DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
ROBERT A. YOUNG BUILDING - 1222 SPRUCE ST.
ST. LOUIS, MISSOURI 63103-2833

16 August 2018

Reply to:
Regional Planning and Environmental Division North
Environmental Compliance Section (PD-C)

Dear Sir or Madam:

The St. Louis District of the U.S. Army Corps of Engineers (USACE) has prepared a draft Environmental Assessment (EA) with unsigned Finding of No Significant Impact (FONSI) to evaluate relocating a degraded and hazardous road which traverses Illinois Department of Natural Resources (IDNR) property and leads to the northwest end of the USACE Dam East Recreation Area (former South Shore State Park) at Carlyle Lake in Clinton County, Illinois.

This document serves to notify the public of the proposed action and analyze the probable environmental impacts of the alternatives. You are receiving this letter because you may be interested in the proposed action. The electronic versions of these documents are available online at:
http://www.mvs.usace.army.mil/Portals/54/docs/pm/Reports/EA/DRAFTEACarlyleRdReloc.pdf, or you may request a copy of the draft EA and FONSI be mailed to you.

The existing degraded road traverses high quality Eastern Massasauga Rattlesnake (EMR) habitat on IDNR property. The relocated road would be located on USACE land and would once again provide a safe, well maintained route to the northwest end of the Dam East Recreation Area in an area where EMR are not known to occur. This situation presents a prime opportunity for USACE to work closely with the IDNR to remove the existing degraded north-south portion of the IDNR roadway, as well as the southern portion of an adjacent USACE roadway, and relocate the access road to higher ground while restoring the lower IDNR property to highly valuable native grassland habitat which is anticipated to benefit the federally threatened EMR. The FONSI summarizes the anticipated effects of the action on the environment, and is unsigned. The FONSI will be signed into effect only after comments received as a result of this public review have been carefully considered. A signed FONSI is required before implementation of the action can occur.

Please provide any comments you may have regarding this project. For questions, comments, or to request a printed copy, please contact: Dr. Teri Allen of the Environmental Compliance Section, **telephone** 314-331-8084, or **e-mail** at Teri.C.Allen@usace.army.mil. Written comments may be sent to the address below, ATTN: Environmental and Planning Section (PD-C, Allen).

may be sent to the address below, ATTN: Environmental and Planning Section (PD-C, Allen). **Please ensure that your comments are received by this office by close of business on Monday, 17 September 2018, in order to have your comments considered.**

Address:

U.S. Army Corps of Engineers, St. Louis District
Regional Planning and Environmental Division North
Environmental Compliance Section (CEMVP-PD-C)
1222 Spruce Street
St. Louis, Missouri 63103-2833

Sincerely,

Brian L. Johnson
Chief, Environmental Compliance Branch

DRAFT
ENVIRONMENTAL ASSESSMENT
WITH
FINDING OF NO SIGNIFICANT IMPACT

Dam East Recreation Area Road Relocation
and
Eastern Massasauga Habitat Restoration
Carlyle Lake – Clinton County, Illinois

August 2018

U.S. Army Corps of Engineers, St. Louis District
Regional Planning and Environmental Division North
Environmental Compliance Section
CEMVP-PD-C
1222 Spruce Street
St. Louis, Missouri 63103-2833

US Army Corps of Engineers ®
St. Louis District

Table of Contents

1 INTRODUCTION

The St. Louis District of the U.S. Army Corps of Engineers (USACE) has prepared this Environmental Assessment (EA) to evaluate the potential impacts associated with the proposed relocation of a road leading to the northwest end of the Dam East Recreation Area (DERA) of Carlyle Lake, and associated restoration of Eastern Massasauga habitat. The Proposed Action is located in Clinton County, Illinois.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's Regulations (40 Code of Federal Regulations §1500-1508, as reflected in the USACE Engineering Regulation 200-2-2. Impacts on relevant environmental resources are discussed in this EA and summarized in the Finding of No Significant Impact (FONSI).

1.1 Project Location

Carlyle Lake is a 26,000 acre reservoir located in south central Illinois at river mile 94.2 on the Kaskaskia River upstream from its confluence with the Mississippi River and about one-half mile upstream from the town of Carlyle, Illinois. The lake is largely located in Clinton County, Illinois, with smaller portions of the lake in Bond and Fayette counties (Figure 1).

The Proposed Action Area is located in the northwest end of the Dam East Recreation Area, located on the southeast side of the Lake approximately 3 miles east of Carlyle, IL (Figure 2). A portion of this area was formerly leased to the Illinois Department of Natural Resources (IDNR) and was known as South Shore State Park.

1.2 Purpose and Need of the Proposed Action

The purpose of the Proposed Action is twofold. First, the Proposed Action would provide a safe, well maintained route to the northwest end of the Dam East Recreation Area (former South Shore State Park) because the only existing access traverses land owned by the Illinois Department of Natural Resources. Due to several years of reduced budgets by the State of Illinois and a subsequent lack of maintenance, the former South Shore State Park facilities became degraded, resulting in unsafe conditions and minimal useable recreation facilities. As a result, the Corps of Engineers terminated the lease and temporarily closed the area to allow for work to be completed to make the area safe for public access. The area formerly leased to the Illinois Department of Natural Resources has been incorporated into the adjoining Dam East Recreation Area. The Proposed Action is needed because IDNR has not had the necessary resources in recent years to maintain the existing roadway, which has consequently become highly degraded and hazardous to motorists (Figure 3).

Second, Section (a)(1) of the Endangered Species Act directs Federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of species listed

pursuant to the Act. This Proposed Action would protect, enhance, and expand habitat suitable for hibernation, seasonal movements, foraging and reproduction of the Eastern Massasauga (*Sistrurus c. catenatus*) on Federal and State of Illinois' land's at Carlyle Lake, while allowing for continued recreational use of the area as specified in the lake's legal authorization. The U.S. Fish and Wildlife Service elevated the Eastern Massasauga from a candidate species to a federally listed threatened species under the Endangered Species Act (USFWS 2016a) on 30 September 2016.

In addition, the Illinois Endangered Species Protection Act [520 ILCS 10/1 et seq.] gives the Illinois Department of Natural Resources the mandate to actively plan and implement a program for the conservation of threatened and endangered species in Illinois. That program is to include research, management and cooperative agreements with other agencies. The protection and enhancement of habitat for the Eastern Massasauga in the Carlyle Lake vicinity in cooperation with the U.S. Army Corps of Engineers and other landowners is in keeping with this conservation mandate.

This situation presents a prime opportunity for USACE to work closely with the IDNR to remove the existing degraded north-south portion of the IDNR roadway and relocate the access road to higher ground so motorists can once again utilize the recreation areas at the northwest end of the USACE Dam East Recreation Area, while restoring the lower IDNR property to highly valuable native grassland habitat which is anticipated to benefit the federally threatened Eastern Massasauga Rattlesnake (EMR).

1.3 Authority

Carlyle Lake was authorized by Congress through the Flood Control Act of 1938 and modified by the Flood Control Act of 1958, House Document No. 232, Eighty-fifth Congress, 1st session. The mission of recreation was authorized by Public Law 78-534, December 2, 1944, Flood Control Act of 1944. The authorized purposes of Carlyle Lake include flood risk management, navigation, water supply, water quality, fish and wildlife conservation, and recreation.

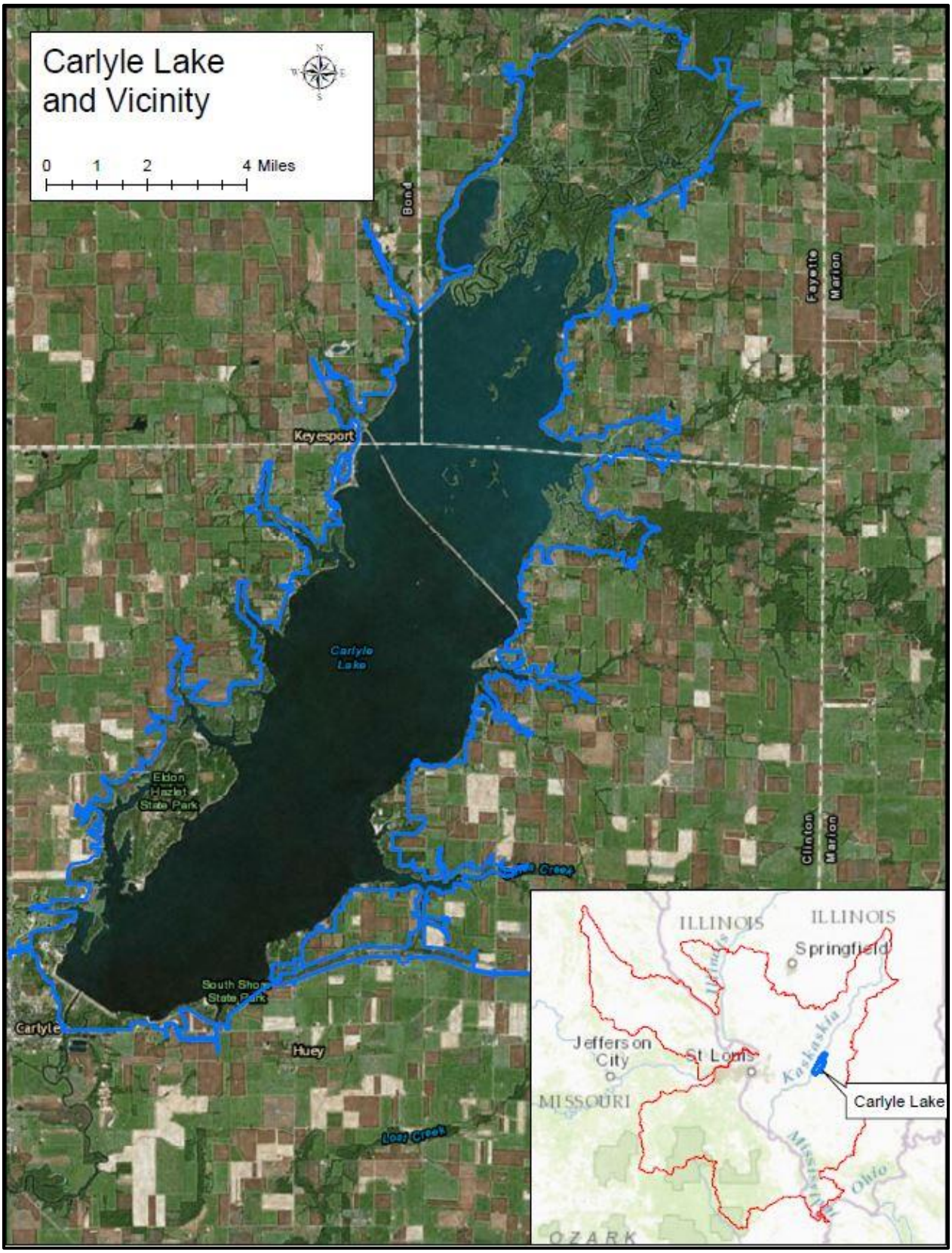

Figure 1. Location map for Carlyle Lake in Fayette, Clinton, and Bond Counties, Illinois.

