facilities in and around the lake is primarily via paved County roads. All roads are in good condition and contain adequate signage to provide easy directions for lake visitors. Roads accessing outlying fish and wildlife management areas are paved, but narrower, and are generally in fair condition.

Table 2-3, provides a list of roads, general location and the primary recreation areas to which they provide access.

Table 2-3: Primary Routes of Access

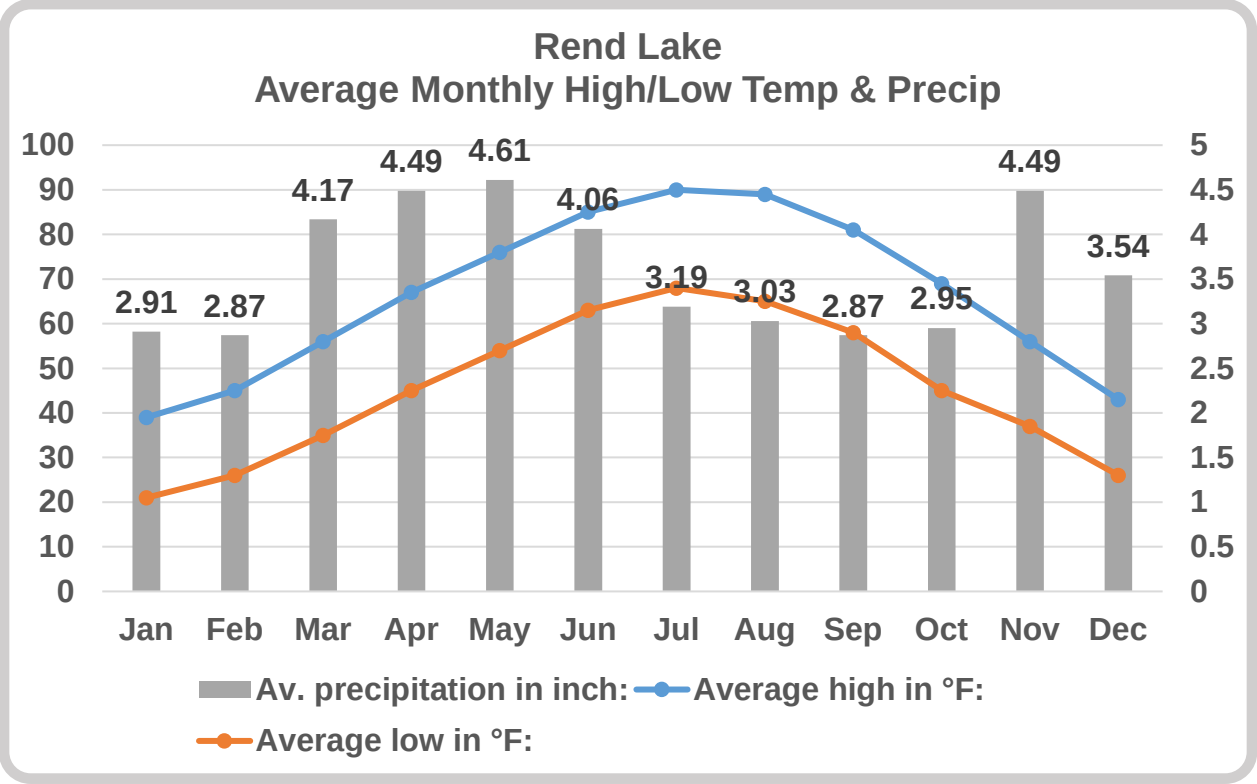
NAME OF ROAD	GENERAL LOCATION OF ROAD	PROVIDES ACCESS TO
Rend City Road	West of the City of Benton, IL and runs north and south on the west side of the Lake	Dam West Recreation Area, Rend Lake Marina, South Sandusky Day-Use and Campground, North Sandusky Recreation Area, Jackie Branch Multiple Use Area
Licata Road and Rend Lake Dam Road	Southeast of Benton, South and east side of Rend Lake	Spillway Recreation Area, South Marcum Recreation Area
Gun Creek Trail	North of Benton, IL, east side of lake	Gun Creek Recreation Area
Marcum Branch Road	North of Benton, IL, east side of lake	North Marcum Recreation Area
State Highway 154	West of Whittington, IL	Wayne Fitzgerrell State Park
Mine 21 Road	East of Sesser, IL	Turnip Patch boat ramp and west side Wildlife Management Areas
North County Line Road	South of Ina, IL	East side Wildlife Management Areas
N. Ken Gray Parkway	West of Ina, IL	Ina Boat Ramp and Ken Gray Boat Ramp

NAME OF ROAD	GENERAL LOCATION OF ROAD	PROVIDES ACCESS TO
North Nason Lane, East Bonnie Road, North Vermont Lane	West of Bonnie, IL	Rend Lake State Fish and Wildlife Refuge

2.6. CLIMATE

The overall climate in the region is relatively moderate, with an average of 210 days of sunshine each year. See **Figure 2-4** for average temperature and precipitation data.

Figure 2-4: Average Temperatures and Precipitation - Rend Lake[12]



[12] Source: National Weather Service

2.6.1. Temperature.

Summers are generally mild with temperatures occasionally reaching 100° F or higher. The winters are short and moderate with temperatures occasionally reaching below zero. The overall average temperature at Rend Lake is 55.75° F. The average annual high temperature is 66.3° F and the average low temperature is 45.25 ° F. The average high temperature occurs in July (90° F) and the average low temperature occurs in January (21° F). The hottest period of the year typically occurs in July and August, while the coldest period occurs from December thru February. From 1974, when the lake was impounded thru 2017 the temperature exceeded 90 degrees F an average of 20 days per year, and was below 32 degrees F an average of 100 days per year.

2.6.2. Wind

Wind blows daily across Rend Lake. The strongest winds typically occur in March and the mildest winds in August. The overall average wind speed at Rend Lake is approximately 10.3 miles per hour and the prevailing winds are from the south to southwest.

2.6.3. Precipitation & Humidity.

The average relative humidity in mid-afternoon is approximately 65%. Humidity is typically higher at night, and the average at dawn is about 85%. The average annual precipitation is approximately 41 inches, of which 38% occurs during April, May, June, and July. Although rainstorms are frequent in the spring, storms become more isolated in July and August, but can lead to locally heavy rainfall amounts. Snowfall is usually limited to the period from October through April and seldom covers the ground for more than a few days at a time. The average annual snowfall is about 5 inches.

According to the National Centers for Environmental Information, between 1974 and 2017, the average annual precipitation has increased by 16%, from 34.5" to 41".

2.7. TOPOGRAPHY, GEOLOGY AND SOILS

2.7.1. Topography

The topography of the area consists of gently rolling lands, with alluvial valleys and terraces developed along the Big Muddy River. Maximum topographic relief on project lands range from a high elevation of 500.0 feet NGVD in the Big Muddy and Casey impoundments to a low elevation of 380.0 feet NGVD at the main dam site.

2.7.2. Geology

Unusual or scenic geological formations are generally absent on the gently rolling uplands of Franklin and Jefferson Counties. Typical glacial landforms are rare and the topography is mostly influenced by the structure of underlying Pennsylvanian bedrock. The most physiographic contrast in the lake area is found along the river valleys and major tributaries.

A. Minerals: Franklin and Jefferson Counties are located in the heart of the Illinois coal and oil production basin. Vast beds of coal underlie the entire region. Coal mining has long been a dominant economic factor in the area. Significant quantities of oil are also produced from oil wells scattered throughout the region. Even though records indicate oil production is decreasing, it is expected to continue for some time into the future.

B. Faults and Seismic Risk Zones: Rend Lake borders a major fault zone. The Rend Lake fault zone extends north and south beneath the Rend Lake dam for approximately 15 miles. There has been no displacement along the fault zone for significant geologic time and future movement is considered unlikely. The most recent significant earthquake within the region was a 5.3 magnitude event that occurred on 9 November 1968, about 25 miles from the dam site. An extensive earthquake analysis of the dam was completed by the USACE in 1981. This study concluded the dam was safe under normal conditions; however there is potential for slope failure on the dam, should there be a large (7.5 magnitude or greater) event.

2.7.3. Soils

Soil formation in this part of Illinois is a result of Pleistocene glaciation and from subsequent wind and water erosion. Soils within the region can generally be

described as being 1 to 1.5 feet of silt loam over 2 feet of silty clay or silty clay loam, underlain by silt loam or silty clay loam glacial till. Permeability rates for these soils are generally low. The water table is transitory in these soils, being one to three feet below the surface during wet periods, but sensitive to drought periods. The low permeability and high water table prevent water from easily seeping into the ground, causing it to accumulate in low areas at the surface. Loess-derived soils are highly erodible, which creates significant shoreline erosion around the lake.

2.8. RESOURCE ANALYSIS (Level 1 Inventory Data)

2.8.1. Wildlife and Aquatic Resources

A. Wildlife Resources

There are numerous species of wildlife located on the Rend Lake Project that are native to Southern Illinois. They include several types of rodents, small game birds, mammals, waterfowl, shorebirds, songbirds, reptiles, amphibians and furbearers.

Environmental stewardship activities, including wildlife management, have not realized their full potential. A renewed emphasis on environmental stewardship activities is being implemented and are included within this document. With renewed emphasis the USACE intends to create and maintain an exceptional, well diversified ecological setting that benefits and attracts a wide variety of wildlife species.

There are 3 wetland area complexes at Rend Lake which feature a combination of moist soil units, shallow wetland areas and green tree units that attract numerous species of waterfowl, migratory birds and other wildlife species. Rend Lake is an important mid-migration stopping point for waterfowl, song birds and shorebirds.

A variety of land management practices, beneficial to waterfowl, songbirds, game birds and mammals are routinely performed at Rend Lake. Federally-owned land that is not utilized for recreation or project operations is being managed for wildlife habitat, by:

1) Planting trees and to provide shelter from weather and predators and to provide nesting cover and food.

2) Manipulating water levels in wetland areas to provide habitat and food for resident and migratory waterfowl, as well as shorebirds.

3) Planting wildlife food plots of various shapes, sizes and species composition to provide additional food sources for wildlife. Moist soil units and mudflats are also planted with Japanese Millet during dry seasons to provide an additional food source for waterfowl and migratory birds.

4) Requiring agricultural lessee's to leave a portion of their corn and soybeans un-harvested, which provides an additional food source for wildlife and birds. They are also required to plant wheat food plots as part of their lease requirements.

5) Utilizing succession control, in the form of mowing and disking to eliminate woody plant species while providing diversity among herbaceous species of plants, which is in stark contrast with adjacent un-mowed and disked areas.

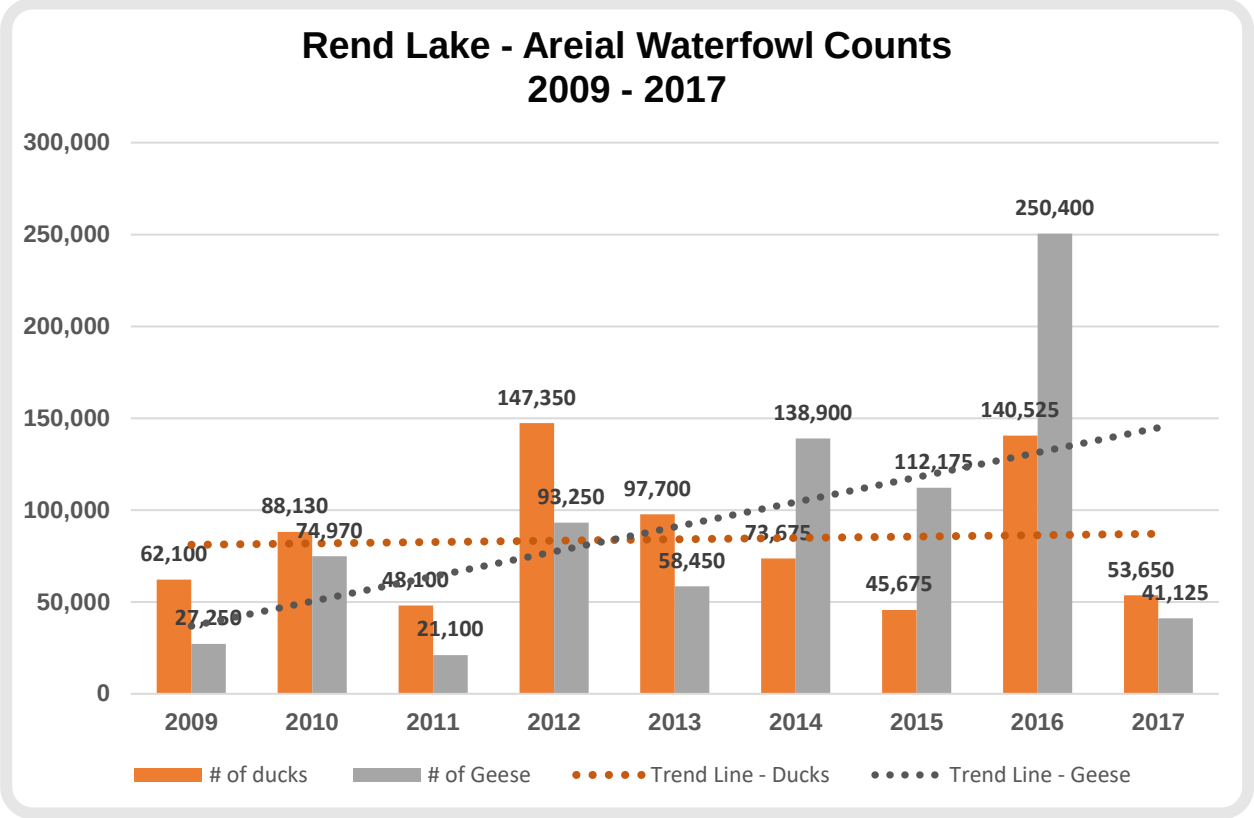
6) Constructing, placing and maintaining nest boxes to provide additional nesting spaces for Wood Ducks, Bluebirds and Purple Martins.

The Illinois Department of Natural Resources (IDNR) manages the northern portion of the lake. The area is primarily managed for waterfowl and migratory bird species by planting agricultural crops, establishing moist soil plant communities during the growing season and then flooding these areas during the fall.

Nearly 300 species of birds have been identified within the Rend lake area. A variety of habitats around the lake provide nesting sites, cover, forage, and structure for bird species at Rend Lake. The Mudflat habitat from Turnip Patch to Ward Branch and in the Ina and Nason Point areas are managed to create a slow, natural, late summer/fall drawdown, which attracts nearly 40 species of migratory shorebirds.

Nearly 35 species of waterfowl also migrate through or over-winter at Rend Lake. Aerial waterfowl surveys are conducted by the IDNR in the fall and winter months at Rend Lake. A review of this data indicate that duck and geese populations are stable or increasing in numbers. **Figure 2-5** shows the annual number of ducks and geese counted in aerial surveys, between 2009 and 2017.

Figure 2-5: Annual Number of Ducks & Geese Counted During Aerial Surveys[13]



A large number of White Pelicans are also common throughout the year on Rend Lake. In addition, the Bald Eagle, once an endangered/threatened species, is also quite common at Rend Lake. There are several active nests around the lake.

The mature upland and bottomland hardwood forests are moderately significant for forest migrants such as the eastern wood pewee, Acadian flycatcher, wood thrush, cerulean warbler, and scarlet tanager. Flooded bottomland timber and slough/oxbows provide breeding habitat for the prothonotary warbler, while bottomland forest edge habitat is favored by the northern parula.

[13] IDNR – Annual Aerial Waterfowl Survey Data

Many mammal species can be found at Rend Lake, including white-tailed deer, cottontail rabbit, fox and gray squirrel, otter, mink, muskrat, beaver, raccoon, opossum, striped skunk, long-tailed weasel, bobcat, coyote, and red and gray fox. Although less well known, many small, primarily nocturnal species, are found here, such as the marsh rice rat, deer mouse, prairie vole, short-tailed shrew, and red bat. Many of these species depend on forested and wetland habitats.

Other terrestrial vertebrates, such as reptiles and amphibians are common at Rend Lake. Although Rend Lake does not lie within the range of any poisonous species of snake, there are reports of siting's in nearby communities. Bullfrogs, leopard frogs, spring peepers, tiger salamander, eastern box turtle, snapping turtle, northern water snake, rat snake, and racer are examples of herptiles that can be found at Rend Lake. According to the US Fish and Wildlife Service, (USFWS), there are 17 species of amphibians and 28 species of reptiles found in Franklin and Jefferson counties.

B. Aquatic Resources

There are more than 30 species of fish in Rend Lake. In addition to traditional sport fish, Rend Lake also contains large populations of carp, buffalo, gar, drum, and shad. The lake and tail-water also have diverse forms of phytoplankton, zooplankton, aquatic insects, crustaceans, amphibians, reptiles and mollusks. The food supply for fish in the lake is supplemented by numerous terrestrial organisms, particularly during periods of rainfall or strong winds. When available, in the spring, threadfin shad are stocked into Rend Lake to provide sport fish with an additional source of forage.

Sport fishing continues to be very popular and productive at Rend Lake and has not significantly reduced the population of game fish. Even so, the largemouth bass population is supplemented with fish that are raised in brood ponds located on the project. Stocking rates from brood have varied from 20,000 to 40,000 each year, over the past few years.

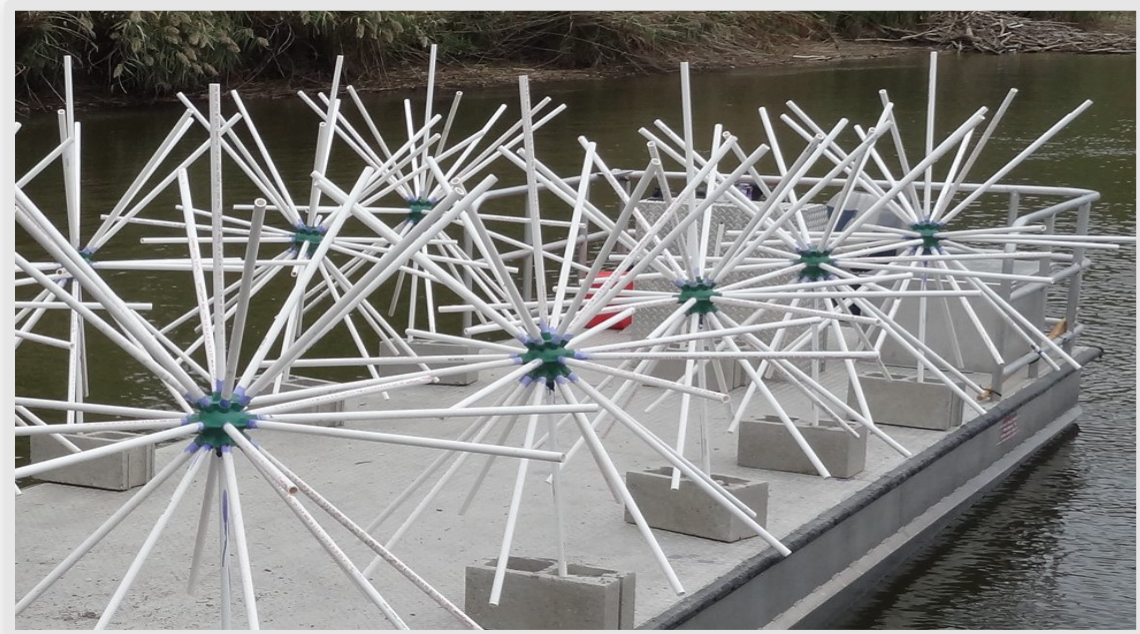
Rend Lake also supports a large population of rough fish (Buffalo, Carp, Drum). The population of rough fish is large enough that a limited number of Commercial Fishing Permits are issued by the IDNR, each year.

Annually, the IDNR conducts electrofishing and trap netting surveys at ten locations in the lake, to monitor sport fish population trends. A supplemental trap netting survey is completed each fall to provide additional information on the crappie population. Data from these surveys is used to assess fish population health and to analyze the effectiveness of fishing regulations.

In March of every year, recycled Christmas trees are placed in the lake to provide valuable nesting habitat, cover and a limited food source. Also, over 1,000 artificial habitat structures (spider blocks and porcupine balls) have been placed in Rend Lake in recent years. **Figure 2-6**, is a photo of spider blocks and **Figure 2-7** is a photo of porcupine balls. Maps, including GPS coordinates, identifying the location of habitat structures are available on the USACE and IDNR websites.

Figure 2-6: Photo of Spider Blocks

Figure 2-7: Photo of Porcupine Balls



Partnerships are invaluable in accomplishing environmental stewardship activities. Local high school student groups and clubs, Boy Scouts, and local businesses provide manpower and supplies to assist USACE and IDNR in creating valuable fish habitat. The USACE at Rend Lake will continue to pursue partnerships in support mission accomplishment.

2.8.2. Vegetative Resources

Vegetative resources at Rend Lake are classified in one of the following categories: bottomland hardwood forest, upland hardwood forest, old field (open lands), grassland, croplands, or wetlands. These categories are further described below.

A. Bottomland Hardwood Forests are comprised of the following primary tree species:

- Red Maple
- Sweetgum
- Green Ash
- Pin Oak

Elm, river birch, sycamore, and black willow are also present. On better drained alluvial soils, white, bur, and swamp white oak, shagbark hickory and other species of hickory occur. The understory is composed largely of the young of the dominant trees and a variety of woody and herbaceous plants such as buttonbush, poison ivy, spotted touch-me-not, and smartweeds.

B. Upland Hardwood Forest tree species include:

- black oak
- northern red oak
- southern red oak
- shingle oak
- post oak
- black cherry
- sassafras
- red mulberry
- black walnut

Understory vegetation consists of scattered mixtures of dogwood, witch hazel, hop hornbeam, and red bud. Where openings occur in the forest crown and at forest edges; autumn olive, poison ivy, blackberry, coralberry, multiflora rose, greenbrier, and Virginia creeper are also evident.

C. Old Field or Open Land areas are intentionally maintained in a weedy cover. In order to control the invasion of woody plants into these areas, they are manipulated through controlled burns about every three years. A typical field of this type contains a variety of perennials, such as, common ragweed, giant ragweed, goldenrod, foxtails, beggar tick, fleabane, and woody shrub/pioneer tree species, such as poison ivy, blackberry, multiflora rose, sumac, elm, persimmon, and sassafras. A significant challenge in managing these areas is the invasion by autumn olive. In the 1980's Autumn Olive was planted for wildlife food and cover. It is now considered to be an invasive species and will dominate an old field area within three years. Management activities to control Autumn Olive is focused on disturbing, manipulating, or retarding growth of the species. These activities are essential in order to maintain old field plant communities.

D. Cropland comprises the majority of the remaining open areas. "Cropland" is comprised of a variety of crops, including; corn, soybeans and wheat. A typical field of this type contains a border strip of grasses, herbaceous annuals and legumes. These areas are managed through two agricultural leases with the State of Illinois. A percentage of crops grown in these areas are intentionally left in the field for wildlife use, especially waterfowl and are located in Wayne Fitzgerrell State Park and Rend Lake State Fish & Wildlife Area.

E. Wetlands comprise over 26,000 acres of land and water at Rend Lake. These include areas such as the lake, shoreline, emergent vegetation wetlands, and bottomland forests. Many of these areas are seasonally flooded to enhance wildlife habitat and recreation opportunities.

The primary objective for conducting vegetative management activities is to increase biological diversity. Vegetative resources are managed to increase their total recreation, wildlife, and scenic values. Activities include maintaining soil fertility, controlling erosion, promoting forest growth, retarding or enhancing ecological succession, controlling or eradicating invasive species, and protecting vegetative resources from insects, disease, fire, and overuse.

The primary inhibitor to increasing vegetative diversity is the amount and number of invasive species and the impact of subsidence caused by coal mining activities.

In addition, many of the trees within developed recreation areas are in a state of decline. There are numerous dead and dying trees located within recreation areas. This is most likely the result of trees nearing the end of their life expectancy, insect outbreaks and tree diseases. Many of the dead trees that have been cut down, were simply left where they lay or have been pushed into brush piles instead of being removed. This is causing additional issues within developed recreation areas, such as creating rodent nesting places and adversely impacting the visual appearance of the parks. This is a significant project-wide issue and is further addressed in Chapter 6, Special Topics, Issues and Considerations.

2.8.3. Candidate, Threatened & Endangered Species

All species of plants and animals, except pest insects, are eligible for listing as a Candidate, Threatened or Endangered Species. "Candidate Species" are species being considered for listing as a Threatened or Endangered. "Threatened" means a species is likely to become endangered within the foreseeable future. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range.

There are numerous threatened and endangered species located within the Rend Lake region. **Table 2-4** provides a list of species found in the Rend Lake area that are on the Federal Threatened and Endangered Species list. **Table 2-5** provides a list of species on the State of Illinois Threatened and Endangered Species list.

Table 2-4: Federal Species List[14]

Common Name	Scientific Name	Status
Indiana bat	*Myotis sodalis*	Endangered
Northern Long-eared bat	*Myotis septentrionalis*	Threatened
Piping Plover	*Charadrius melodus*	Endangered

Table 2-5: State Species List[15]

Common Name	Scientific Name	Status
Barn owl	Cimicifuga racemosa	Endangered
Cypress minnow	Hybognathus hayi	Endangered
False Bugbane	*Laterallus jamaicensis*	Endangered
Green Trillium	Trillium viride	Endangered
Indiana bat	*Myotis sodalis*	Endangered
Little Blue Heron	*Egretta Caerulea*	Endangered

[14] U.S. Fish & Wildlife Service
[15] Illinois Department of Natural Resources

Common Name	Scientific Name	Status
Loggerhead shrike	Lanius ludoyicianus	Endangered
Northern Long-eared bat	*Myotis septentrionalis*	Threatened
ornate box turtle	*Terrapene ornate*	Threatened
osprey	*Pandion haliaetus*	Endangered
Piping Plover	*Charadrius melodus*	Endangered
Pugnose shiner	Notropis anogenus	Endangered
River Cooter	Pseudemys concinna	Endangered
River redhorse	Moxostoma carinatum	Endangered
Spotted pondweed	Potomogeton pulcher *Spotted pondweed*	Threatened

None of the proposed actions in this plan will have an adverse impact on threatened or endangered species.

2.8.4. Invasive Species

An invasive species is a plant, fungus, or animal species that is not native to a specific location (an introduced species), and which has a tendency to spread to a degree believed to cause damage to the environment, human economy or human health. Invasive species continue to pose a significant threat to project resources

The most common Invasive vegetative species found around Rend Lake Include:

- Autumn Olive
- Bradford Pear Tree
- Burning Bush
- Chinese Wisteria
- Bush Honeysuckle
- Common Reed
- Japanese Honeysuckle
- Japanese Knotweed
- Japanese Stilt grass
- Johnson Grass
- Kudzu
- Multiflora Rose

Autumn Olive and Bush/Japanese Honeysuckle pose the most concern, as they are; widespread throughout project, increasing in acreage, reproduce rapidly, grow quickly and are difficult to control. They have taken over many of the native old field areas and prairies on project lands, as well as understory growth in forested areas. Some of the old field areas and prairie areas have been successfully restored by removing the invasive species with heavy equipment and implementing succession control through mowing, disking and burning on an annual rotational basis.

Most of the other species listed above are present on project lands, but are not widespread.

Common Reed (Phragmites) is of most concern in aquatic and wetland areas. Executive Order (EO) 13112, signed in 1999, established the National Invasive Species Council, consisting of Federal land management agencies, to provide national leadership regarding invasive species. The EO also authorizes Federal agencies, whose actions may affect the status of invasive species, to:

a. Prevent the introduction of invasive species
b. Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner
c. Monitor invasive species populations accurately and reliably
d. Provide for restoration of native species and habitat conditions in ecosystems that have been invaded
e. Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species
f. Promote public education on invasive species and the means to address them
g. Not authorize, fund, or carry out actions that the agency believes are likely to cause or promote the introduction or spread of invasive species.

Another invasive species of concern is the Asian Carp. Only two Asian carp (Silver carp) have been collected by commercial fishermen in Rend Lake. One was collected in 2007 and one in 2018. No Bighead, Grass, or Black carp have been collected in Rend Lake. Asian carp are found in the spillway exit channel, sluice ditch, and Big Muddy River below the Rend Lake Dam. In addition to

annually removing thousands of pounds of rough fish species, the IDNR commercial fishing program also provides a valuable monitoring tool for the presence of Asian carp within Rend Lake.

A site specific regulation is enforced by the IDNR, making it illegal to use a minnow seine, cast net, or shad scoop for collecting bait within 1,000 yards downstream of the Rend Lake Dam and Spillway. This regulation was implemented to lessen the risk of fishermen catching a juvenile Asian carp, that look similar to a gizzard shad, and releasing the Asian carp into the lake or using it in the lake as bait.

Bow fishing for the species is permitted below the dam. However, this alone will not reduce the growth of the Asian carp population. IDNR and USACE fisheries biologists are working together to investigate alternative solutions for removing more Asian carp from the spillway. Some possible alternatives include promoting more bow fishing activities in the spillway, a special event (Carpfest) emphasizing the palatability of Asian carp, and working with commercial fishermen to increase marketability of the Asian carp in Illinois.

In addition, the USACE is a member of the Asian Carp Regional Coordinating Committee (ACRCC), which was established in 2009 to execute an aggressive multi-tiered strategy to prevent an Asian Carp invasion into the Great Lakes and to ensure monitoring for necessary response actions. The ACRCC does not dictate management of fishery issues to individual states or provincial authorities and does not discourage or reject management principles, techniques or actions.

While the ACRCC does not directly implement activities, it develops the overall, coordinated strategy for control and management of Asian carp with input from each member and relies on each member agency to implement actions. In June 2015, the ACRCC developed the “Asian Carp Control Strategy Framework”, which is available at: http://www.asiancarp.us/documents/2015Framework.pdf

The list of invasive species at Rend Lake will most likely increase in the future, which makes it incumbent on land managers to communicate with each other in order to provide early identification of invasive species and coordinate efforts to control and eliminate invasive species.

2.8.5. Ecological Setting

See Fish & Wildlife Resources (2.8.1.) and Vegetative Resources (2.8.2)

2.8.6. Wetlands

Three wetland sub-impoundment complexes have been developed on Rend Lake to facilitate waterfowl management activities. The three areas are:

A. Rend Lake Wetland Complex is below Rend Lake Dam

B. Atchison Creek Wetland Complex is near Bonnie, IL on the east side of the project

C. Gun Creek Wetland Complex, which consists of White Oak Pond, Cypress View and Green-tree, is located on the east side of the project.

The wetland complexes contain a variety of habitats, including moist-soil habitat, Green-Tree wetlands and permanently submerged areas.

Moist-soil habitats are shallow-water areas impounded by levees and contain water-control structures that enable flooding during fall and winter and dewatering during spring and summer. Flooding provides foraging habitat and cover for diverse communities of migrating and over-wintering waterfowl, as well as other water birds.[16] Drawdowns (dewatering to mudflat conditions) promote germination and growth of plants adapted to moist or shallowly flooded sites.[17]

Green-tree wetlands in the Gun Creek and Rend City Wetland complexes, are bottom-land forests that are flooded with shallow water in the fall and winter, when trees enter their dormant stage. The presence of water in these areas allows for greater access to acorns, hickory nuts, and other forest foods that dabbling ducks, such as mallards and other wetland wildlife species, feed on. The water is removed in early spring when trees begin their growth stage.

Water levels in these Wetland Complex areas are manipulated through pumping operations and water control structures. The primary purpose for these activities is to provide resting and feeding areas for migratory waterfowl.

[16] Fredrickson and Taylor 1982; Reid 1989; Reid et al. 1989; Reinecke et al. 1989
[17] Low and Bellrose 1944; Fredrickson and Taylor 1982

There are also mudflat areas on the upper reaches of the lake which provide resting and feeding areas for waterfowl. The mudflats are large stretches of muddy shoreline, which are present when the water level in Rend Lake is at 407.0 feet NGVD or lower. They are most prominent in the area just south of the Casey Fork sub-impoundment dam, Ina, Turnip Patch and Ward Branch. These areas are prime habitat for resting shorebirds, but can become over-grown with undesirable woody vegetation (willow) that must be removed, since it inhibits growth and production of desirable wetland vegetation. During years, when the lake level is low, portions of these areas are disked and planted with Japanese Millett or smartweed, which provides cover and additional food sources.

The Rend Lake State Fish & Wildlife Refuge is comprised of 12,833 acres of land on the north end of Rend Lake, of which 7,799 acres is Federal property licensed to the Illinois Department of Natural Resources (IDNR) for wildlife management purposes. The refuge has numerous wetlands and upland fields that are managed to benefit wildlife. Crops are planted as a food source for wildlife and consists of corn, Japanese millet, buckwheat and winter wheat.

As part of their license agreement, the IDNR also manages two sub-impoundment dams. The Big Muddy (Waltonville) Sub-Impoundment is on the Big Muddy River near the Waltonville boat ramp and the Casey Fork Sub-Impoundment is on the Casey Fork Creek near Casey, IL, at Bonnie Dam Access. The primary purposes of the sub-impoundment dams is to retain large amounts of sedimentation from passing into the lake and to regulate water levels north of the dams. In the fall, large pumps are placed on the sub-impoundment dams and water is pumped from Rend Lake to slowly fill the impoundment areas by late November, to an elevation of 411.5 feet NVGD. Water in the sub-impoundments is maintained at an elevation between 411.5 and 412.0 feet NVGD, until late January, when it is slowly lowered to reach 409.0 feet NVGD, by March 15th. When the sub-impoundment areas are full, large numbers of ducks and geese migrate to the area, making it one of the premier waterfowl hunting areas in Illinois.

2.9. CULTURAL RESOURCES[18]

2.9.1. Prehistory. Archeological studies relevant to the prehistory of the Rend

[18] Rend Lake Environmental Impact Statement, 1974

Lake area, began with the excavation of mounds near Carbondale, IL in the 1800's. Some survey and excavation work was conducted in the late 1930's near Carbondale and an excavation was conducted near Murphysboro in 1951. These excavations identified three Woodland complexes (Crab Orchard, Raymond, and Dillinger Foci).

In the early 1960's the Highway Salvage Program (Illinois Archaeological Survey) resulted in several small excavations in the Mt. Vernon, IL area. The Bodine #1 and #2 sites established the presence of Crab Orchard in the upper Big Muddy and led to the formulation of an early Crab Orchard stage called Sugar Hill. The Rend Lake Reservoir Salvage Project (Southern Illinois University Museum at Carbondale) was initiated in response to the proposed construction of Rend Lake. The area to be inundated by the lake was surveyed, which resulted in the identification of 143 sites with potential archeological significance.

In a 1972 PhD dissertation by Sidney Denny, Southern Illinois University at Carbondale (SIU-C), the Rend Lake Salvage Project data were combined with all previously known data to produce an archeological summary of the Big Muddy River Basin. In the same year, a salvage excavation of the Fry No. 1 site was conducted by Rend Lake Jr. College, which produced the first radio-carbon dating information to be associated with pre-history data in the Rend Lake area. Carbon dating revealed the excavated material to be approximately 2,100 years old.

In 1978-9, SIU-E conducted a Cultural Resource Shoreline Survey of Rend Lake. During this survey, widespread erosional destruction was noted. There were 185 potential sites identified, of which 127 were assigned cultural affiliations. In 1980, SIU-E conducted data recovery work on two sites (RL-50 and RL-51).

In 1980, the final report of the above-mentioned shoreline survey was published as: “A FINAL REPORT OF A CULTURAL RESOURCE SHORELINE SURVEY OF THE REND LAKE RESERVOIR, FRANKLIN AND JEFFERSON COUNTIES, ILLINOIS”, by W. Woods and S. Denny, SIU-E. To date, this is the most comprehensive study conducted on the cultural resources of Rend Lake.

Prehistory of the Rend Lake area is based almost entirely upon the survey data collected during this survey. As a result, we can provide a brief chronological overview of the prehistory of Rend Lake, as presently known.

While it is known that Paleo-Indian (ca. 11,000-8,000 B.C.) occupation existed, that period of prehistory is poorly represented at Rend Lake. It is believed that a more substantial Paleo-component was once present, undisputed proof has been obliterated by prehistoric flooding and erosion.

The Early Archaic period (ca. 8,000-5,000 B.C.) is represented at 14 sites clustered in areas adjacent to the mouths of tributaries.

The Middle Archaic period (ca. 5,000-2,000 B.C.) is represented by 15 sites, concentrated near major tributaries or the main channel, near what was probably more heavily forested terrain.

The Late Archaic period (ca. 2,000-1,000 B.C.), represents a time span that is only one third as long as either of the preceding two periods and is represented in over twice as many (38) sites. A system of “continuity in settlement” is suggested by a number of middle to late multi-component sites.

The Early Woodland period (ca. 1,000-300 B.C.), is difficult to identify, because of unresolved chronological issues. However, three sites have been tentatively assigned to the Early Woodland Period, on the basis of projectile point typology.

Middle Woodland status (ca. 300 B.C. - A.D. 600), has been assigned to 59 sites, three of which are known to have contained structures. Salvage excavation has been conducted at one (RL-50) of those sites. Many of the 59 sites may well represent or be mixed with Early Woodland material, pending resolution of typological problems. Sites are found in all environmental zones, but center in the uplands near the main channels of Casey Fork and the Big Muddy.

Forty-eight Late Woodland components (A.D. 600-900), have been identified. It is believed that site distribution, similar to that of the Middle Woodland period, reflects the cultivation of plants occurred on the enriched soils of the abandoned Middle Woodland sites.

The Mississippian period (A.D. 900 -?) is represented by only 8 sites, all of them multi-component. Structures are known at two sites, one of which (RL-57) has undergone salvage data recovery. The Mississippian Period, during which large towns, earthworks, and extensive trade networks developed elsewhere in the Midwest, appears to have been represented by a few farmsteads or hamlets in the Rend Lake Area.

2.9.2. Historical Overview. The National Register of Historic Places does not identify any significant historic sites in the Rend Lake area (Franklin and Jefferson Counties). The State's Historical Landmark Survey for the area has been completed and one structure, which is not on Corps-managed property, may be identified as a land mark. Known as the Nason Mine Site (also known as the Bell and Zoller Mine), located at the north end of the lake, at Nason, IL. The mine and the town of Nason were founded by the Consolidated Coal Company in 1922 and 1923, respectively. The original name of the mine was Jefferson No. 20; it was changed to the Bell and Zoller Coal Company. The site includes a large powerhouse, emissions stack, and other related structures, which are different from today's modern mines. The town was designated and laid out as a model city by the planning staff for the mine. The town was founded on 15 May 1923; however, neither the mine, nor the town grew to their anticipated size. After an ownership change and other setbacks, the mine closed in 1952. At the present time, the mine and the town of Nason, are essentially in ruins, with only sidewalks, boulevard trees, a few houses, and taverns and a few mine structures remain.

Written history of the region began in 1673 with the French explorations of Marquette and Joliet. The Jesuits and fur traders followed close behind the explorers. The first permanent European settlement within the Central Mississippi Valley area, occurred at Cahokia, Illinois, in 1699. During that year, the Holy Family Parish was established at the Illini Indian village also found at that location.

The settlement of Kaskaskia followed in 1702 and this village soon became the dominant commercial center within the area. Construction of Fort Chartres, Randolph County, Illinois (completed in 1720) coincided with an increase in mining activities within the region. These activities continued into the first quarter of the 19th Century. French influence in the area officially ended in 1763 at the end of the French and Indian War, at which time the British received all the land east of the Mississippi River, except for some small areas owned by the Canadians. To insure trade monopoly for the British, settlement in the area was forbidden and the land was only given out by grants from an Illinois Administrator by the name of Colonel Wilkins.

This arrangement did not last very long, because in 1775, the War for Independence started. Most of the British troops in the area left, leaving only the militia behind and the Indians were once again set against the Colonists. By 1778, most of the British forces had left the area, when a small colonial force led

by George Rogers Clark disembarked from flatboats on the Ohio River, crossed Southern Illinois from Fort Massac via Crab Orchard Creek and the Big Muddy River, and took Fort Kaskaskia without a fight. The following winter Clark's capture of Vincennes secured the West for the United States.

Until the Revolution, Illinois had been a part of the State of Virginia, but it was ceded along with the rest of the land north of the Ohio River to the Federal Government. By 1798, Illinois had a population of about 5,000 white males, which allowed it to become a territory under the Northwest Territory Ordinance.

Between 1700 and 1800, conflicts with the British and the Indians, made it very difficult for those living in Southern Illinois. In 1812, the second war with the British began and again the Indians were used against the people of the area. .

After the War of 1812, a migration of people from the east populated the area. New roads and riverboats allowed trade to expand in Southern Illinois. Farming was the main industry in Southern Illinois during early statehood. Until railroads were built in the 1850's, coal mining was fairly small scale and only operated along the rivers within the region. In 1861 the Civil War began, calling upon Southern Illinois for men and resources, which taxed the struggling area once again.

After the Civil War there was a brief farming boom and coal mining continued to grow. Between 1890 and 1900, Franklin and Jefferson Counties produced 221,954 tons of coal and between 1911 and 1920, they produced 80,666,484 tons of coal. Even though coal production expanded rapidly, the demand was seasonal and by the 1920's, after World War I, the demand for coal declined. The region was entirely dependent on the mining and farming industries. With coal production dropping, many found it necessary to move elsewhere in order to maintain employment.

2.10. DEMOGRAPHICS[19]

The ten-county area surrounding Rend Lake is approximately 5,253 square miles in size, with an average population density of 69 people per square mile, while the

[19] U.S. Census Bureau

state average is 231.1 people per square mile. The ten counties lie within a fifty-mile radius of the project and include:

- Franklin
- Hamilton
- Jackson
- Jefferson
- Marion
- Perry
- Saline
- Washington
- Wayne
- Williamson

In 2010 the population of the ten-county area was 337,804 and in 2017 is estimated to be approximately 330,584, which is a 2.9% decrease. Between 1940 and 2010, the state population increased by 62%, from 7,897,241 to 12,830,632. While, for the same time period, the population for the ten-county region around Rend Lake decreased by 2%, from 344,269 to 337,804.

Also of interest is the fact that seven of the ten counties (Franklin, Hamilton, Marion, Perry, Saline, Washington and Wayne) had larger populations in the years prior to 1940 than they do today. This is also true for three of those counties (Hamilton, Washington and Wayne) for the years prior to 1900.

The total ten-county population for census years between 1900 and 2010 is presented in **Figure 2-8**. The largest population for the ten-county region occurred in 1940. Basically, the total population within the ten-county area has remained consistent since the 1920's.

Figure 2-8: **Population of Ten-County Region 1900-2010**

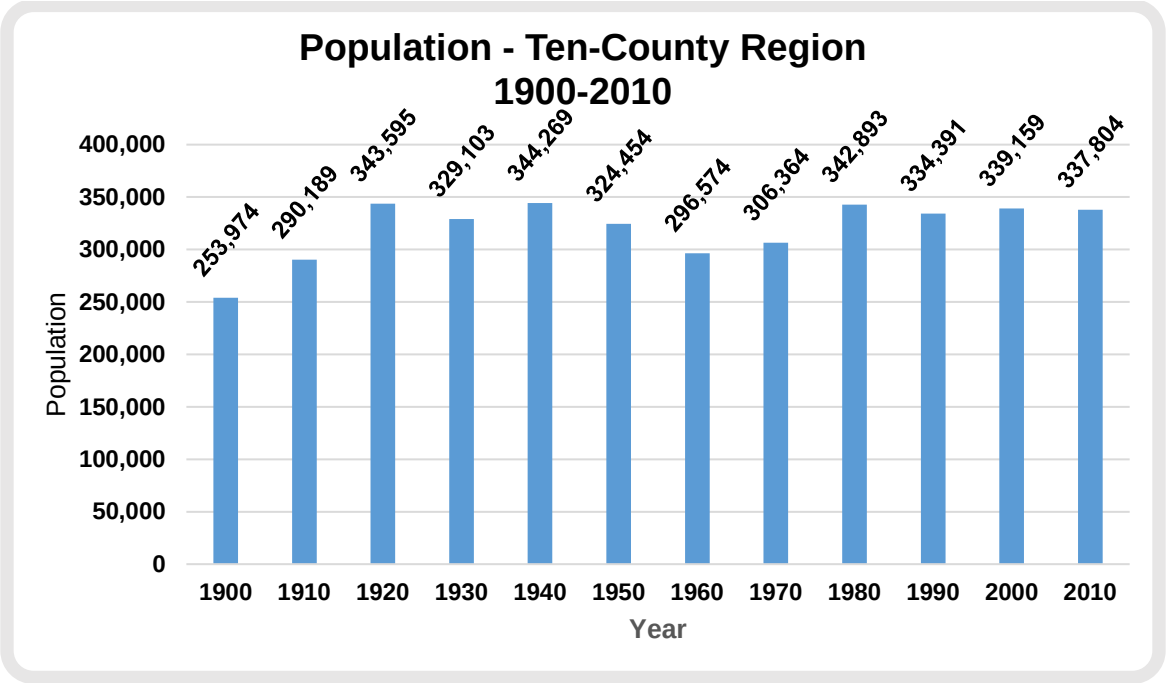


Table 2-6 compares demographic data for the ten-county region around Rend Lake with State of Illinois and National data.

Table 2-6: Demographic Facts for the Ten-County Region Compared to State and National Data

Demographic	Ten-County Average	State Average	National Average
Percent of Population Living in Poverty	16.8%	13.0%	12.7%
Median Household Income	$43,526	$59,196	$55,322
Percentage White	92.2%	77.2%	76.9%
Percentage Black or African American	4.8%	14.7%	13.3%
Percentage Hispanic or Latino	2.2%	17.0%	17.8%
Percentage Foreign Born	1.7%	13.9%	13.2%

Demographic	Ten-County Average	State Average	National Average
Median Gross Monthly Rent	$594	$925	$949
Owner-Occupied Housing Unit Rate	72.5%	66.0%	63.6%
Percent with Bachelor's Degree or Higher	18.3%	32.9%	30.3%
Percent of People, Under Age 65, With a Disability	12.0%	7.1%	8.6%
Percent of People, 16 Years and Older, in the Civilian Working Pool	57.5%	65.4%	63.1%
Source: U.S. Census Bureau (2016 Estimates)			

The data in **Figure 2-8** and **Table 2-6** reveal that population growth is significantly slower than the rest of the State and nation. Also, minority populations are significantly under-represented within the region, compared to the rest of the State and country. The same holds true for the percentage of foreign-born people. In addition, the percentage of people with a Bachelor Degree or higher, is significantly lower than the rest of the State and nation.

2.11. ECONOMICS[20]

Natural and recreation resources at Rend Lake provide social, economic and environmental benefits for all Americans. Recreation promotes economic as well as personal and social well-being by providing jobs and income stability for local communities.

Recreation at Rend Lake is an economic engine for local communities and the region. Resorts, marinas and grocery stores provide goods and services to lake visitors. Nearby establishments provide visitors with gas, food and lodging while they visit. Visitor use also contributes to sales of recreation equipment, such as boats, recreational vehicles, tents and fishing gear.

[20] Source: USACE Value to the Nation – Fast Facts - 2016

In an average year Rend Lake visitors spend approximately $34,172,063 within 30 miles of the lake for things such as gas, food and lodging. An additional $23,818,370 in sales is generated for durable goods, such as boats and camping equipment. This spending supports approximately 328 jobs resulting in labor income of about $8,268,520 within 30 miles of the lake.

With multiplier effects, Rend Lake visitor trip spending results in:

- $47,299,642 in total spending
- $35,410,180 in total sales
- 419 jobs
- $11,599,883 in labor income
- $17,634,593 in value added (wages & salaries, payroll benefits, profits, rents and indirect business taxes)

The money spent by visitors to Rend Lake on trip expenses adds to the local and national economies by supporting jobs and generating income. Visitor spending represents a sizable component of the economy in communities around the lake.

Other benefits provided by recreation opportunities at the lake help combat one of the most significant of the nation's health problems; lack of physical activity. Recreational programs and activities at the lake also help strengthen family ties and friendships; provide opportunities for children to develop personal skills, social values and self-esteem; and increase water safety. Recreation experiences increase motivation to learn more about the environment; understanding and awareness of environmental issues; and sensitivity to the environment.

2.12. RECREATION FACILITIES, ACTIVITIES & NEEDS

2.12.1. Recreation Facilities

There are a variety of outdoor recreation areas and facilities located at Rend Lake. There are 11 major recreation areas; 10 managed by the USACE and 1 by the Illinois Department of Natural Resources (IDNR). In addition there is one marina, a visitor information center, several wildlife management areas as well as numerous small recreation access areas located on the project. **Table 2-7**

provides a summary of recreation areas and facilities located at Rend Lake. A complete list of recreation areas and facilities is provided in **Appendix A**.

Table 2-7: Rend Lake Recreation Area and Facility Summary

Type of Recreation Area/Facility	Managed by USACE	Managed by Others	Total
# of Campgrounds/# of Campsites	4/513	1/260	5/773
# of Day-Use Areas/# of Picnic Sites	7/84	1/13	8/97
# of Boat Ramps/# of Launch Lanes	10/30	16/22	26/52
# of Marinas/# of Wet Slips/# of Dry Slips	0/0/0	1/270/46	1/270/46
Miles of Trails	15	15	30
Vegetative & Wildlife Management Acres	6,016	7,799	13,819
# of Hunter/Fishermen Access Areas	25	7	32

The operation and maintenance of recreation facilities has minimal impact to the environment or scenic qualities of the lake. Structural and landscape designs are blended with the surrounding area as much as possible. The USACE also manages three wetland restoration areas, while the State of Illinois manages two sub-impoundment areas, which include waterfowl resting areas, used extensively by waterfowl during their spring and fall migrations.

2.12.2. Recreation Activities.

The outdoor recreation opportunities provided at Rend Lake are designed to support a wide range of recreational activities and interests. Major activities include:

A. Fishing

Fishing is a popular outdoor recreation activity at Rend Lake. In 2016 an estimated 245,211 person trips were spent fishing at Rend Lake.[21] To facilitate access to the lake, 26 boat ramps are provided around the lake.

[21] USACE, Value to the Nation Fast Facts, 2016

The State of Illinois Division of Fisheries manages all waters at Rend Lake to assure conservation and the enhancement of the fishery resource and the equity of the fishing public, while providing the maximum enjoyment. Rend Lake offers good fishing opportunities for crappie, white bass, largemouth bass, bluegill, channel and flathead catfish, freshwater drum and carp.

The lake is bisected by State Highway 154. There are 18 public boat ramps located in the upper reaches of the lake:

1. Jackie Branch
2. Turnip Patch
3. Waltonville
4. Buck Creek
5. East Waltonville
6. Dareville
7. North Nason
8. South Nason
9. Bluegill Hole
10. Cottonwood
11. Silo
12. East Casey Fork
13. Pin Oaks Flat
14. Bonnie Dam Access
15. South Bonnie
16. Ina
17. Cypress View
18. RLCD boat ramp

Boat ramps located in the lower reaches of the lake include:

1. Dam West Recreation Area
2. South Sandusky Recreation Area
3. North Sandusky Recreation Area
4. Sailboat Harbor (x2)
5. Gun Creek Recreation Area
6. North Marcum Recreation Area
7. South Marcum Recreation Area

Located below the Rend Lake Dam is the Spillway Recreation Area. Here, anglers have caught a variety of different species of fishes. The major species caught are:

1. Asian carp (considered an invasive species)
2. bluegill
3. buffalo
4. carp
5. channel catfish
6. crappie
7. drum

8. gar 9. white bass

Future fisheries habitat improvements are essential, especially at targeted fish spawning locations, in order to maintain a viable fishery within the lake. This includes placement of strategically placed manmade habitat structures in the lake as well as performing additional shoreline protection around the lake.

Another critical component for maintaining a viable fishery is to operate the on-project brood ponds, managed by the State and USACE, to their full potential. In addition, a robust fish stocking program, using State and local hatcheries, will be required.

B. Hunting/Trapping

In 2016 an estimated 129,058 visits were recorded for people hunting at Rend Lake[22]. Part of the wildlife management program at Rend Lake includes development of food plots that include planting sunflowers, corn, beans, winter wheat, clover, milo, and millet. These food plots are essential in providing a quality wildlife habitat. Other land management techniques such as, conducting prescribed burns, restoring native prairies, wetland restoration, and reforestation also provide benefits to a wide variety of wildlife populations.

Rend Lake is one of the most popular waterfowl hunting areas in the state because it serves as a mid-migration resting area for waterfowl and other migrating birds. The lake also provides quality hunting opportunities for white-tail deer, turkey, rabbits, squirrels, doves, bobwhite quail, and pheasants.

Trapping is permitted on public lands except where posted. Trapping helps manage the density of wildlife populations and helps prevent disease. Trapping is also allowed within the sub-impoundments after waterfowl season ends and requires a permit from the IDNR.

C. Camping

In 2016 an estimated 86,743 visits were recorded for people camping at Rend Lake.[23] Campgrounds at Rend Lake provide a variety of camping opportunities

[22] USACE, Value to the Nation, 2016
[23] NRRS, 2016

and types of facilities. There are 4 campgrounds managed by the USACE and one campground managed by the IDNR. They are:

1. South Sandusky (USACE)
2. North Sandusky (USACE)
3. Gun Creek (USACE)
4. South Marcum (USACE)
5. Wayne Fitzgerrell State Park (IDNR)

A total of 756 campsites are available for public use. Campgrounds offer a blend of amenities such as fire rings/grills, playgrounds, open play areas, basketball courts, 50-amp electrical services, sewer hookups, drinking water, comfort stations and shower buildings. Group camping is also available at two campground locations, Shagbark Group Camp and Dale Miller Group Camp.

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As camping equipment and recreation vehicles continue to change, upgrades and modifications to campgrounds and campsites will also be required. Recreational vehicles continue to increase in size. So, campsites will need to be modified and redesigned in order to keep pace with market trends.

In addition to the public campgrounds managed by the USACE and IDNR, there are several private campgrounds located near the lake.

D. Boating

Rend Lake is the second largest man-made lake in Illinois and is capable of accommodating all types of water recreation activities including; fishing, sailing, kayaking, canoeing, water skiing, wake boarding, tubing and parasailing. In 2016 an estimated 160,452 visits were recorded for people participating in boating-related activities.[24]

[24] USACE, Value to the Nation, 2016

E. Trail Activities

There are 34 miles of multi-use trails located at Rend Lake that support a variety of trail activities, such as biking, hiking, walking for pleasure and fitness, dog walking, jogging, nature photography, bird watching and interpretation.

The use of recreational trails has become one of the most popular outdoor recreation activities at Rend Lake. The wide variety of recreation activities that trails support, contributes to their popularity.

The Rend Lake Bike Trail Plan is a comprehensive plan and is included as **Appendix B**. The USACE will facilitate efforts to connect as many existing trail systems as possible.

F. Picnicking

Most recreation areas have picnic sites consisting of a picnic table and pedestal grill. In 2016 an estimated 180,662 visits were recorded for people picnicking at Rend Lake.[25]

G. Swimming

In 2016 an estimated 129,058 visits were recorded for people swimming at Rend Lake[26]. The designated swimming area, marked with buoys and depth markers, is located in South Sandusky Recreation Area.

Water quality is always a concern, and is monitored regularly to assure public health and safety. The swimming beach is tested for water quality on a weekly basis: Swimming at locations other than the designated swimming beaches is not encouraged.

H. Sightseeing

Sightseeing at Rend Lake continues to be a popular activity. Activities such as wildlife watching, birding and nature photography are rapidly increasing. In

[25] USACE, Value to the Nation, 2016
[26] USACE, Value to the Nation, 2016

2016 an estimated 335,552 visits were recorded for people sightseeing at Rend Lake.[27]

2.12.3. Recreation Needs

A. Accessibility

In 1968 Congress passed the Architectural Barriers Act (ABA) which requires any building or facility that is constructed, altered, or leased with Federal funds to be accessible to and usable by people with disabilities. As a Federal entity the USACE is responsible for ensuring all recreation facilities and opportunities are accessible to everyone.

One of the primary proposed actions in this Master Plan is to ensure all facilities meet the requirements of the Americans with Disabilities Act (ADA), as well as the standards required by the ABA. Accomplishing this will improve public health, safety, and customer service.

B. Illinois Statewide Comprehensive Outdoor Recreation Plan (SCORP)

According to the most recent SCORP (2015–2019), trails are among the most popular and requested outdoor recreation facility in the state. Trails are integral connectivity routes, linking communities and park visitors to neighborhoods, schools, recreation areas and shopping opportunities. As a result, many communities are doing more than simply adding sidewalks; multi-use trails have been built to provide a variety of recreation opportunities. Nearly 3,000 miles of trails have been built by communities throughout the state.

The 2013-2014 Illinois Outdoor Recreation Survey revealed the following information:

1. 85.4% of respondents indicated that outdoor recreation was of some importance in their everyday lives
2. 80.7% of respondents reported pleasure walking as the most popular outdoor activity in the state

[27] USACE, Value to the Nation, 2016

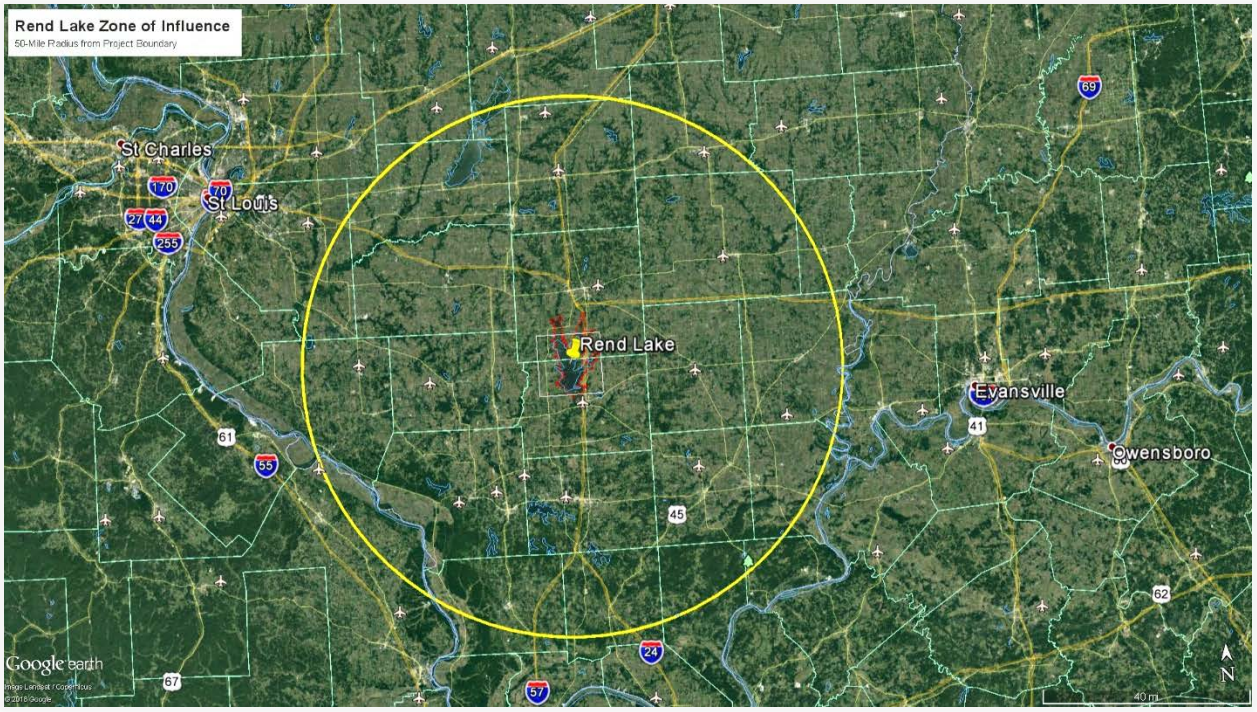
3. Pleasure walking and observing wildlife/bird watching, were the two activities with the highest participation rate.
4. Half of respondents engage in pleasure walking over 30 times per year
5. Half of respondents engage in nature observation and bird watching over 10 times per year.

Other information identified in the 2013-2014 Illinois Outdoor Recreation Survey, indicate that over eight out of ten respondents felt that spending time with family and friends, exposing children to nature, and escaping their daily routines were important contributing factors affecting their decision to engage in outdoor recreation activities. Respondents were asked to provide their opinions about outdoor recreation resource issues in general and were asked to indicate agreement or disagreement regarding a variety of issues. Well over nine out of ten respondents consider outdoor recreation areas to be important for general health and fitness (96.1%). Further, respondents indicated that recreation areas should serve the needs of all people, regardless of their physical ability, ethnic background, or economic means (93.4%); and that community recreation areas make a valuable contribution to the quality of life and economic vitality of communities

2.12.4. Zone of Influence

The Zone of Influence is the geographic area surrounding the lake where impacts may occur as a result of actions within the boundary of the Project Site. The zone of influence for Rend Lake has been determined to be a 50-mile radius from the boundary line of the Rend Lake Project Site (**Figure 2-9**). The majority of overnight and day-use visitors originate within this zone. Also, this is the most common distance used by the USACE in recreation-related studies and master plan documents.

Figure 2-9: Rend Lake Zone of Influence



For Rend Lake, this area comprises parts of Illinois and Missouri, including the majority of Southern-Illinois. Counties within the Zone of Influence include the entirety of the following counties in Illinois:

Franklin	Johnson	Washington
Hamilton	Marion	Williamson
Jackson	Perry	Union
Jefferson	Saline	

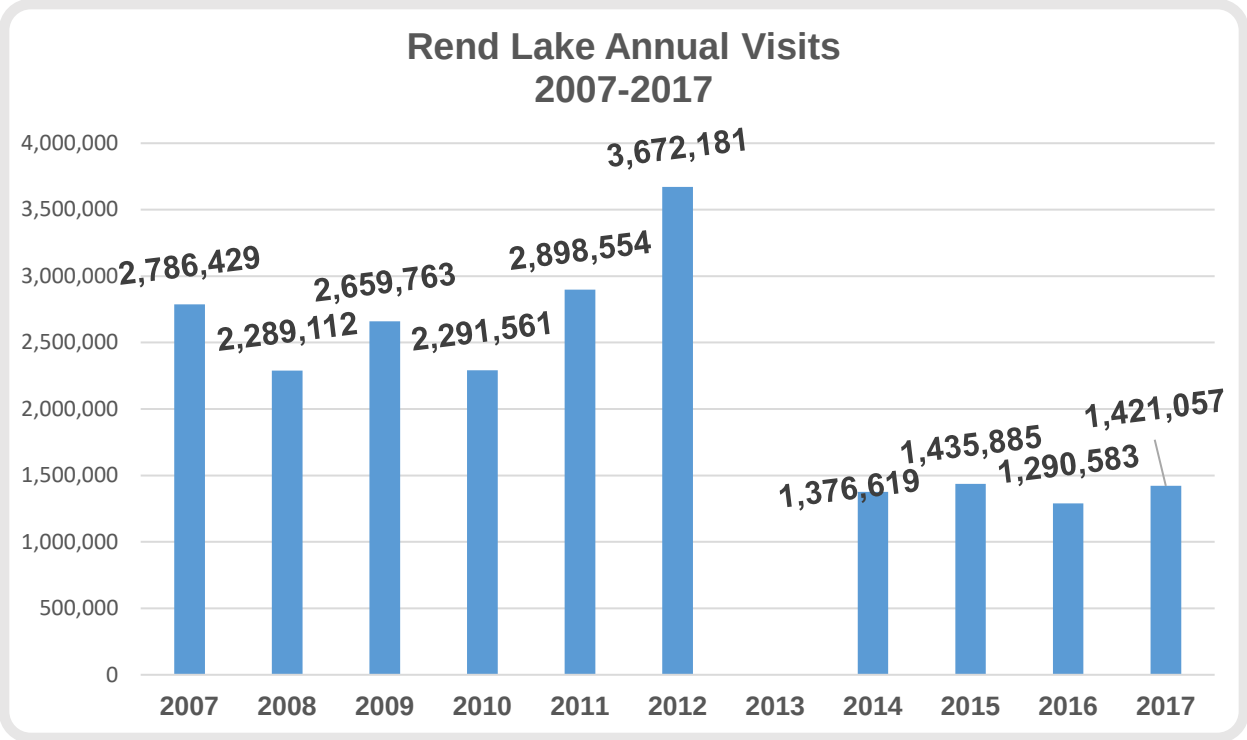
and parts of the following counties in Illinois and Missouri:

Bond	Gallatin	Randolph
Clinton	Hardin	St. Clair
Clay	Perry, MO	Wayne
Fayette	Pope	White

2.12.5. Visitation Profile

Annually, Rend Lake receives an average of 2,300,076 visits. A "Visit" is defined as one person participating in recreation activities within a developed recreation area for any period of time. For instance, one person picnicking for 30 minutes is one visit; likewise, one person camping for 2, 5, or any number of consecutive days is also one visit. **Figure 2-10** depicts Annual visits for Rend Lake from 2007 – 2017.

Figure 2-10: Rend Lake Annual Visits 2007 - 2017



Source: OMBIL (No data available for 2013)

In 2013 the Corps of Engineers transitioned to a new visitation estimation framework that includes updated regional load factors and a revised definition for a Project Site Area, which resulted in significant changes to Rend Lake's estimate of annual visitation. Because of this transition, no data is available for 2013.

A load factor is a statistical estimate that translates traffic counter numbers into a visitor count. Many factors are considered when establishing a load factor, including:

- Average number of occupants in the vehicle
- Average number times a single vehicle crosses over a traffic counter during a visit
- Average length of stay to a Project Site Area during a visit.
- Average count of non-visitor vehicles such as, staff, contractors, residents, etc. crossing traffic counters
- Count bias, such as seasonal differences, month of year, day of week, etc.

Prior to 2012, visitation estimates were based on load factors, calculated from actual visitor-use surveys that were conducted in the mid 1980's. It was recognized that recreational use patterns of visitors to USACE projects had changed significantly since the 1980's.

To account for these changes in use patterns, the USACE conducted new visitor use surveys at selected Corps projects across the nation. A wide variety of recreation areas were surveyed. The data collected during these surveys was then used to establish regional load factors based on the type of recreation area being surveyed. These Regional load factors were then applied to Corps projects and recreation areas that were similar to those where the surveys were actually conducted.

As a result, the calculated number of visits at Corps project nationwide significantly decreased. This is not to say there are actually fewer visitors. Simply the method used to calculate visitation has changed. Therefore, when comparing visitation figures after 2012 to those prior to 2012, there appears to be significantly fewer visits.

2.12.6. Recreation Analysis

A. Land-Based Recreation

There are a variety of land-based recreation opportunities, activities, and facilities located at Rend Lake and within the region. These activities include camping, hiking, hunting, picnicking, wildlife/bird viewing, geo-caching, disc-golfing, and sightseeing

1) Land-Based Recreation in the Region

In order to have a better understanding of the current recreation conditions at Rend Lake, a desktop inventory of recreation areas and facilities located within a 50-mile radius of Rend Lake was conducted. This area was established based on studies conducted by USACE, which establish the camping market area for USACE lake projects to be approximately 50 miles and the day–use market area to be approximately 30 miles. However, a survey conducted by the Outdoor Foundation, *"A Special Report on Camping – 2011,"* found that not more than 64 percent of people who participate in outdoor recreation activities will travel further than 100 miles from their home to participate in those activities. Since land-based recreation activities are comprised of overnight and day-use visitors, a 100-mile radius from Rend Lake was considered adequate, and is used to define the region for this analysis.

Regional recreation facilities were divided into two main categories: recreation facilities managed by USACE and those managed by others. For facilities managed by entities other than USACE, some information about the types of recreation facilities and visitation was not available. For example, the number of picnic sites at state, county, or city recreation areas was not available. Therefore, comparisons about recreational facilities and activities were sometimes difficult to establish on a regional basis. Recreation areas where data was not sufficiently complete were not included in regional comparative analyses. The most reliable and consistent data and information was provided by USACE. Therefore, in many cases, comparative analyses only include USACE projects within the region.

2) Regional Recreation Areas and Facilities Managed by USACE

There are three other USACE projects within 100 miles of Rend Lake. They are:

a. Carlyle Lake
b. Lake Shelbyville
c. Wappapello Lake

Each of these projects has a variety of land-based recreation areas and facilities. **Table 2-9** depicts the number and type of land-based recreation facilities, visitation, and acreage data for these projects, including Rend Lake.