Figure 2. Approximate location of the Proposed Action Area located within Carlyle Lake in Clinton County, Illinois.

Figure 3. Photo of the highly degraded roadway to the northwest end of the Dam East Recreation Area at the boundary of the USACE and IDNR owned properties. The boundary line is indicated by the dashed orange line.

2 ALTERNATIVES CONSIDERED

This section of the EA describes the alternatives considered, and compares the alternatives in terms of their potential effects on the quality of the human environment (natural/physical, social, cultural, economic) and their achievement of project objectives.

2.1 Alternative 1 – No Action Alternative (Future without Proposed Action)

NEPA requires that a "No Action" Alternative be addressed to provide a baseline or reference against which to describe environmental effects of the Proposed Action alternative(s). The "No Action" alternative assumes that the Proposed Action would not be realized. Under this scenario, the USACE would continue to perform its operation and maintenance responsibilities on USACE property, but no new federal action regarding road relocation or EMR habitat restoration in the Proposed Action Area would be taken in the foreseeable future.

2.2 Alternative 2 – Blue-White-Pink Road Alignment with EMR Habitat Rehabilitation

Under Alternative 2 – Blue-White-Pink Road Alignment, an existing grass service road (blue and white alignments) would be upgraded to a two-way/two-lane asphalt road and become the primary road to the northwest parts of the Dam East Recreation Area from the south and west (Figure 4). The existing grass service road traverses through a higher elevation forested tract of land near the shoreline of Carlyle Lake, and has been maintained (mowed) over the last 20 years as part of the former South Shore State Park. Currently, sections of the service road are roughly 15 feet wide. The footprint of the proposed asphalt roadway would be cleared of trees and underbrush and expand to a maximum width of 50 feet to accommodate two lane traffic, aggregate shoulders and road drainage ditches. A northern extension of the service road (pink alignment) would also be constructed through the higher elevation forested tract to connect to an existing USACE road at the northwest end of the Dam East Recreation Area (Figure 4).

The final Blue-White-Pink Road Alignment is proposed to be roughly 3,030 feet long. Approximately 3.4 acres of existing forest habitat would be removed for construction of the road. This includes removal of approximately 358 trees due to widening of the mowed service road required for two lane traffic, the north and south connector roads, aggregate roadside shoulders, and drainage ditching.

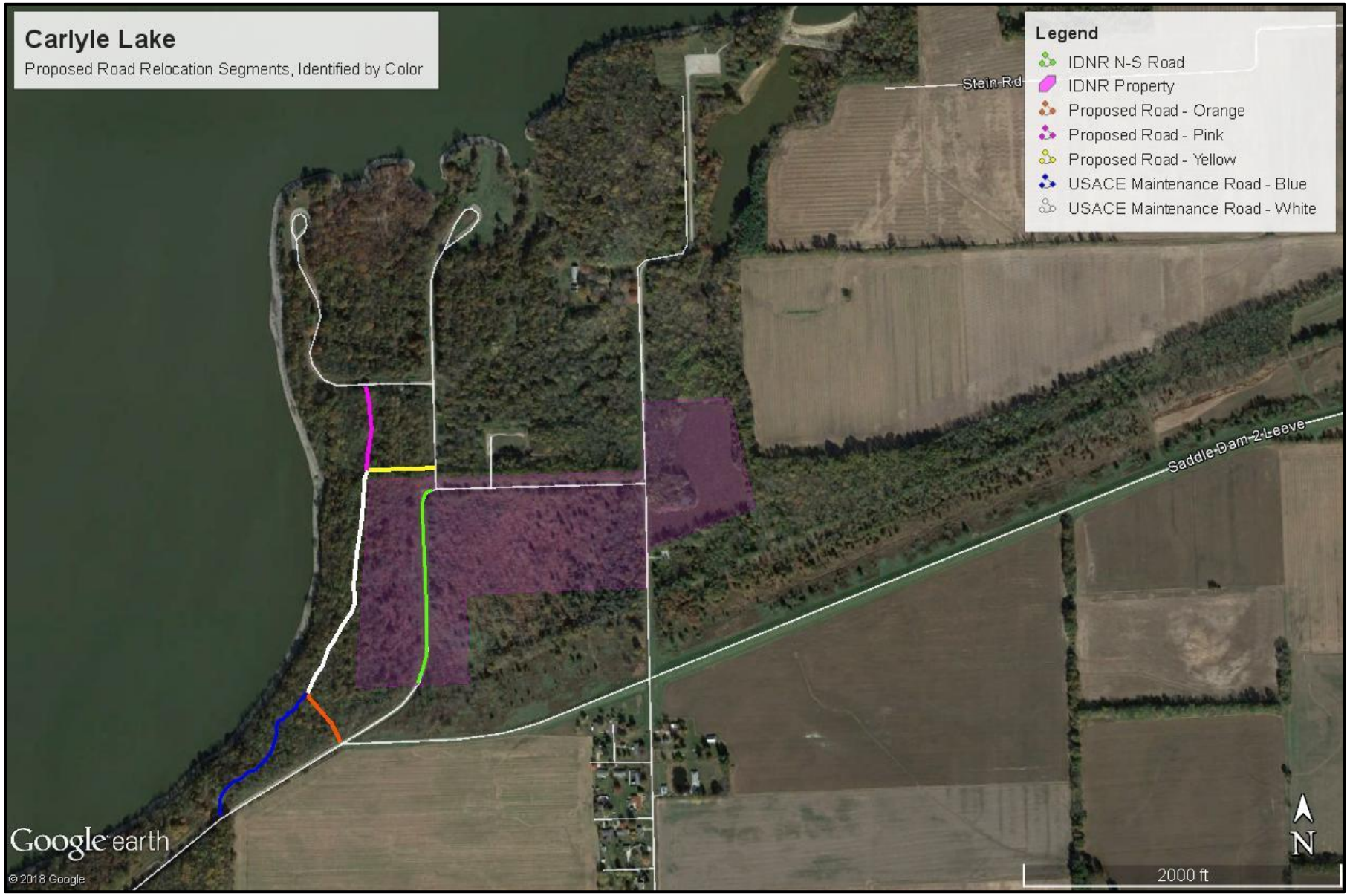

Figure 4. Illustration of potential road relocation paths to the northwest end of the Dam East Recreation Area, identified by color.

2.2.1 Road Construction and EMR Habitat Restoration - USACE and IDNR Coordination

Along the proposed road relocation route, shrubby vegetation would be scraped off and tree stumps and roots would be excavated. A three inch base of clean rock would be added to form the base of the proposed roadway. The existing north-south (N-S) portion of the IDNR roadway, as well as the adjoining southern portion of the USACE roadway (up to Saddle Dam 2 Road), would be pulverized using a mechanical road reclaimer to remove the asphalt layer and mix it with the underlying base. This material would then be moved from its current location to the proposed road relocation route on USACE property and used as part of the relocated roadway construction process. The pulverized rock mixture from the reclaimed north-south portion of the IDNR road and the adjoining southern portion of the USACE roadway would be added on top of a 3 inch rock base, and a layer of oil and rock chips would be added to complete the process. Finally, roadway ditches would be formed to ensure proper drainage.

The areas occupied by the north-south portion of the IDNR roadway and the adjoining southern portion of the USACE roadway (up to Saddle Dam 2 Road) which are reclaimed for road material would be backfilled as necessary and graded to the elevation of the surrounding area. The former IDNR roadway area (approximately 1.4 acres) and the former USACE adjacent roadway area (approximately 0.6 acres) would then be treated as necessary to provide suitable soil conditions and planted with native grasses. This would reduce the habitat fragmentation within prime EMR habitat (Figure 4).

2.3 Alternative 3 – Blue-White-Yellow Road Alignment with EMR Habitat Rehabilitation

Alternative 3 – Blue-White-Yellow Road Alignment would be very similar to Alternative 2, although with an eastern extension (yellow) of the existing path through lower elevation land instead of the northerly (pink) extension (Figure 4).

The final Blue-White-Yellow Road Alignment roadway is proposed to be roughly 2,914 feet long. Approximately 3.3 acres of existing forest habitat would be removed for construction of the proposed road. This includes removal of approximately 312 trees due to widening of the mowed service road required for two lane traffic, the north and south connector roads, aggregate roadside shoulders, and drainage ditching. The construction method and EMR habitat restoration would be as described in Section 2.2.1 - USACE and IDNR Coordination.

2.4 Alternative 4 – Orange-White-Pink Road Alignment with EMR Habitat Rehabilitation

Alternative 4 – Orange-White-Pink Road Alignment would be very similar to Alternative 2, although with a short southern route (orange) to the existing maintenance road (white) instead of the longer blue route, along with the northern (pink) extension through the higher elevation forested tract to an existing roadway in the Dam East Recreation Area (Figure 4).

The final Orange-White-Pink Road Alignment roadway is proposed to be roughly 2,399 feet long. Approximately 2.7 acres of existing forest habitat would be removed for construction of the proposed road. This includes removal of approximately 300 trees due to widening of the mowed service road required for two lane traffic, the north and south connector roads, aggregate roadside shoulders, and drainage ditching. The construction method and EMR habitat restoration would be as described in Section 2.2.1 - USACE and IDNR Coordination.

2.5 Alternative 5 – Orange-White-Yellow Road Alignment with EMR Habitat Rehabilitation

Alternative 5 – Orange-White-Yellow Road Alignment would be very similar to Alternative 4, although with an eastern extension (yellow) of the existing path instead of the northerly (pink) extension through the higher elevation forested tract (Figure 4).

The final Orange-White-Yellow Road Alignment roadway is proposed to be roughly 2,283 feet long. Approximately 2.6 acres of existing forest habitat would be removed for construction of the proposed road. This includes removal of approximately 254 trees due to widening of the mowed service road required for two lane traffic, the north and south connector roads, aggregate roadside shoulders, and drainage ditching. The construction method and EMR habitat restoration would be as described in Section 2.2.1 - USACE and IDNR Coordination.