Table 2-8: Land-Based Recreation Facilities at Regional USACE Lakes

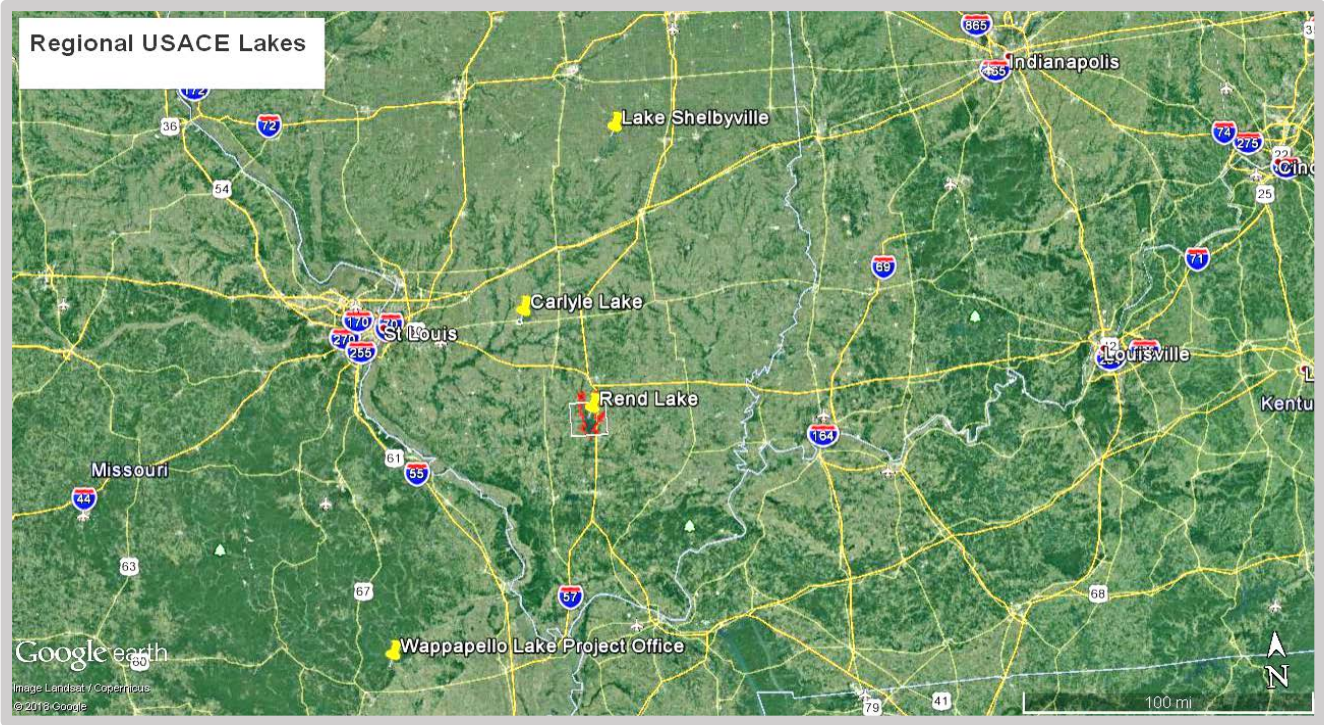
Lake Name	Recreation Areas	Picnic Sites	Camp Sites	Miles of Trails	Annual Visits	Land Acres	Water Surface Acres	Shoreline Miles	Total Acres
Rend Lake	53*	104*	756*	34*	1,200,583	21,329*	18,900*	162*	40,229*
Carlyle Lake	40	424	726	66	1,374,199	12,833	24,700	88	37,543
Lake Shelbyville	71	130	1,321	79	1,519,708	23,241	11,100	172	34,341
Wappapello Lake	28	101	443	26	899,450	35,949	8,400	180	44,349
TOTAL	**192**	**759**	**3,246**	**205**	**5,083,940**	**93,352**	**63,110**	**602**	**156,462**

Source: USACE, Value to the Nation, 2016

**Data from the data source do not reflect the change in data identified elsewhere in this report.*

Figure 2-11 depicts the location of these projects.

Figure 2-11: Location of Regional USACE Lakes



3) Regional Recreation Areas and Facilities Managed by Others

There are nine State, County, and City parks within the region. Campsites and trails are the primary land-based recreation facilities provided at these recreation areas. **Table 2-10** identifies these recreation areas, their managing entity, and the number of campsites and/or miles of trails. These areas and facilities were selected because they are the largest and most significant areas managed by others within the region.

Table 2-9: Campgrounds and Trails within the Region Managed by Others[28]

Recreation Area Name	Managing Entity	# of Campsites	Miles of Trails	Acres
Pyramid State Park	IDNR	50	15	20,000
Giant City State Park	IDNR	125	27	5,000
Ferne Clyffe State Park	IDNR	88	10	2,400
Saline County State Fish and Wildlife Area	IDNR	43	3	1,200
Sam Dale Lake State Fish and Wildlife Area	IDNR	67	14	1,340
Arrowhead Lake	Johnson City	66	2 1/4	330
Lake Murphysboro	IDNR	79	2 1/2	1,022
Crab Orchard National Wildlife Refuge	USFWS	205	7	44,000
Shawnee National Forest	USNFS	180	330	289,000
Total Managed by Others		**903**	**411**	**364,292**

4) Comparison of Campsites and Miles of Trails within the Region

The USACE provides 78% of the campsites within the region and 33% of the trail miles, on only 20% of the land-base.

5) Comparison of Land-Based Recreation at Regional USACE Projects

Table 2-10 provides a summary of data from USACE Projects within 100 miles of Rend Lake, which includes Carlyle Lake, Lake Shelbyville and Wappapello Lake. The data provides a comparison of physical

[28] Respective managing entities provided data

attributes and identifies the percentage of the regional total located at Rend Lake.

Table 2-10: Regional USACE Recreation Areas, Facilities and Physical Attributes Compared to Rend Lake

Physical Attribute	Regional Average	Regional Total	Rend Lake Total	Rend Lake % of Regional Total
Water Surface Acres	15,778	63,110	18,900*	30%
Land Acres	23,338	93,352	21,329*	23%
# of Recreation Areas	48	192	53	28%
# of Campsites	812	3,246	756	23%
# of Picnic Sites	190	759	104	14%
Miles of Trails	51	205	34	17%

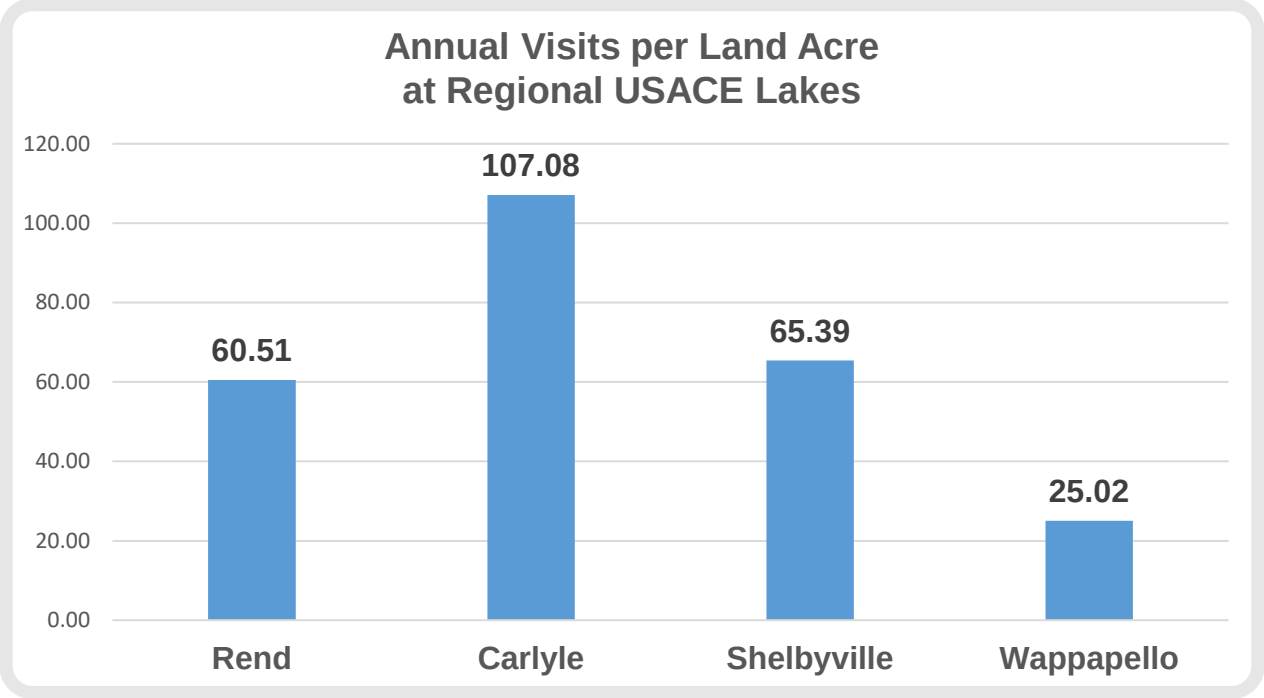
Source: USACE, Value to the Nation, 2016

**Acreages from the data source do not reflect the change in acreages identified elsewhere in this report. (20,633 surface acres)*

6) Annual Visits per Land Acre

Figure 2-12 depicts annual visits per land acre. The number of visits per land acre is a measure of density and intensity of use. Within the region, there is an average of 64.5 annual visits per land acre. At Rend Lake the average annual visits per land acre is 60.5, which is close to the regional average. Since this data represents the overall average for the project, and does not distinguish between developed recreation areas and undeveloped lands, there may be some recreation areas or project lands where annual visits are higher or lower than the number identified.

Figure 2-12: Annual Number of Visits per Land Acre

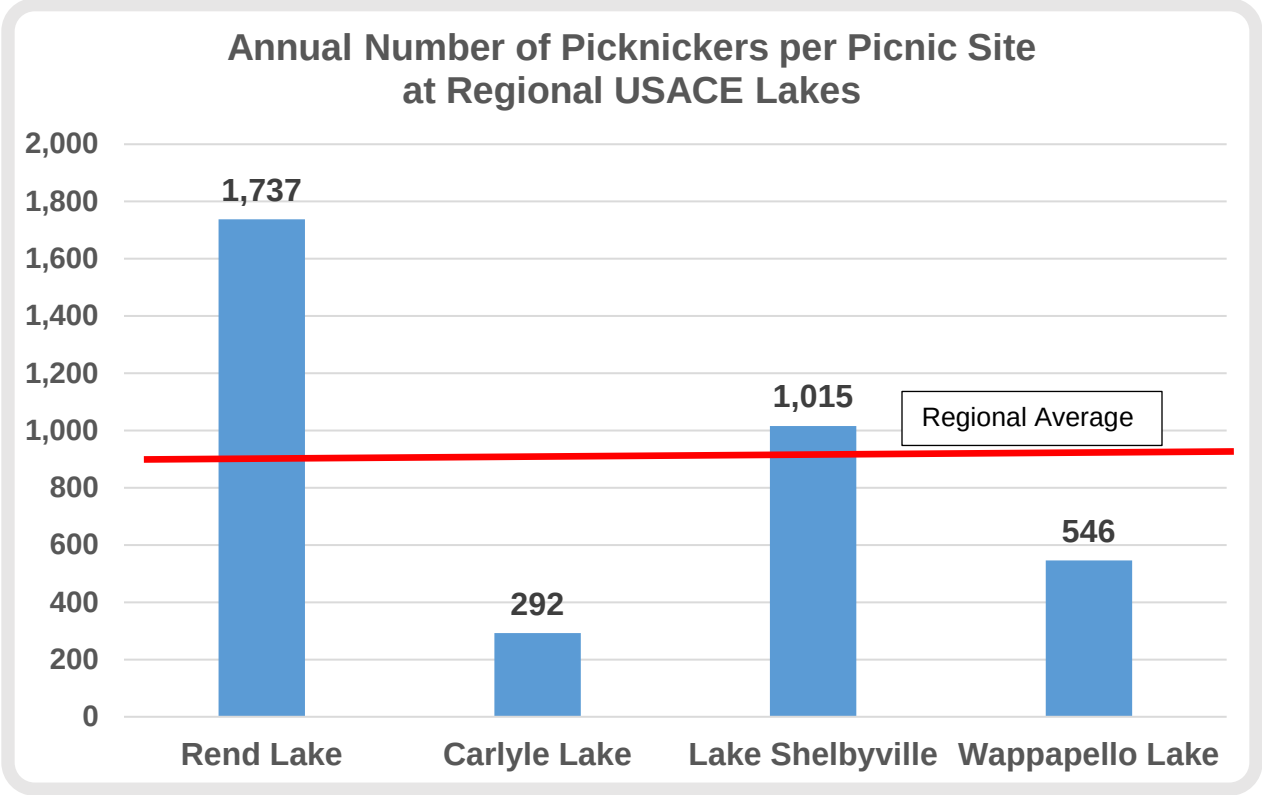


Source: USACE, Value to the Nation, 2016

7) Annual Number of Picnickers per Picnic Site

Figure 2-13 depicts the annual number of picnickers per picnic site. Within the region, there is an average of 898 annual picnickers per picnic site (depicted by red line). Rend Lake has the highest number of picnickers per picnic site, compared to other regional USACE lakes. This implies there is a lack of picnic sites at Rend Lake and the number of picnic sites could be increased to better serve visitor needs.

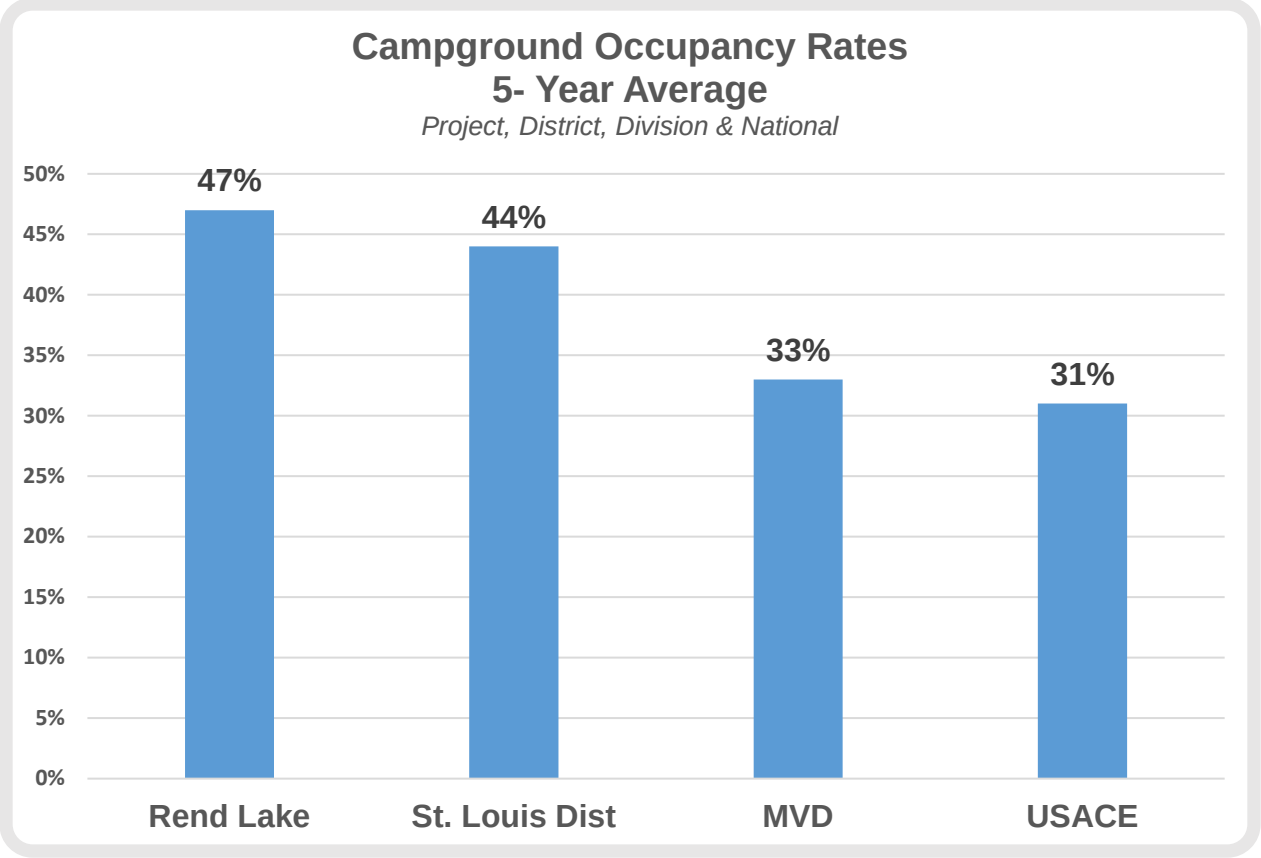
Figure 2-13: Annual Number of Picnickers per Picnic Site



8) Camping – Annual Occupancy Rate Comparison

Within the region there are 3,246 campsites, and 758 of those are located at Rend Lake. The 5-Year Average Annual Occupancy Rate for recreation facilities (mostly campgrounds) at Rend Lake is above average for the region. To provide a more comprehensive analysis for this measure, occupancy rates for all lakes within the St Louis District, the Mississippi Valley Division, and USACE lakes nation-wide are also compared. **Figure2-14**.

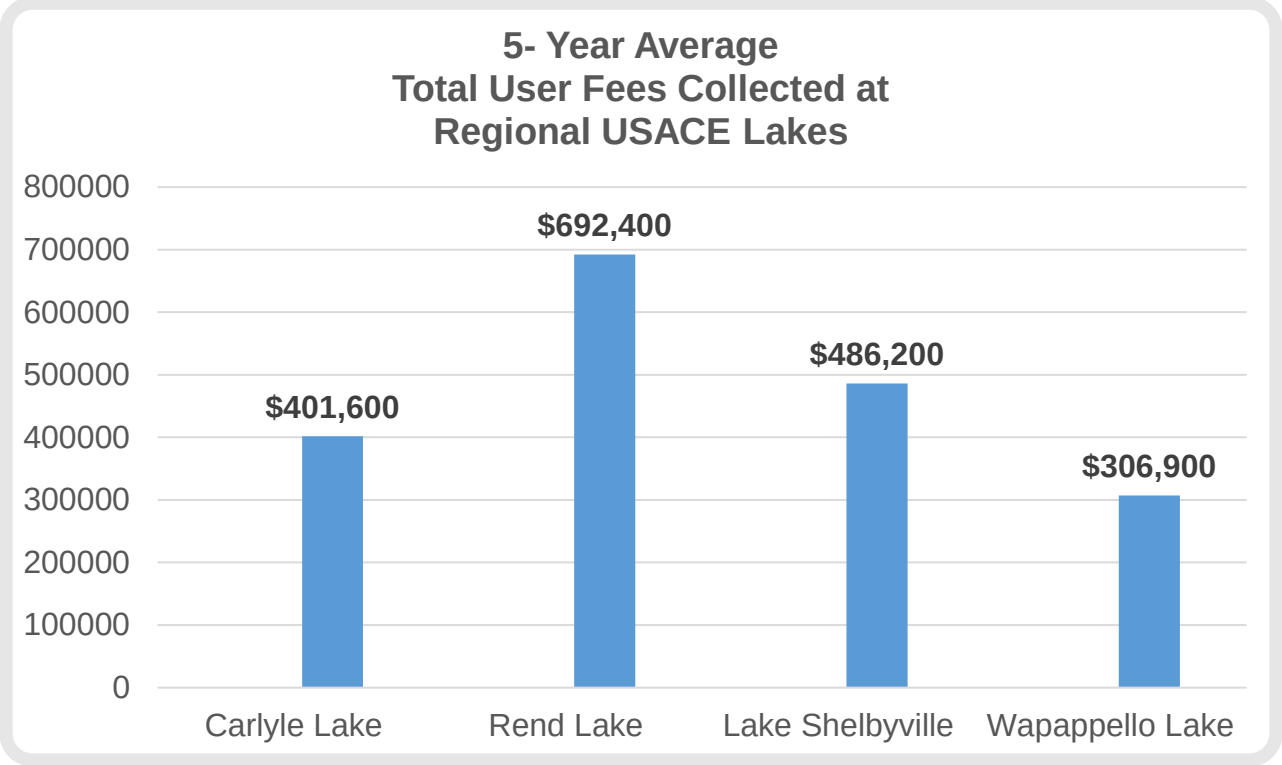
Figure 2-14: Campground Occupancy Rates for USACE



Source: NRRS

The 5-Year average amount of Recreation User Fees collected at Rend Lake is significantly higher than other USACE lakes within the region. This is depicted in **Figure 2-15.**

Figure 2-15: 5-Year Average - Recreation User Fees Collected at USACE Regional Lakes

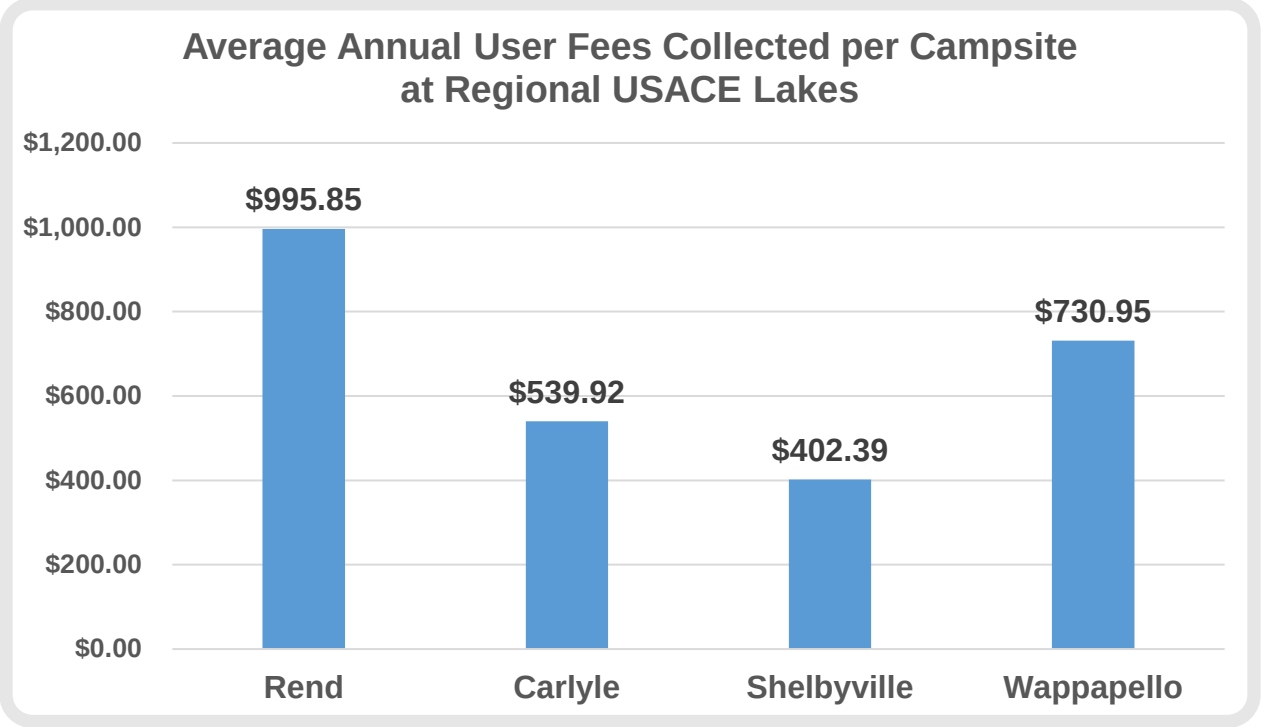


Source: NRRS

Another measure of interest is the amount of User Fees collected per campsite at regional USACE lakes, which is depicted in **Figure 2-16.**

The data reveals there is high demand for campsites at Rend Lake and additional camping opportunities would most likely be used, if provided.

Figure 2-16: User Fees Collected per Campsite at Regional USACE Lakes



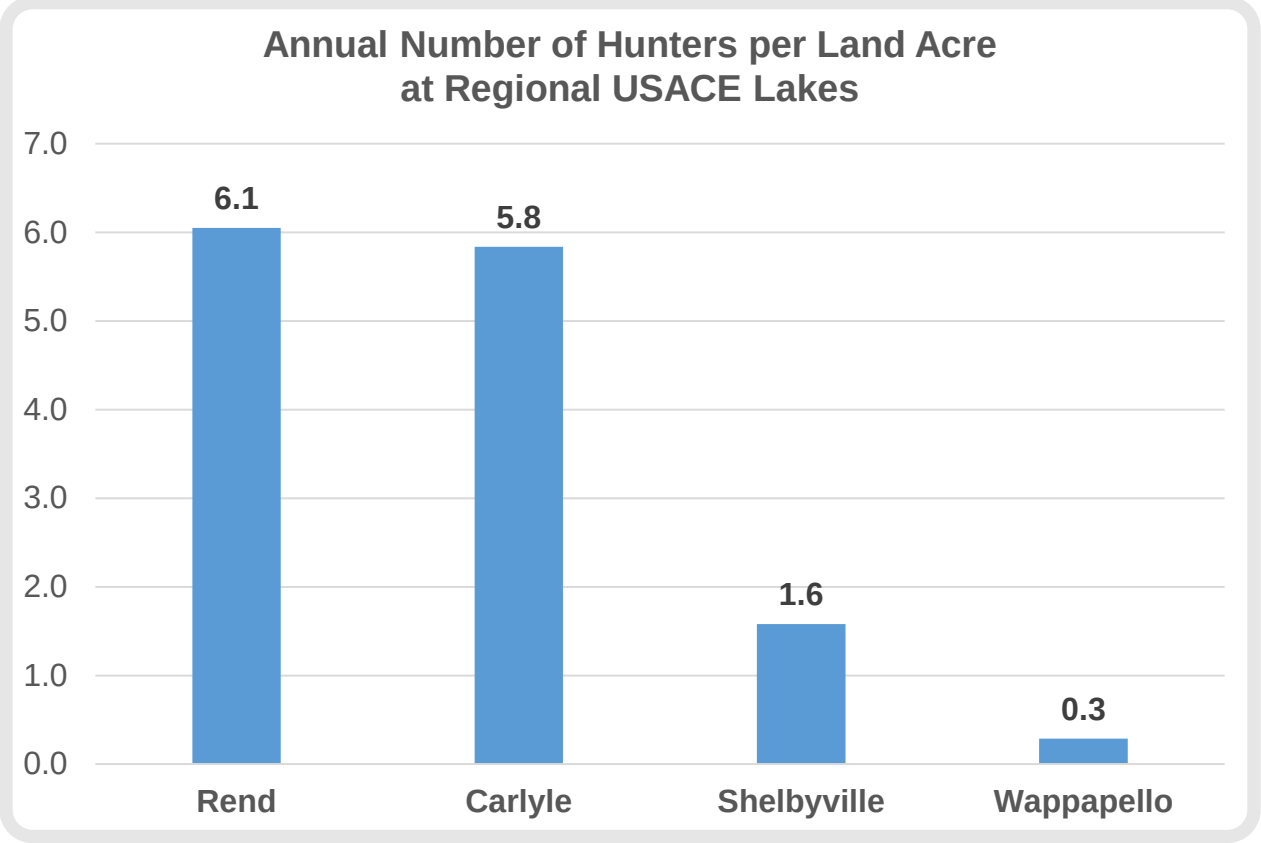
Source: NRRS

9) Hunting

A review of hunting-related data and information indicate within the region there is an average of 2.69 hunters per acre of land and on average, there is .37 acres of land available per hunter. **Figure 2-17** depicts the annual number of hunters per land acre at USACE-managed lakes in the region, while **Figure 2-18** depicts the number of land acres per hunter.

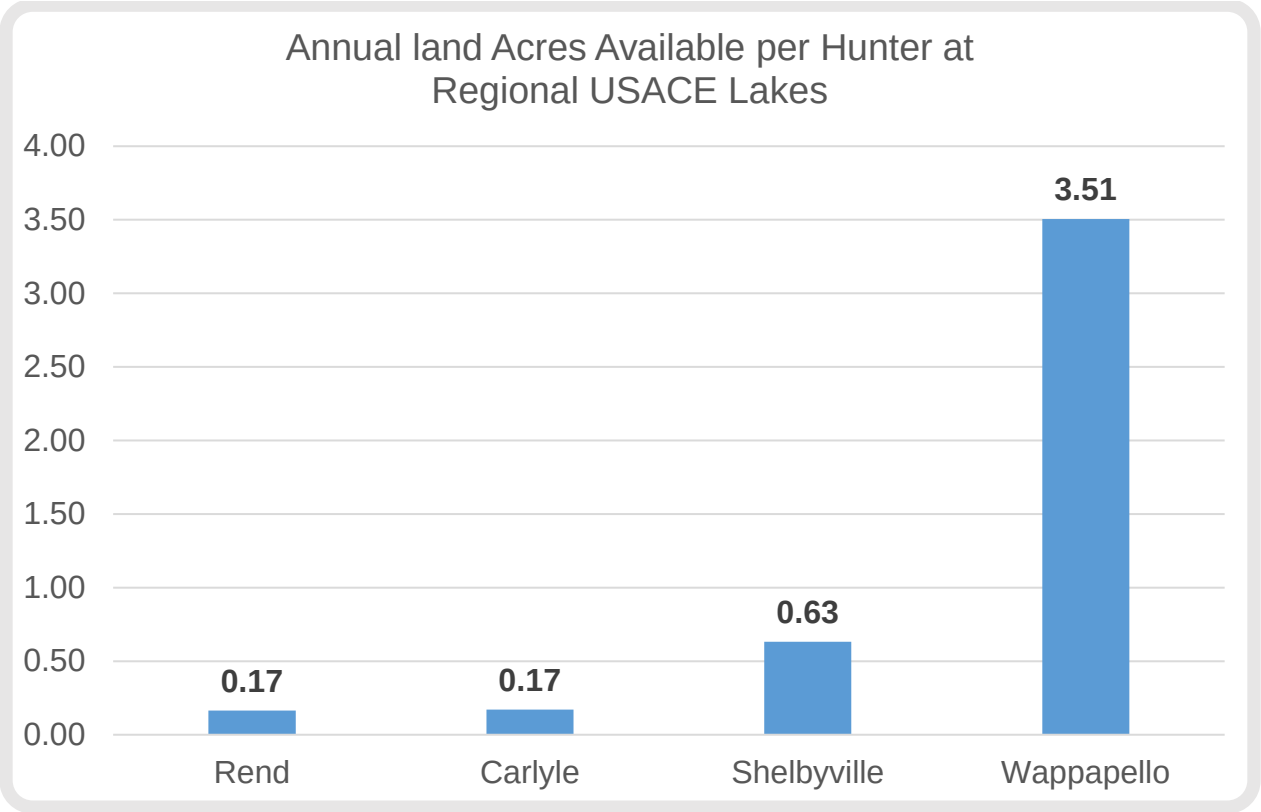
The data reveals that hunting is an extremely important activity at Rend Lake. In addition, hunting activities at Rend and Carlyle Lakes are conducted on a relatively small number of acres per hunter.

Figure 2-17: Annual Number of Hunters per Land Acre at Regional USACE Lakes



Source: USACE, Value to the Nation, 2016

Figure 2-18: Annual Number of Acres Available per Hunter at Regional USACE Lakes

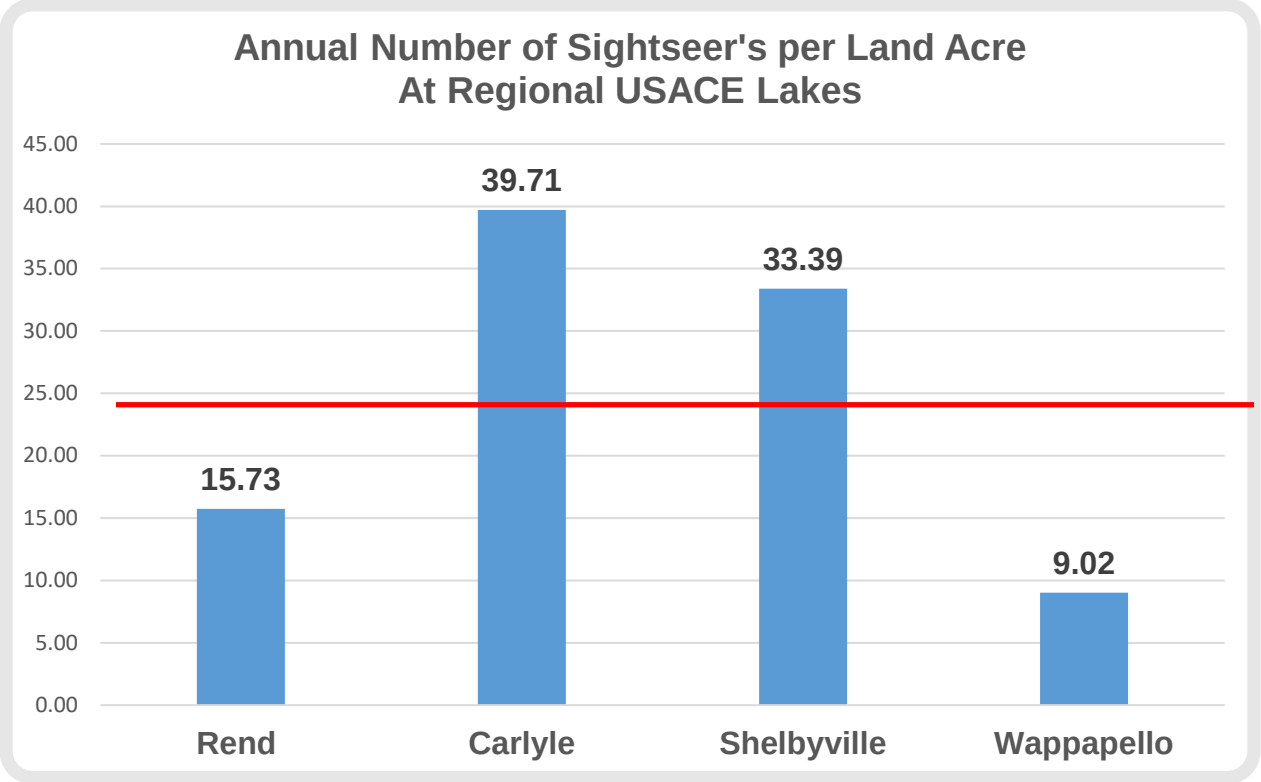


Source: USACE, Value to the Nation, 2016

10) Sightseeing

Figure 2-19 depicts the annual number of sightseers per land acre for USACE-managed projects in the region. Carlyle Lake and Lake Shelbyville have a significantly higher number of sightseers than other projects in the region. Carlyle Lake has significantly more annual sightseers per land acre than the regional average of 24 (depicted by red line). The reason for this is most likely because Carlyle Lake and Lake Shelbyville are in closer proximity to more populated places than Wappapello Lake and Rend Lake.