2.6 Evaluation and Comparison of Alternatives

Table 1 summarizes the features and forest impacts of the alternatives considered. Considerations for road realignment route selection included:

- Meeting regulatory requirements
- Minimizing the construction footprint, construction cost, and operation and maintenance costs (O&M)
- Potential requirements for specialized equipment
- Avoiding or minimizing any cultural or environmental impacts
- Safe route for recreationists, including those towing boats or trailers, or driving large RVs.

Table 1. Alignment alternatives, forest impacts, and estimated construction and maintenance costs.

Alternatives	Total # of Trees Removed	# of Trees > 4" DBH* Removed	# of High Value Trees for Wildlife Removed	Length of Proposed New Road (feet)	Acres of Proposed New Road (feet)	Estimated Construction Cost	Estimated Annual O&M Cost
Blue	112	96	24	1,006	1.1	$56,336	$4,573
Orange	54	45	28	375	0.43	$21,000	$1,705
White	169	145	56	1,484	1.7	$83,104	$6,745
Pink	77	57	14	540	0.61	$30,240	$2,455
Yellow	31	22	7	424	0.46	$23,744	$1,927
Alternative 1 – No Action	0	0	0	0	0.0	$0	$0
Alternative 2 – Blue-White-Pink Alignment	358	298	94	3,030	3.4	$169,680	$13,773
Alternative 3 – Blue-White-Yellow Alignment	312	263	87	2,914	3.3	$163,184	$13,245
Alternative 4 – Orange-White-Pink Alignment	300	247	98	2,399	2.7	$134,344	$10,905
Alternative 5 – Orange-White-Yellow Alignment	254	212	92	2,283	2.6	$127,848	$10,377

*DBH – Diameter Breast Height

When the blue (Figures 5-6) and orange (Figure 7) routes were compared at the southern end of the proposed road relocation, the orange route was considerably shorter, thereby reducing construction and operation and maintenance costs. In addition, roughly half as many trees would need to be removed for the shorter orange route. The number of high quality wildlife resource trees requiring removal would be similar between the two routes.

Comparison of the pink (Figure 8) and yellow (Figure 9) routes at the northern end of the proposed road relocation showed that although the pink route was approximately 116 feet longer and thus 0.1 acre larger than the yellow route, this was not substantial in terms of the overall environmental impacts, construction costs or O&M costs. Additionally, the pink route was located along a higher elevation, which would place it further from the existing high quality Eastern Massasauga Rattlesnake (EMR) habitat (https://www.fws.gov/midwest/endangered/Reptiles/eama/index.html). Conversely, the pink route would result in the removal of approximately seven additional high quality wildlife resource trees than the yellow route.

The white route is included in all proposed Alternatives, as it utilizes an existing service road (Figures 9-11), thereby minimizing environmental impacts.

2.7 Tentatively Selected Plan

The Tentatively Selected Plan for the Proposed Action is Alternative 4 - Orange-White-Pink Road Alignment (Figure 4). The construction method and EMR habitat restoration would be as described in Section 2.2.1 - USACE and IDNR Coordination.

Figure 5. Photo of the existing service road along the southern portion of the "blue" route.

Figure 6. Photo of the existing service road along the northern portion of the "blue" route.

Figure 7. Photo of proposed "orange" route near entrance off of Saddle Dam 2 Road.

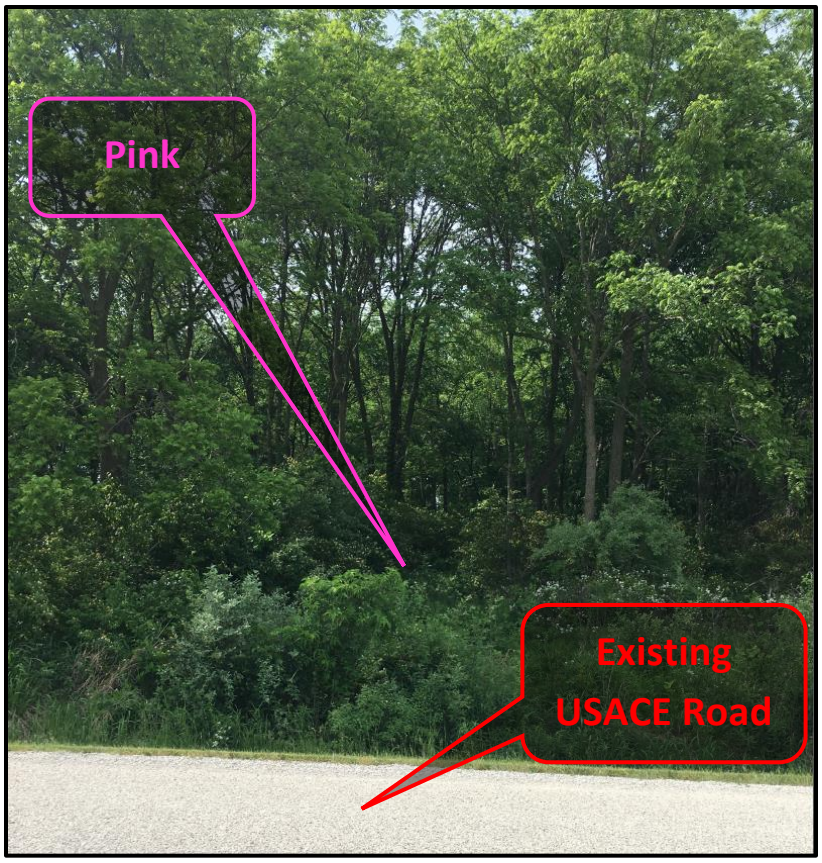

Figure 8. Photo of proposed "pink" route near its convergence with the existing USACE roadway.

Figure 9. Photo looking eastward towards the proposed "yellow" route from the northern "white" portion of the existing service road.

Figure 10. Photo of the existing service road along the southern portion of the "white" route.

Figure 11. Photo of the existing service road along the northern portion of the "white" route.

3 DESCRIPTION OF THE EXISTING ENVIRONMENT

This section describes the relevant existing biological, physical, economic, and social conditions in the Proposed Action Area, which are referred to under the NEPA process as the Affected Environment. The resources described in this section are those recognized as significant by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public.

Numerous site visits were conducted between 2016 and 2018 in order to examine environmental resources and determine potential impacts that may result from the Proposed Action.

3.1 Topography and Geology

The topography of the land around the lake is one of moderately low relief with gently rolling hills and alluvial valleys. The highest elevation in the area is about four miles southwest of Carlyle, Illinois and is approximately 580 feet National Geodetic Vertical Datum (NGVD). More than seventy percent of the land in the general area has a slope of less than 2 percent. Of the remainder, slightly less than 20 percent of the land is gently sloping and only about 10 percent has a slope of 5 percent or more.

Bedrock is seldom exposed to view in the Carlyle Lake area because it is buried by younger glacial age materials. The youngest bedrock is from the Pennsylvanian period, which is 320 to 286 million years ago. This is where major deposits of coal are found in this part of Illinois. Herrin #6 Coal is the major seam of coal found in this area and it is located about 500 feet below Carlyle Lake and the surrounding region. Deeper and older rock formations yield minor amounts of oil and natural gas.

The youngest materials found at the surface consist of glacial derived materials such as till and loess. During the Illinoisan period, about 191,000 to 130,000 years ago, the region was covered in ice, which eroded the upland and covered the area with glacial materials. This activity created the smooth plain and shallow valley topography we see within the region today. This glacial till can be seen along the wave-cut banks of the lake and is called Vandalia till. It is generally composed of silt with some small pebbles.

3.2 Aesthetics

Carlyle Lake is the largest man-made lake in Illinois, with over 26,000 acres of water and 11,000 acres of public land. The lake was created by the U.S. Army Corps of Engineers, which built Carlyle

Dam across the Kaskaskia River, thereby creating a reservoir. The normal summer pool (joint use pool) of the lake is 445.0 (NGVD), which provides a water surface area of approximately 25,000 acres and 87 miles of shoreline. The lake extends upstream from the dam about 13 miles and is 1 to 3 miles wide. The region of southern Illinois where Carlyle Lake now stands is relatively flat, and the lake is relatively shallow with an average depth of 11 feet. The northern portion of the lake above the railroad tracks has large areas of heavy sediment deposition creating a view of mudflats. The area below the railroad tracks is generally open water.

3.3 Land Cover

The primary land cover in the proposed action area is forest fragmented by area of development (existing roads); and agricultural vegetation, interspersed with areas of non-native vegetation. A very small area of shrubland/grassland is also present (Figure 12).