Figure 2-19: Annual Number of Sightseer's per Land Acre at Regional USACE Lakes



Source: USACE, Value to the Nation, 2016

B. Water-Based Recreation and Land/Water Interface Recreation Facilities

There are a variety of water-based recreation opportunities/activities and land/water interface recreation facilities located within the region and at Rend Lake. This section of the recreation analysis focuses on recreational activities that typically occur on water, such as swimming, boating, fishing, and water skiing/tubing, as well as the land/water interface recreation facilities that enable those opportunities and activities.

According to the National Recreation and Park Association, water is the number one recreation attraction in America. Swimming in lakes, streams and waters is ranked among the top ten recreational activities. Lakes and oceans remain the top vacation destinations in America. Whether one uses aquatic resources to swim, boat, ski, or fish or simply to take advantage of surrounding resources such as bicycle paths, walkways, and hiking trails, water is a recreation resource that offers rest, relaxation, fun, and fitness.

1) Regional Land/Water Interface Recreation Facilities

This analysis is limited to Rend Lake and the three other USACE projects within the region; Carlyle Lake, Lake Shelbyville and Wappapello Lake.

Water-based recreational opportunities are basically determined and limited by the quantity of land/water interface recreation facilities that provide access to the water, such as boat ramps, marinas, swim beaches, and community docks. A desktop inventory of these facilities was conducted in order to quantify the water-based recreational opportunities available within the region.

Table 2-11 depicts the number and type of land/water interface recreation facilities at USACE projects within the region. The percentage of regional land/water interface facilities located at Rend Lake is:

a. Water Surface Acres – 30%

b. Public Boat Ramps – 28%
c. Car/Trailer Spaces – 18%
d. Marina Slips – 12%
e. Swim Beaches – 5%

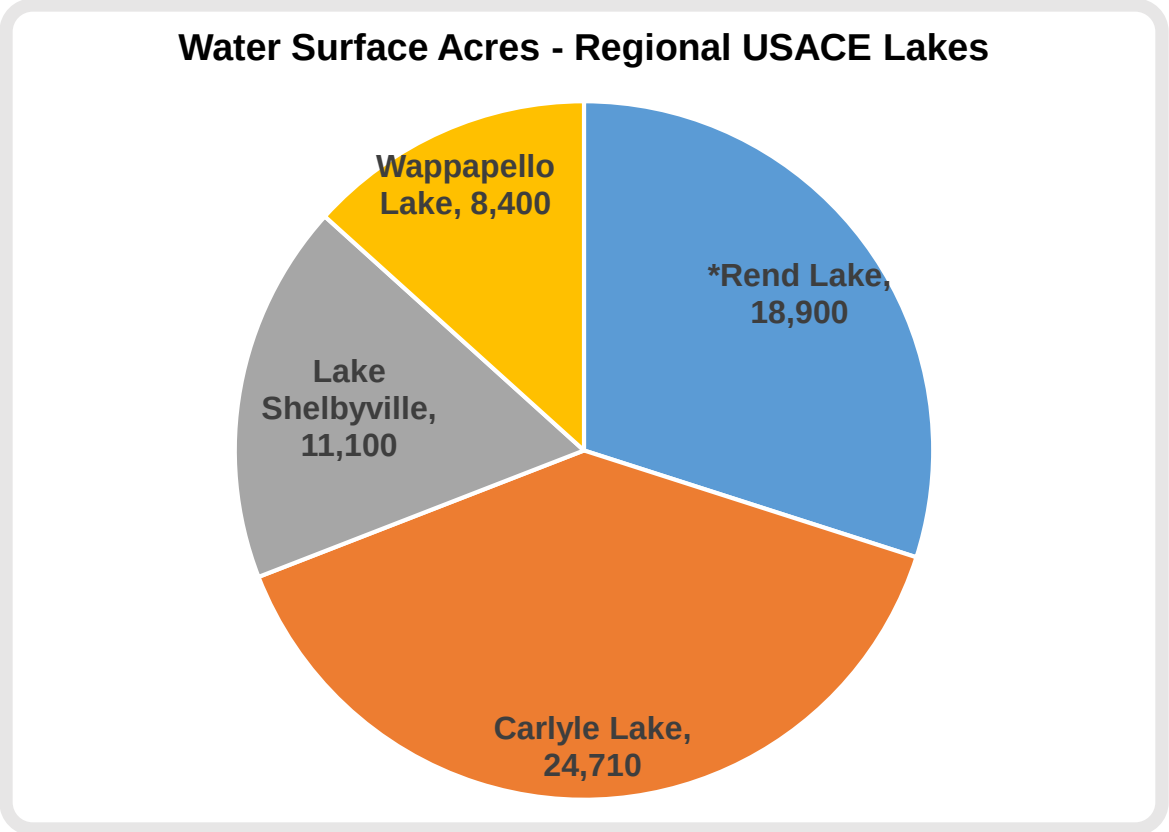
Table 2-11: Land/Water-Based Recreation Facilities at USACE Regional Lakes

Lake Name	Water Surface Acres	Boat Ramps/ Launch Lanes	Car-Trailer Spaces	Marina Slips (wet & dry)	Swim Beaches	Car Parking Spaces at Swim Beaches
Rend Lake	18,900*	30/57*	724*	274	1	461
Carlyle Lake	24,710	24/45	1,286	670	6	1,235
Lake Shelbyville	11,100	32/55	1,362	912	7	1,375
Wappapello Lake	8,400	24/38	721	482	7	517
Total	**63,110**	**109/195**	**4,093**	**2,338**	**21**	**3,588**

Source: USACE, Value to the Nation, 2016 and OMBIL
**Data from the data source do not reflect the change in data identified elsewhere in this report.*

Figure 2-20 is a chart depicting the water surface acreages at USACE regional lakes.

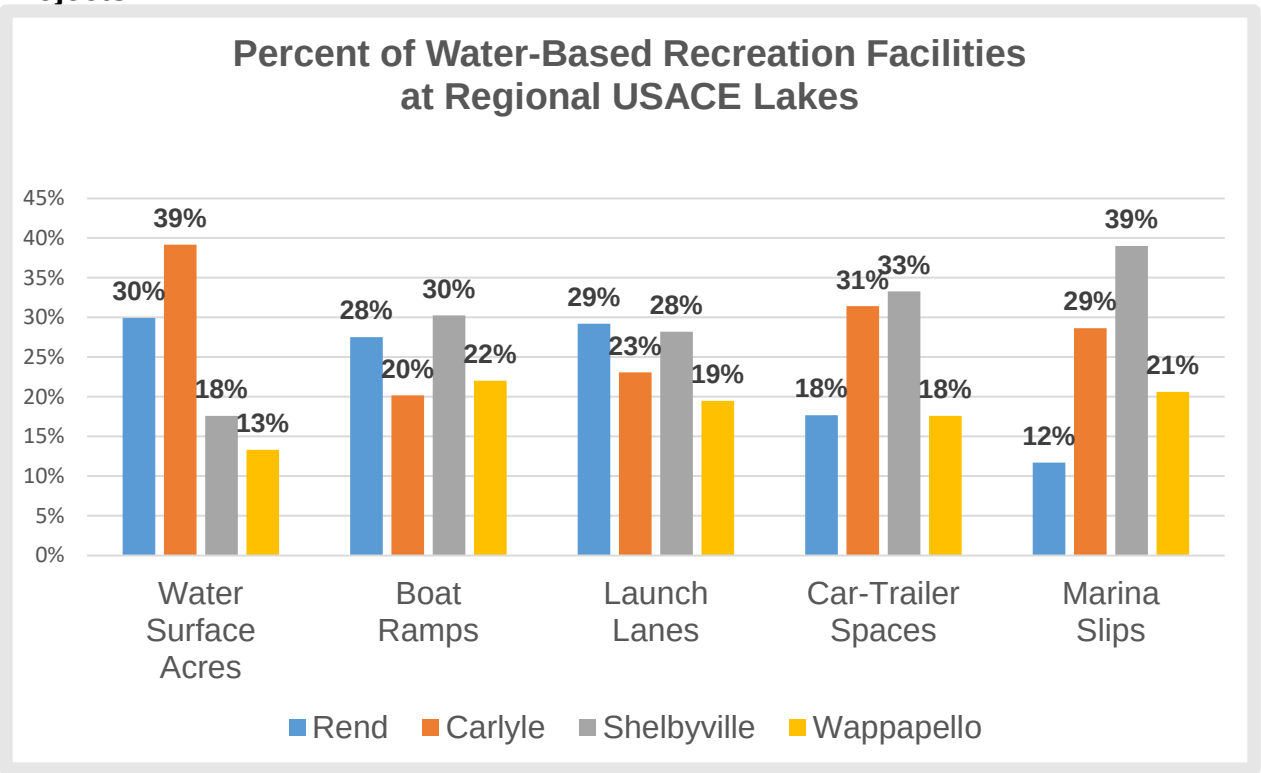
Figure 2-20: Water Surface Acres – Regional USACE Lakes



Source: OMBIL
**Acreages from the data source do not reflect the change in acreages identified elsewhere in this report for Rend Lake (20,633 surface acres)*

Figure 2-21 depicts the percentage of water-based recreation facilities at regional USACE lakes.

Figure 2-21: Percent of Water-Based Recreation Facilities at Regional USACE Projects



Source: OMBIL
**Water Surface Acres from the data source do not reflect the change in acreages identified elsewhere in this report*

2) Regional Water-Based Recreation Opportunities

Land/water interface recreation facilities are the critical links that allow water-based recreation opportunities to be provided and activities to occur. Land/water interface recreation facilities include boat ramps, swimming beaches, marinas and community docks. Water-based recreation opportunities would not exist if not for the land/water interface recreation facilities. Recreational boating activities cannot occur without a marina, boat ramp, or boat dock to provide access to the water surface. Likewise, swimming at designated locations cannot occur, if not for the swimming beach. This is true for all types of water-based recreation activities.

a. Boating

Recreational boating opportunities are largely dependent upon and limited by the quantity of land/water interface recreational facilities such as, boat ramps, marinas, and boat docks, which provide access to the water. Regional recreation boating opportunities were calculated by adding the following facility numbers together for USACE projects within the region:

- Number of Car/Trailer Parking Spaces at public boat ramp parking lots
- Number of Marina Slips (wet & dry)
- Number of boats served by community docks

Using data from **Table 2-12**, the following formula was used to estimate regional recreational boating opportunities:

4,093 (car/trailer spaces at public boat ramps)
+ 2,338 (marina slips)
+ 170 (boats served by community docks – Carlyle Lake Only)
= 6,601 (Regional Recreational Boating Opportunity Coefficient)

According to U.S. Coast Guard statistics, 2002 National Recreational Boating Survey Report, the average number of people on-board a recreational boat when underway is three. Therefore, regional boating opportunities can be calculated by multiplying the regional boating opportunity coefficient (6,601) by 3 (6,601 X 3 = 19,803).

Therefore, within the region, there are **19,803** opportunities for people to go boating and participate in boating recreation-related activities at any given point in time.

b. Swimming

For the purposes of this analysis, swimming opportunities and activities were limited to swimming that occurs at designated swimming beaches at USACE lakes within the region.

Standards for the design and operation of swimming beaches at USACE lakes are contained in EM 1110-1-400, Recreation Facility and Customer Service Standards, 1 Nov 2004. Paragraph 5.4.4.1 indicates: “Swim area sizing should be based on the assumption that approximately 60% of the total number of beach users will be on the beach at one time, with 30% in the water and 10% elsewhere. As a rule of thumb, a turnover factor of 3 will be used for design purposes. Ideally, 50 square feet of sand and turf and 30 square feet of swimming area inside the buoyed safety area should be provided for each person. Swim area capacities will vary according to the attendance, supervision, size of swim area, anticipated usage, and type of swim area experience desired. Any space standard used to compute swim area capacity should be flexible enough to accommodate these factors. Parking areas should be sized to prevent overcrowding of swim areas.”

In addition, Table 2-4 of EM 1110-1-400 indicates there should be one car parking apace for every three swimmers, which is the same load factor used in the USACE – Visitor Estimating and Reporting System (VERS), which is used for calculating recreation visitation at USACE lakes. **Table 2-12** provides a regional summary of car parking spaces for recreation areas that contain a designated swimming beach.

Table 2-12: Car Parking Spaces at Designated Swimming Beaches at USACE Regional Lakes

Lake Name	Recreation Area	Car Parking Spaces
Rend Lake	South Sandusky	461
Rend Lake	**Total**	**461**
Carlyle Lake	Dam West	594

Lake Name	Recreation Area	Car Parking Spaces
Carlyle Lake	Coles Creek	286
Carlyle Lake	Dam East	217
Carlyle Lake	Keyesport	138
Carlyle Lake	**Total**	**1,235**
Lake Shelbyville	Coon Creek	42
Lake Shelbyville	Dam West	481
Lake Shelbyville	Lithia Springs	42
Lake Shelbyville	Sullivan Beach	244
Lake Shelbyville	Wilborn Creek	294
Lake Shelbyville	Wolf Creek SP	272
Lake Shelbyville	**Total**	**1,375**
Wappapello Lake	Peoples Creek	117
Wappapello Lake	Redman Creek	221
Wappapello Lake	Rockwood Point	93
Wappapello Lake	Wappapello SP	86
Wappapello Lake	**Total**	**517**
Grand Total		**3,588**

Source: OMBIL

c. Regional Swimming Opportunities

Using the information in **Table 2-13**, we can estimate the swimming opportunities available at USACE lakes within the region. The formula used to estimate swimming opportunities is:

Swimming Opportunities = (Number of Car Parking Spaces at Recreation areas with designated swim beaches) X 3 (VERS load factor and parking space requirement of Swim Beaches)

3,588 (Parking Spaces)
x 3 (Load Factor)
= 10,764 (Regional Swimming Opportunities)

Within the region, there are:

- 21 Swimming Beaches
- 3,588 car parking spaces located within recreation areas where swimming beaches are located
- 10,764 Recreational Swimming Opportunities
- 13% of the Swimming Opportunities available within the region are provided at Rend Lake

The following formula is used to calculate the square feet of water area needed for designated swim beaches within the region:

10,764 (Regional Swimming Opportunities)
X 0.30 (Estimated percentage of people in water)
= 3,229 (Maximum Estimated number of people in water swimming)
X 30 (Square feet per person)
= 96,876 SF (Regional Square Feet of swimming area needed inside buoyed safety areas)

d. Swimming Opportunities and Swim Beach Carrying Capacity – Rend Lake

While the square footage inside the buoyed swim areas is not known for other Regional Lakes, at Rend Lake there is 140,761 square feet of water surface area inside of buoyed swim areas at lake elevation 405.0 feet NGVD. Therefore the carrying capacity for swim beaches located at Rend Lake is 4,692 swimmers. The calculation used to determine swim beach carrying capacity is: (140,761 SF divided by 30 SF per person = 4,692 beach users).

The carrying capacity for swim beaches at Rend Lake greatly exceed the number of swimming opportunities provided. It appears beach sizes and water surface area inside of buoyed swim areas could be reduced without Impacting visitor use

- Swim Beach Carrying Capacity = 4,692 people
- Existing Swimming Opportunities = 1,383 people

e. Recreational Boating Opportunities and Carrying Capacity – Rend Lake

Rend Lake provides a wide variety of boating opportunities for all types of vessels, both powered and un-powered. USACE estimates for 2016[29], indicate there were 160,452 person trips at Rend Lake related to boating activities.

1. Boating Opportunities – Rend Lake

A boating opportunity is defined as the ability to access the water surface of the lake to participate in any type of boating-related outdoor recreation activity, through the use of an authorized land/water interface facility, such as a boat ramp, marina or boat dock.

At Rend Lake boating opportunities are provided through the following land/water interface facilities:

a. Wet Storage slips at commercial marinas – 274
b. Dry storage slips at commercial marinas – 103
c. Car/Trailer spaces at outgranted recreation areas – 488
e. Car/Trailer spaces at USACE recreation areas – 236

The combined total of these facilities (1,101), multiplied by the average number of people per boat (3), is equal to the number of boating opportunities currently available at Rend Lake, which equates to 3,303.

2. Boating Capacity – Rend Lake

A variety of boating capacity studies have been conducted for a wide range of lakes throughout the United States. No two studies or outcomes from those studies are the same and there are no agreed-upon scientific standards, processes or procedures for establishing a definitive boating capacity for a particular body of water. For the purposes of this Master Plan update, a nationwide

[29] USACE, Value to the Nation, 2016

literature review was conducted, which identified previously conducted studies of a similar nature. These studies were screened for similarities and differences with the existing conditions at Rend Lake. These studies were then used as a resource in order to identify the most appropriate methods for determining the boating capacity at Rend Lake. Each of the studies included as part of this review are cited in Chapter 9, Bibliography.

3. Lake Use Rate – Rend Lake

Lake use rate is a measure of the estimated number of boats on the lake at any given time from all land/water interface facilities, such as marinas and boat ramps. This is also known as the Boats At One Time (BAOT) coefficient. In the studies reviewed, lake use rates ranged from 10% to 50%, with the most commonly recommended range between 10% and 35%. Based on a review of similar studies it was determined the appropriate lake use rate for Rend Lake to be 15%. Therefore, the BAOT coefficient for Rend Lake is approximately **495**, which is calculated by multiplying the boating opportunities by 15% (3,303 X .15 = 495)

4. Useable Lake Area – Rend Lake

There are 17,171 water surface acres classified as “Open Recreation” for Rend Lake. Generally, these water surface acres are those **not** classified as Fish & Wildlife Sanctuary, Restricted, or designated “No-Wake”.

With this amount of “Open Recreation” water classification, it is highly improbable the boating capacity of the lake will ever be exceeded, since this would require the number of boating opportunities to be greater than 8,500, where currently they are 3,303. Based on this information, the lake can easily accommodate all boating activities for the foreseeable future.

2.13. RELATED RECREATIONAL, HISTORICAL AND CULTURAL AREAS

Rend Lake is the primary source of outdoor recreational activities in the area. Crab Orchard Lake, Little Grassy Lake, and Devils Kitchen Lake, located in Crab Orchard National Wildlife Refuge, are the closest lakes to Rend Lake. Lake Kinkaid and Lake of Egypt are also within a one-hour drive from Rend Lake. However, these lakes are relatively small compared to Rend Lake, but do offer fishing, hunting, hiking, sightseeing, camping, picnicking and boating opportunities.

Shawnee National Forest is within a one-hour drive and offers unique recreational opportunities for backwoods hiking over rugged rocky bluffs at Garden of the Gods Area. Rend Lake shooting complex near Rend Lake College, and the World shooting Complex managed by the Illinois Department of Natural Resources near Sparta, IL offer trap, skeet, and clay shooting opportunities.

Other unique opportunities in Southern Illinois include, scenic driving tours along the banks of the Mississippi and Ohio Rivers, outdoor programs at Crab Orchard National Wildlife Refuge and Touch of Nature, and a museum and battle re-enactments at Fort Massac State Park, located on the Ohio River at Metropolis, IL.

St. Louis, Missouri is located 100 miles northwest of Rend Lake, providing suburban residents the opportunity to enjoy outdoor recreation opportunities within a one or two hour drive from home.

2.14. REAL ESTATE

2.14.1. Acquisition Policy

Land acquisition for the Rend Lake project was accomplished by the Rend Lake Conservancy District (RLCD), who is the local sponsor for the project. Preliminary studies for the project determined the acquisition line to be all lands below 415.0 feet NGVD, which totaled 32,400 acres. Additional lands acquired included:

A. 1,400 acres for public use recreational development
B. 120 acres for public hunting and fishing access
C. 750 acres for the outlet channel at the dam site
D. 230 acres for road relocations

In total, 34,900 acres of land were acquired in fee title by the RLCD, for the Rend Lake project. Once acquired, ownership of the land was transferred in fee title to the USACE.

In addition to the lands acquired for Federal ownership, RLCD also acquired lands located within a quarter-mile strip outside the acquisition line of 415.0 feet NGVD. Ownership of this land allowed RLCD to control the course of development for the reservoir area, such as parks, recreational and residential areas, business enterprises and other related developments.[30]

Because of the unique process used for authorizing the construction of Rend Lake, it is important to retain authorizing documentation associated with the authorization of Rend Lake, for historical posterity. Therefore, the authorizing documentation for Rend Lake is included as **Appendix E**.

2.15. PERTINENT PUBLIC LAWS

Development and management of authorized USACE reservoir projects is provided through the enactment of several public laws. These laws direct the USACE to provide recreation opportunities and facilities, maintain and enhance fish and wildlife habitat and protect natural resources.

2.15.1. Recreation. Development and management of recreation opportunities and facilities by the USACE, other governmental agencies, local groups, or individuals is authorized through the following public laws:

A. **Section 4 of the Flood Control Act (PL 78-534)**, 22 December 1944, authorizes providing facilities for public use, including recreation, and conservation of fish and wildlife.

B. River and Harbors Act (PL 79-14), 2 March 1945, specifies the rights and interests of the states in watershed development and water utilization and control, and the requirements for cooperation with state

[30] Page 31, Rend Lake Reservoir, Letter from the Secretary of Army, Transmitting a Letter from the Chief of Engineers, Department of the Army, Dated July 6, 1962, Submitting a Report, Together with Accompanying Papers and Illustrations, on an Interim Report on the Rend Lake Reservoir, Illinois, Requested by a Resolution of the Committee on Public Works, House of Representatives, Adopted July 6, 1949.

agencies in planning for flood control and navigation improvements.

C. Section 209 of the Flood Control Act of 1954 (PL 83-780), 3 September 1954, amended the Flood Control Act of 1944. Authorizes the Secretary of the Army to grant leases to federal, state or governmental agencies without monetary considerations for use and occupation of land and water areas under the jurisdiction of the Department of the Army for park and recreation purposes when in the public interest.

D. **Land and Water Conservation Fund Act of 1965 (PL 88-578),** 1 September 1964 as amended, contains provisions by which the USACE may charge for admission and use of its recreation areas under prescribed conditions.

E. Federal Water Project Recreation Act (PL 89-72), 9 July 1965, contains cost sharing provisions for acquisition of lands and development of recreation facilities for water resource projects authorized after 1965. It also provides for cost sharing development of new areas that were not part of initial project construction.

F. Architectural Barriers Act of 1968 (PL 90-480 as amended), provides information and guidance regarding universal accessibility for USACE recreation facilities and programs for persons with disabilities.

G. **Rehabilitation Act of 1973 (PL 93-112) and the Rehabilitation Act Amendments of 1974 (PL 93-516)**, (see Architectural Barriers Act above).

H. Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978 (PL 95-602), (see Architectural Barriers Act above).

I. Americans with Disabilities Act of 1990 (PL 101-336), (see Architectural Barriers Act above).

J. Architectural Barriers Act (ABA), 2010, Standards and Guidelines for

Accessible Design.

K. Accessibility Guidelines for Outdoor Developed Areas, 26 September 2013, provides guidance published by the Architectural and Transportation Barriers Compliance Board for outdoor recreation areas and facilities.

L. Water Resources Development Act of 1992 (PL 102-580), 31 October 1992, authorizes the Challenge Cost Sharing Program (Section 225) that permits the USACE to develop and implement a program to accept contributions of funds, materials and services from non-Federal public and private entities for use in managing recreation facilities and natural resources. This is known as the Challenge Partnership Program.

M. Omnibus Budget Reconciliation Act - Day Use Fees (PL 103-66), 10 August 1993, contains provisions by which the USACE may collect fees for use of developed recreation sites and facilities, including campsites, swimming beaches, and boat launching ramps. However, it excludes assessing fees for boat launching ramps in undeveloped or lightly developed areas where only minimum security and illumination is provided.

N. Water Resources Development Act of 1996, 12 October 1996. Section 208 (Recreation Policy and User Fees) (PL 104-303) directed that increased emphasis be placed on recreation opportunities at USACE projects and specifies that a portion of recreation fees collected at USACE projects remain for use at the project where they are collected. Section 519 (Recreation Partnership Initiative) directed the USACE to promote Federal, non-Federal, and private sector cooperation in creating public recreation opportunities at USACE projects.

O. Water Resources Development Act of 2016, as amended 15 September 2016. (Sec. 1007) The Water Resources Development Act of 1992 (WRDA 1992) is amended to authorize the Corps of Engineers

to allow a nonfederal public or private entity that has entered into a cooperative agreement for the operation and management of recreation facilities and natural resources at civil works projects under the Corps' jurisdiction to collect user fees for the use of developed recreation sites and facilities, whether developed or constructed by such entity or the Corps. An entity may: (1) use any visitor reservation service that the Corps of Engineers has provided for by contract or interagency agreement to manage fee collections and reservations, subject to the Corps' terms and conditions; and (2) retain the fees collected to pay for operation, maintenance, and management at the recreation site where they were collected.

2.15.2. Fish and Wildlife. Fish and wildlife resources are maintained and protected in compliance with the following public laws:

A. **Fish and Wildlife Coordination Act**, 10 March 1934, as amended, 14 August 1946 (PL 79-732), 1958 (PL 85-624), provides authority for making project lands available for management by interested Federal and state wildlife agencies, for wildlife management purposes. It further provides for more effective integration of fish and wildlife conservation programs at Federal Water Resource projects.

B. **National Environmental Policy Act of 1969**, as amended (42 USC 4321 et seq), declares a national environmental policy and requires that all Federal agencies shall, to the fullest extent possible, use a systematic, interdisciplinary approach which integrates natural and social sciences and environmental design in their planning and decision making processes.

C. **National Environmental Policy Act (NEPA**), is a United States environmental law that promotes the enhancement of the environment and established the President's Council on Environmental Quality (CEQ). The law was enacted on January 1, 1970.

D. **Endangered Species Act of 1973,** as amended (16 USC

1531 and 1536) requires that Federal agencies shall, in consultation with the U.S. Fish and Wildlife Service (USFWS) (or the National Marine Fisheries Service), use their authorities in furtherance of conserving endangered and threatened species and take such action as necessary to assure that their actions are not likely to jeopardize such species or destroy or modify their critical habitat.

E. Resource Conservation and Recovery Act (RCRA), gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. The law was enacted 1976

F. **Water Resource Development Act of 1986**, (PL 99-662) Section 1135, provides for modification to structures or operations of a project, consistent with authorized project purposes, to improve the quality of the environment, i.e. restoration of fish and wildlife habitat. WRDA 1996 amended Section 103 of WRDA 1986 by specifying that the non-Federal share of environmental restoration and protection projects shall be 35 percent.

G. Executive Order 12962, 7 June 1995, as amended, Recreational Fisheries, directs Federal agencies to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities. In addition, it establishes a National Recreational Fisheries Coordination Council consisting of seven members (including one designated by the Secretary of Defense). The “Coordination Council” is charged with developing a comprehensive Recreational Fishery Resources Conservation Plan. This EO also directs all Federal agencies to identify and minimize conflicts between recreational fisheries and their responsibilities under the Endangered Species Act of 1973 and expands the role of the Sport Fishing and Boating Partnership Council.

2.15.3. Forest Resources

Protection and improvement of natural resources are maintained and protected through the following public laws:

Forest Conservation Act (PL 86-717), 6 September 1960, provides for the protection of forest cover in reservoir areas, and specifies that reservoir areas of projects for flood control, navigation, hydroelectric power development, and other related purposes, owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers, shall be developed and maintained so as to encourage, promote and assure fully adequate and dependable future resources of readily available timber through sustained yield programs, reforestation, and accepted conservation practices, and to increase the value of such areas for conservation, recreation and other beneficial uses; provided, that such development and management is accomplished to the extent practicable and compatible with other authorized project purposes. The law further provides in order to carry out the national policy declared in the first section of this Act, the Chief of Engineers, under the supervision of the Secretary of the Army, shall provide for the protection and development of forest or other vegetative cover and the establishment and maintenance of other conservation measures on reservoir areas under his jurisdiction, so as to yield the maximum benefit and otherwise improve such areas. Programs and policies developed pursuant to this act are to be coordinated with the Secretary of Agriculture, and appropriate state conservation agencies.

2.15.4. Other Incidental Uses

A. Title 10, United States Code, Section 2667, authorizes the lease of land and water areas at Civil Works projects for any commercial or private purpose, not inconsistent with authorized project purposes and subject to specific restrictions thereupon, as set out in regulations, policy, and Delegations of Authority. The use of project lands for easements and licenses is authorized in various Congressional Acts and codified in Titles 10, 16, 30, 32 and 43 of the United States Code.

B. Title 16, United States Code, Section 460d, authorizes use of public lands for any public purpose, including fish and wildlife management, if it is in the public interest. .

C. Uniform Real Property Acquisition and Relocation Assistance

Act of 1970, (PL 91-646), as amended, requires lands and rights-of-way to be acquired pursuant to provisions of the act.

2.15.5. Cultural and Historical Resource Considerations. A variety of public laws mandating the protection of cultural resources on public lands have been enacted. They include:

A. The National Historic Preservation Act of 1966 (PL 89-665), 15 October 1966, as amended through 2014 (PL 91-243, PL 93-54, PL 94-422, PL 94-458, PL96-1999, PL 96-244, PL 96-515, PL98-483, PL 99-514, PL 100-127, PL 102-575, PL 103-437, PL 104-333, PL 106-113, PL 106-176, PL 106-208, PL 113-287 and PL 106-355), states a policy of preserving, restoring, and maintaining cultural resources and requires Federal agencies to take into account the impacts their activities may have on sites potentially eligible for inclusion in the National Register of Historic Places.

B. Archaeological and Historic Preservation Act of 1974, as amended (54 USC 312501, et seq.) the 1960 Reservoir Salvage Act (PL 86-523), provides for the preservation of historical and archaeological data that might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any Federal construction projects.

C. American Indian Religious Freedom Act of 1978 (PL 95-341), 11 August 1978, protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

D. Archeological Resources Protection Act of 1979 (PL 96-95), (16 USC 470aa, et seq.), 96th Congress Revision and update of 1906 Antiquities Act protects archaeological resources and sites that are on public lands and Indian land, and fosters increased cooperation and exchange of information between governmental authorities, the professional community, and private individuals.

E. Native American Graves Protection and Repatriation Act

(PL 101-601), 16 November 1990, requires Federal agencies and museums to inventory and summarize human remains, funerary objects, sacred objects, and objects of cultural patrimony and to provide this information to potentially affiliated Native American Tribes. The Act requires repatriation of these items, upon request and following the guidelines in 43 CFR Part 10, to the cultural affiliated tribe(s) and establishes a grant program within the Department of the Interior to assist tribes with repatriation and museums in preparing the inventories and collection summaries. The act also outlines the procedures that Federal agencies must follow in the event of an inadvertent discovery or unintentional excavation of human remains and funerary objects from Federal or tribal lands.

F. Indian Sacred Site, Executive Order 13007, 24 May 1996, directs Federal land-managing agencies to accommodate Native American use of sacred sites for religious purposes and to avoid adversely affecting the physical integrity of sacred sites. Agencies are required to develop procedures for reasonable notice to tribes of a proposed action or land management policy that may restrict access to, or ceremonial use of, a sacred site or adversely affect its physical integrity.

G. Water Resources Development Act of 2000, (PL 106-541), Section 208, authorizes the Army to rebury Native American human remains that were discovered on Civil Works project lands and have been rightfully claimed by a tribe on those lands.

2.16. MANAGEMENT PLANS

A variety of management plans are used to guide the Operation and Maintenance activities at Rend Lake. The name of the plan, a brief description about the plan and the year the plan was approved, is presented in **Table 2-13.**

Table 2-13: Management Plans – Rend Lake

Name of Plan	Plan Description	Year Approved/ Updated
Rend Lake Safety Plan	This plan identifies known and potential health and safety hazards for employees, contractors, and members of the public, and provides a plan for mitigating the risk.	2014
Rend Lake Water Control Manual	This plan presents the detailed plan of regulation and pertinent information relative to Rend Lake	2015
St. Louis District Cultural Resource Management Plan – Rend Lake	This plan presents the detailed management plan for cultural resources found at Rend Lake	1985
Flood Emergency Plan – Rend Lake	This plan identifies the procedures that are implemented when pool elevation exceeds 405.0 feet NGVD, which is the top of the normal recreation pool elevation. This plan identifies each of the facilities impacted at various lake elevations.	2015
Rend Lake Operational Management Plan	The purpose of the OMP is to prescribe specific operation and maintenance procedures and guidance required to implement and achieve resource use objectives and concepts approved in the project master plan.	2003
Rend Lake Physical Security Plan	This plan prescribes policies, procedures, and responsibilities to ensure the physical security of all public property and facilities located at Rend Lake.	2016
Rend Lake Spill Prevention, Control, and Countermeasure Plan (SPCCP)	This plan provides a detailed plan for the prevention and containment of hazardous substances resulting from USACE activities at Rend Lake.	2015

Name of Plan	Plan Description	Year Approved/ Updated
St. Louis District Operations Management Manual	The purpose of the OMM is to draw together natural-resources and recreation-management policies and procedures so that public services provided by all CEMVS-OD operational projects may be administered in a consistent manner	2010
St. Louis District Cultural Resources Management Policy	Provides policy guidance for the protection of cultural resources located on projects within the St. Louis District	1982
St. Louis District Policy for the Management of Flowage Easement Lands	Provides guidance and policy for management of flowage easement lands. The permit and consent approval process is identified.	2011
St. Louis District Historic Properties Management Plan (HPMP)	Serves as a guide to ensure laws and regulations related to historic properties management are implement at all projects within the St. Louis District	1986
St. Louis District Handbook on Oil and Gas Development	Provides guidance on the decision making process and procedures for issuing outgrant's for Oil and Gas development on USACE properties.	1994

CHAPTER 3

RESOURCE OBJECTIVES

3.1. Rend Lake Master Plan Vision Statement

The Rend Lake Master Plan Update 2018 vision statement was developed to help guide the process of updating the Rend Lake Master Plan:

"Conserve the natural, cultural, and community resources in a sustainable manner to provide benefits for current and future generations."

3.2. Resource Goals and Objectives

3.2.1. Resource Goals

The terms "goal" and "objective" are often defined as synonymous, but in the context of this Master Plan, goals express the overall desired end state of the Master Plan, whereas resource objectives are the specific task-oriented actions necessary to achieve the overall Master Plan goals. The goals for the Rend Lake Master Plan are:

a. **Goal A**. Provide best management practices to respond to regional needs, resource capabilities and suitability, and expressed public interests consistent with authorized project purposes.

b. **Goal B**. Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.

c. **Goal C**. Provide public outdoor recreation opportunities that support project purposes and public demands created by the project itself while sustaining project natural resources.

d. **Goal D**. Understand the particular qualities, characteristics, and potentials of the project.

e. **Goal E**. Provide consistency and compatibility with national objectives and other State and regional goals and programs.

f. **Goal F**. Monitor water quality of the lake and work with federal, state and local agencies to ensure any hazards or concerns are resolved.

3.2.2. Resource Objectives

Resource objectives are defined as clearly written statements that respond to identified issues and that specify measurable and attainable activities for resource development and/or management of the lands and waters under the jurisdiction of the USACE, St. Louis District, Rend Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, Environmental Operating Principles (EOPs), and applicable national performance measures. They are consistent with authorized project purposes, Federal laws and directives, regional needs, resource capabilities, and take public input into consideration. Recreational and natural resources carrying capacities were also accounted for during development of the objectives found in this Master Plan.

The Illinois State Comprehensive Outdoor Recreation Plan (SCORP) was considered as well. The objectives in this Master Plan, to the best extent possible, aim to maximize project benefits, meet public needs, and foster environmental sustainability for Rend Lake.

A. Recreational Objectives

1. Evaluate the demand for improved recreation facilities and increased public access on USACE-managed public lands and water for recreational activities (i.e. camping, walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.) and facilities (i.e. campsites, picnic facilities, overlooks, cabins, resorts, marinas, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots). Goal A, C, F

2. Monitor current public use levels and evaluate impacts from overuse and crowding, as well as underuse. Take action to prevent overuse, conflict, and public safety issues, and realign facilities to achieve optimal efficiency and O&M cost reduction. Goal A, C

3. Provide a unique natural resource and aesthetic-based recreation experience within the Rend Lake watershed. Goal A, B, C, D, F

4. Evaluate recreational use zoning and regulations for natural resource protection, quality recreational opportunities, and public safety concerns. Goal A

5. Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans. Goal B, C, E, F

6. Increase universally accessible facilities at Rend Lake. Goal A, C, E

7. Ensure consistency with the USACE Recreation Strategic Plan. Goal E

8. Implement actions that support the Illinois Statewide Comprehensive Outdoor Recreation Plan (SCORP) to ensure consistency in achieving recreation goals. Goal E

B. Natural Resource Management Objectives

1. Actively manage and conserve forest, fish, and wildlife resources, special status species, by implementing ecosystem management principles and best management practices to ensure sustainability and enhance biodiversity. Goal A, B, D, E, F

2. Consider watershed approach during decision-making process. Goal E, F

3. Actively manage resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats. Goal B, E, F

4. Optimize use of resources (labor, funds, and partnerships) for management and prevention of invasive species. Goal B.

5. Minimize development on Federal lands to preserve the scenic beauty and aesthetics of the project. Goal A, B, C, D

6. Continually evaluate erosion control and sedimentation issues at Rend Lake. Goal A, B, E, F

7. Identify and protect unique or sensitive habitat areas. Goal A, B, D, E

8. Promote forest health through tree replacement and timber resource management actions to create a diverse and sustainable forest habitat. Goal A, B, D

9. Enhance aquatic habitat to ensure consistency with fisheries management improvement projects. Goal A, B, C, D, F

C. Environmental Compliance Objectives

1. Manage project lands and water to sustain healthy fish and wildlife populations and habitat conditions and avoid negative effects to public water supply, ensuring public health and safety. Goal A, B, C, D, E, F

2. Consider both point and non-point sources of water quality problems during decision making. Goal A, B, D, E, F

3. Maintain coordination, communication, and cooperation among regulating agencies and non-governmental organizations to resolve and/or mitigate environmental issues. Goal A, B, D, E, F

4. Ensure compliance with Environmental Review Guide for Operations (ERGO) at all Rend Lake facilities. Goal A, B, E, F

D. Interpretive Services and Outreach Program Objectives

1. Provide opportunities (i.e. town hall meetings) for communication among stakeholders, agencies, special interest groups, and the general public. Goal A, D, E, F

2. Continue providing educational and outreach programs. Topics to include Project operations, water quality, history, cultural resources, water safety, recreation, nature, and ecology. Goal A, B, C, D, E, F

3. Maintain a network among local, state, and federal agencies concerning the exchange of lake-related information for public education and management purposes. Goal A, D, E, F

4. Capture trends concerning boating accidents, drowning's and other incidents on public lands and waters and coordinate data collection with other public safety officials. Goal A, C, D, E

5. Promote the USACE Water Safety messages. Goal A, C, D, E

6. Educate adjacent landowners on public land use policies. Goal A, B, C, D, E

7. Continue to educate public on Rend Lake Water Control Plan and associated impacts to the surrounding communities. Goal A, C, D, E, F

E. Economic Impact Objectives

1. Balance economic and environmental interests involving Rend Lake. Goal A, B, C, D, E, F

2. Leverage resources and cooperation with stakeholders and local communities to promote tourism and recreational use of the lake. Goal A, B, C, D, E

3. Maximize economic benefits associated with USACE-related activities. Goal A, B, C, D, E

F. General Management Objectives

1. Secure sustainable funding for the Recreation and Environmental Stewardship programs. Goal A, B, C, D, E, F

2. Ensure consistency with USACE Campaign Plan (national level),

Implementation Plan (regional level), Operations Plan (District level). Goal E

3. Adapt to funding level changes in future years. Goal E

4. Foster the development of partnerships and look for ways to leverage dollars with organizations with common interests and objectives. Goal A, C, D.

5. Ensure consistency with Executive Order 13834, Regarding Efficient Federal Operations (May 17, 2018). Goal E

6. Evaluate non-recreation outgrant requests, such as utility easements, in accordance with national guidance set forth in ER 1130-2-550. Manage and administer outgrants in accordance with national guidance set forth in ER 405-1-12. Goal A, B, D, E

G. Cultural Resources Management Objectives

1. Monitor and coordinate lake development and the protection of cultural resources with State Historic Preservation Offices and federally recognized Tribes. Goal A, B, D, E

2. Monitor cultural resources on the project. Goal A, B, D, E

3. Increase public awareness and education of regional history. Goal B, D, E

4. Maintain compliance with Section 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act; and the Native American Graves Protection and Repatriation Act on public lands surrounding the lake. Goal B, D, E

5. Prevent unauthorized or illegal excavation and removal of cultural resources on project lands. Goal B, D, E

CHAPTER 4

LAND ALLOCATION, LAND CLASSIFICATION, WATER SURFACE AND PROJECT EASEMENT LANDS

4.1. LAND ALLOCATION (See Plate 2)

Land Allocation refers to the congressionally authorized purpose for which the project lands were acquired. In total, approximately 40,822 acres of land and water were purchased. Two land allocation categories exist for Rend Lake:

4.1.1. Operations. This allocation includes lands acquired according to the authorizing documents for operation of the project, which include:

- Flood Risk Management
- Water Supply
- Water Quality
- Fish & Wildlife Conservation

4.1.2. Recreation. This allocation includes lands acquired for public recreation, according to the authorizing documents and Preliminary Master Plan.

4.2. LAND CLASSIFICATION (See Plate 3)

Land Classification further refines the Land Allocation categories by identifying the primary use for which project lands are managed. Project lands are classified for development and resource management consistent with authorized project purposes and the provisions of the National Environmental Policy Act and other Federal laws.

4.2.1. Project Operations. (See Plate 3) (316 Acres)

This category includes those lands required for the dam, spillway, levees, offices, maintenance facilities and other areas used solely for the operation of the project. There are 316 acres with this classification.

4.2.2. High Density Recreation. (See Plate 3) (4,396 Acres)

This category includes lands developed for intensive recreational activities for

the visiting public including; day-use areas, campgrounds, commercial concessions, marinas, resorts and quasi-public development.

Activities and facilities that interfere with public recreational use of these lands is prohibited. Other types of use such as low-density recreation activities and wildlife management activities are acceptable, especially on an interim basis. Agricultural activities are not permitted on these lands. There are 4,436 acres of land with this classification.

4.2.3. Mitigation. (0 Acres)

There are no lands with this classification located at Rend Lake.

4.2.4. Environmentally Sensitive Areas. (0 Acres)

There are no lands with this classification located at Rend Lake.

4.2.5. Multiple Resource Management Lands. (See Plate 3) (14,771 Acres)

This classification allows for designating lands using one of the following sub-classifications:

A. Low Density Recreation. (820 Acres)

This classification is used for lands with minimal development or infrastructure. These lands support passive types of recreational use (e.g. primitive camping, fishing, hunting, hiking, walking, wildlife viewing, etc.). Facilities may include boat ramps, trails, small parking areas or vault toilets. Activities or facilities may be permitted for such things as; erosion control, scenic quality improvement and wildlife management. Hunting and fishing are typically allowed in accordance with state fish and wildlife regulations and where the activity or facility does not create a safety issue.

B. Wildlife Management. (7,799 Acres)

This classification is used for stewardship of fish and wildlife resources. The USACE conducts fish and wildlife management activities which seek to maintain populations of targeted wildlife species through the manipulation and management of habitat. These activities are normally accomplished in conjunction with the IDNR, using a variety of techniques including the

placement of artificial structures and other practices. In addition the USACE conducts fish and wildlife management activities on all project lands and waters which are identified by land classification and/or resource objective for fish and wildlife management purposes. Priority is given to those species identified as special status species, specified by law and national focus plans and agreements such as the Endangered Species Act and the North American Waterfowl Management Plan.

C. Vegetative Management. (6,017 Acres)

This classification is used for stewardship of forest, prairie and other native vegetative resources. Vegetative management activities are applied to develop, maintain, protect and/or improve vegetation conditions for timber, fish, soils, recreation, water quality and other beneficial uses.

D. Future or Inactive Recreation Areas. (135 Acres)

This classification is used for areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. Until there is an opportunity to develop or re-open these areas, they will be managed for multiple resources.

There are two areas with this classification located at Rend Lake.

Jackie Branch (85 acres)
Gun Creek Complex (49 acres)

4.2.6. Water Surface Classification (See Plate 27-A) (20,633 Acres)

All **20,613 water surface acres** of Rend Lake are zoned using one of the following classifications.

A. Restricted. This classification is used for water areas restricted for project operations, safety and security purposes. Public access to these areas is not permitted. These areas are marked with buoys that physically prevent access. These areas include the water areas immediately upstream and downstream of the dam, water intake structures, pump stations and any other areas

determined to be a public safety or security concern. There are **26 acres** of water with this classification.

B. No-Wake. This classification is used to protect environmentally sensitive shoreline areas and recreational water access areas from disturbance, and/or for public safety. Generally, all areas marked as “no-wake” are located at boat ramps, entrances to coves, under bridges, boating pass-through’ s, and adjacent to designated swimming beaches. There are **553 acres** of water with this classification.

C. Fish & Wildlife Sanctuary. This classification is used to identify areas where annual or seasonal restrictions are in place to protect fish and wildlife species during periods of migration, resting, feeding, nesting and/or spawning. These areas are marked with a combination of signs and/or buoys. There are **2,882 acres** of water with this classification.

The USACE and IDNR closely coordinate location and seasonal change requirements for waters with this classification. When changes are made the public is informed through news and media releases.

D. Open Recreation. This classification is used for water areas available for year-round or seasonal water-based recreational use. Generally, these waters can be used by most types of vessels for all types of water-based recreational activities. There are **17,171 acres** of water with this classification.

4.2.7. Project Easement Lands

A. Operations Easement Lands

There are no Operations Easement Lands located at Rend Lake.

B. Flowage Easement Lands (See Plate 3) (687 Acres)

There are **687 acres** of flowage easement land located at Rend Lake. These are privately owned lands where a flowage easement estate was purchased by the Federal Government, which allows for the land to be occasionally flooded and inundated during high water events. Generally, these lands are

located between elevation 415.0 feet NGVD feet NGVD and 416.0 feet NGVD and are directly adjacent to the land owned in fee title by the USACE.

Construction on flowage easement lands is regulated by permit and permits are required for placement of dredged or fill material. In compliance with the Clean Water Act, flowage easement permits or consents will not be issued until a Section 404 Permit has been issued or until the Regulatory Office (OD-F) provides notice, in writing, that none is required. The Regulatory Branch of the St. Louis District will review the Section 404 application concurrent with the flowage easement permit process. Proposed construction on flowage easement lands will also require review by the Real Estate Office (RE).

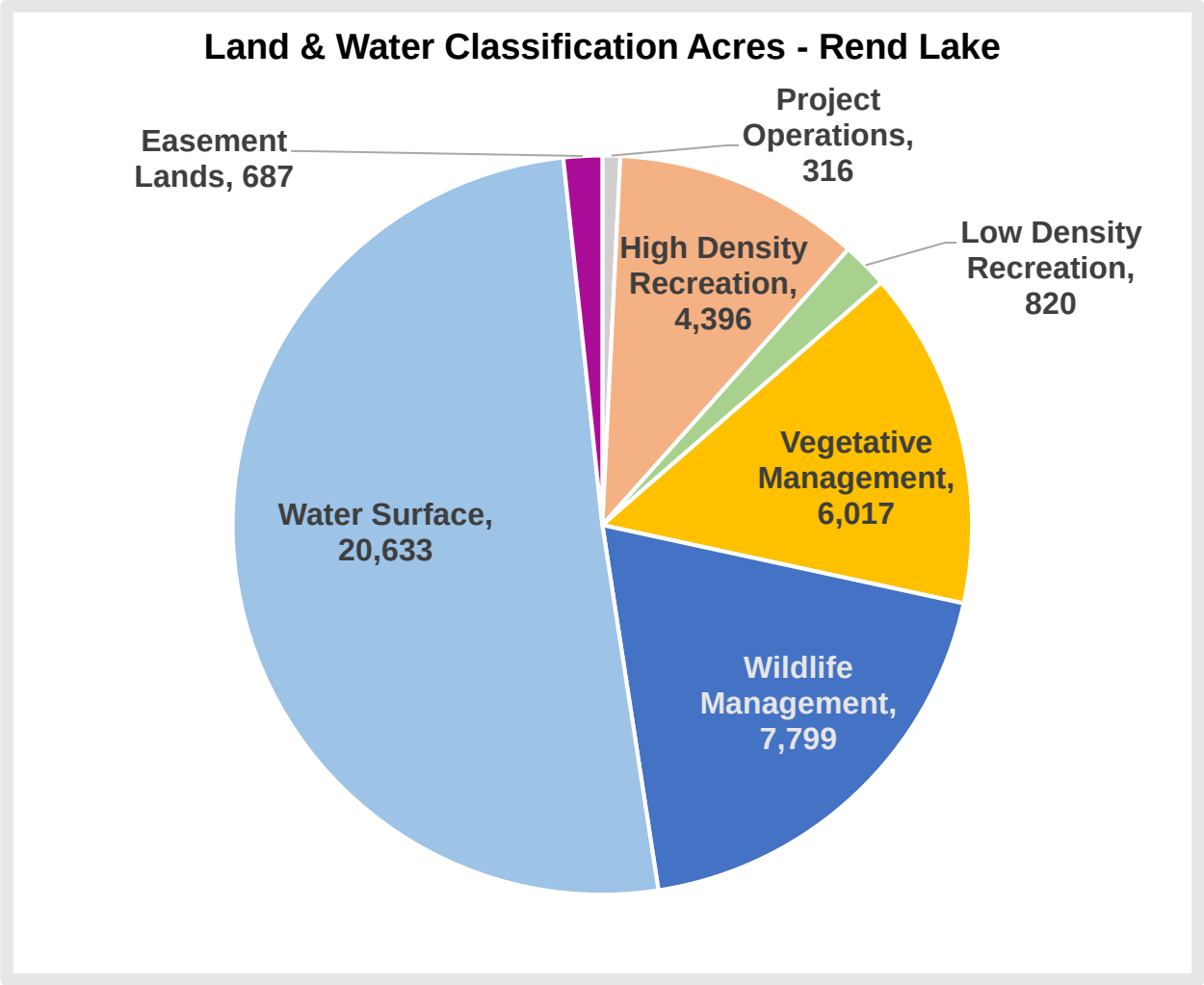
District flowage easement policy allows for exceptions without compensatory storage, but at Rend Lake, only for Natural Resources Conservation Service approved designated wetlands.

C. Conservation Easement Lands

There are no Conservation Easement Lands located at Rend Lake.

Figure 4-1 provides a graphical representation of the land and water classification acreages for Rend Lake.

Figure 4-1: Land and Water Classifications – Rend Lake (Acres)



CHAPTER 5

RESOURCE PLAN

5.1. INTRODUCTION

The Rend Lake Master Plan provides guidance for the orderly development, use and management of Project resources. Resource planning takes into consideration:

a. Authorized Project Purposes
b. Public Input and Interests
c. Regional Needs, Opportunities and Constraints

All proposed development is designed to be compatible with the project's natural and cultural resources. Project planning and land classification takes into consideration several factors:

a. Seasonal Flooding
b. Soils
c. Ecological Conditions
d. Existing and Projected Recreation Demand
e. State and Local Interests
f. Applicable Laws, Regulations and Policies

Some Proposed Actions in this plan may require NEPA review and evaluation. When required, NEPA evaluation and documentation will be obtained before the Proposed Action is implemented.

5.2. RESOURCE PLANS – GENERAL

Implementation of resource management objectives is dependent upon land classification, anticipated concurrent use, and other environmental, geologic, and topographic variables. The Operational Management Plan (OMP) subdivides land and water classifications into management units based upon land use objectives, natural and man-made resources, and environmental sustainability. The OMP establishes achievable goals to maintain and improve ecological conditions and outdoor recreation opportunities.

This section of the Master Plan provides basic information and data about each Project Site Area at Rend Lake and includes:

a. Area Name
b. Basic information & data about the area
c. Listing of Existing Facilities and a brief discussion
d. Listing of Proposed Actions and a brief discussion

Proposed Actions are actions being proposed in this Master Plan and are intended to be implemented within approximately ten years or by the next Master Plan update.

The Land Classifications for Rend Lake are:

a. Project Operations
b. High Density Recreation
c. Environmentally Sensitive Areas (ESA)
d. Multiple Resource Management
e. Water Surface
f. Flowage Easement Lands

These land classifications are described fully in Chapter 4, Paragraph 4.2. - Land Classification. **Table 5-1** provides a summary of land classification acreages for Rend Lake. **Please note that these acreages are different than those contained in previous Master Plans. The reason for this is because of better technology and more accurate measurements using GIS data**.

Table 5-1 Land Classification Acreages (See Plate 3)

Land Classification	Acres	Total Acres
Project Operations		**316**
High Density Recreation		**4,396**
Multiple Resource Management		**14,771**
Low Density Recreation	820	
Vegetative Management	6,017	
Wildlife Management	7,799	
Future Recreation	135	
Environmentally Sensitive Areas	**0**	**0**
Water Surface		**20,633**
Restricted	27	
No Wake	553	
Fish & Wildlife Sanctuary	2,882	
Open Recreation	17,171	
Easement Lands		**687**
Flowage Easement	687	

Land Classification	Acres	Total Acres
TOTAL		**40,803**

Note: Water Surface Acres are calculated at pool elevation 405.0 feet NGVD

5.2.1. Project Operations (316 Acres)

This classification includes those lands required for the dam, spillway, levees, sub-impoundment dams, offices, maintenance facilities, visitor center and other areas that are used solely for the operation of the project. There are nine Project Site Areas with this land classification, totaling 316 acres. **Table 5-2** provides a summary of lands classified as Project Operations and the Master Plan Plate Number that depicts each area.

Table 5-2: Summary of Project Operations Lands

Area #	Area Name	Acres	Plate Number
OP-1	Main Dam & Spillway	132	7-A & B
OP-2	Maintenance Compound	31	6-A & B
OP=3	Project Office & Visitor Center	3	6-A & B
OP-4	Sandusky Land Treatment	12	10-A & B
OP-5	Big Muddy Sub-Impoundment Dam	6	25-A & B
OP-6	IDNR Wildlife Management Office	8	24-A & B
OP-7	Casey Fork Sub-Impoundment Dam	5	26-A & B
OP-8	IDNR – WFSP Administrative Office	113	21-A & B
OP-9	RLCD Golf Course Office	1	23-A & B
OP-10	RLCD Intake Structure	4	23-A & B
	TOTAL	**316**	

A. Main Dam & Spillway (OP-1) (132 Acres)

This area is comprised of 132 acres. The main dam consists of a compacted earth embankment. The total length of the dam and spillway is approximately 10,600 feet. The crest of the embankment is at elevation 424.0 feet NGVD, approximately 54 feet above the river bed.

The Rend Lake Dam Road runs along the crest of the main dam, over a bridge spanning the spillway approach channel, and along the crest of the auxiliary spillway. This road connects Rend City Road to Mine 24 and Licata Roads. It provides access to the Spillway and South Marcum Recreation Areas.

Two water areas upstream of the dam have been classified as “Restricted” and are delineated by “No Boats” buoys, which prohibit boat access, and orange line buoys, which physically prevent access by boat. No boats are permitted within 100 feet of the structure and within 200 feet of the bridge that crosses the intake channel.

Proposed Actions: None

B. USACE Maintenance Complex (OP-2) (31 Acres)

This area is comprised of 31 acres, located just west of the main dam The Maintenance Compound includes a carpenter shop, laundry and storage room, an electrician shop, open and enclosed storage bays, fenced vehicle and equipment compound, fuel tanks, hazardous material storage building, and storage bay for the Mississippi Valley Division Emergency Command and Control Vehicle.

Proposed Action: (# 191) Add more storage facilities to include both open and enclosed bays at the maintenance complex. **(Proposed New Action)**

C. USACE Administrative Office & Visitor Center (OP-3) (3 Acres)

The Project Office and Visitor Center are combined in one 20,000 square foot facility and occupies 3 acres. The 8,000 square foot Visitor Center features a large exhibit hall, Garden View Room, brochure area, and indoor public restroom facilities. Outdoor facilities include a covered classroom, bulletin board, electronic marquee, and pollinator garden. The remaining 12,000 square feet is comprised of Rend Lake USACE employee work spaces, library, lunch and conference room, kitchen, weather shelter/workout room, and outdoor covered picnic area. The office also houses a National Weather Service weather station. This area includes

asphalted visitor and employee parking and large solar panels to offset energy consumption.

Proposed Action: (# 190) Add a sprinkler system throughout the lawn of the Rend Lake Project Office and Visitor Center to improve the landscape. **(Proposed New Action)**

D. Sandusky Land Treatment Facility (OP-4) (12 Acres)

This area is comprised of 12 acres, located just north of the Blackberry Nature Trail and West of the South Sandusky Campground Sycamore loop. It includes a stabilization pond and spray field that treats incoming waste from North and South Sandusky Recreation Areas, Dam West Recreation Area including the Rend Lake Marina, and the USACE Project Office, Visitor Center, and Maintenance Complex.

The facility has exceeded its useable service life, will require significant investment to remain operational and is becoming non-compliant with IEPA standards. Connection to the local municipal system (City of Sesser) and realignment of existing lift stations will be required. The existing waste water land treatment system will be removed. Yearly cost savings are estimated to be $45,000 and Estimated Life of Project Savings are $1,125,000.

Proposed Action: (# 3A) See 3B & 3C Discontinue use of the treatment facility and connect the previously serviced areas to the city of Sesser's sewer system. **(Proposed Replacement Action)**

E. Big Muddy Sub-Impoundment Dam (OP-5) (6 Acres)

Big Muddy Sub-Impoundment Dam is comprised of 6 acres, located on the Big Muddy River on the upper end of the lake. It is an earth fill dam, 3,740 feet in length, with a 2,435 foot ungated overflow. The crest of the dam is 416.0 feet NGVD and the overflow section is at 412.0 feet NGVD.

The sub-impoundment dam allows for manipulation of the water surface in order to support a variety of wildlife management activities. The IDNR and

USACE cooperate in the operation and maintenance of the dam, where the USACE is responsible for maintenance and repair of the structure and the IDNR operates the water control structure to manipulate water levels in the sub-impoundment.

Proposed Actions: None

F. IDNR Wildlife Management Office (OP-6) (8 Acres)

This area is comprised of 8 acres within the confines of the Rend Lake Wildlife Refuge and serves as the Refuge Headquarters. This complex contains the Site Superintendent's office, an administrative and maintenance building, a hazardous materials storage building, an above-ground gasoline and diesel fuel storage tank and pump with secondary containment, 2 equipment storage sheds, and a gravel parking lot.

Proposed Actions: None

G. Casey Fork Sub-Impoundment Dam (OP-7) (5 Acres)

The Casey Fork Sub-Impoundment Dam is comprised of 5 acres, located on the Casey Fork tributary, in the upper reaches of the lake. It is an earth fill dam, 7,650 feet in length, with 4,485' ungated overflow. The crest of the dam is 416.0 feet NGVD and the overflow section is at 412.0 feet NGVD.

The sub-impoundment dam allows for manipulation of the water surface in order to support a variety of wildlife management activities. The IDNR and USACE cooperate in the operation and maintenance of the dam, where the USACE is responsible for maintenance and repair of the structure and the IDNR operates the water control structure to manipulate water levels in the sub-impoundment.

Proposed Actions: None

H. WFSP Management Office & Maintenance Area (OP-8) (113 Acres)

This area is comprised of 113 acres and is within the confines of the Wayne Fitzgerrell State Park, where the Illinois Department of Natural Resources (IDNR) maintains a Park Office. This complex contains the Site Superintendent's residence, an administrative and maintenance building, a hazardous materials storage building, an above ground gasoline and diesel fuel storage tank and pump with secondary containment, 2 equipment storage sheds, and a gravel lot.

Proposed Actions: None

I. RLCD Golf Course Maintenance Complex (OP-9) (1 Acre)

This area is comprised of 1 acre and is within the confines of the Rend Lake Conservancy District leased area near the Gun Creek Recreation Area. The area includes the greens keeper's office and maintenance facility, equipment storage lean-to, and raw water intake structure for the golf course irrigation system.

Proposed Actions: None

J. RLCD Intake Structure & Pipeline (OP-10) (4 Acres)

This area is comprised of 4 acres and located adjacent to the North Marcum Recreation Area. The area contains the raw water intake structure and associated infrastructure, which is managed by the Rend Lake Conservancy District. An underground pipe carries raw water to the water treatment plant, located on adjacent RLCD-owned land.

The water surface area around this structure has been classified as "Restricted" and a perimeter established around the intake structure marked with "No Boat" buoys that prohibit boat access. In addition, orange line buoys have been placed to physically prevent boat access. No boats are permitted within 100 feet of the structure.

Proposed Actions: (# 234) Upgrade outdated Chlorine Dioxide Building with needed improvements. Repair and modify the existing concrete inlet

structure that feeds the water treatment plant**. (Proposed Replacement Action)**

5.2.2. High Density Recreation (See Plate's 6 A & B - 19 A & B) (4,396 Acres)

This classification includes lands developed for intensive recreational activities for the visiting public including; day-use areas, campgrounds, commercial concessions, marinas, resorts and quasi-public development. There are 11 Project Site Areas with this classification and include a total of 4,396 acres. **Table 5-3** provides a summary of lands classified as High Density Recreation.

Table 5-3: Summary of High Density Recreation Areas

Area #	Area Name	Acres	Plate Number
R-1	Spillway Recreation Area	87	7-A & B
R-2	Dam West Recreation Area	83	8-A & B
R-3	Rend Lake Marina	40	24-A & B
R-4	South Sandusky Recreation Area	462	9-A – 10-B
R-5	North Sandusky Recreation Area	501	11-A – 12-B
R-6	Ina Recreation Area	16	15-A & B
R-7	Wayne Fitzgerrell State Park	2,513	21-A & B
R-8	Gun Creek Recreation Area	157	16-A & B
R-9	RLCD Recreation Area	67	23-A & B
R-10	North Marcum Recreation Area	74	17-A & B
R-11	South Marcum Recreation Area	396	18-A – 19-B
	TOTAL	**4,396**	

Specific information about each of these recreation areas is presented in the following pages and includes static information about the area (area name, type of area, classification, managing entity, and acres). Additional information, including developed acreage, average annual visits, average annual revenue, average annual occupancy rate (if applicable), and density of use, which is a measure of amount and intensity of use based on the average annual visits per developed acre of land.

A brief narrative description of the area is provided along with a table that identifies the number of existing recreation facilities. Following this information is a discussion about existing recreation facilities and identification and discussion about proposed actions recommended for each area.

A. Spillway Recreation Area (R-1) (See Plate's 7-A & B)

Area Name: Spillway Recreation Area
Land Classification: High Density Recreation

Type of Area: Day Use Area
Managing Entity: USACE

Acres: 87

Avg. Annual Visits: 80,924
Avg. Annual Revenue: $1,975

Developed Acres: 18

Density of Use: 4,461 (Lake Average. = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: N/A

Narrative Description of Area: The Spillway Recreation Area is a day use area located on the east side of the Main Dam, just west of the South Marcum Recreation Area. It is a popular location for large events, fishing, hunting, sightseeing, bike riding and other trail activities. The area also provides access to wildlife and vegetative management areas below the dam.

Existing Facilities

Day Use Facilities	
Picnic Sites	2
Picnic Shelters	1
Boat Ramp/Lanes	
Car Parking	202
Trailer Parking	
Courtesy Dock	
Fish Cleaning Station	
Trails/Trail Miles	1/.5
Water Fountains	3
Rest Rooms	1 V 1 WB
Beach Change House	
Playground	1
Fishing Pier	
Amphitheater	1

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: During large events, temporary portable toilets, sanitary hand washing facilities and refuse containers must be set-up in the area. The existing electrical capabilities can only support about five vendor trailers. The Dedication Lot on the south side of the Main Dam Road provides

access to the spillway outlet, Rend Lake Bike Trail, and vegetative and wildlife management areas south of the dam. Several small parking lots south of the dam provide access to trails and bank fishing along the spillway and old river channel.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
161	Install roof over amphitheater	N	Install a roof over the amphitheater
162	Relocate light pole between Shelter 11 and the lake	R	The light pole will be relocated so it does not obstruct the view of the lake.
163	Replace comfort station with ADA/ABA compliant facility with increased capacity	R	Replace comfort station with ADA/ABA compliant facility with increased capacity and connect to municipal sewer system.
164	Increase electrical capacity and provide additional water service	R	Install 50 AMP electric service and additional water service to accommodate special event vendor trailers
193	Provide Leash-free dog park	N	Construct a leash-free dog park

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Many large events take place in this area. Providing a roof over the amphitheater will satisfy customer requests and provide shelter from inclement weather. Relocating the light pole near the large shelter will improve customer satisfaction and provide an unobstructed view of the lake. Modifying the comfort station to be ADA/ABA compliant, increasing its capacity and connecting it to the City of Benton's sewer system, will eliminate the cost and need of providing portable sanitary facilities that are required during large events. Installing increased electrical capacity and additional water service will provide the necessary infrastructure to accommodate vendor's trailers during large events. These proposed actions will reduce O&M costs, while increasing use, visitor safety/satisfaction and revenue collection. Installation of a leash-free dog park will provide a unique facility for local residents and visitors to Rend Lake.

B. Rend Lake Marina (R-3) (See Plate's 24-A & B)

Area Name: Rend Lake Marina
Land Classification: High Density Recreation

Type of Area: Marina
Managing Entity: Concession

Acres: 40
Developed Acres: 40

Avg. Annual Visits: 37,184

Avg. Annual Revenue: N/A

Density of Use: 930 (Lake Avg. = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: 73.18% (2017)

Narrative Description of Area: The Rend Lake Marina is located north of the Dam West Recreation Area. The marina is the only full service marina on the lake. Services include; wet and dry slip rental, boat sales and rentals, boat repairs, boat storage, towing, sewage pump-out services, fuel sales, marina store and public restrooms.

Existing Facilities

Outgranted Facilities	
Wet Slips	235
Dry Slips	103
Boat Ramp/Lanes	
Restaurant	
Gas Sales	1
Store	1
Lodge/Hotel/ Rooms	
Cabins	
Picnic Sites/Shelter	
Admin. Bldg.	1
Trails/Trail Miles	
Playground	
Restrooms (V/WB)*	2 WB

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Existing facilities at the Marina are in fair condition. There are several docks with old Styrofoam floatation and frames. Some dock structures are in need of repair or

replacement. Many of the marina facilities need to be repaired and updated. The marina operator has a plan in place for replacing this floatation with encapsulated floatation, as the old wears out.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
86	Provide sewer hook-up to municipal system	R	Provide sewer hook-up to municipal system
87	Construct up to 10 rental cabins	PA	Cabins will be single family cabins with bathroom and sleeping accommodations.
88	Construct dry storage boat building	PA	Build 1 dry boat storage building
89	Construct restaurant	PA	Build a small restaurant/snack bar facility
90	Add boat slips	PA	Provide additional slips on the houseboat dock
91	Expand Showroom	N	Increase the size of the existing boat sales showroom
92	Install courtesy dock for cabin users	N	Install a courtesy dock along the shoreline for use by rental cabin users
93	Replace dock floatation with encapsulated material	R	Replace old Styrofoam floatation with encapsulated material.
94	Repair/Replace dock supporting structures	R	Repair/replace rusting dock supporting structures

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Constructing rental cabins will provide highly desired overnight accommodations near the lake. The addition of a restaurant, dry storage boat building, courtesy docks for rental cabin users and additional boat slips will improve customer satisfaction and provide a wider variety of amenities and services. Repairing or replacing dock structures and floatation will respond to recent compliance inspections and provide for improved visitor safety and area aesthetics

C. Dam West Recreation Area (R-2) (See Plate's 8-A & B)

Area Name: Dam West Recreation Area
Land Classification: High Density Recreation

Type of Area: **Day-Use Area**
Managing Entity: USACE

Acres: 83
Developed Acres: 45

Avg. Annual Visits: 90,074

Avg. Annual Revenue: $19,275

Density of Use: 2,001 (Lake Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: N/A

Narrative Description of Area: The Dam West Recreation Area is a day-use area located on the east side of the Main Dam, just across the road from the Visitor Center and south of the Rend Lake Marina.