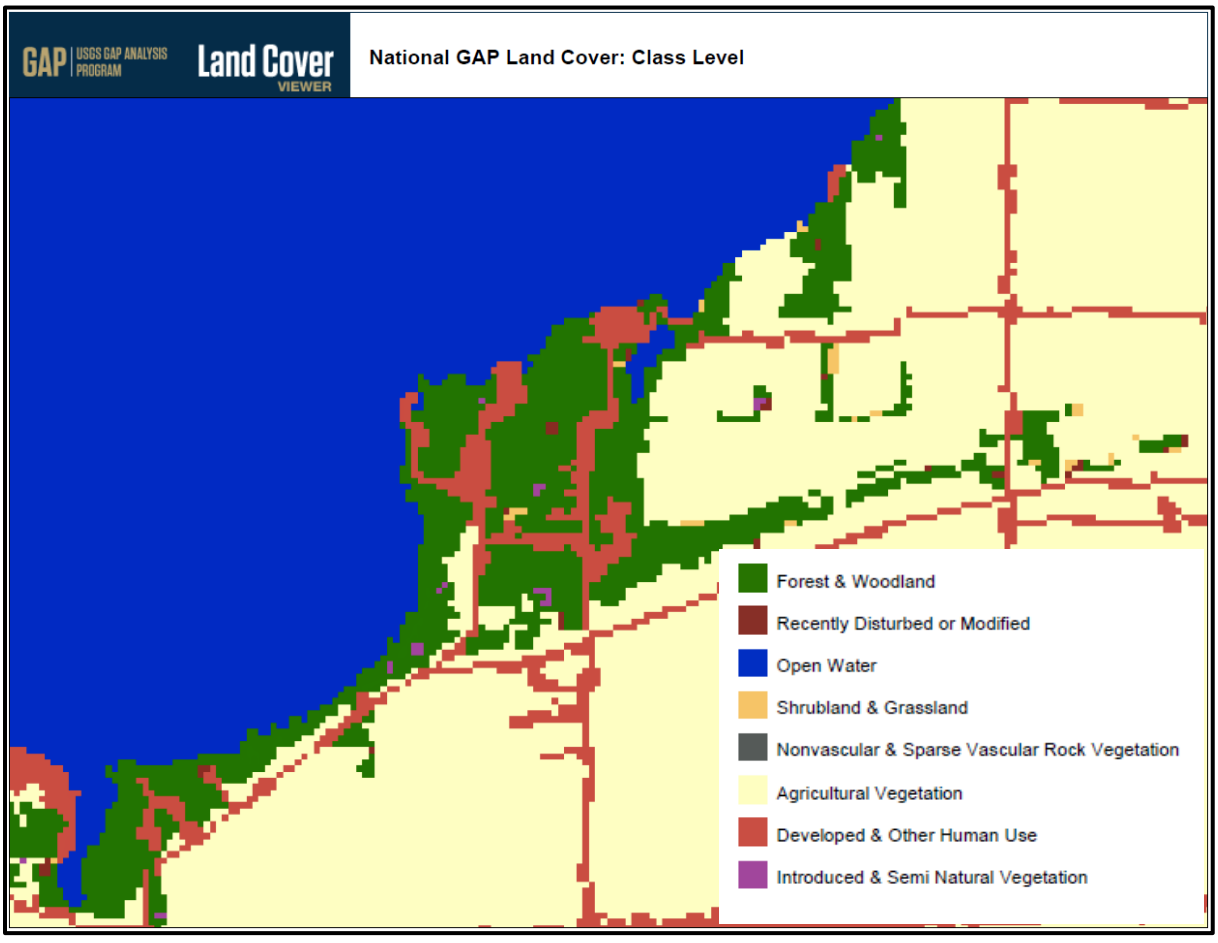

Figure 12. U.S. Geological Service land cover for the proposed project area.

3.4 Noise

The area in the vicinity of the proposed project includes transportation, recreation, residential, and agricultural zones. Agricultural and open space areas typically have noise levels in the range of 34-70 decibels (dB; a measure of loudness) depending on their proximity to transportation arteries (Figure 13). Noise associated with transportation arteries such as highways, railroads, airports etc., would be greater than those in rural areas. Agriculture, traffic, and recreation-related noise, such as that created by vehicles, machinery, and recreationists, are the main sources of noise within the study area. In general, urban noise emissions do not typically exceed about 60 dB, but may attain 90 dB or greater in busier urban areas or near high volume transportation arteries.

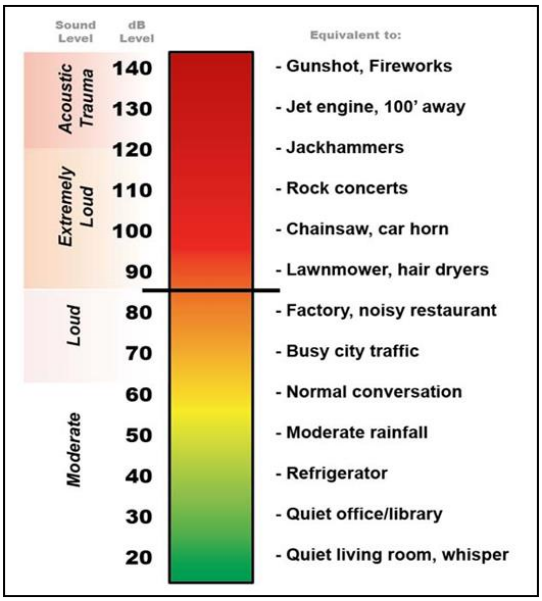

Figure 13. Examples of the sound level and decibel (dB) level of various sources.

3.5 Water Quality

The water quality in Carlyle Lake and the downstream river channel is generally good and is of suitable quality for uses, such as: water supply, primary and secondary water contact recreation, and support for desirable biological communities.

A routine water quality monitoring and investigation program is in place and managed by USACE. Because the lake is very shallow and susceptible to high winds, it often prevents the lake from stratifying permanently during the summer months. During extended periods with little wind and high air temperatures the likelihood of undesirable algae blooms greatly increases. Upon subsequent algae die off, the dissolved oxygen in the lake as well as the downstream discharge

can become severely depressed. This condition, combined with minimum downstream discharge, can cause minor fish kills in the lake as well as below the dam. When this occurs operational modifications such as changing the release source from the sluice gate to the spillway are implemented in order to improve downstream water quality. In addition, the minimum release is increased from 50 cubic feet per second (cfs) to 100 cfs. Using these management techniques helps to ensure that the lake continues to provide a suitable source for drinking water with the exception of potential taste and odor issues sometimes associated with algae blooms.

Generally, the water collected at all sampling sites in the lake, tributaries and tailwater meet or exceed Illinois State water quality standards for primary and secondary water contact recreation, which include swimming, boating, fishing and water skiing. Even though phosphorous levels routinely exceed Illinois State water quality standards, discharge from the lake generally has lower concentrations of phosphorous than the incoming tributary flows. Also on a few occasions, the tailwater has not met the minimum dissolved oxygen standards established by the State of Illinois.

According to the 2018 Illinois Integrated Water Quality Report 303(d) List, Carlyle Lake is listed as impaired due to total phosphorus, total suspended solids, and mercury. Therefore, the lake is not supporting the designated uses of fish consumption (mercury), and impacts to aesthetic quality (total phosphorus causing eutrophication, and total suspended solids causing turbidity). The primary tool used to assess aesthetic quality for freshwater lakes is the Aesthetic Quality Index (AQI). The AQI represents the extent to which pleasure boating, canoeing, and aesthetic enjoyment are attained at a lake. Continued water quality monitoring would ensure the potential for water quality degradation is kept to a minimum.

3.6 Air Quality

The Clean Air Act of 1963 requires the U.S. Environmental Protection Agency (USEPA) to designate National Ambient Air Quality Standards (NAAQS). The USEPA has identified standards for six criteria pollutants: ozone, particulate matter (PM_{10} = less than 10 microns; and $PM_{2.5}$ = less than 2.5 microns in diameter), sulfur dioxide, lead, carbon monoxide, and nitrogen dioxide. Clinton County, IL is currently in attainment for all EPA air quality standards (USEPA 2018; https://www3.epa.gov/airquality/greenbook/anayo_il.html).

3.7 Recreation

There are a variety of outdoor recreation areas and facilities located at Carlyle Lake, including ten major recreation areas, four marinas, a visitor information center, several wildlife management areas, and numerous small recreation access areas. The outdoor recreation opportunities

provided at Carlyle Lake are designed to support a wide range of recreational activities and interests. Major activities include bike riding, boating, sailing, kayaking, canoeing, water skiing, wake boarding, tubing parasailing, camping, fishing, hiking/walking for pleasure and fitness, hunting, picnicking, sight-seeing, swimming, and wildlife viewing/nature photography.

The Proposed Action Area is located within the Dam West Recreation Area, which is classified as a high density recreation area. The area is temporarily closed to the public due to the termination of the South Shore State Park IDNR lease. The road relocation and EMR habitat restoration are actions which would once again make the area safe for public access and recreational use. Within the Proposed Action Area, recreation currently consists primarily of sight-seeing, wildlife viewing, and nature photography, when the area is open to the public.

3.8 Prime and Unique Farmland

In order to protect farmland from increasing urban sprawl, Congress passed the Agriculture and Food Act of 1981 (PL 97-98), which contained the Farmland Protection Policy Act (FPPA). This Act is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. The Act also focuses on areas of prime farmland, which is identified by the United States Department of Agriculture Natural Resources Conservation Service (NRCS). For the purpose of the Farmland Protection Policy Act, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. Activities not subject to FPPA include projects on land used for water storage, and public lands previously converted to non-agricultural use. Within the Carlyle Lake boundary, there are approximately 1,700 acres of prime farmland and approximately 1,900 acres of farmland of statewide importance. Within the vicinity of the Proposed Action Area, 49.6% of the land is classified as prime farmland if drained; 30.8% is classified as prime farmland; 16.7% is classified as not prime farmland; and 2.8% is classified as farmland of statewide importance (Figure 14).

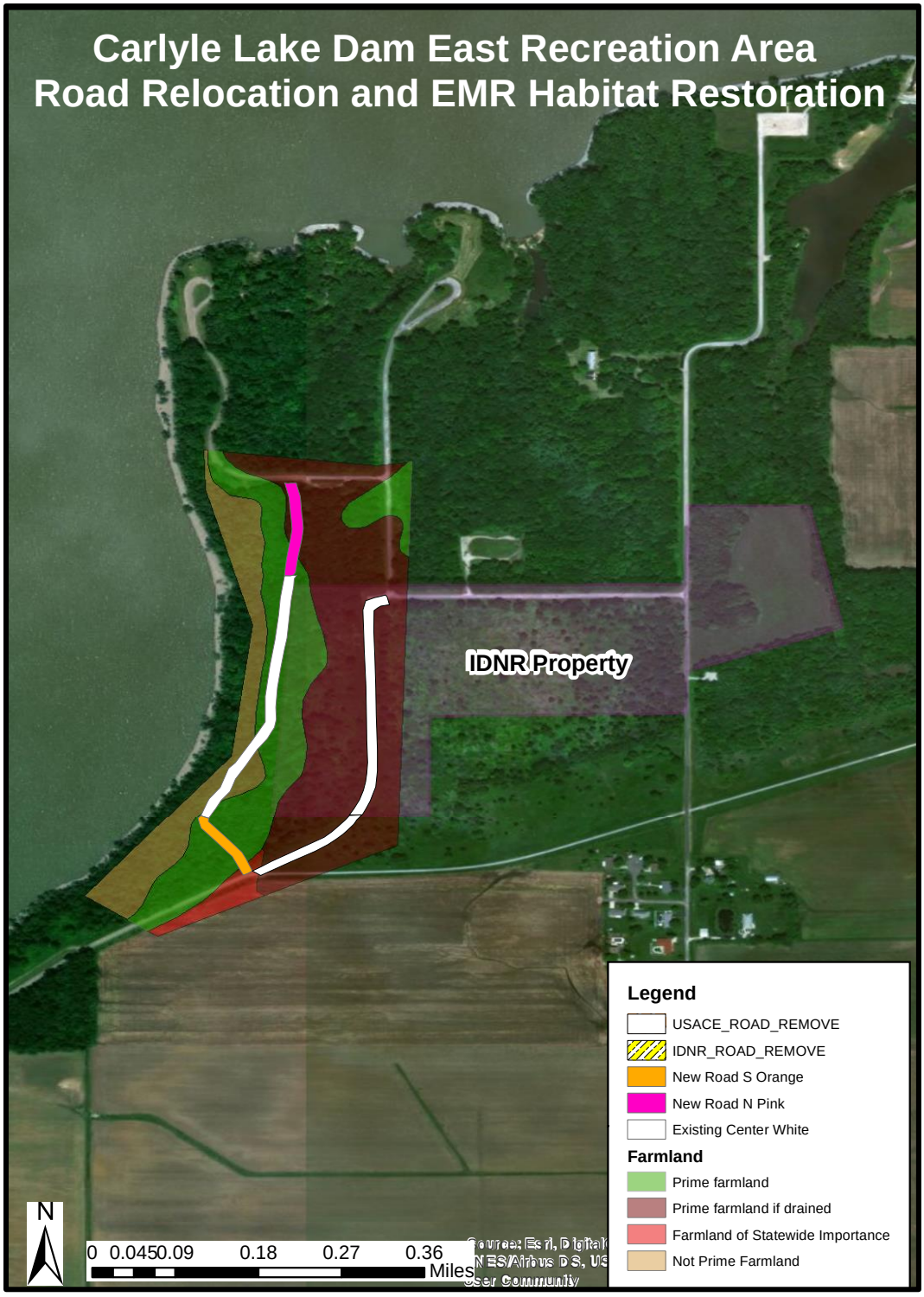

Figure 14. Farmland classification within the vicinity of the Proposed Action.