Existing Facilities

Day Use Facilities	
Picnic Sites	16
Picnic Shelters	1
Boat Ramp/Lanes	1/4
Car Parking	51
Trailer Parking	97
Courtesy Dock	1
Fish Cleaning Station	
Swimming Area	
Trails/Trail Miles	1/.9
Water Fountains	1
Rest Rooms	1 WB
Beach Change House	
Playground	1
Fishing Pier	

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: The Dam West Recreation Area is located across the road from the Visitor Center and is comprised of two areas; a picnic area and a boat ramp area. Picnic sites are heavily used, often in conjunction with a trip to the Visitor Center. Currently comfort stations are not accessible. Fishing along the shoreline is difficult because of rip-rap along the shoreline. The water distribution system is reaching the end of its useful life. The picnic shelter is in need of renovation. Many of the trees in the area are dying. The breakwater at the boat ramp does not provide adequate protection for the ramp.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
16	Install accessible picnic sites	PA	Install accessible picnic sites
17	Construct ADA/ABA compliant waterborne comfort station	PA	Construct ADA/ABA compliant waterborne comfort station that will also serve as a storm shelter.
18	Provide accessible fishing access	PA	Install a concrete sidewalk from the picnic area parking lot to the shoreline and construct ADA/ABA compliant fishing pier or platform
3D	Replace water lines and connect to municipal system	R	Replace water distribution lines for the entire area and connect to the City of Sesser system
21	Replace comfort station at boat ramp with ADA/ABA compliant facility	R	Replace boat ramp comfort station with ADA/ABA compliant facility, that will also serve as a storm shelter
23	Renovate Picnic Shelter #6 at boat ramp and replace wooden roof with metal roof	R	Renovate picnic shelter and replace wooden roof with a metal roof
22	Replace playground equipment with ADA/ABA compliant equipment	R	Replace playground equipment with ADA/ABA compliant equipment.
19	Construct fish cleaning station	N	Construct ADA/ABA compliant fish cleaning station and connect to sewer system
194	Implement Tree Replacement Plan	R	Replace dead or dying trees

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Providing ADA/ABA compliant facilities will greatly improve visitor experience and along with the Visitor Center, will provide an entire complex that meet ADA/ABA standards. Construction of a fish cleaning station will respond to visitor requests and eliminate O&M issues related to malodorous refuse receptacles. Renovation of facilities will improve visitor safety and increase revenue collection. Implementing a tree replacement plan will ensure tree canopy sustainability. Proposed actions will ultimately reduce O&M costs.

D. South Sandusky Recreation Area (R-4) (See Plate's 9-A – 10-B)

Area Name: South Sandusky Recreation Area
Land Classification: High Density Recreation

Type of Area: Day-Use & Campground
Managing Entity: USACE

Acres: 461
Developed Acres: 63

Avg. Annual Visits: 96,083

Avg. Annual Revenue: $151,651

Density of Use: 1,525 (Lake Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: 43.6%

Narrative Description of Area: The South Sandusky Recreation Area is located on the east side of South Rend City Road, just north of the Dam West Recreation Area. The area is comprised of a day-use area, interpretive nature trail and campground. The day-use area includes the only designated swimming beach on the lake, except for a small beach in Dale Miller Group Camp. On weekends, the beach is heavily used.

Existing Facilities

Day Use Facilities		Camping Facilities		Operational Facilities	
Picnic Sites	20	Entrance Station	**1**	Land Treatment Facility	**1**
Picnic Shelters	2	Campsites (E/W/S)*	43 EWS 23 EW 54 E 8 P		
Boat Ramp/Lanes	1/4	Gate Attendant Sites	2		
Car Parking	199	Dump Station	1		
Trailer Parking	98	Playgrounds	3		
Courtesy Dock	1	Rest Rooms	5 WB		
Fish Cleaning Station		Shower Buildings	3 WB		
Swimming Area	1	Laundry			
Trails/Trail Miles	2/2.7	Amphitheater			
Water Fountains	3	Water Hydrants	12		
Rest Rooms	2 WB	Multipurpose Court/Play Field	1		
Beach Shower House	1	Trails/Trail Miles	1/1.7		
Playground	1				

***** *(E = Electric, W = Water, S = Sewer, P = Primitive, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Although the South Sandusky campground has a good occupancy rate, many of the campsites do not meet Customer Service Standards contained in EM 1110-1-400. Vehicle spurs are too narrow and impact areas are too small to accommodate recreational vehicles and camping equipment. Improper spur alignment creates maintenance and repair to adjacent grounds and vegetation. Lift stations have reached the end of their useful life. Comfort stations and shower houses are not ADA/ABA compliant and have reached the end of their useful life. Many of the trees in the area are dead or dying and have reached the end of their life expectancy. The two operational storage buildings in the campground are not compatible with public recreational use. The roads and turn-arounds in campground loops are too narrow and tight and do not meet roadway and parking design standards. Picnic sites in the area are heavily used.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
141	CG: Renovate campsites to meet Customer Service Standards. (46 sites to full service hookups & water to 32 sites)	PA	Renovate campsites to meet Customer Service Standards and provide sewer and water hookups.
143	CG: Replace shower building to include laundry facilities and comfort stations with ADA/ABA compliant facilities	PA	Replace shower building with ADA/ABA compliant facility to include laundry and replace comfort stations with ADA/ABA compliant facilities.
146	CG: Replace 3 lift stations	R	3 lift stations in the campground will be replaced
147	CG: Remove metal storage buildings and consider alternate location for new facilities	R	Remove both the old STP building and shed used for straw and barricade storage and relocate to appropriate Operations area
150	CG: Modify boat-in area along shoreline and incorporate as part of Kayak Trail	R	Provide sand/river gravel along shoreline at boat mooring area to serve as kayak launching area for proposed water trail
151	CG: Provide electric service to tent area	N	Install two 110 volt electrical outlets at each primitive tent site
149	CG: Install Wi-Fi	N	Provide Wi-Fi service for campground guests.
152	CG: Adjust roads and turn-arounds to be compliant with Customer Service Standards	R	Adjust camping roads and loop turn-arounds to be compliant with Customer Service Standards and EM 1110-2-410 (Roads & Circulation).
140	CG: Implement tree replacement plan	R	Plant native trees to replace trees that are dead or dying.
195	CG: Construct small leash-free dog area at appropriate location in the campground	N	Provide a small leash-free dog area at appropriate location.
196	CG: Construct additional small parking areas	N	Construct additional small parking areas within the campground

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
4	CG: Provide additional loop to Blackberry Nature Trail	N	Develop an additional loop to the Blackberry Nature Trail
3B	CG & DU: Provide sewer hookup to municipal system	R	Provide sewer hookup to municipal system
154	DU: Provide additional handicapped parking spaces	R	Restripe and provide additional handicapped parking spaces
153	DU: Provide ADA/ABA compliant pedestrian access between boat ramp parking lot and swim beach parking lot	N	Construct ADA/ABA compliant sidewalk between boat ramp parking lot and beach parking lot.
157	DU: Replace comfort stations with ADA/ABA compliant facilities	R	Replace comfort stations at the beach and the boat ramp with ADA/ABA compliant facilities that will also serve as storm shelters
155	DU: Renovate existing picnic sites to meet Customer Service Standards	R	Renovate existing picnic sites to meet Customer Service Standards
156	DU: Provide additional picnic sites	N	Construct additional picnic sites in compliance with Customer Service Standards
142	DU: Install 10 picnic sites relocated from North Sandusky	PA	Install 10 picnic sites relocated from N. Sandusky to meet Customer Service Standards
160	DU: Replace beach shower house with ADA/ABA compliant facility	R	Replace beach shower house with ADA/ABA compliant facility
158	DU: Replace concrete picnic tables with ADA/ABA compliant tables and renovate picnic sites to meet Customer Service Standards	R	Replace concrete picnic tables with ADA/ABA compliant tables and renovate picnic sites to meet Customer Service Standards
159	DU: Replace lift station	R	Replace lift station
197	Implement Tree Replacement Plan	R	Replace dead or dying trees
232	DU: Replace/renovate Shelter #2	R	Replace or renovate Shelter #2

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Data analysis indicates that occupancy rates for sites with water and sewer hookups are 25% to 40% higher than those without. The goal is to provide full service hookups to 75% of the campsites. All campsites will be renovated to meet Customer Service Standards contained in EM 1110-1-400. Providing sites that meet Customer Service Standards will improve customer satisfaction, attract new users and help minimize annual O&M costs. Renovation activities should be accomplished to ensure protection of existing vegetation. The addition of outdoor Wi-Fi will greatly improve customer satisfaction. Adding a kayak launch will be responsive to customer input. A small leash-free dog area in the campground will be responsive to customer needs. Additional picnic site in the day use area will be well utilized.

E. North Sandusky Recreation Area (R-5) (See Plate's 11-A – 12-B)

Area Name: North Sandusky Recreation Area
Land Classification: High Density Recreation

Type of Area: Day-Use & Campground
Managing Entity: USACE

Acres: 501
Developed Acres: 66

Avg. Annual Visits: 34,158
Avg. Annual Revenue: $141,640

Density of Use: 518 (Lake Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: 47.3%

Narrative Description of Area: North Sandusky Recreation Area is located on the west side of the lake, just north of South Sandusky Recreation Area, and includes a day-use area and campground

Existing Facilities

Day Use Facilities		Camping Facilities	
Picnic Sites	16	Entrance Station	1
Picnic Shelters	2	Campsites (E/W/S)*	16 EWS 102 E
Boat Ramp/Lanes	1/4	Gate Attendant Sites	2
Car Parking	226	Dump Station	2
Trailer Parking	77	Playgrounds	2
Courtesy Dock	1	Rest Rooms	5
Fish Cleaning Station		Shower Buildings	2
Trails/Trail Miles	1/2.6	Amphitheater	
Water Fountains	4	Water Hydrants	14
Rest Rooms	4	Multipurpose Court/Play Field	
Beach Change House		Trails/Trail Miles	1/1.7
Playground	1		
Disc Golf Course/baskets	1/18		

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Although the North Sandusky campground has a good occupancy rate, many of the campsites do not meet Customer Service Standards contained in EM 1110-1-400. Vehicle spurs are too narrow and impact areas are too small to accommodate recreational vehicles and camping

equipment. Improper spur alignment creates maintenance and repair to adjacent grounds and vegetation. Lift stations are deteriorating and have reached the end of their useful life. Picnic sites receive heavy use.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
56	CG: Convert 38 campsites to full hookup & install water to 26 sites	PA	Convert 38 campsites to full hookup & install water to 26 sites
57	CG: Renovate 75 campsites to meet Customer Service Standards	PA	Renovate 75 campsites to meet Customer Service Standards
58	CG: Replace 9 comfort stations with ADA/ABA compliant facilities	PA	Replace comfort stations to be ADA/ABA compliant and meet Customer Service Standards
61	CG: Construct 10 new campsites in the White Oak loop	PA	Construct new campsites within the interior of the White Oak loop.
63	CG: Widen roads and adjust turn-arounds in all camping loops	R	Adjust and widen all turn-arounds in camping loops to accommodate larger camping units and to be in compliance with EM 1110-2-410 (Roads & Circulation).
70	CG: Replace playground equipment with ADA/ABA compliant equipment	R	Replace the old playground equipment in White Oak loop with ADA/ABA compliant equipment
62	CG: Renovate campsites to meet Customer Service Standards	R	Renovate campsites to meet Customer Service Standards
3C	CG & DU: Provide sewer hookup to municipal system	R	Provide sewer hookup to municipal system
77	CG: Modify shoreline to accommodate kayak launching	R	Provide sand/river gravel along shoreline to serve as kayak launching area between the loops of Hickory and White Oak
201	DU: Replace lift station in day-use area	R	Replace lift station lift station in day-use area
198	CG: Provide Wi-Fi Service	N	Install appropriately-sized Wi-Fi system for use by campground guests
66	CG: Install group shelter in Shagbark Group Area	N	Install ADA/ABA compliant group shelter in Group Area
65	CG: Replace comfort station in Shagbark Group Area with ADA/ABA compliant shower facility	R	Replace comfort station in Shagbark Group Area with ADA/ABA compliant shower building facility
59	DU: Divide day use area into 2 areas (picnic area & group camp)	PA	Convert portion of day-use area to Group Camp Area with appropriate recreation amenities in compliance with Customer Service Standards
60	DU: Install accessible fishing access	PA	Install ADA/ABA compliant fishing access in day-use area
76	DU: Replace comfort stations with ADA/ABA compliant facilities	R	Replace comfort stations in day-use area with ADA/ABA compliant facilities

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
200	DU: Relocate and renovate picnic sites to more optimal location	R	Relocate and renovate picnic sites in day use area
81	DU: Install solar lighting at Boat Ramp	R	Install solar lighting at boat ramp
77	DU: Modify shoreline to accommodate kayak launching	R	Provide sand/river gravel area along shoreline to serve as a kayak launch and incorporate as a part of future water trails
78	DU: Reduce the number of picnic sites	R	Reduce the number of picnic sites in the area.
74	DU: Install additional ADA/ABA compliant playground equipment	N	The shelter near the current playground equipment has been removed. Additional playground needed near the two remaining shelters. Potentially remove the current aged, non-compliant playground
79	DU: Construct ADA/ABA compliant fish cleaning station at boat ramp	N	Construct ADA/ABA compliant fish cleaning station near boat ramp
202	CG: Construct small parking lots throughout the campground to provide additional parking	N	Small parking lots will be constructed throughout the campground to provide parking for visitors
203	CG: Construct small leash-free dog park	N	Construct small leash-free dog park in appropriate location within the campground
199	Implement Tree Replacement Plan	R	Replace dead or dying trees
230	DU: Replace/renovate Shelter #3	R	Replace or renovate Shelter #3

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Data analysis indicates that occupancy rates for sites with water and sewer hookups are 25% to 40% higher than those without. The goal is to provide full service hookups to 75% of the campsites. Campsites will be renovated to meet Campsite Design Guidelines contained in EM 1110-1-400. Improperly sized spurs and impact sites are creating degradation to adjacent soil and vegetation. Providing sites that meet Customer Service Standards will improve customer satisfaction, attract new users and help minimize annual O&M costs. Renovation activities should be accomplished to ensure protection of existing vegetation. The addition of outdoor Wi-Fi will greatly improve customer satisfaction. Adding a kayak launch will respond to customer input. Replacing and renovating facilities to be ADA/ABA compliant will provide increased customer satisfaction. Connection to municipal sewer services will reduce O&M cost. Implementing a tree replacement plan will ensure an adequate tree canopy is maintained.

F. Ina Recreation Area (R-6) (See Plate's 15-A & B)

Area Name: Ina Recreation Area
Land Classification: High Density Recreation

Type of Area: Day-Use Area
Managing Entity: USACE

Acres: 16
Developed Acres: 5

Avg. Annual Visits: 18,645
Average Annual Revenue: N/A

Density of Use: 3,729 (Lake Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: N/A

Narrative Description of Area: Ina Recreation Area is located on the east side of the lake, just west of the town of Ina, IL. Currently, the area has minimal recreation facilities. However, the area is being considered for development as a marina and resort by Jefferson County and Jefferson County Development Corporation.

Existing Facilities

Day Use Facilities	
Picnic Sites	
Picnic Shelters	
Boat Ramp/Lanes	1/1
Car Parking	
Trailer Parking	30
Courtesy Dock	1
Fish Cleaning Station	
Trails/Trail Miles	
Water Fountains	
Rest Rooms	
Beach Change House	
Playground	
Fishing Pier	

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Existing recreation facilities in the area are minimal (boat ramp, courtesy dock & parking). Even so, the area has a higher than average Density of Use coefficient. This most likely

is because access to the area is greatly facilitated by direct exit access to I-57, where a Loves Travel Stop is located. Also, the area is used extensively by local residents for access to the upper reaches of Rend Lake.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
34	Outgrant area for Construction of Marina and Resort	PA	Outgrant area to local government entity for development of a marina and resort.
35	Install Accessible Fishing Access	PA	Construct Accessible Fishing Access
223	Continue Coordination with Jefferson County	PA	Outgrant area to local government entity for development of a marina and resort.

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: This area was originally constructed for use as a marina. A protected boat basin already exists. Currently there are no marina facilities in the upper reaches of Rend Lake. Currently Jefferson County and Jefferson County Development Corporation are in the process of attracting interested marina developers. They have already conducted a Market and Initial Feasibility Study, which is included as **Appendix C.** The primary purpose of the study was to determine the appropriate size and scope of a new marina and associated development to meet regional demand, while preserving the business and financial capacity of the existing Rend Lake Marina, in Franklin County. The study was conducted in accordance with USACE policy (ER 1130-2-550) Recreation Operations and Maintenance Policies.

G. Wayne Fitzgerrell State Park (R-7) (See Plate's 21-A & B)

Area Name: Wayne Fitzgerrell State Park
Land Classification: High Density Recreation

Type of Area: Multiple Use Recreation
Managing Entity: IDNR

Acres: 2,513
Developed Acres: 950

Avg. Annual Visits: 105,174
Avg. Annual Revenue: N/A

Density of Use: 111 (Project Average = 1,631)
(Average Annual Visits per developed acre)

Occupancy Rate: N/A

Narrative Description of Area: Wayne Fitzgerrell State Park is located on the east side of the lake, just north of Whittington, IL and south of Ina, IL.

Existing Facilities

Outgranted Day Use Facilities		Outgranted Camping Facilities		Other Outgranted Facilities		Outgranted Operational Facilities	
Picnic Sites	13	Entrance Station	1	Wet Slips		Maintenance Area	1
Picnic Shelters	4	Campsites (E/W/S)*	243 E 17 P	Dry Slips		Park Manager Housing	1
Boat Ramp/Lanes	2/4	Gate Attendant Sites		Boat Ramp/Lanes		Administration Bldg	1
Car Parking	212	Dump Station	1	Restaurant	1		
Trailer Parking	120	Playgrounds	1	Gas Sales	1		
Courtesy Dock	7	Rest Rooms		Store	1		
Fish Cleaning Station	1	Shower Buildings	3	Lodge/Hotel/ Rooms	3/105		
Swimming Area		Laundry		Cabins	11		
Trails/Trail Miles	2/13.5	Amphitheater		Golf Course			
Water Fountains	5	Water Hydrants	17	Swim Pool	1		
Rest Rooms	16 V 1 WB	Multipurpose Court/Play Field		Multipurpose Court/Play Field	1		
Playground	3						
Fishing Pier	1						

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Recreation facilities include an extensive roadway system with numerous parking lots and large recreational vehicle campground with 243 campsites with three (3) shower

buildings. Other amenities include five (5) day use areas, five (5) picnic shelters, tent campground and group camping area, four (4) boat ramps and a 4.0 mile section of the Rend Lake Bike Trail. Recreational activities provided at the area include boating, fishing, hunting, hiking, bicycling, nature observation and field trialing.

In 1989, the Department began development of the Rend Lake Resort at the north end of Wayne Fitzgerrell State Park. The development now includes one (10 unit) "boatel", one (15 unit) boatel, 11 duplex cabins, a 48 unit motel with ample conference facilities, tennis court, swimming pool, restaurant, and a concession building. In late 2016, the State ended the contract for operation of the Resort with a private concessionaire. The Resort was found to contain deficiencies and repairs to address these issues have been ongoing since that time. The IDNR will continue making additional repairs to the facility and solicit new managers to re-open the facility to the public.

Proposed Actions: *(See Next Page)*

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
166	Resurface & modify culverts on bike trail	PA	Place concrete on existing bike trail and modify culverts on bike trail.
167	Upgrade 50 campsites	PA	Renovate 50 campsites to be full service hookups
168	Construct Outdoor Dining Area	PA	Construct outdoor dining area
169	Construct Outdoor Event Center	PA	Construct outdoor event center
170	Construct Boatel	PA	Construct Boatel rental units
210	Rend Lake Resort Repairs	R	Repair/Replace various buildings and conduct deferred maintenance. Continue to pursue a suitable operator for the resort facility. When concessionaire is retained, parts of resort may re-open incrementally.
179	Repair/Replace Lift Stations	R	Repair/Replace 12 lift station pumps
204	Construct ADA/ABA Compliant Fishing Pier	N	Construct ADA/ABA compliant fishing pier (12' X 155') and provide security lighting
205	Resurface Sailboat Harbor Boat Access	R	Resurface parking area and realign car/trailer spaces to improve ease of use
206	Extend Electrical Service to Day-Use Area	N	Provide underground electrical service to group shelters
207	Resurface Roads & Parking	R	Resurface roads and parking areas
208	Replace Water Valves	R	Replace water valves throughout the park
209	Reforestation	R	Replace dead and dying trees with native species
171	Update and Renovate Office	R	Update and renovate park administrative office
172	Repair Docks & install new decking	R	Repair boat docks and replace decking
173	Renovate picnic tables - Entire Park	R	Renovate picnic table throughout the park
174	Remove three buildings no longer in use	R	Remove three buildings
175	Replace posts on group shelter	R	Replace posts on group shelter
176	Upgrade primary power lines - Tri-county Electric	R	Upgrade primary power lines to allow for installation of 50 amp service
177	Provide additional grills & tables in day-use areas	R	Install additional grills & tables in day-use area
178	Place additional insulation in existing building	R	Place additional insulation in existing building
181	Run underground power to Shelter's 1,2, & 3	R	Run underground power to Shelter's 1,2, & 3
182	Upgrade power & sewer lines - Hickman Point CG	R	Upgrade power & sewer lines - Hickman Point CG

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
183	Install shelter for bass tournaments	N	Install shelter for bass tournaments
185	Replace two wooden vault toilets at scout shelter	R	Replace two wooden vault toilets at scout shelter
186	Upgrade campground electrical system	R	Upgrade campground electrical system
187	Replace 150 grills at main CG	R	Replace 150 grills at main CG
188	Replace three shower buildings	R	Replace three shower buildings
189	Replace kiosk roof shingles	R	Replace kiosk roof shingles
** (R = Replacement, N = New, PA = Previously Approved)*			

Proposed Action Discussion: The following is a list of capital improvements IDNR is considering for Wayne Fitzgerrell over the timespan this master plan will be current. The list is not in any priority order and funding is contingent on legislative and administration budget approvals.

Rend Lake Resort Repairs: IDNR will make necessary repairs to the various buildings at the Resort to address long deferred maintenance needs. The repairs will be done in 2018-2019 to make the facility suitable for accommodating overnight stays and providing food services. If a new concessionaire is successfully retained during the process of making repairs, parts of the Resort may re-open incrementally as repairs to individual buildings are completed.

Enhance Bike Trail: Resurface approximately 4.0 miles of aggregate surfaced bike trail with concrete pavement. This will reduce maintenance requirements and provide for a more uniform and easier riding surface for bicyclists.

Improve Campground Services: The existing RV campground needs numerous enhancements to meet the demand of modern campers. The campground has too few water hookups and provides no sewer hookups for individual campsites. Out of 250 campsites, only about 30 existing sites provide 50-amp electric hookups which is not sufficient to meet the electrical demands of modern campers. Most RV trailers and motorhomes now require 50-amp service to run multiple a/c units, fully equipped kitchens with stoves, refrigerators and microwaves. The campground is routinely replacing blown service panel fuses on hot summer weekends. Most of the existing drinking fountains in the campground date back to being first installed in the 1970s and are inoperable and parts cannot be obtained for repairs. Most campers have full bathrooms that require water service hookups. Parking spaces are not currently provided at each campsite and the campsite is not long enough to hold the RV trailer and the tow vehicle so campers are parking in turf areas.

IDNR will consider renovations to the existing RV campground by making necessary upgrades in phases to each camping loop. Each campsite will be upgraded to include a 50-amp load-center, sewer riser, and water service. A paved vehicle parking space will be added to each campsite (12' wd. x 22' long). Due to the expense of the project, it would likely be done incrementally and the conceptual phasing may be the following:

Phase 1 – Hickman's Loop (30 campsites) and Shady Rest Loop (77 campsites) and renovations to the existing (3) shower buildings.

Phase 2 – Lakeview Loop (44 campsites) and Lookout Point (65 campsites)

Phase 3 – Bay View Loop (31 campsites)

Lift Station Repairs: Replace 12 lift station pumps and guides where needed throughout the park.

Construct ADA/ABA Fishing Pier: Existing accessible fishing opportunities at Rend Lake are limited. Construct a barrier-free ADA/ABA fishing pier approximately 12' wd. x 155' in length with access to deep water. Security lights (4-5) would be helpful to illuminate the dock for pre-dawn or evening fishing. ADA/ABA access routes and parking would be needed to tie the facility in with an existing day use area.

Resurfacing Sailboat Harbor Boat Access: The existing parking areas at the Sailboat Harbor area south of Rt. 154 will be resurfaced with hot mix asphalt. New car/trailer parking configurations will improve ease of use by boaters and anglers.

Extend Electrical Service to Day Use Areas: This project will run underground primary electric service to Picnic Shelters 1, 2 and 3 in the day use area. Service runs to the shelters will allow users greater flexibility to host family gatherings and events with access to electrical outlets instead of relying on generators.

Internal Roads and Parking: This project will resurface the existing park roads and parking areas. The system was last resurfaced in 2006 and will likely need new overlays during the term of this master plan update.

Replace Water Valves: At various locations throughout the park, water valves need replacement to provide site management the ability to shut off water service as needed to make repairs to facilities.

Reforestation: The Park has recently discovered many ash trees that emerald ash borers and is beginning a process of removing infected trees in day use and camping areas before they become hazards. Replacing trees using native species and container stock will be an ongoing project for several years.

H. Gun Creek Recreation Area (R-8) (See Plate's 16-A & B)

Area Name: Gun Creek Recreation Area
Land Classification: High Density Recreation
Type of Area: Day-Use & Campground
Managing Entity: USACE

Acres: 157
Developed Acres: 33
Avg. Annual Visits: 75,205
Avg. Annual Revenue: $171,832

Density of Use: 800 (Project Average = 1,631)
(Average Annual Visits per developed acre)
Average Annual Occupancy Rate: 57.8%

Narrative Description of Area: Gun Creek Recreation Area is located just south of Wayne Fitzgerrell State Park and immediately adjacent to RLCD golf course and resort. The area is comprised of a campground and day-use Area.

Existing Facilities

Day Use Facilities		Camping Facilities	
Picnic Sites		Entrance Station	1
Picnic Shelters	1	Campsites (E/W/S)*	26 EWS 74 E
Boat Ramp/Lanes	1/4	Gate Attendant Sites	2
Car Parking	77	Dump Station	1
Trailer Parking	86	Playgrounds	2
Courtesy Dock	1	Rest Rooms	1 WB
Fish Cleaning Station		Shower Buildings	2 WB
Trails/Trail Miles		Amphitheater	
Water Fountains	3	Water Hydrants	14
Rest Rooms	2 V	Multipurpose Court/Play Field	
Playground	1		

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Although the Gun Creek campground has good occupancy rate, many of the campsites do not meet the Campsite Design Guidelines contained in EM 1110-1-400 and requirements in EM 1110-2-410. Vehicle spurs are too narrow and impact areas are too small to accommodate recreational vehicles and camping equipment. Improper spur alignment causes rut damage from trailers and RV's to adjacent grounds and vegetation. Many of the trees are reaching the end of their life expectancy.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
25	CG: Renovate campsites to meet Customer Service Standards	PA	Renovate campsites to meet Customer Service Standards, including roads and circulation
213	CG: Install Wi-Fi	N	Install appropriately sized Wi-Fi system for customer use.
28	DU: Construct bike trail with access into campground	PA	Construct portion of trail as approved in the Rend Lake Bike Trail Plan
24	CG: Renovate CG (49 full hook-up sites & 25 water hook-ups)	PA	Renovate CG (49 full hook-up sites & 25 water hook-ups)
212	Construct small leash-free dog area	N	Provide leash-free dog area in appropriate location
26	DU: Construct accessible fishing access	PA	Construct ADA/ABA compliant fishing access along the shoreline
27	DU: Convert portion of area to camping	PA	Convert a portion of the Day-Use Area into campsites
29	DU: Replace vault comfort stations with ADA/ABA compliant waterborne facilities	R	Replace vault comfort stations with ADA/ABA compliant facilities
30	DU: Renovate Playground & replace with ADA/ABA compliant equipment	R	Renovate Playground & replace with ADA/ABA compliant equipment
32	DU: Extend Bike trail into campground	PA	Extend Bike trail into campground
211	Implement tree replacement plan	R	Plant native tree species to replace dead or dying trees
33	DU: Modify shoreline and incorporate as part of Kayak Trail	N	Provide sand area along shoreline to serve as a kayak launch and incorporate as a part of future water trails
231	DU: Replace/renovate Shelter #10	R	Replace or renovate Shelter #10

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Data analysis indicates that occupancy rates for sites with water and sewer hookups are 25% to 40% higher than those without. The goal is to provide full service hookups to 75% of the campsites. Campsites will be renovated to meet Campsite Design Guidelines contained in EM 1110-1-400. Improperly sized spurs and impact sites are creating degradation to adjacent soil and vegetation. Providing sites that meet Customer Service Standards will improve customer satisfaction, attract new users and help minimize annual O&M costs. Renovation activities will be accomplished to ensure protection of existing vegetation. The addition of outdoor Wi-Fi will greatly improve customer satisfaction. Many of the trees are reaching the end of their life expectancy. Replace dead or dying trees with native species. Adding a kayak launch will respond to customer requests. Providing a leash-free dog area will respond to customer input.

I. RLCD Recreation Area (R-9) (See Plate's 23-A & B)

Area Name: Rend Lake Conservation District
Land Classification: Recreation

Type of Area: Multipurpose
Managing Entity: RLCD

Acres: 67
Developed Acres: 67

Avg. Annual Visits: 40,312
Avg. Annual Revenue: N/A

Density of Use: 601 (Lake Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: N/A

Narrative Description of Area: This area is located adjacent to North Marcum Day-Use Area

Existing Facilities

Outgranted Facilities	
Wet Slips	
Dry Slips	
Boat Ramp/Lanes	1/4
Restaurant	
Gas Sales	
Store	
Lodge/Hotel/ Rooms	
Cabins	
Golf Course (3 holes)	1
Picnic Sites/Shelter	
Admin. Bldg.	
Trails/Trail Miles	2/2.5
Playground	

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Currently there are very few recreation facilities managed by RLCD. Located on public land. RLCD holds a recreational lease with the USACE for facilities located on USACE property, including a 4-lane boat ramp, small portions of a golf course, and portions of parking lots that serve recreation facilities located on RLCD land.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA/F)*	Description
103	Resurface two parking lots north of Hwy 154	R	The gravel beginning to show through. Resurface with seal coat. (on lease that is
101	Construct six miles of unpaved multi-use trail	N	Bike/hike trails through woods approximating shoreline and elsewhere for circle trails.
102	Construct .75 miles of paved multi-use trail to connect boat ramp parking lot to existing paved trail	N	Connector to make boat ramp area accessible to existing trail south of 154.
214	Connect paved multi-use trail system with COE paved trail	F	Finish the trail south and east of water treatment plant to shoreline across from South Marcum Recreation Area.
108	Develop Recreation Complex to include marina and lakeside resort.	F	If and when a viable partner is found expand the area along I-57 to include a marina and lakeside resort.

** (R = Replacement, N = New, PA = Previously Approved, F = Future Action)*

Proposed Action Discussion: The majority of the proposed actions will be constructed on land owned by RLCD. However, some of the amenities (courtesy docks, portions of trails, etc.) associated with that development may extend on to USACE property. Prior to placement of any facility on USACE property, RLCD is required, through their recreational lease, to obtain written approval from the Corps. The lease requires all facilities located on public land to be open to use by all members of the general public.

J. North Marcum Recreation Area (R-10) (See Plate's 17-A & B)

Area Name: North Marcum Recreation Area
Land Classification: High Density Recreation
Type of Area: Day-Use
Managing Entity: USACE

Acres: 74
Developed Acres: 36
Avg. Annual Visits: 34,544
Avg. Annual Revenue: $3,595

Density of Use: 960 (Lake Average = 1,631)
(Average Annual Visits per developed acre)
Average Annual Occupancy Rate: N/A

Narrative Description of Area: North Marcum Recreation Area is located approximately 1 mile north of the Main Dam.

Existing Facilities

Day Use Facilities	
Picnic Sites	22
Picnic Shelters	2
Boat Ramp/Lanes	1/2
Car Parking	389
Trailer Parking	50
Courtesy Dock	1
Fish Cleaning Station	
Swimming Area	
Trails/Trail Miles	1/.1
Water Fountains	3
Rest Rooms	1 V 1 WB
Beach Shower House	1
Playground	1
Fishing Pier	

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: At one time the area included a designated swimming beach, which has been converted to a boat-in area. Initially, this transition caused some minor user conflicts between, previous beach users and current boat-in users. Even though over time, this situation has improved, efforts to separate uses (swimming and boating) will continue to be implemented. The land-based

recreation facilities are underutilized. However, the area is popular with local boaters, since it provides a location where family can meet for picnics and gatherings.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
45	Replace vault comfort station at boat ramp with ADA/ABA compliant waterborne facility	PA	The comfort station at the boat ramp will be replaced with ADA/ABA compliant facility
46	Construct accessible fishing access	PA	Install ADA/ABA compliant fishing facilities
47	Remove basketball court	R	Remove basketball court
48	Reduce large sand area	R	Remove much of the sand from the previous beach area, leaving a strip of sand along the shoreline for boats.
49	Replace shower house with ADA/ABA compliant comfort station	R	Replace the shower house with ADA/ABA compliant comfort station
50	Replace water distribution system to area	R	Replace the water distribution system
51	Replace and relocate Shelter 7 with ADA/ABA compliant structure	R	Replace and relocate Shelter #7 with ADA/ABA compliant structure
52	Reduce the size of the boat ramp parking lot and boat-in parking area	R	Reduce the size of the boat ramp parking lot and boat-in parking area
53	Modify breakwater or construct additional breakwater	R	Modify breakwater to be more effective

** (R = Replacement, N = New, PA = Previously Approved, F = Future Action)*

Proposed Action Discussion: Recreational use in this area has transitioned from swimming to boating. Many of the existing facilities, such as the shower house, basketball court and group shelters receive very little use. Relocating shelter #7 closer to the water will encourage use of the facility. Parking lots in the area can be reduced in size without impacting recreational use. Constructing an ADA/ABA- compliant fishing access facility will provide new recreation opportunities for lake visitors and local communities.

K. South Marcum Recreation Area (R-11) (See Plate's 18-A – 19-B)

Area Name: South Marcum Recreation Area
Land Classification: High Density Recreation

Type of Area: Day-Use & Campground
Managing Entity: USACE

Acres: 396
Developed Acres: 48

Avg. Annual Visits: 122,542

Avg. Annual Revenue: $187,370

Density of Use: 2,553 (Project Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: 45.7%

Narrative Description of Area: South Marcum Recreation Area is located just east of the Spillway Recreation Area and Main Dam. The area is comprised of a day-use area, campground, volunteer village and group camp area.

Existing Facilities

Day Use Facilities		Camping Facilities	
Picnic Sites	8	Entrance Station	1
Picnic Shelters	1	Campsites (E/W/S)*	46 EWS 100 E 14 P
Boat Ramp/Lanes	1/4	Gate Attendant Sites	2
Car Parking	116	Dump Station	1
Trailer Parking	100	Playgrounds	4
Courtesy Dock	1	Rest Rooms	3 WB
Fish Cleaning Station		Shower Buildings	4 WB
Swimming Area		Laundry	
Trails/Trail Miles	1/.5	Amphitheater	
Water Fountains	2	Water Hydrants	9
Rest Rooms	1 V	Multipurpose Court/Play Field	1
Beach Change House		Trails/Trail Miles	2/2.1

***** *(E = Electric, W = Water, S = Sewer, P = Primitive, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Although the South Marcum campground has good occupancy rate, many of the campsites do not meet the Campsite Design Guidelines contained in EM 1110-1-400. Vehicle

spurs are not level, too narrow and impact areas are too small to accommodate recreational vehicles and camping equipment. There are many ruts along circulation roads as a result of improper spur alignment and narrow roads. Many of the trees are reaching the end of their life expectancy. Currently there are five Volunteer Village Campsites, with previous approval to construct 20 sites. Green Herron pond is in need of refurbishment. Facilities within the area need to be renovated or replaced to meet ADA/ABA standards.

Proposed Actions

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
111	CG: Convert 75 campsites to full hookup.	PA	Convert 75 campsites to full service hookup sites.
112	CG: Install water hookups to 37 sites	PA	Install water hookups to 37 sites.
117	CG: Renovate campsites to meet Customer Service Standards	R	Realign and renovate campsites to meet Customer Service Standards.
113	CG: Provide sewer hook-up to municipal system	PA	Connect to City of Benton sewer system.
114	CG: Widen campground roads to meet customer service standards	PA	Widen campground roads to meet Customer Service Standards and EM 1110-2-410 (Roads & Circulation)
110	CG: Renovate Green Heron Pond	PA	Renovate Green Heron Pond
115	CG: Renovate 100 campsites	PA	Renovate 100 campsites
118	CG: Beaver Lodge Loop: Re-align parking at mini-shower	R	Realign parking spaces at mini-shower building
121	CG: Replace comfort stations to include showers and modify large shower house to include laundry facilities. All will be ADA/ABA compliant facilities	R	Replace comfort stations to include showers and replace main shower building to include laundry facilities. All will be ADA/ABA compliant facilities.
124	CG: Provide revetment protection to the areas of shoreline currently unarmored where erosion is occurring	R	Provide shoreline protection to areas where erosion is occurring
130	CG: Modify some sites in Whispering Pines into “Buddy Sites”	R	Modify some campsites in Whispering Pines to be “Buddy Sites” and in compliance with Customer Service Standards.
116	Construct Volunteer Village, including: Relocate existing 5 campsites further east and incorporate existing sites into campground, Construct group shelter, fire circle, and laundry facility, Relocate and convert gate to the Volunteer Village from a manual gate to electronic gate, Construct 15 additional campsites, provide trash removal service	PA & N	Construct Volunteer Village, including: Relocate existing 5 campsites further east and incorporate existing sites into campground, Construct group shelter, fire circle, and laundry facility, Relocate and convert gate to the Volunteer Village from a manual gate to electronic gate, Construct 15 additional campsites, provide trash removal service
122	CG: Construct additional ADA/ABA compliant shower facility in Beaver Lodge Loop.	N	Construct additional ADA/ABA compliant shower facility in Beaver Lodge Loop
134	CG: Install Wi-Fi	N	Provide properly sized Wi-Fi service for customer use

Action Item #	Proposed Action	Type of Action (R/N/PA)*	Description
125	CG: Install electric in tent site area	N	Provide two 110V electrical outlets at each primitive tent site
126	CG: Install water hydrants in tent site area	N	Provide water hydrants in tent area
127	Correct standing water issues around campsites	R	Correct standing water issues around campsites
136	DU: Replace and relocate Shelter #9 with ADA/ABA compliant structure	R	Replace and relocate Shelter #9 with ADA/ABA compliant structure.
137	DU: Replace and relocate playground with ADA/ABA compliant equipment	R	Replace and relocate playground equipment with ADA/ABA compliant equipment
138	DU: Renovate boat loading platform to be ADA/ABA compliant	R	Renovate existing boat loading platform to be ADA/ABA compliant
215	DU: Modify shoreline to accommodate kayak launching	R	Provide sand area along shoreline to serve as a kayak launch and incorporate as a part of future water trails
216	Implement Tree replacement Plan	R	Implement tree replacement plan
217	CG: Provide small parking lots in CG	N	Construct small parking lots throughout CG to accommodate parking demand
218	CG: Install small leash-free dog area	N	Provide small leash-free dog area at appropriate location

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Data analysis indicates that occupancy rates for sites with water and sewer hookups are 25% to 40% higher than those without. The goal is to provide full service hookups to 75% of the campsites. Campsites will be renovated to meet Campsite Design Guidelines contained in EM 1110-1-400 and requirements in EM 1110-2-410. Improperly sized spurs and impact sites are creating degradation to adjacent soil and vegetation. Providing sites that meet Customer Service Standards will improve customer satisfaction, attract new users and help minimize annual O&M costs. Renovation activities should be accomplished to ensure protection of existing vegetation. The addition of outdoor Wi-Fi will greatly improve customer satisfaction. A tree replacement plan will be implemented to ensure environmental sustainability and tree canopy protection. Adding a kayak launch will respond to customer requests. The Volunteer Village will be moved further east to the end of the loop road and the existing five sites will be incorporated into the public campground. A well-appointed Volunteer Village will help grow the program and provide the necessary amenities to attract and retain well qualified volunteers.

L. Dale Miller Group Camp (R-11) (See Plate's 18-A & B)

Area Name: Dale Miller Group Camp
Land Classification: High Density Recreation

Type of Area: Group Camping Area
Managing Entity: USACE

Acres: 19
Developed Acres: 6

Avg. Annual Visits: 2,128
Avg. Annual Revenue: $15,090

Density of Use: 355 (Lake Average = 1,631)
(Average Annual Visits per developed acre)

Average Annual Occupancy Rate: 66.7%

Narrative Description of Area: Dale Miller Group Camp is located within the South Marcum Recreation Area. This group camp area can accommodate up to 200 people and is very popular for family reunions, weddings, and organizational outings.

Existing Facilities

Camping Facilities	
Entrance Station	
Campsites (E/W/S)*	9 EWS
Gate Attendant Sites	
Dump Station	
Playgrounds	2
Rest Rooms	
Shower Buildings	1 WB
Water Hydrants	5
Multipurpose Court/Play Field	2
Trails/Trail Miles	1/.3
Swimming Area	1
Camping Shelters	5

***** *(E = Electric, W = Water, S = Sewer, V = Vault, WB = Waterborne)*

Existing Facility Discussion: Although the Dale Miller Group Camp has good occupancy rate, the campsites do not meet the Campsite Design Guidelines contained in EM 1110-1-400. Currently the RV sites in this area are located in a parking area along the roadway, which is too narrow for proper parking

and backing of recreational vehicles and camping units. These sites will be relocated within the area and constructed to meet customer service standards.. Many of the trees are reaching the end of their life expectancy. The camping shelters and group shelter are deteriorating and have reached the end of their useful life, causing increased maintenance and O&M costs. The current play fields and courts do not meet customer service standards, causing them to have little to no use.

Proposed Actions

Action item #	Proposed Action	Type of Action (R/N/PA)*	Description
14	Convert 5 picnic sites into full service hookup campsites	PA	Convert 5 primitive campsites along the beach access road into 50 amp electric sites with RV pad, grill, lantern post, and picnic table
15	Construct accessible fishing access	PA	Construct accessible fishing access including a floating dock and concrete path to dock adjacent to camping shelter #3
8	Construct enclosed mini shelter	PA	Construct a new enclosed shelter on the end of the turnaround overlooking the lake
9	Relocate and renovate RV campsites to meet Customer Service Standards	R	Realign current sites and roadway to accommodate recreational vehicles/camping units and impact areas
12	Renovate sleeping shelters	R	Renovate sleeping shelters
10	Remove Tennis Court	R	Remove tennis court
13	Renovate group shelter to include food preparation facilities in order to meet customer demand	R	Renovate electric and inside amenities to accommodate kitchen area including refrigerator, stovetop, oven, and sink.

** (R = Replacement, N = New, PA = Previously Approved)*

Proposed Action Discussion: Campsites will be renovated to meet Campsite Design Guidelines contained in EM 1110-1-400 and requirements in EM 1110-2-410. Renovating the shelters, campsites, and play areas to meet Customer Service Standards will improve customer satisfaction, attract new users and help minimize annual O&M costs. Renovation activities will be accomplished to ensure protection of existing vegetation. A tree replacement plan will be implemented to ensure environmental sustainability and tree canopy protection. The addition of accessible fishing access will respond to customer needs. The existing RV sites will be relocated and renovated to meet standards. Renovating camp shelters and group shelter will provide needed repairs and updating.

5.3.2. Multiple Resource Management Lands

This classification allows for the designation of a predominate use of an area, using one of the following sub-classifications:

A. Low Density Recreation

This classification is used for lands with minimal development or infrastructure. These lands support passive types of recreational use (e.g. fishing, hunting, hiking, walking, wildlife viewing, etc.). There are five areas with this classification and include a total of 820 acres. **Table 5-4** provides a summary of lands classified as Low Density Recreation.

Table 5-4: Summary of Low Density Recreation Areas

Area #	Area Name	Acres
LD-1	Stockpile Storage Area	107
LD-2	Turnip Patch MRA	12
LD-3	Rend Lake Shooting Complex	67
LD-4	I-57 MRA	4
LD-5	North Marcum MRA	630
	TOTAL	**820**

Proposed Actions:

North Marcum MRA (LD-5) (# 54): Implement phase 5 of Rend Lake Bike Trail Plan **(Previously Approved)**

Partner with local organizations for the construction and maintenance of projects to increase the low density recreation opportunities in this area. Projects include the construct a 14-mile mountain bike trail, competitive archery trail and range, and associated infrastructure.

B. Vegetative Management

This classification is used for stewardship of forest, prairie and other native vegetative resources. There are twelve areas with this classification and include a total of 6,016 acres. **Table 5-5** provides a summary of lands classified as Vegetative Management.

Table 5-5: Summary of Vegetative Management Areas

Area #	Area Name	Acres
VM-1	Main Dam MRA	802
VM-2	Sandusky Creek MRA	131
VM-3	North Sandusky MRA	124
VM-4	Jackie Branch MRA	162
VM-5	West MRA	964
VM-6	Ward Branch MRA	730
VM-7	Atchison Creek MRA	606
VM-8	Ina MRA	647
VM-9	Gun Creek MRA	1,505
VM-10	Jones MRA (Sims Point)	181
VM--11	Marcum Creek MRA	88
VM-12	South Marcum MRA	77
	TOTAL	**6,016**

Proposed Actions:

1. Main Dam MRA (VM-1) (802 Acres):

A. (# 42) Provide an improved water source to wetland complex. (**Previously Approved)**

B. (# 44) Develop trails on top of existing levees and make connections to Rend Lake Bike Trail. Trails will be developed as loops and/or interpretive trails. **(Proposed New Action)**

C. (# 43) There are currently no convenient access points/parking lots for the Rend City Wetlands. Construct a gravel parking lot for the Rend City Wetlands adjacent to Rend City Road which will provide safe off-road parking for visitors using the area. **(Previously Approved)**

D. (# 40) Upgrade the main water control structure for Rend City Wetlands. This will eliminate the need to pump water in and out of the wetland area. Add pump pads for use of portable pumps if upgrading the structure is not feasible. **(Proposed Replacement Action)**

E. (# 228) Modify existing secondary water control structures to their recommended elevation (**Proposed Replacement Action)**

F. (# 233) Construct wildlife viewing tower at strategic location within the MRA. This will provide a unique view of the wetlands and allow visitors a better understanding of the importance of wetlands. **(Proposed New Action)**

2. Atchison Creek MRA (VM-7) (606 Acres):

Proposed Actions:

A. (# 1) Currently there is no parking lot for this area. Construct a gravel parking lot to provide safe access to the area. **(Proposed New Action)**

B. (# 2) Construct pump pads for use of portable pumps to fill wetlands from adjacent creek. **(Proposed Replacement Action)**

3. Gun Creek MRA (VM-9) (1,505 Acres):

(# 33) Modify the shoreline near Cypress View Boat Ramp to accommodate kayak launching for water trail access. **(Proposed Replacement Action)**

4. South Marcum MRA (VM-11) (77 Acres):

(# 139) Implement Phase 5 of Rend Lake Bike Trail Plan **(Previously Approved)**

C. Wildlife Management (See Plate's 24-A – 26-B) (7,799 Acres)

This classification is used for stewardship of fish and wildlife resources. There are three areas with this classification and includes a total of 7,799 acres. **Table 5-6** provides a summary of lands classified as Wildlife Management.

Table 5-6: Summary of Wildlife Management Lands

Area #	Area Name	Acres	Plate Number
WM-1	Rend Lake Wildlife Refuge	1,109	24-A & 24-B
WM-2	Big Muddy Wildlife Area	4,087	25-A & 25-B
WM-3	Casey Fork Wildlife Area	2,603	26-A & 26-B

	TOTAL	**7,799**

1. Rend Lake Wildlife Refuge (WM-1): (1,109 Acres)

Proposed Actions:

A. (# 95) Remove seven deteriorating wooden vault toilets and replace with ADA/ABA compliant facilities in the same proximity at access points. Install miscellaneous concrete sidewalks and parking spaces to improve accessibility to facilities and access points**. (Previously Approved)**

B. (# 82) Resurface the access roads and parking in all areas. **(Proposed Replacement Action)**

C. (# 98) Renovate the floating courtesy docks at Bonnie South and Waltonville Access areas. **(Proposed Replacement Action)**

D. (# 84) Replace sub-impoundment pump **(Proposed Replacement Action)**

E. (# 83) Replace vault toilets at Dareville & Bonnie South with ADA/ABA compliant facilities. **(Proposed Replacement Action)**

2. Big Muddy Wildlife Management Area: (WM-2) (4,087 Acres)

Proposed Actions:

(# 192) Upgrade sub-impoundment Pump (**Previously Approved)**

3. Casey Fork Wildlife Management Area (WM-3) (2,603 Acres):

Proposed Actions:

A. (# 5) Resurface the township road providing access to the Bonnie Dam and South Bonnie Access areas. The project will include base repair and compaction, ditch cleanout and replacement of drainage structures as needed. Due to the flood prone nature of this area, a bituminous concrete surface (binder and surface courses) should be used for parking and road areas. Install regulatory signage and stripe and sign parking areas**. (Previously Approved)**

B. (# 85) Construct a permanent hunter check station at the Cottonwood Access Area. It will be a pole building 22' x 36' with a 10' overhang across the front to provide shelter during blind drawings. It will have a sealed concrete floor throughout, 2 walk through doors, 1 insulated overhead door, electric service, outlets, lighting, 2 pole mounted exterior security lights, security fence enclosure with 1 vehicle gate, and 1 standard IDNR unit toilet**. (Previously Approved)**

C. (# 6) Upgrade sub-impoundment Pump **(Previously Approved)**

D. Future or Inactive Recreation Areas (135 Acres)

This classification is for areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. There are two areas, containing 135 acres with this classification.

Table 5-7: Summary of Future or Inactive Recreation Area

Area #	Area Name	Acres
FR-1	Jackie Branch Future Recreation Area	85
FR-2	Gun Creek Complex	49
	TOTAL	**135**

Proposed Actions:

1. Jackie Branch Future Recreation Area (FR-1) (85 Acres):

A. (# 36) Construct a fish cleaning station. There are no fish cleaning stations currently located on USACE managed areas at Rend Lake.

This station will provide a much needed service to the public and eliminate the issue of fish remains being placed in project dumpsters. **(Previously Approved)**

B. (# 229) Replace and relocate the boat ramp. The ramp is currently located in the back of the shallow cove and is experiencing extensive siltation. The boat ramp is also constructed of preformed concrete slabs that continue to shift and subside, causing cracks and voids in and between the slabs**. (Previously Approved)**

C. (# 37) Construct accessible fishing access along the shoreline. The shoreline around this area has been protected from erosion with rip-rap, making it difficult to access the shoreline for fishing. Installation of accessible fishing access will involve constructing a walkway from the parking lot to the shoreline and installing a pier or concrete platform**. (Previously Approved)**

D. (# 220) Provide sand area along shoreline to serve as a kayak launch and incorporate as a part of the Rend Lake Water Trail. This will respond to customer requests. **(Proposed New Action)**

2. Gun Creek Complex (FR-2) (49 Acres):

(# 108) This area is currently outgranted to RLCD. Planned development includes an extensive commercial recreation complex, oriented toward the resort, convention, and vacation market. The majority of this proposed development will occur on adjacent private land. **(Proposed Future Action)**

5.2.4. Environmentally Sensitive Areas

This classification is used in areas where scientific, ecological, cultural or aesthetic features exist.

There are no Environmentally Sensitive Areas at Rend Lake.

5.2.5. Water Surface Classifications (See Plate 28, 29, 30)

The total water surface area for Rend Lake is **20,633 acres**. There are four water surface classifications at Rend Lake.

A. Restricted (RW-2). This classification is used for water areas restricted for project operations, safety and security purposes. Public access to these areas is not permitted. These areas are marked with buoys that physically prevent access. These areas include the water areas immediately upstream and downstream of the dam, water intake structures, pump stations and any other areas determined to be a public safety or security concern. There are **27 water surface acres** with this classification.

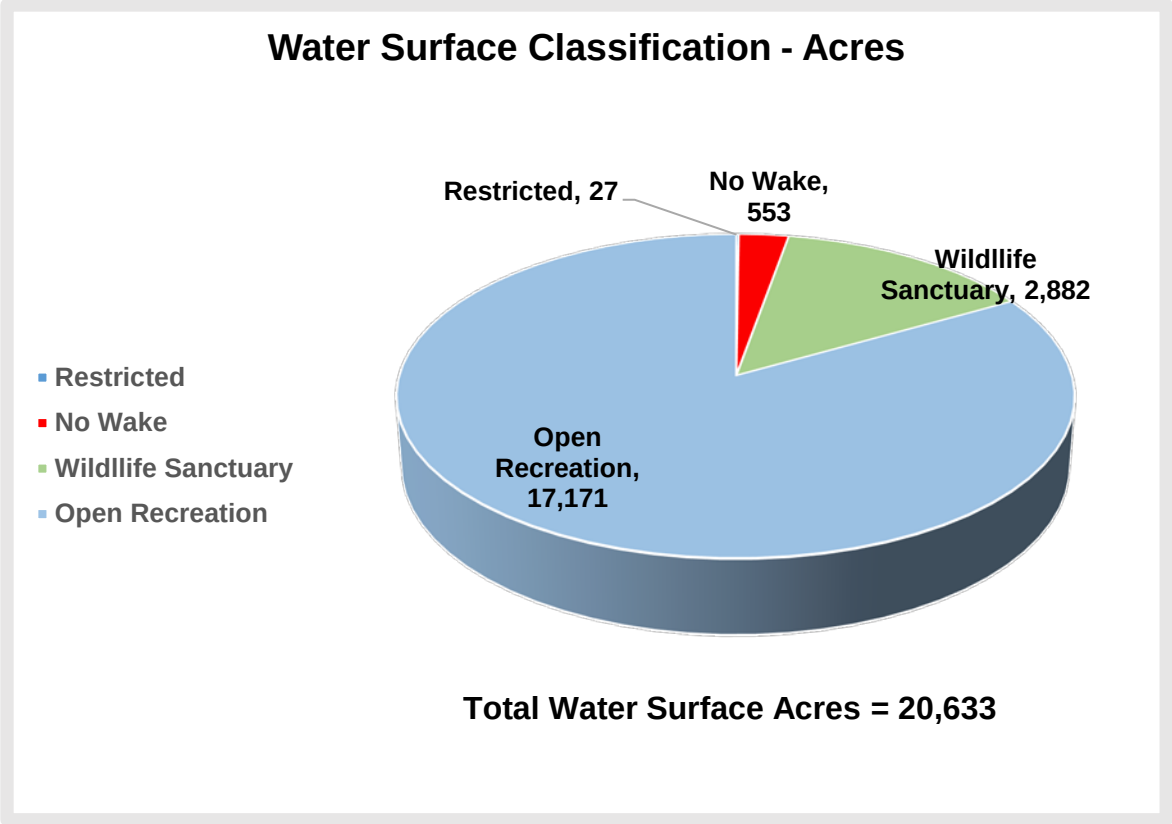
B. No-Wake (RW-3). This classification is used to protect environmentally sensitive shoreline areas and recreational water access areas from disturbance, and/or for public safety. Generally, all areas marked as "no-wake" are located at boat ramps, entrances to coves, railroad trestles boating pass-through' s at bridges, and adjacent to designated swimming beaches. There are **553 water surface acres** with this classification.

C. Fish & Wildlife Sanctuary (RW-4). This classification is used to identify areas where annual or seasonal restrictions are in place to protect fish and wildlife species during periods of migration, resting, feeding, nesting and/or spawning. These areas are marked with a combination of signs and/or buoys. There are **2,882 water surface acres** with this classification.

D. Open Recreation (RW-1). This classification is used for water areas available for year-round or seasonal water-based recreational use. Generally, these waters can be used by most types of vessels for all types of water-based recreational activities. There are **17,171 water surface acres** with this classification.

The water surface classifications are depicted in **Figure 5-1**.

Figure 5-1: Water Surface Classification – Rend Lake



Proposed Actions:

(# 221) This is the first time the water surface at Rend Lake has been classified. **(Proposed New Action)**

5.2.6. Easement Lands (687 Acres)

All 687 acres of Easement Lands at Rend Lake are Flowage Easement Lands. These are privately-owned lands and are generally located between elevation 412.0 feet NGVD and 416.0 feet NGVD. The USACE fee-taking line when creating the Rend Lake Project was 410.0 feet NGVD plus 300 feet horizontal or 416.0 feet NGVD, whichever was the higher elevation.

Proposed Actions: None

CHAPTER 6

SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1. Lack of Overnight Accommodations in the Area

Other than campgrounds, there are very few options and limited choices for obtaining overnight accommodations in close proximity to the lake. Further compounding the issue is the fact that lodge facilities at Wayne Fitzgerrell State Park are temporarily closed for repairs. The IDNR is making progress toward reopening the facility and has issued a request for proposals, to obtain a qualified resort operator. It is likely the resort will not reopen until sometime in 2019.

Within three miles of the Rend Lake boundary there are only five hotel/motel/cabin rental facilities where overnight accommodations can be obtained and only two of these facilities are within reasonable walking distance from the lake. The five facilities combined offer a total of 188 rental rooms or units. The two facilities near the lake contain 50 of the 188 units.

In order to improve this situation, the USACE at Rend Lake is evaluating the possibility of issuing a recreational lease for cabin rentals. There are several locations on the lake that may be suitable for this type of activity. However, further evaluation and review will be needed before a final decision can be made.

Proposed Action: (# 222) Evaluate potential locations, where offering a lease to provide overnight rental cabins, will be pursued by the USACE.

6.2. Consideration for an Additional Marina

A previously approved Master Plan action is the development of an additional marina at the Ina Recreation Area, located in the upper reaches on the east side of the lake. Currently, Jefferson County and the Jefferson County Development Authority are taking efforts to determine the feasibility of such a development. They have completed A Market Feasibility Study for a Marina at the Ina Recreation Area, which is included as **Appendix C**.

Proposed Action: (# 223) The USACE will continue to work closely with Jefferson County in looking for viable options to facilitate this development.

6.3. Expansion of Volunteer Village

In 2017, volunteers at Rend Lake provided 3,545 hours of volunteer service, with an estimated total value of $436,579. Each year, the number of volunteers and the hours of service they provide continue to increase. As such, it is vitally important to develop and implement a well-rounded and comprehensive volunteer program.

In May of 2018, members of the Master Plan – 2018, Product Delivery Team (PDT) from Rend Lake, conducted field visits to several USACE lakes in the South Atlantic Division, where highly rated volunteer programs and volunteer villages have been established. These field visits were extremely valuable and provided a framework from which to establish an effective and efficient volunteer village for Rend Lake.

One of the most important aspects for establishing a successful volunteer village, particularly at lake's located in rural areas, is developing a well-appointed Volunteer Village, where volunteers are provided with a campsite and other amenities to ensure a safe and meaningful volunteer experience.

To this end, a **Proposed Action (# 116), is creation of a Volunteer Village.** The village will be located in a currently closed camping loop in South Marcum Recreation Area **(See Plate's 19-A & B)**. The Village will include an electronic access gate, partially enclosed shelter with meeting space, kitchen facilities, dining area, laundry, showers, outdoor grill and cooking area, fire circle and up to twenty individual, full service campsites. All facilities will be ADA/ABA compliant.

6.4. Tree Management and Replacement Plan within Designated Recreation Areas

A significant number of trees, particularly within the boundaries of developed recreation areas, are dying or are already dead. There are several factors causing this alarming loss of trees, including insect damage, tree diseases, and the fact that trees are nearing the end of their life expectancy.

6.4.1. Insect damage

Tree damage is being caused by the following insects:

A. Emerald Ash Borer: The Emerald Ash Borer has already moved through southern Illinois, killing a large percentage of ash trees at Rend Lake. Damage is caused when the Larvae of the Emerald Ash Borer feed laterally around the tree in the cambium, girdling the tree and preventing nutrients from travelling through the tree. Up to half of the

canopy may be destroyed after a few years of infestation and a healthy tree may be killed in as little as 6 years.

B. Horned Oak Gall Wasp & Gouty Oak Gall Wasp: The majority of the debilitating oak galls found on oak trees in Illinois are caused by the Horned Oak Gall Wasp and the Gouty Oak Gall Wasp. Horned oak gall occurs on Pin, Black, and Water Oak, while gouty oak gall occurs on Pin, Scarlet, Red, and Black Oak species. The galls are prevalent on many oak trees at Rend Lake and are beginning to adversely impact the oak tree population

The gall is formed by the tree in reaction to insect-released chemicals or other stimuli, which incite plant hormones to form the gall. The inside of the gall is rich with protein and provides a source of concentrated food for developing larvae. The galls can become lethal when the tree's twigs and branches become heavily infested. Younger trees are at a greater risk for death than mature trees.

6.4.2. Tree Diseases

Several tree diseases are prevalent in the Rend Lake area, and include:

A. Anthranose: Anthracnose diseases of hardwood trees are widespread throughout Southern Illinois. The most common symptom from this disease is dead areas or blotches on the leaves. The diseases are particularly severe on American sycamore, the white oak group, black walnut, and dogwood.

B. Oak Wilt: Oak wilt is caused by a fungus that colonizes vascular tissue of susceptible tree species. The fungus is spread through roots by a variety of beetles. This disease can kill mature trees in the red oak group (black, pin, red, and shingle oaks) in one season. Trees in the white oak group (bur, swamp, and white oaks) are more tolerant of the pathogen and it may take several years to kill an infected tree. Leaf scorch and wilt may be observed in late spring and early summer on infected trees. Ultimately, complete defoliation occurs by late summer.

C. Decline and Dieback: Symptoms of decline and dieback are often subtle, slow in developing, and usually uniform throughout the crown of infected trees. Dieback usually begins in the top of the tree and progresses downward. As the disease worsens, thinning of foliage in the crown, dieback of twigs and branches, and production of suckers on the branches and trunk are common symptoms.

D. American Chestnut Blight: Chestnut blight is a fungus that has virtually wiped out the American chestnut from Southern Illinois. The fungus is lethal and widespread in the Rend Lake area and there is no indication that a cure for this disease will be found.

6.4.3. End of Life Expectancy

Many trees at Rend Lake are nearing the end of their anticipated life expectancy. While some hardwood tree species can live to be well over 100-years old, this is not typical in a natural forest setting. Forest trees must continually compete for space, nutrients and sunlight, which reduces hardiness. Further competition is caused by the increasing number of vegetative invasive species that grow in the understory of hardwood forests in Southern Illinois. These conditions can greatly reduce the life expectancy of hardwood tree species.

6.4.4. Cleanup & Removal of Dead and Downed Trees

Inside of high density recreation areas a large number of trees have died and been cut down, because of the safety hazard they pose to humans involved in recreational activities in close proximity to dead or dying trees.

The number of dead or dying trees within designated recreation areas is extensive. In many cases, there have been so many trees requiring cut-down, the staff have not been able to keep up with the rapid pace of tree mortality. This is exasperated even more when strong winds from storms is added to the mix. In these instances, a large number of trees are impacted from a relatively short, but intense storm event, making removal and clean-up a challenge.

Over time, this has created a significant problem with large piles of brush and tree limbs simply left where they were cut down. The brush piles have become a haven for undesirable rodents and other mammals, such as skunks. In some locations there are so many dead trees lying on the ground, it is impossible to safely walk through the area. This is also creating an aesthetic issue in many of the recreation areas.

Leaving the dead trees in the area is also contributing to the spread of diseases and/or insect infestations to nearby healthy trees. Thus creating a never ending, accelerated cycle of tree mortality.

To address this problem, a concerted and extensive effort will be required. The dead trees and brush piles need to be removed from recreation areas in order to slow the progression of rapid tree decline and death.

6.4.5 Tree Replacement Planting

In order to counteract the adverse conditions cited above, an aggressive and comprehensive tree replacement plan must be developed and implemented. In order to re-establish a healthy tree canopy within developed recreation areas. A large number and wide variety of native tree species will need to be planted. The wider the variety of native trees used in this replacement effort, the more likely success can be achieved.

In addition to planting a variety of native species, a variety of tree ages, from seedlings to well established older trees, should be used in this tree replacement initiative. This will greatly improve the survival rate of replaced trees and accelerate the replacement process.

Therefore, a **Proposed Action** for this Master Plan, is the development and implementation of a **Tree Management and Replacement Plan, Inside Designated Recreation Areas**. A well developed and implemented plan will ensure a healthy and sustainable tree canopy is established in developed recreation areas at Rend Lake. *Note: No specific action Item # is assigned, since this action is identified within individual Project Site Areas.*

6.5. Aging Environmental Stewardship Infrastructure

Budgetary constraints have prevented the proper maintenance of Environmental Stewardship infrastructure facilities that are located at several Multiple Resource Areas at Rend Lake. Many of the water control facilities and levees associated with the creation of seasonal wetlands have deteriorated and are in need of repair or replacement.

Proposed Action: (# 224) Develop a long term management plan that focuses on restoring existing wetlands to their original operating condition and restructuring agricultural leases to make them more effective and efficient.

These actions will facilitate improvement of diverse habitats that will support a variety of fish and wildlife management activities.

The Wildlife Management Plan will focus on the use of partnerships to leverage dollars and better compete for grants that may be available for environmental

stewardship activities. Engaging partners and volunteers will be an important component of the plan.

6.6. Recreation Area & Site Renovation

Recreation areas and facilities along with their associated infrastructure were constructed in the late 1960's and early 1970's. Recreation facility standards at that time, were much different than they are today. Recreational vehicles and equipment were much smaller, required less space and contained fewer amenities.

Today, recreational vehicles and associated equipment have exponentially increased in size and complexity in features they contain. In addition, the variety and types of recreational vehicles and equipment has grown by leaps and bounds. These changes require recreation providers to keep pace with industry standards, in order to meet customer demands. .

To address this situation, in 1996 the USACE developed customer service standards, which included new design and operational standards for recreation areas and facilities, such as campgrounds, campsites, day-use areas, picnic sites, boat ramps and other types of recreation areas and facilities. These new standards are routinely updated in order to stay current with the recreation vehicle and equipment manufacturing industries.

In developing this Master Plan, over 1,000 individual NRRS customer surveys were reviewed and evaluated, to ensure current public input was obtained. The most identified issue was the small size of impact areas, narrowness of roadways and camp spurs not being level enough to accommodate recreation equipment.

To meet these new standards and customer demand, will require the USACE at Rend Lake to make significant changes to recreation areas, sites and facilities. To simply replace existing facilities, within the same footprint they currently occupy, will not address the problem or provide good customer service. In many cases reconfiguration and/or realignment and widening of roads and/or camp spurs will be required in order to meet customer service standards. Existing campsites where customer service standards cannot be met because of elevation changes or space limitations, will be relocated to a suitable location where standards can be met.

Overall site plans will be developed for each recreation area where renovation and/or replacement activity will occur. It is important to establish site plans to ensure a comprehensive development plan can be implemented in phases, since the likelihood of receiving large funding amounts, sufficient to cover the renovation of an entire recreation area at one time, is highly unlikely. Development of site plans will greatly facilitate establishing work priorities and accomplishing work in a phased approach.

All renovation and replacement activities will comply with Recreation Customer Service Standards and every effort will be made to achieve ADA/ABA compliance, where feasible. Actions to accomplish this work is included in **Chapter 5**.

6.7. Rend Lake Trails

Hiking, biking, kayaking, wildlife viewing and photography have become very popular trail activities at Rend Lake and elsewhere across the county. Over half of the visitors to Rend Lake use the trails located on public land. According to the State of Illinois SCORP for 2015-2019[31], Trails are among the most popular and requested recreational amenity in any community and on all types of public lands. Bike paths have become integral to the concept of smart growth and creating walkable communities, which connect neighborhoods with schools and shopping centers. As a result, many communities are doing more than simply adding sidewalks; multi-use trails have been built to provide these recreational and practical opportunities.

Nearly 3,000 miles of local and regional trails have been built by communities throughout the state. Some agencies have created trail development plans in order to properly plan the building and management of trails in their community. Agencies with trail development plans indicated constructing more trails than agencies without such plans. The trail development plan appears to be an important planning piece for agencies. These plans can help communities and agencies create a vision and timeline that can be used for securing future funding for trail projects.

6.7.1. Rend Lake Bike Trail (RLBT)

The Rend Lake Bike Trail has three existing segments offering over 20 miles of multi-use trail. The longest contiguous is over 12 miles long. The entire trail is constructed of concrete, except for a 6-mile segment constructed of small

[31] *Illinois SCORP, 2015-2019*

aggregate and located between Wayne Fitzgerrell State Park and Rend Lake College.