3.9 Traffic and Roadways

Access to Carlyle Lake is facilitated by network of Interstate roadways, U.S. Highways, State Highways and county roads located in Clinton, Bond and Fayette counties, Illinois. The roads leading from major highways to recreation areas at Carlyle Lake are maintained by county authorities. In general, the condition of these roads is good. Huey Road lies to the east of the Proposed Action Area and leads north to the lake from Highway 50 (Figure 15).

Within the Proposed Action Area, Saddle Dam 2 Road is owned and maintained by USACE, and leads from the Dam East area towards the northwest end of the Dam East Recreation Area. However, property and roadway owned and maintain by IDNR bisects the USACE owned access road to the Dam East Recreation Area. Unfortunately, the roadway owned and maintained by IDNR has become highly degraded and hazardous to motorists because IDNR has not had the necessary resources in recent years to maintain the existing roadway. This results in the lakefront at the northwest end of the Dam East Recreation Area (former South Shore State Park) being inaccessible to the public. Prior to the lease termination, traffic in the area was comprised of hunters, wildlife and bird watchers, anglers, campers, and sightseers. The heaviest traffic occurred during the spring and fall.

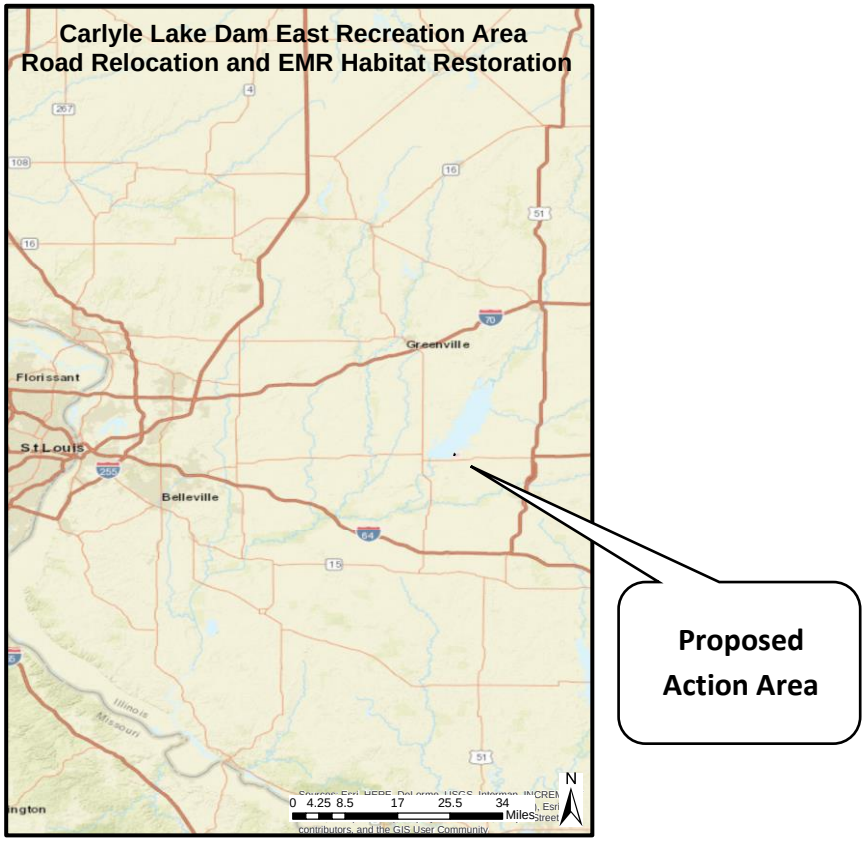

Figure 15. Major roadways leading to the Proposed Action Area at Carlyle Lake.

3.10 Socio-Economics and Demographics

Natural and recreational resources at Carlyle Lake provide ample social, economic and environmental benefits for both visitors and the local economy. Having local recreation options close to the reservoir promotes economic investment, environmental awareness and social well-being to local residents and visitors by providing jobs, education, solitude, and exercise opportunities. Recreation at Carlyle Lake is also an economic engine for local business, communities and the region. The town of Carlyle caters to local residents and visitors by offering resorts, marinas, grocery stores, and gasoline for cars, boats, and recreational vehicles. Visitor use also contributes to sales of recreation equipment, such as boats, campers, tents and fishing gear (USACE 2017).

Table 2 presents essential demographic and economic information for the City of Carlyle, Illinois (factfinder.census.gov).

Table 2. Essential demographic and economic information for the City of Carlyle, Illinois.

Socio-Economics	**Carlyle, Illinois**
Population Size	3,281
Median Age of Population (years)	41.0
Number of Households	1,354
Average Household Size	2.3
Median Household Income	$56,290
Median Value of Owner-Occupied Housing	$116,800
Population Below Poverty Level	12.6%
Industry	**Carlyle, Illinois**
Educational services, and health care and social assistance	16.0%
Construction	15.1%
Retail trade	14.7%
Manufacturing	14.1%
Wholesale trade	7.0%
Professional, scientific, and management, and administrative and waste management services	6.5%
Agriculture, forestry, fishing and hunting, and mining	6.0%
Transportation and warehousing, and utilities	4.8%

Finance and insurance, and real estate and rental and leasing	4.1%
Public administration	4.0%
Other services, except public administration	3.9%
Arts, entertainment, and recreation, and accommodation and food services	2.8%
Information	1.2%
Racial Demographics (%)	**Carlyle, Illinois**
White	95.2%
Black or African American	2.7%
American Indian and Alaska Native	0.0%
Asian	0.9%
Native Hawaiian & other Pacific Islander	0.0%
Two or More Races	0.6%
Hispanic	1.3%
Minority Population	4.8%

3.11 Environmental Justice

Environmental justice refers to fair treatment of all races, cultures and income levels with respect to development, implementation and enforcement of environmental laws, policies and actions. Environmental justice analysis was developed following the requirements of:

- Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations," 1994)

- "Department of Defense's Strategy on Environmental Justice" (March 24, 1995).

The purpose of environmental justice analysis is to identify and address, as appropriate, human health or environmental effects of the proposed action on minority and low income populations. Following the above directives, the methodology to accomplish this includes identifying minority and low-income populations within the study area by demographic analysis. Data from the 2010 U.S. Census (https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml) were utilized for this analysis. Data are included above in Section 3.10 – Socio-Economics and Demographics. The City of Carlyle, Illinois, does not exceed a 20% poverty level or minority population.

3.12 Hazardous, Toxic, and Radioactive Waste (HTRW)

A modified Phase I Environment Site Assessment was performed in conformance with the scope and limitations of ASTM Practice E 1527 for the U.S. Army Corps of Engineers property formerly known as South Shore State Park, Carlyle Lake, Clinton County, Illinois. This assessment revealed no evidence of Recognized Environmental Conditions (RECs) in connection with the property. The site visit, interviews, and records search revealed no indication of any spills, pesticide/herbicide use, or HTRW contamination. In the event that HTRW material is discovered that may be hazardous to human health during construction operations, that portion of work would stop and the USACE Environmental Quality Section would be contacted immediately to perform a re-evaluation of the environmental conditions.

3.13 Cultural Resources

The proposed road relocation and EMR habitat restoration are entirely contained within the 1992 Phase I Archaeological Survey for Autumn Olive Tree Removal at South Shore State Park, Clinton County, Illinois. This survey identified seven archaeological sites within the path of, or within the immediate vicinity of, the proposed road relocation. The 1992 investigation made the determination that none of these seven sites meet the requirements for National Register eligibility.

Pursuant to Section 106 of the National Historic Preservation Act (PL 89-665, as amended), and the implementing regulation 36CFR800, a letter requesting concurrence with the determination of no adverse effect was sent to the Illinois State Historic Preservation Office (IL SHPO) on 28 October 2016. Concurrence by the IL SHPO was given in a letter dated 17 November 2016. In the unlikely event that archaeological cultural deposits or historic sites are discovered during the project, all activity in the immediate area would halt until the newly discovered site is evaluated. The newly discovered site would be protected from construction impacts until its eligibility for the National Register is determined in consultation with the IL SHPO and any appropriate mitigation is complete.

3.14 Tribal Coordination

USACE initiated coordination with 26 Native American tribes on 26 January 2017. Responses were received from the following Native American tribes: Miami Tribe of Oklahoma, letter dated 10 February 2017; Quapaw Tribe of Oklahoma, letter dated 3 March 2017; and Eastern Shawnee Tribe, e-mail dated 5 April 2017. At this time, none of the tribes consulted offered any objection to the Proposed Action within the Dam East Recreation Area at Carlyle Lake, Clinton County, IL.

3.15 Terrestrial and Wildlife Resources

The area proposed for the road relocation is not located within a floodplain and is considered to be classified as an upland hardwood community type. Species composition is a typical mixture of shade intolerant species, i.e. oak (*Quercus* sp.), black walnut (*Juglans nigra*), and black cherry (*Prunus serotina*) as well as shade tolerant species, i.e., American elm (*Ulmus americana*) that occur within an upland hardwood forest community. Other tree species include lesser amounts of green ash, eastern red cedar, hackberry, hickory, eastern red bud, pin oak, sassafras, sycamore, and sweetgum. A small portion of the tree species present occur within bottomland forest communities, however, these species are present in a non-competitive structural position and are being out competed by the upland species, which are well suited to the existing site conditions. The median size of trees to be removed for the proposed road relocation is 8 inches DBH.

The area proposed for the EMR habitat restoration is not located within a floodplain, although it is near an area which may flood (Figure 16). This juxtaposition provides high quality habitat for EMR. The IDNR property is managed through use of herbicides and prescribed burning as well as native vegetation planting to enhance EMR habitat. Currently, this area is sparsely vegetated with live mature trees. Exotic and invasive plant control is ongoing within the management area. Numerous standing dead trees or snags are present on site. Herbaceous perennial forb and grass species make up the majority of existing vegetation within this IDNR managed area. This type of grassland habitat is preferred by the EMR.

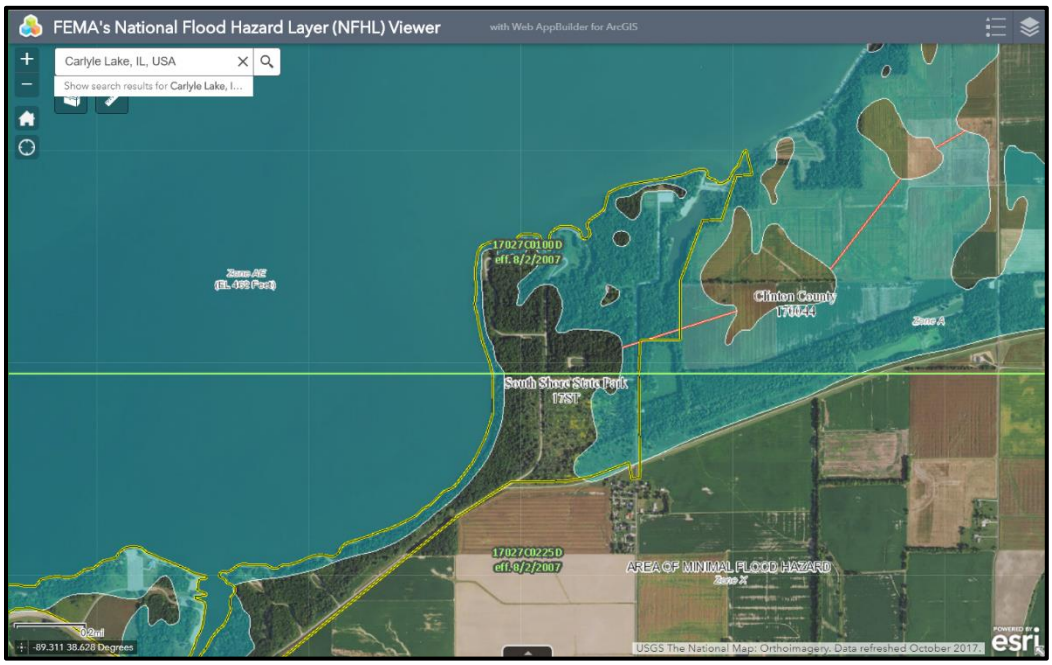

Figure 16. Extent of floodplain area that will be inundated by a flood event having a 1-percent chance of being equaled or exceeded in any given year.

There are numerous species of wildlife located in the vicinity of the Dam East Recreation Area that are native to Illinois including: white-tailed deer, turkey, rabbits, squirrels, opossums, raccoons, various amphibians, reptiles, nesting and migratory birds, and small rodents. Migrating waterfowl, shore birds, and wading birds also use the wetlands located near the Dam East Recreation Area. Many migratory song birds, owls, and hawks are known to use the Carlyle Lake area (Joe Smothers, pers. comm.). Importantly, the federally threatened Eastern Massasauga Rattlesnake population is unique to the area. The wildlife management and environmental stewardship activities conducted on the Carlyle Lake Project lands in general have created an exceptional, well diversified ecological setting that has benefitted and attracted a wide variety of wildlife species.

3.16 Aquatic Resources

Carlyle Lake is the largest reservoir in Illinois, encompassing approximately 25,000 acres. The lake length is 15 miles, and the maximum width is 3.5 miles. The surface area is roughly 26,000 acres, bounded by 85 miles of shoreline. The average depth is 11 feet, and the maximum depth is approximately 35 feet. Carlyle Lake is classified as eutrophic.

The fishes of Carlyle Lake and the lake spillway are typical of Midwestern waters. Major sport, commercial, and forage species are white and black crappie, bluegill, green sunfish, longear sunfish, yellow and black bullhead, channel and flathead catfish, white and yellow bass, walleye, sauger, largemouth bass, freshwater drum, carp, three species of gar, gizzard shad, brook silversides, red shiner, bullhead minnow, golden shiner, and western mosquitofish. The waters of the lake and tailwater also have diverse forms of phytoplankton, zooplankton, aquatic insects, crustaceans, amphibians, reptiles and mollusks.

3.17 Wetlands

According to the USFWS National Wetland Inventory map (USFWS 2018a), there are no wetlands within the proposed action area. The site is considered to be upland, defined by the hydrology, soils, and vegetation. The ridge site does not receive periodic inundation or saturation by surface or groundwater during the growing season (Figure 17).

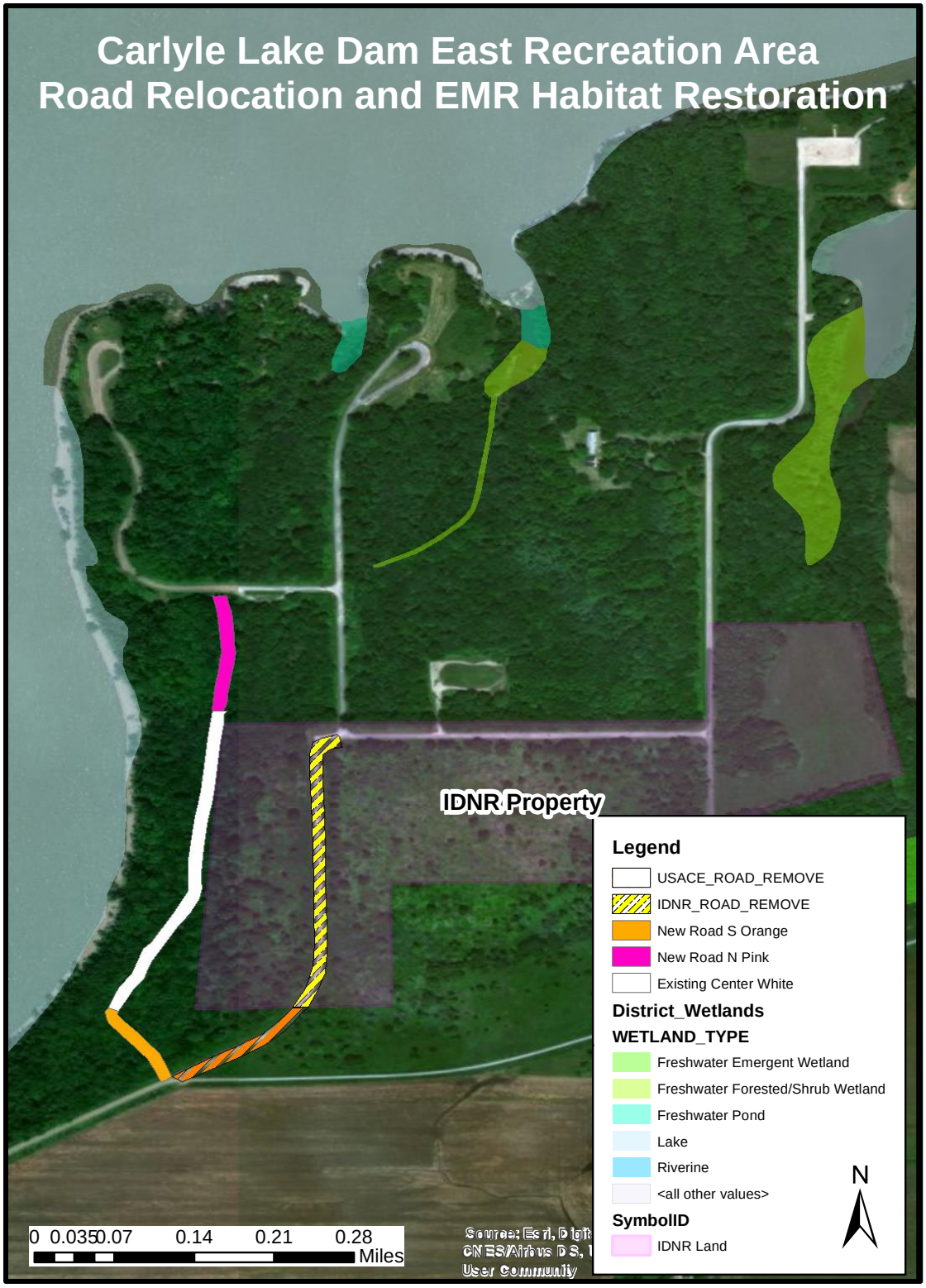

Figure 17. Depiction of wetland habitat within the vicinity of the proposed road relocation and EMR habitat restoration area, Carlyle Lake, Illinois.

3.18 Bald Eagles

On August 9, 2007 the bald eagle was removed from the federal list of threatened and endangered species. However, the species remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The BGEPA prohibits unregulated take of bald eagles, including disturbance. The U.S. Fish and Wildlife Service developed the National Bald Eagle Management Guidelines (USFWS 2007) to provide landowners, land managers, and others with information and recommendations regarding how to minimize potential project impacts to bald eagles, particularly where such impacts may constitute disturbance.

On numerous occasions during 2017-2018, USACE biologists have conducted field investigations and surveys of the Proposed Project Area to determine the presence of bald eagle nests/nesting. No bald eagles or nests were observed. Eagles do congregate in the winter season in areas around the Dam East Recreation Area to feed on fish, but they vacate the area in the spring months.

3.19 State Listed Species

The Illinois Department of Natural Resource (IDNR) was contacted via the Ecological Compliance Assessment Tool (EcoCAT) website on 12 August 2018, for a list of Illinois State threatened and endangered species that could potentially be located in the project areas (IDNR project number: 1901484) (IDNR 2018a). The Illinois Natural Heritage Database shows that two species may be in the vicinity of the Proposed Action location. These species include: Eastern Massasauga (*Sistrurus catenatus*); see Section 3.20.3 - Federally Listed Species), and Ornate Box Turtle (*Terrapene ornate*).