The RLBT is envisioned to be a multi-phase project that, when complete, will provide superb recreational and transportation opportunities for Rend Lake visitors and local communities, linking them to cities, attractions, and facilities in the area. The trail is designed for multi-use activities such as, biking, hiking, jogging, and walking for fitness/pleasure. Community leaders anticipate that completion of the RLBT will complement and enhance transportation and recreational opportunities within the area, while having a positive economic impact on the region. **Figure 6-1** is a map of the RLBT.

Figure 6-1: Map of Rend Lake Bike Trail

A **Proposed Action (# 225)** is for the USACE to **engage potential stakeholders and facilitate actions to implement the Rend Lake Bike Trail Plan**, which is included as **Appendix D**. **(Previously Approved)**

Phases 1-4 of the RLBTP have been complete. There are three phases of the RLBT yet to be completed:

Phase 5: This phase of the plan will connect South Marcum Campground to North Marcum Day Use Area. This segment of the trail will be routed through areas that have been previously disturbed by development, such as roadways, utility right-of-ways, and cultivated fields.

Phase 6: This phase of the plan will develop the trail along Illinois Highway 154 and Rend City Road Rights-of-Way. Completion of this segment of the trail will connect the east and west sides of the lake and create a 20-mile continuous loop trail. Implementing this phase will require a cooperative effort involving the USACE, IDNR, IDOT, RLCD, and Franklin County, since the majority of this phase of the trail will be located along road Rights-of-Way.

Phase 7: This phase of the trail will provide access to Gun Creek Campground. It will be routed from the Nighthawk camping loop to Phase 6, described above. This trail segment will run along an existing utility right-of-way.

Completion of the RLBT plan will provide a safer route for users, connecting major recreation areas and providing future opportunities for local cities and communities to connect to the trail system as well.

6.7.2. Rend Lake Kayak & Canoe Trail

The use of kayaks and canoes at Rend Lake continues to grow and visitors are looking for areas that are kayak friendly that provide easy access. A **Proposed Action** is for the USACE, with assistance from partners and volunteers, to **identify and map a variety of water trails** on the lake and **establish kayak launches and resting points at several locations along the shoreline**. The USACE has developed a draft plan that identifies 7 different kayak trails offering 35 miles of mapped water trails that include 10 kayak launches, strategically

placed along the shoreline. **(Proposed New Action).** . *Note: No specific action Item # is assigned, since this action is identified within individual Project Site Areas.*

6.7.3. Connecting Existing Trails and Developing Specialized Trails and Trail Loops

Another priority focus concerning trails and trail activities, is the connectivity of existing trails and development of specialized trails and trail loops. Trails provide an extremely diverse variety of outdoor recreation opportunities and experiences. Outdoor recreation activities conducted on trails, include: walking for leisure/pleasure, walking for fitness/health, bicycle riding, jogging, hiking, dog walking, nature photography and interpretation, to mention a few.

Trails provide a wide range of recreational opportunities for a diverse array of recreational activities. In order to accommodate this wide array of use and users, trail management must also be implemented in a multi-use, multi-faceted approach. Developing partnerships and alliances with potential trail user groups is critical to successful implementation of a comprehensive multi-use trail plan. As such, the USACE will actively pursue partnerships with a variety of user groups in an attempt to satisfy their recreational trail needs.

As other trails are planned or developed within the region, the USACE will look for opportunities to provide interconnectivity with those trails. Also, when specialized user groups, such as mountain biking clubs, jogging and fitness clubs, archery clubs, nature photography clubs, etc., express a desire to develop specialized use trails, the Corps will work with those groups to determine if there needs can be met through the development of specialized trails and/or trail loops that can be connected to existing or planned trails.

As an example, the Rend Lake Bike Club has approached the USACE about their desire to develop a mountain bike trail on USACE lands. The Corps is currently partnering with this club to determine the best location for a mountain bike trail at Rend Lake. When specialized trails can be developed in conjunction with and connected to other types of trails, the variety of recreational opportunities is greatly increased.

Therefore, a **Proposed Action,** is to **evaluate feasibility and pursue ways to connect existing trails when considering the development of specialized**

use trails and/or specialized trail loops. (**Proposed New Action).** . *Note: No specific action Item # is assigned, since this action is identified within individual Project Site Areas.*

6.8. Expansion of Partnerships including consideration of Prison Labor Program

The USACE at Rend Lake is actively working to formalize several partnerships, including:

6.8.1. Develop a Friends of Reservoirs Group: Friends of Reservoirs (FOR) is a non-profit foundation dedicated to protecting and/or restoring fisheries habitat in reservoir systems nationwide. Local and regional FOR groups are developed to focus efforts on a specific geographical area. It is envisioned the Rend Lake group will provide support for the improvement of fishing and recreational opportunities at Rend Lake. This group will also be an avenue for interested groups to complete research and other environmental enhancement projects. The group's first project will be planting cypress trees in designated locations to reduce shoreline erosion and enhance fisheries habitat at Rend Lake.

6.8.2. Rend Lake Bike Club: The Rend Lake Bike Club has proposed creating a 14-mile mountain bike trail that incudes segments for a variety of skill levels. The Rend Lake Bike Club and members of the Cycle1 Cycling Studio, are proposing to design, construct and maintain the trail system. The closed portion of North Marcum Recreation Area is being considered. A conceptual plan for the trail is included as **Figure 6-2**.

6.8.3. Partners for Archery Range & Trail: The USACE at Rend Lake is in discussions with Rend Lake College and Rend Lake Conservancy District about their desire to develop and maintain a Competitive Archery Trail and Range. The trail will be utilized by the Archery Team at Rend Lake College as well as other interested archery organizations. We are working to see if this need can be met in conjunction with the trail identified 6.8.B. Refer to **Figure 6-2**.

6.8.4. Partners for Water Trails: Currently, volunteers are working to identify the best locations for the development of water trails on Rend Lake. The volunteers

are developing initial mapping for the trails, identifying canoe/kayak launching and resting areas, as well as development of an ADA/ABA compliant structure to facilitate canoe/kayak launching. Potential partners include the kayak and canoeing clubs located in Southern Illinois.

Figure 6-2: Conceptual Plan for Trail System at North Marcum Recreation Area

6.8.5. Develop a Cooperating Association

Cooperating associations are a specific type of partnership established to support USACE educational, interpretive or scientific programs, in part through financial assistance earned from sales of educational materials, memberships, special event fees and fundraising contributions. A cooperating association is a legal entity, established under state and federal law, which has non-profit and tax-exempt status under Internal Revenue Service codes and which operates under the terms of a Cooperating Association Agreement with USACE.

To effectively collaborate, cooperating associations and USACE Natural Resources Management (NRM) staff must be knowledgeable about each other, and the partnership must be entered into for the purpose of accomplishing agreed upon objectives. From the nonprofit or community perspective, a formal cooperating association relationship with USACE can broaden capacity to fulfill goals, formalize and strengthen the relationship with the agency, and increase public support. From a federal agency perspective, as non-Federal organizations, cooperating associations often have the benefit of less operating and fiscal restrictions than USACE. Cooperating associations do not have the same rules regarding competition for contracts, credit card spending limits, or levels of review for new projects and actions.

Associations may be able to contract for services more cost-effectively and more efficiently than USACE. Cooperating associations may have strong ties to the community and a network of other potential partners that they can directly solicit for funding and contributions. And, the public may find an association to be more approachable than a government agency.

Together, the ability for enhanced outreach, increased productivity, and achievement of important natural resource, educational, recreational and safety objectives go beyond the individual capabilities of either the nonprofit partner or USACE.

Cooperating Associations can:

- Purchase supplies, materials, equipment, programs, exhibits, and publications to be utilized at the USACE lake/river project
- Operate bookstores on-site to generate revenue
- Apply and receive grants, for which federal agencies may not be eligible

- Operate visitor centers
- Operate donation boxes at USACE facilities and use the money for recreation and NRM program improvements. Donation boxes must identify who handles proceeds and for what purpose.
- Sponsor special events and collect fees in conjunction with the events
- Provide concession services where appropriate

A Proposed Action (# 226) is to develop a Cooperating Association at Rend Lake. (Proposed New Action)

6.8.6. Water Safety Task Force

A Water Safety Task Force is developed to support efforts to educate the public about recreational water safety. The Task Force is typically comprised of local public service agencies such as police departments, fire departments, hospitals, and other emergency service providers. They meet on a regular basis to align water safety missions, plan events, and provide financial support for USACE water safety initiatives.

The USACE at Rend Lake is interested in engaging local agencies to develop a Rend Lake Water Safety Task Force to assist with activities, such as:

- Maintaining life jacket loaner stations
- Managing and funding a water safety giveaway program
- Develop and manage a water safety ranger trading card program
- Volunteer at water safety events, such as the annual Beach Blast

6.8.7. Establish a Civilian Inmate Labor Program

The USACE at Rend Lake is considering developing a Civilian Inmate Labor Program with The Illinois Department of Corrections (IDOC) – Du Quoin Impact Incarceration Program and Jefferson County Sheriff's Department, in order to leverage resources in support of USACE mission accomplishment. The program is designed to provide labor and specialized skills from selected and qualified inmates in return for on the job training and experience in advance of an inmates release from the incarceration facility.

Currently the proposal with Jefferson County, is awaiting review and approval by the Assistant Secretary of the Army for Civil Works. Once approval is obtained for Jefferson County, the proposal with IDOC will be submitted for approval.

Implementing this program has the potential to provide an estimated annual value of $225,000 for work provided by inmates from the IDOC facility and an additional annual value of $125,000 for work provided by inmates from the Jefferson County facility.

A Proposed Action (# 227) is to pursue development a Civilian Inmate Labor Program for implementation at Rend Lake. (Proposed New Action)

6.9. Sedimentation and Siltation at Boat Ramps

Sedimentation deposits on boat ramps are an issue during low water events. A comprehensive sedimentation study conducted in 2010 concluded which areas had the worst sedimentation issues. Those areas included the North Marcum Boat Ramp, the Gun Creek Boat Ramp, and the Ina Boat Ramp. These ramps were then dredged in 2010 and have not been closed due to low water since the dredging was completed.

The Rend Lake Management Team will continue to monitor sedimentation at boat ramps and implement necessary actions to minimize impacts.

6.10. Interpretive Services and Outreach

The goal of the Interpretive Services and Outreach Program (ISOP) is to interact and make effective, meaningful contacts with lake visitors, community organizations and local residents. Rend Lake's robust outreach program makes over 12,500 direct interpretive contacts annually with visitors to the lake or in support of educators, community groups, social services, and partner agencies

Outreach objectives include:

A. Implement an intensive Water Safety program, designed to reach as many visitors (all ages) as possible about the importance of water safety and wearing life jackets.

B. Facilitate and promote effective partnerships by leveraging resources with stakeholders, community organizations, local residents, lake visitors and volunteers.

C. Actively partner with local and regional groups and organizations in coordinating special events and activities throughout the year and ensure public safety for all that attend.

The Interpretive Services and Outreach Program will continue to increase utilization of social media tools as an effective way to communicate with the public. This will include the use of websites, phone applications, Facebook, Instagram and Twitter.

Expanding educational programming and interactive programming to increase public opportunities and educate the maximum number of individuals is key to the future success of the program.

CHAPTER 7

AGENCY & PUBLIC COORDINATION

Agency and Public Coordination - Overview

All materials and information used for Agency and Public Coordination activities are included as **Appendix E**.

Obtaining public input and coordinating with stakeholders, affected agencies and organizations was an important part in updating the Rend Lake Master Plan. Throughout the Master Plan update process every effort was made to involve the public, and coordinate with appropriate Federal, state, and local agencies.

On 22 November 2017, letters were sent to affected agency officials and congressional interests, informing them about the Master Plan update process and timeline.

On 22 November 2017, letters were sent to stakeholders and partners, informing them about the Master Plan update process and timeline.

On 29 November 2017, news releases were sent to local and state newspapers, television and radio stations, to inform the public about the Master Plan update, including date, time and location of the public workshop, designed to provide information and obtain input for the updated Master Plan.

A web page was developed that included information about the Master Plan update process, public meeting date, time and location, as well as a way to provide input electronically through the website. A copy of the existing Rend Lake Master Plan was also accessible through the website.

On 12 December 2017, a public workshop was conducted at the Project Visitor Center. Fact sheets about the Master Plan update process and a PowerPoint presentation was provided along with blank comment cards and an invitation to provide input concerning the Rend Lake Master Plan update.

In February 2018, coordination meetings were held with other Federal, State and Local agencies to discuss issues and identify areas of concern for the Master Plan update.

Written comments on the plan were received through 30 January 2018. A summary of all comments received can be found in **Appendix E**.

On 23 February 2018, a letter was sent to everyone that provided input, thanking them for their involvement and included a schedule for review of the updated Rend Lake Master Plan - 2018.

The initial draft of the updated Rend Lake Master Plan was completed on August 3, 2018 and sent to the St. Louis District Office for internal review and Quality Assurance and Quality Control evaluation.

In August 2018 a news release was sent to appropriate media outlets to inform the public about the availability to review the updated Master Plan and to identify the date, time and location for a second public information meeting to present highlights and significant changes to the Rend Lake Master Plan - 2018. In addition the updated Master Plan was made available for viewing on the website.
http://www.mvs.usace.army.mil

An overview of the updated plan was presented at a public workshop on 23 August 2018. The draft updated plan was available for review through 28 September 2018.

In addition to the above, over 1,000 NRRS Customer Facility Rating Comments were carefully reviewed and considered when developing the *Proposed Actions* included in this Master Plan. The NRRS “Facility Rating Report – Detail”, proved to be an extremely useful tool for obtaining customer input.

CHAPTER 8

SUMMARY OF RECOMMENDATIONS

This chapter provides a summary of all the Proposed Actions contained in this Master Plan. Proposed Actions are intended to be accomplished during the next 10 to 15 years and were developed using the most current data available at the time this plan was developed. They take into consideration existing conditions, public and agency input, as well as future trends in outdoor recreation. Each of the proposed actions will require funding through the USACE budget formulation process and may require additional coordination with stakeholders and partners upon implementation. Even though most of the Proposed Actions were determined to be categorically excluded from further NEPA action, when implemented, some may require additional documentation in order to ensure compliance.

Table 8-1 identifies each Proposed Action, Action Item number, its location, and type of action, page number, plate number and Master Plan Area Number. Please note the table is sorted on "Location".

Table 8-1 Summary of Proposed Actions
*(**R**eplacement/**N**ew/**F**uture/**P**reviously **A**pproved)

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
2	Construct Pump Pads	Atchison Creek MRA	N	5-41	N/A	VM-7
1	Construct Parking Lot	Atchison Creek MRA	N	5-41	N/A	VM-7
192	Upgrade sub-impoundment pump	Big Muddy WMA	PA	5-42	26	WM-2

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
85	Construct Pole Barn/Hunter Check-in Station at Cottonwood Access Area	Casey Fork WMA	PA	5-43	27	WM-3
6	Upgrade sub-impoundment pumps	Casey Fork WMA	PA	5-43	27	WM-3
5	Resurface Access Road	Casey Fork WMA	PA	5-43	27	WM-3
15	Install accessible fishing access	Dale Miller Group Camp	PA	5-38	18	R-11
14	Convert 5 picnic sites to full hookup sites	Dale Miller Group Camp	PA	5-38	18	R-11
13	Renovate enclosed group shelter to include food preparation facilities (cabinets, refrigerator, stove, etc.)	Dale Miller Group Camp	R	5-38	18	R-11
12	Renovate camping shelters	Dale Miller Group Camp	R	5-38	18	R-11
10	Remove tennis court	Dale Miller Group Camp	R	5-38	18	R-11
9	Relocate RV camping sites and renovate to meet customer service standards	Dale Miller Group Camp	R	5-38	18	R-11

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
8	Construct enclosed mini-shelter	Dale Miller Group Camp	PA	5-38	18	R-11
194	Implement Tree Replacement Plan	Dam West Recreation Area	R	5-14	8	R-2
23	Renovate shelter #6 and replace wooden roof on shelter with metal roof	Dam West Recreation Area	R	5-14	8	R-2
22	Replace playground equipment with ADA/ABA compliant equipment	Dam West Recreation Area	R	5-14	8	R-2
21	Replace comfort station at boat ramp with ADA/ABA compliant facility	Dam West Recreation Area	R	5-14	8	R-2
3D	Replace water lines and connect to municipal system	Dam West Recreation Area	R	5-14	8	R-2
19	Construct Fish Cleaning Station	Dam West Recreation Area	N	5-14	8	R-2
18	Install accessible fishing area	Dam West Recreation Area	PA	5-14	8	R-2
17	Install waterborne comfort station	Dam West Recreation Area	PA	5-14	8	R-2

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
16	Install accessible picnic sites	Dam West Recreation Area	PA	5-14	8	R-2
211	Implement Tree Replacement Plan	Gun Creek	R	5-29	16	R-8
213	Install Wi-Fi	Gun Creek CG	N	5-29	16	R-8
212	Construct small leash-free dog area	Gun Creek CG	N	5-29	16	R-8
25	Renovate 50 campsites to meet Customer Service Standards	Gun Creek CG	PA	5-29	16	R-8
24	Renovate campground (49 full hookup sites & 25 water hookups)	Gun Creek CG	PA	5-29	16	R-8
32	Extend bike trail into CG	Gun Creek Day Use	PA	5-29	16	R-8
30	Renovate playground and replace with ADA/ABA compliant equipment	Gun Creek Day Use	R	5-29	16	R-8
29	Replace vault comfort stations with ADA/ABA compliant waterborne facilities	Gun Creek Day Use	R	5-29	16	R-8

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
28	Construct bike trail	Gun Creek Day Use	PA	5-29	16	R-8
27	Convert portion of day-use area to camping	Gun Creek Day Use	PA	5-29	16	R-8
26	Install accessible fishing access	Gun Creek Day Use	PA	5-29	16	R-8
231	Replace/renovate Shelter #10	Gun Creek Day Use	R	5-29	16	R-8
108	Develop Recreation Complex to include marina and lakeside resort	RLCD	F	5-44	23-A&B	FR-2
33	Modify shoreline for Kayak Launch	Gun Creek MRA	N	5-41	16	VM-9
35	Install accessible fishing access	Ina Recreation Area	PA	5-22	15	R-6
34	Marina Construction	Ina Recreation Area	PA	5-22	15	R-6
37	Install accessible fishing access	Jackie Branch	PA	5-44	13	FR-1

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
36	Install fish cleaning station	Jackie Branch	PA	5-44	13	FR-1
229	Relocate and Replace Boat Ramp	Jackie Branch	PA	5-44	13	FR-1
220	Provide sand along shoreline for Kayak Trail	Jackie Branch	N	5-44	13	FR-1
44	Provide trails on top of existing levees	Main Dam MRA	N	5-40	7	VM-1
43	Construct gravel parking lot	Main Dam MRA	PA	5-40	7	VM-1
42	Provide an improved water source to wetland complex	Main Dam MRA	PA	5-40	7	VM-1
40	Upgrade water control structure	Main Dam MRA	R	5-40	7	VM-1
228	Modify secondary water control structures to recommended elevation	Main Dam MRA	R	5-40	7	VM-1
233	Construct Wildlife Viewing Tower	Main Dam MRA	N	5-40	7	VM-1

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
53	Modify breakwater or add additional breakwater on opposite side of cove	North Marcum Day Use	R	5-33	17	R-10
52	Reduce the size of the boat ramp parking lot	North Marcum Day Use	R	5-33	17	R-10
51	Relocate shelter #7 and renovate	North Marcum Day Use	R	5-33	17	R-10
50	Upgrade water service to area	North Marcum Day Use	R	5-33	17	R-10
49	Remove shower house and replace with ADA/ABA compliant comfort station	North Marcum Day Use	R	5-33	17	R-10
48	Remove beach area by planting grass over most of the sand area. A small strip of sand will be left along the shoreline for boat-in use and the area converted to boat-in use only	North Marcum Day Use	R	5-33	17	R-10
47	Remove basketball court	North Marcum Day Use	R	5-33	17	R-10
46	Install accessible fishing access	North Marcum Day Use	PA	5-33	17	R-10

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
45	Replace vault toilet at boat ramp with waterborne facility	North Marcum Day Use	PA	5-33	17	R-10
54	Implement Phase 5 of bike trail plan	North Marcum MRA	PA	5-39	N/A	LD-5
203	Construct small leash-free dog area	North Sandusky CG	N	5-20	12	R-5
202	Construct small parking areas within campground	North Sandusky CG	N	5-20	12	R-5
199	Implement Tree Replacement Plan	North Sandusky CG	R	5-20	12	R-5
198	Install Wi-Fi service	North Sandusky CG	N	5-19	12	R-5
70	Replace playground equipment in White Oak Loop with ADA/ABA compliant facility	North Sandusky CG	R	5-19	12	R-5
66	Install group shelter in Shagbark Group Area	North Sandusky CG	N	5-19	12	R-5
65	Replace comfort station in Shagbark group area with ADA/ABA compliant facility	North Sandusky CG	R	5-19	12	R-5

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
3C	Provide sewer hook-up to municipal system	North Sandusky CG & DU	R	5-19	12	R-5
77	Modify shoreline to accommodate kayak landing	North Sandusky CG	N	5-19	12	R-5
63	Adjust turn-arounds in all camping loops	North Sandusky CG	R	5-19	12	R-5
62	Renovate all campsites to meet customer service standards	North Sandusky CG	R	5-19	12	R-5
61	Construct 10 campsites (White Oak loop)	North Sandusky CG	PA	5-19	12	R-5
60	Install accessible fishing access	North Sandusky CG	PA	5-19	12	R-5
59	Divide day-use into 2 areas (picnic area & group camp)	North Sandusky DU	PA	5-19	11 & 12	R-5
58	Replace 9 comfort stations	North Sandusky CG	PA	5-19	12	R-5
57	Renovate 75 campsites	North Sandusky CG	PA	5-19	12	R-5

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
56	Convert 38 sites to full hookup and install water to 26 sites	North Sandusky CG	PA	5-19	12	R-5
201	Replace Lift station	North Sandusky Day Use	R	5-19	11	R-5
200	Relocate and renovate picnic sites	North Sandusky Day Use	R	5-20	11	R-5
81	Install additional lighting at boat ramp	North Sandusky Day Use	R	5-20	11	R-5
79	Install Fish Cleaning Station	North Sandusky Day Use	N	5-20	11	R-5
78	Reduce the number of picnic sites	North Sandusky Day Use	R	5-20	11	R-5
77	Modify shoreline to accommodate Kayak Trail	North Sandusky Day Use	N	5-20	11	R-5
76	Replace all comfort stations with ADA/ABA compliant facilities	North Sandusky Day Use	R	5-20	11	R-5
74	Install additional playground equipment	North Sandusky Day Use	N	5-20	11	R-5

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
94	Repair/Replace dock supporting structures	Rend Lake Marina	R	5-12	24	R-3
93	Replace dock floatation with encapsulated material	Rend Lake Marina	R	5-12	24	R-3
92	Install courtesy dock for cabin users	Rend Lake Marina	N	5-12	24	R-3
91	Expand Showroom	Rend Lake Marina	N	5-12	24	R-3
90	Add boat slips	Rend Lake Marina	PA	5-12	24	R-3
89	Construct restaurant	Rend Lake Marina	PA	5-12	24	R-3
88	Provide dry boat storage building	Rend Lake Marina	PA	5-12	24	R-3
87	Provide up to 10 rental cabins	Rend Lake Marina	PA	5-12	24	R-3
86	Provide sewer hook-up to municipal system	Rend Lake Marina	R	5-12	24	R-3

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
98	Renovate Courtesy Docks	Rend Lake Wildlife Refuge	R	5-42	22	WM-1
95	Remove 7 wooden vault toilets & replace with 5 concrete block vault toilets	Rend Lake Wildlife Refuge	PA	5-42	22	WM-1
84	Replace Sub-impoundment pumps	Rend Lake Wildlife Refuge	R	5-42	22	WM-1
83	Replace Vault toilets at Dareville & Bonnie South with ADA/ABA compliant facilities	Rend Lake Wildlife Refuge	R	5-42	22	WM-1
82	Resurface Access Roads & Parking Areas	Rend Lake Wildlife Refuge	R	5-42	22	WM-1
214	Connect paved multi-use trail with USACE paved trail	RLCD	F	5-31	23	R-9
99	Modify existing concrete inlet structure for water treatment plant	RLCD	R	5-7	23	OP-10
103	Resurface two parking lots north of Hwy 154	RLCD	R	5-31	23	R-9
102	Construct .75-miles of paved multi-use trail to connect boat ramp parking lot to existing paved trail	RLCD	N	5-31	23	R-9

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
101	Construct 6 miles of unpaved multi-use trail	RLCD	N	5-31	23	R-9
234	Upgrade Chlorine Dioxide Building	RLCD-OPS	R	5-7	23	OP-10
3A	Provide sewer hook-up to municipal system	Sandusky Land Treatment Facility	PA	5-5	10	OP-4
130	Whispering Pines Loop: Modify some sites to be "Buddy Sites"	South Marcum CG	R	5-35	19	R-11
127	Correct standing water issues around campsites	South Marcum CG	R	5-36	19	R-11
126	Add water hydrants to walk-in tent area	South Marcum CG	N	5-36	19	R-11
125	Add electrical service to walk-in tent area	South Marcum CG	N	5-36	19	R-11
124	Provide revetment along shoreline	South Marcum CG	R	5-35	19	R-11
122	Beaver Lodge Loop: Install additional mini-shower facilities	South Marcum CG	N	5-35	19	R-11

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
121	Replace comfort stations to include showers and modify large shower house to include laundry facilities.	South Marcum CG	R	5-35	19	R-11
118	Beaver Lodge Loop: re-align parking at mini shower building	South Marcum CG	R	5-35	19	R-11
117	Renovate all campsites to meet customer service standards & convert to full hookup	South Marcum CG	R	5-35	19	R-11
116	Construct Volunteer Village, including: Relocate existing 5 campsites further east and incorporate existing sites into campground, Construct group shelter, fire circle, and laundry facility, Relocate and convert gate to the Volunteer Village from a manual gate to electronic gate, Construct 15 additional campsites, provide trash removal service.	South Marcum CG	PA & N	5-35 & 6-2	19	R-11
216	Implement Tree Replacement Plan	South Marcum CG	R	5-36	19	R-11
218	Provide Leash-free dog area	South Marcum CG	N	5-36	19	R-11
217	Construct small parking areas within campground	South Marcum CG	R	5-36	19	R-11

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
115	Renovate 100 campsites	South Marcum CG	PA	5-36	19	R-11
114	Widen campground roads to meet customer service standards	South Marcum CG	PA	5-35	19	R-11
113	Provide sewer hook-up to municipal system	South Marcum CG	PA	5-35	19	R-11
112	Install water hookups to 37 sites	South Marcum CG	PA	5-35	19	R-11
111	Convert 75 campsites to full hook-up	South Marcum CG	PA	5-35	19	R-11
110	Renovate Green Heron Pond	South Marcum CG	PA	5-35	19	R-11
134	Install Wi-Fi	South Marcum CG	N	5-35	19	R-11
138	Renovate boat loading platform to be ADA/ABA compliant	South Marcum Day Use	R	5-36	18	R-11
137	Relocate playground equipment to be near shelter #9 & renovate to be ADA/ABA compliant	South Marcum Day Use	R	5-36	18	R-11

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
136	Relocate and renovate Shelter #9	South Marcum Day Use	R	5-36	18	R-11
215	Modify shoreline to accommodate Kayak Trail	South Marcum Day Use	N	5-36	18	R-11
139	Implement Phase 5 of bike trail plan	South Marcum MRA	PA	5-41	N/A	R-11
197	Implement Tree Replacement Plan	South Sandusky CG	N	5-17	10	R-4
196	Construct small parking areas within campground	South Sandusky CG	N	5-16	10	R-4
195	Construct small leash-free dog area	South Sandusky CG	N	5-16	10	R-4
151	Add electric outlets for Tent Camping Area	South Sandusky CG	R	5-16	10	R-4
150	Modify boat-in area along shoreline and incorporate as part of Kayak Trail	South Sandusky CG	R	5-16	10	R-4
149	Install Wi-Fi	South Sandusky CG	N	5-16	10	R-4

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
147	Remove two metal storage buildings and consider alternate location for replacement buildings	South Sandusky CG	R	5-16	10	R-4
146	Replace 3 Lift Stations	South Sandusky CG	R	5-16	10	R-4
143	Replace shower buildings and comfort stations with ADA/ABA compliant facilities	South Sandusky CG	PA	5-16	10	R-4
142	Install 10 picnic sites relocated from North Sandusky	South Sandusky DU	PA	5-17	10	R-4
141	Renovate campsites to meet customer service standards. (46 sites to full service hookups & water to 32 sites)	South Sandusky CG	PA	5-16	10	R-4
4	Add additional loop to Blackberry Nature Trail	South Sandusky CG	N	5-17	10	R-4
3B	Provide sewer hook-up to municipal system	South Sandusky CG & DU	R	5-17	10	R-4
140	Implement Tree Replacement Plan	South Sandusky CG	R	5-16	10	R-4
160	Renovate/Replace shower house with ADA/ABA compliant facility	South Sandusky Day Use	R	5-17	9	R-4

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
159	Upgrade lift station	South Sandusky Day Use	R	5-17	9	R-4
158	Replace concrete picnic tables	South Sandusky Day Use	R	5-17	9	R-4
157	Replace all comfort stations with ADA/ABA compliant facilities	South Sandusky Day Use	R	5-17	9	R-4
156	Provide additional picnic sites	South Sandusky Day Use	N	5-17	9	R-4
155	Renovate existing picnic sites to meet customer service standards	South Sandusky Day Use	R	5-17	9	R-4
154	Provide additional handicapped parking spaces close to beach	South Sandusky Day Use	R	5-17	9	R-4
153	Provide ADA/ABA compliant pedestrian access between boat ramp parking lot and swim beach	South Sandusky Day Use	N	5-17	9	R-4
152	Reconfigure turn-around to be compliant with Customer Service Standards	South Sandusky CG	R	5-16	9	R-4
232	Replace/renovate Shelter #2	South Sandusky Day Use	R	5-17	10	R-4

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
230	Replace/Renovate Shelter #3	North Sandusky Day Use	R	5-17	9	R-4
193	Install leash-free dog park	Spillway Recreation Area	N	5-10	7	R-1
164	Increase electrical capacity and additional water service to accommodate vendor trailers during special events.	Spillway Recreation Area	R	5-10	7	R-1
163	Replace comfort station with ADA/ABA compliant facility with increased capacity and connect to municipal sewer system	Spillway Recreation Area	R	5-10	7	R-1
162	Relocate light pole between large shelter & lake	Spillway Recreation Area	R	5-10	7	R-1
161	Install roof over amphitheater	Spillway Recreation Area	N	5-10	7	R-1
191	Add storage facilities at Maintenance Compound	USACE Maintenance Compound	N	5-4	6	OP-2
190	Add Sprinkler System to improve landscape	USACE Office & Visitor Center	N	5-5	6	OP-3
205	Resurface Sailboat harbor Access Road	WFSP	R	5-25	21	R-7

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
210	Rend Lake Resort Repairs	WFSP	R	5-25	21	R-7
209	Reforestation	WFSP	R	5-25	21	R-7
208	Replace Water Valves	WFSP	R	5-25	21	R-7
207	Resurface Roads & Parking	WFSP	R	5-25	21	R-7
206	Extend Electrical Service to Day-Use Area	WFSP	N	5-25	21	R-7
204	Construct ADA/ABA Compliant Fishing Pier	WFSP	N	5-25	21	R-7
189	Replace kiosk roof shingles	WFSP	R	5-26	21	R-7
188	Replace three shower buildings	WFSP	R	5-26	21	R-7
187	Replace 150 grills at main CG	WFSP	R	5-26	21	R-7

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
186	Upgrade campground electrical system	WFSP	R	5-26	21	R-7
185	Replace two wooden vault toilets at scout shelter	WFSP	R	5-26	21	R-7
183	Install shelter for bass tournaments	WFSP	N	5-26	21	R-7
182	Upgrade power & sewer lines - Hickman Point CG	WFSP	R	5-26	21	R-7
181	Run underground power to Shelter's 1,2, & 3	WFSP	R	5-26	21	R-7
179	Replace lift station pump	WFSP	R	5-25	21	R-7
177	Provide additional grills & tables in day-use areas	WFSP	R	5-26	21	R-7
176	Upgrade primary power lines - Tri-county Electric	WFSP	R	5-25	21	R-7
175	Replace posts on group shelter	WFSP	R	5-25	21	R-7

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
173	Renovate picnic tables - Entire Park	WFSP	R	5-25	21	R-7
172	Repair Docks & install new decking	WFSP	R	5-25	21	R-7
170	Construct Boatel	WFSP	PA	5-25	21	R-7
169	Outdoor Event Center	WFSP	PA	5-25	21	R-7
168	Outdoor Dining Area	WFSP	PA	5-25	21	R-7
167	Upgrade 50 campsites to full service	WFSP	PA	5-25	21	R-7
166	Resurface & modify culverts on bike trail	WFSP	PA	5-25	21	R-7
178	Place additional insulation in existing building	WFSP-OPS	R	5-26	21	OP-8
174	Remove three buildings no longer in use	WFSP-OPS	R	5-25	21	OP-8

Action Item #	Proposed Action	Location	Type of Action *(R,N,F, PA)	Page	Plate #	MP Area #
171	Update and Renovate Office	WFSP-OPS	R	5-25	21	OP-8
221	Classify Water Surface	Water Surface	N	5-46	28	RW-1, 2 & 3
222	Evaluate Potential for Issuing Lease for Over-night Accommodations	Entire Project	N	6-1	N/A	N/A
223	Continue Coordination with Jefferson County for Development of Marina/Resort	Ina Recreation Area	PA	6-1	15-A & B	R-6
224	Develop Action Plan for Restoring Wetlands	Vegetative Management Areas	N	6-5	N/A	VM-1-12
225	Facilitate Actions to Fully Implement RLBTP	Entire Project	PA	6-9	N/A	N/A
226	Develop Cooperating Association	Entire Project	N	6-15	N/A	N/A
227	Develop Civilian Inmate Labor Program	Entire Project	N	6-16	N/A	N/A

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CHAPTER 9

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