Ornate Box Turtle. The ornate box turtle is a terrestrial species that prefers sand and black soil prairies. It burrows in the ground to escape heat in the summer and cold in the winter. With 99% of Illinois' original prairies destroyed, the decline in ornate box turtle numbers is attributed to the loss of habitat, which resulted in this species being listed as an Illinois threatened species in 2009. Other threats to this species include habitat fragmentation, road mortality, and collection by turtle enthusiasts. Their diet primarily consists of insects, snails, earthworms, tadpoles, carrion, berries, and other plant materials. According to the IDNR NatureServe Biotics5 database (IDNR 2018b; accessed 12 August 2018), there are no records of the ornate box turtle occurring in the vicinity of the Proposed Action.

3.20 Federally Listed Species

In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, an official list of species and critical habitat potentially occurring in the vicinity of the proposed project was acquired from the USFWS Information for Planning and Conservation (IPaC; USFWS 2018b) website at (https://ecos.fws.gov/ipac/) on 20 June 2018 (Table 3). Habitat requirements and impacts of the federal action are discussed for each listed species.

Table 3. Federally listed threatened and endangered species potentially occurring within the Proposed Project Area.

Species	Federal Status	Habitat
Indiana bat (*Myotis sodalis)*	Endangered	Caves, mines (winter hibernacula); trees (summer roosting); and small stream corridors with well-developed riparian woods; upland forests (foraging)
Northern long-eared bat (*Myotis septentrionalis*)	Threatened Key to 4(d) Rule	Caves, mines; rivers and reservoirs adjacent to forests
Piping plover (*Charadrius melodus*)	Endangered	May be present in Clinton County during migration
Eastern massasauga (*Sistrurus catenatus*)	Threatened	Graminoid dominated plant communities (fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands)
Eastern prairie fringed orchid (Platanthera leucophaea)	Threatened	Mesic to wet prairies
Lakeside daisy (*Hymenoxys acaulis* var. *glabra*)	Threatened	Dry rocky prairies

4 ANTICIPATED ENVIRONMENTAL IMPACTS

This section evaluates and discusses the potential impacts (environmental consequences) for each resource topic discussed in Chapter 3 that could be impacted, directly or indirectly, by the no-action alternative and the Tentatively Selected Plan. Direct impacts are those that would take place at the same time and place (40 CFR §1508.8(a)) as the action under consideration. Indirect impacts are those that are caused by the action and are later in time or farther removed in

distance, but are still reasonably foreseeable (40 CFR §1508.8(b)). The depth of analysis corresponds to the scope and magnitude of the potential environmental impact.

4.1 Topography and Geology

4.1.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and the IDNR road would remain unmaintained and closed to the public for the foreseeable future. No changes to the overall topography or geology would occur.

4.1.2 Tentatively Selected Plan (Orange-White-Pink Road Alignment - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, the proposed road route would be cleared and approximately 6 inches of base material would be placed. Roadway ditches would be formed to ensure proper drainage. Identified existing IDNR and USACE roadways within the prime EMR habitat would be removed, backfilled as necessary with clean fill material and graded to the elevation of the surrounding area. The area would then be treated as necessary to provide suitable soil conditions and planted with native grassland species. This would result in a very slight elevational increase along the new roadway route. Thus, only nominal changes to the overall topography would occur.

4.2 Aesthetics

4.2.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No changes to the overall aesthetics of the area would occur.

4.2.2 Tentatively Selected Plan (Orange-White-Pink Road Alignment - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, aesthetic impacts due to construction activities in the vicinity of the Proposed Action would be temporary. Tree removal, road degradation, and new roadway construction would occur during a period of low visitor use. The location of the relocated road would be largely blocked from view by existing vegetation. Reseeding of the INDR property and grassland is not likely to be aesthetically unpleasing to most people. Thus, no adverse long term aesthetic impacts are anticipated.

4.3 Land Cover

4.3.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned. The IDNR road and would remain unmaintained and closed to the public for the foreseeable future. The USACE service road within the forest tract would continue to be mowed. No changes to the land cover of the area are anticipated.

4.3.2 Tentatively Selected Plan (Orange-White-Pink Road Alignment - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, approximately 2.7 acres of forest habitat would be permanently converted to roadway on USACE property; and approximately 1.4 acres of existing degraded roadway on IDNR property and 0.6 acres of existing paved roadway on USACE property would be converted to non-forested grassland habitat and managed for the benefit of wildlife, including the federally endangered EMR.

4.4 Noise

4.4.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No changes to the noise level in the area are anticipated.

4.4.2 Tentatively Selected Plan (Orange-White-Pink Road Alignment - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, noise due to construction activities in the vicinity of the Proposed Action would be temporary. After construction is complete, the overall noise level in the vicinity of the Proposed Action would remain unchanged relative to the level which existed prior to the IDNR South Shore State Park lease termination. Common sources of noise would include transportation, recreation, residential, and agricultural activities.

4.5 Water Quality

4.5.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No changes to water quality in the area would occur.

4.5.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, no changes to water quality are anticipated in the vicinity of the Proposed Action. Drainage ditches would be constructed to

divert water away from the new road alignment to increase safety, and to provide conveyance to an appropriate area.

4.6 Air Quality

4.6.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No changes to the air quality in the area would occur.

4.6.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Emissions from equipment, as well as dust would be generated during the proposed construction activities. However, no adverse long-term air quality impacts are anticipated to occur in the region as a result of the Proposed Action.

4.7 Recreation

4.7.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. Recreational activities within the Proposed Action Area would be extremely limited. Campgrounds, day-use areas, picnic shelters, and fishing access would remain closed.

4.7.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, USACE would continue to conduct cleanup and improvements to the Dam East Recreation Area, including restoration of electricity for security lighting (initial phases), and potable water. USACE eventually hopes to reopen the campground, however this is contingent on funding and would likely occur during later phases of restoration. Planning for future restoration of day-use areas, picnic shelters, and fishing access is also underway.

4.8 Prime and Unique Farmland

4.8.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and the IDNR road would remain unmaintained and closed to the public for the foreseeable future. No changes to prime or unique farmland would occur within the Proposed Action Area.

4.8.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, approximately 2.7 acres of forest habitat, some of which is classified as prime farmland, would be permanently converted to roadway on USACE property. However, activities not subject to FPPA include projects on public lands previously converted to non-agricultural use. The Dam Ease Recreation Area is classified for high density recreation. Thus, no impacts to prime farmland subject to FPPA would be impacted by the Proposed Action.

4.9 Traffic and Roadways

4.9.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and the road traversing the IDNR land would remain unmaintained and closed to the public for the foreseeable future. While reduced traffic on the IDNR roadway may benefit the EMR, the existence of the N-S road still contributes to habitat fragmentation and lower quality EMR habitat within the parcel.

4.9.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, the overall vehicular traffic level in the vicinity of the Proposed Action would remain unchanged relative to the level that existed when the former South Shore State Park was fully functional. By relocating the existing N-S portion of the IDNR and USACE roads to the higher elevation forested area, it is anticipated that reduced EMR road mortality would result within the Proposed Action Area, as the forested area is not preferred by EMR (Dreslik 2005).

4.10 Socio-Economics and Demographics

4.10.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. Lack of access to recreational areas at the northwest parts of the Dam East Recreation Area and the shoreline of Carlyle Lake may have negative socioeconomic consequences for local businesses and visitors to the lake.

4.10.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, access to recreational areas at the northwest parts of the Dam East Recreation Area and the shoreline of Carlyle Lake are anticipated to provide positive socioeconomic consequences for local businesses.

4.11 Environmental Justice

4.11.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. Since the road would remain closed to all visitors, no unfair treatment based on race, culture or income levels would result.

4.11.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, the road would be open to all visitors, thus no unfair treatment based on race, culture or income levels would occur.

4.12 Hazardous, Toxic, and Radioactive Water (HTRW)

4.12.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No HTRW issues are anticipated within the Proposed Action Area.

4.12.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, the likelihood of hazardous substances adversely affecting the Proposed Project Area due to the proposed construction activities is very low. The St. Louis District Environmental Quality Section would be contacted immediately if suspected HTRW material was encountered at any point during construction.

4.13 Cultural Resources

4.13.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No cultural resource issues are anticipated within the Proposed Action Area.

4.13.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

The Proposed Action was coordinated with the Illinois State Historic Preservation Office (IL SHPO) on 28 October 2016. Concurrence by the IL SHPO was given in a letter dated 17 November 2016. In the unlikely event that archaeological cultural deposits or historic sites are discovered during the project, all activity in the immediate area would halt until the newly discovered site is evaluated. No cultural resource issues are anticipated within the Proposed Action Area.

4.14 Tribal Coordination

4.14.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No tribal resource issues are anticipated within the Proposed Action Area.

4.14.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

USACE initiated coordination with 26 Native American tribes on 26 January 2017. Responses were received from the following Native American tribes: Miami Tribe of Oklahoma, letter dated 10 February 2017; Quapaw Tribe of Oklahoma, letter dated 3 March 2017; and Eastern Shawnee Tribe, e-mail dated 5 April 2017. At this time, none of the tribes consulted offered any objection to the Proposed Action within the Dam East Recreation Area at Carlyle Lake, Clinton County, IL. No tribal resource issues are anticipated within the Proposed Action Area.

4.15 Terrestrial and Wildlife Resources

4.15.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. While reduced traffic on the IDNR roadway may benefit the EMR and other wildlife by reducing the potential for road mortality, the existence of the N-S road still contributes to habitat fragmentation. This decreases opportunities for EMR migration and gene flow within the patch, as well as lowers EMR habitat quality.

4.15.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, approximately 300 trees over 2.7 acres of existing forest habitat would be cleared for the road relocation; and approximately 2.0 acres of existing roadway would be reclaimed, planted with native grassland vegetation, and managed for wildlife. Mobile wildlife would likely relocate during construction activities. Due to the abundance of similar forest habitat in the vicinity, and the fact that a large portion of the proposed road alignment has been routinely mowed for approximately 20 years, impacts to terrestrial resources and wildlife are anticipated to be minimal.

4.16 Aquatic Resources

4.16.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No aquatic resource issues are anticipated within the Proposed Action Area.

4.16.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, no aquatic resource issues are anticipated within the Proposed Action Area.

4.17 Wetlands

4.17.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. No wetland resource are present within the Proposed Action Area.

4.17.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

No jurisdictional wetlands, waterways or other Waters of the United States would be affected by the construction and maintenance associated with this Proposed Action. As such, the St. Louis District, Regulatory Branch, determined that no Section 404 Clean Water Acts permits would be required to complete the project as proposed.

4.18 Bald Eagles

4.18.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. At this time, no Bald Eagle nests are present within the Proposed Action Area.

4.18.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

No Bald Eagle nests are present within the Proposed Action Area. Since a large portion of the proposed road alignment has been routinely mowed for approximately 20 years, adverse impacts to Bald Eagles are not anticipated.

4.19 State Listed Species

4.19.1 No Action Alternative

Under the No Action Alternative, the road would not be realigned and would remain unmaintained and closed to the public for the foreseeable future. The road proposed to be removed would remain in place and would continue to fragment the EMR habitat.

4.19.2 Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4)

Under the Road Realignment and EMR Habitat Alternative, benefits to EMR are expected to accrue. The Proposed Action would relocate a road from an area of high quality EMR habitat to an area that is not known to support EMRs. The existing IDNR road is a barrier to snake movement (Epps et al. 2005; Shepard et al. 2008b; Baker et al. 2016), a vehicle mortality threat (Shepard et al. 2008a; Baker et al. 2016), and creates a predation risk to snakes basking or attempting to cross the roadway (Dreslik 2005; Shine et al. 2004). Additionally, the removal of the existing N-S portions of the IDNR and USACE roadways would eliminate a barrier to snake movement and restore grassland habitat within an EMR high-use habitat patch. Thus, the road relocation should reduce the potential for overall road mortality, increase opportunities for migration and gene flow within the patch, and provide a more contiguous habitat block.

The Ornate Box Turtle is not known to occur in the vicinity of the Proposed Action, thus no adverse impacts are anticipated.

4.20 Federally Listed Species Biological Assessment

In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, an official list of species and critical habitat potentially occurring in the vicinity of the proposed project was acquired from the USFWS Information for Planning and Conservation (IPaC; 2018b) website at (https://ecos.fws.gov/ipac) on 20 June 2018. Species included in the USFWS official species list are described in the following section.

This Biological Assessment covers construction activities for the Proposed Action. After construction is complete, the federally listed species would be covered by the Biological Assessment for the Carlyle Lake Project 2016 Master Plan Update (USACE 2018a).

4.20.1 Indiana Bat (Myotis sodalis)

The endangered Indiana bat has been noted as occurring in several Illinois and Missouri counties. Indiana bats migrate seasonally between winter hibernacula and summer roosting habitats. Winter hibernacula includes caves and abandoned mines. Females emerge from hibernation in late March or early April to migrate to summer roosts. Females form nursery colonies under the loose bark of trees (dead or alive) and/or in cavities, where each female gives birth to a single

young in June or early July. A maternity colony may include from one to 100 individuals. A single colony may utilize a number of roost trees during the summer, typically a primary roost tree and several alternates. Some males remain in the area near the winter hibernacula during the summer months, but others disperse throughout the range of the species and roost individually or in small numbers in the same types of trees as females.

Indiana bat summer habitat consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches DBH that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet of other forested/wooded habitat. Trees with less than 5 inches DBH that have exfoliating bark, cracks, crevices, and/or hollows may have some potential to be male Indiana bat summer roosting habitat. However, early-successional, even-aged stands of trees less than 5 inches DBH is not typically considered to be suitable roosting habitat. However, early successional habitat with small diameter trees may be used as foraging habitat by Indiana bats.

During the summer, Indiana bats frequent the corridors of small streams with well-developed riparian woods, as well as mature bottomland and upland forests. They forage for insects along stream corridors, within the canopy of floodplain and upland forests, over clearings with early successional vegetation (old fields), along the borders of croplands, along wooded fence rows, and over farm ponds and in pastures. It has been shown that the foraging range for the bats varies by season, age and sex and ranges up to 81 acres.

Disturbance and vandalism, improper cave gates and structures, natural hazards such as flooding or freezing, microclimate changes, land use changes in maternity range, and chemical contamination are the leading causes of population decline in the Indiana bat (USFWS 2000, 2004).

Suitable Indiana bat summer habitat may be located in the forested areas in the vicinity of the proposed road relocation project.

"No Action" Alternative – Under the No Action Alternative, the existing roadways would not be realigned from IDNR and USACE properties to the higher elevation forested alignment on USACE property.

Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4) – Approximately 300 trees, with an average diameter of 8 inches DBH would need to be cleared from the proposed road relocation alignment on USACE property. The removal of trees for the road would result in an approximately 50 foot wide swath through a portion of the existing upland forest habitat. Additionally, traffic would travel along this route instead of along the existing route within the USACE and IDNR properties. The common name, size range, and median DBH for each tree species identified for removal are listed in Table 4. All tree clearing activity would be restricted to the hibernation period, which is defined as 1 October – 31 March. Therefore, the St. Louis District has determined that the proposed actions *"may affect, but not likely to adversely affect"* the Indiana Bat.

Table 4. List of trees proposed to be removed along the Orange-White-Pink road alignment.

Common Name	# of Trees Removed	DBH Range (inches)	Median DBH (inches)
Black Cherry	32	4-18	8
Black Oak	3	6-12	8
Black Walnut	39	4-20	10
Box Elder	3	6-14	12
Bur Oak	1	16	16
Cottonwood	1	28	28
Eastern Red Cedar	1	8	8
Eastern Redbud	1	4	4
Elm	41	4-14	6
Green Ash	13	4-18	10
Hackberry	13	4-14	6
Hickory	14	4-18	10
Honey Locust	3	6-18	10
Mulberry	1	6	6
Northern Red Oak	1	4	4
Pecan	5	4-12	6
Persimmon	15	4-8	6
Pin Oak	18	10-34	17
Sassafras	10	4-6	4
Shingle Oak	76	4-24	8

Swamp White Oak	1	14	14
Sweetgum	6	6-22	16
Sycamore	2	10-12	11
Total	**300**	**4-34**	**8**

4.20.2 Northern Long-eared Bat (*Myotis septentrionalis*)

The northern long-eared bat (*Myotis septentrionalis*) is a federally threatened bat species. The northern long-eared bat is sparsely found across much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia.

Northern long-eared bats spend winter hibernating in large caves and mines. Summer habitat for the northern long-eared bat includes a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches DBH that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested/wooded habitat. The northern long-eared bat has also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. Northern long-eared bats typically occupy their summer habitat from mid-May through mid-August each year and the species may arrive or leave some time before or after this period.

Forest fragmentation, logging and forest conversion are major threats to the species. One of the primary threats to the northern long-eared bat is the fungal disease, white-nose syndrome, which has killed an estimated 5.5 million cave-hibernating bats in the Northeast, Southeast, Midwest and Canada.

Suitable northern long-eared bat summer habitat may be located in the forested areas in the vicinity of the proposed road relocation project.

"No Action" Alternative – Under the No Action Alternative, the existing roadways would not be realigned from IDNR and USACE properties to the higher elevation forested alignment on USACE property.

Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4) – Approximately 300 trees, with an average diameter of 8 inches DBH would need to be cleared from the proposed road relocation alignment on USACE property. The removal of trees for the road would result in an approximately 50 foot wide swath through a portion of the existing upland forest habitat. Additionally, traffic would travel along this route instead of along the existing route within the USACE and IDNR properties. The common name, size range, and median DBH for each tree species identified for removal are listed in Table 4. All tree clearing activity would be restricted to the hibernation period, which is defined as 1 October – 31 March. Therefore, the St. Louis District has determined that the proposed actions "*may affect, but not likely to adversely affect*" the Northern Long-eared Bat.

4.20.3 Piping Plover (*Charadrius melodus*)

The Piping Plover (*Charadrius melodus*) in the Great Lakes area is a federally endangered bird species. Piping Plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. Piping Plovers are migratory birds. In the spring and summer they breed in northern United States and Canada. There are three locations where piping plovers nest in North America: the shorelines of the Great Lakes, the shores of rivers and lakes in the Northern Great Plains, and along the Atlantic Coast. Their nesting range has become smaller over the years, especially in the Great Lakes area. In the fall, plovers migrate south and winter along the coast of the Gulf of Mexico or other southern locations.

Major threats to the species includes loss of the coastal beaches traditionally used by Piping Plovers for nesting due to commercial, residential, and recreational developments; inundation of nests due to high water; and loss of suitable nesting habitat due to vegetative encroachment. Additionally, Piping Plovers are very sensitive to the presence of humans, and may abandon their nest if too much disturbance occurs. Further stressors include predators such as dogs, cats, fox, gulls, and crows.

No populations of this species are known to occur in Carlyle Lake area, and suitable habitat for the piping plover does not exist within the vicinity of the proposed road relocation project.

"No Action" Alternative – Under the No Action Alternative, the existing roadways would not be realigned from IDNR and USACE properties to the higher elevation forested alignment on USACE property.

Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4) – Because mudflats within Carlyle Lake can provide feeding locations for migrants as they travel, the St. Louis District has determined that the Proposed Action "*may affect, but not likely to adversely affect*" the Piping Plover.

4.20.4 Eastern Massasauga (*Sistrurus catenatus*)

This snake species is known to occur within the Proposed Action Area, particularly within the grassland/wetted prairie habitat. The EMR occasionally uses wooded/shrub scrub edges with greater canopy cover along the perimeter of the wetted prairie, depending on sex, life stage, and time of year. Road mortality is one of the leading sources of observed mortality (Shepard et al. 2008a; Baker et al. 2016) and considered a significant threat to the EMR population at Carlyle Lake (Baker et al. 2016). Baker et al. (2016) documented 49 automobile mortalities occurring at Carlyle Lake between 2000 and 2011 (Shepard et al. 2008a). Most mortalities occur in the summer and fall when snakes are most active (Baker et al. 2016) (USACE 2018b).

Snakes may be found on roads either because they are using them to thermoregulate or crossing them to move between habitat areas (Andrews and Gibbons 2005). Crossing roads could result in mortality, while staying in one habitat patch restricts gene flow between patches, which may reduce population viability (Epps et al. 2005; Shepard et al. 2008b; Baker et al. 2016). Dreslik (2005) suggests that mortality rates are higher on road segments that fragment patches of grassland habitat, compounding the negative effects of reduced gene flow, inbreeding, and lack of migration. The high degree of habitat fragmentation created by roads around Carlyle Lake means snakes are either forced to cross roads when searching for mates, suitable foraging, and hibernation sites or remain restricted to one habitat patch (Shine et al. 2004). It has also been observed that some people appear to go out of their way to purposely run over snakes when they encounter them (Langley et al. 1989; Ashley et al. 2007) (USACE 2018b).

"No Action" Alternative – Under the No Action Alternative, the existing roadways would not be realigned from IDNR and USACE properties to the higher elevation forested alignment on USACE property. The existing roadways would remain in place and continue to act as a barrier to migration and gene flow within the patch, and the patch would remain fragmented and unrestored.

Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4) – The Proposed Action would relocate a road from an area of high quality EMR habitat to an area that is not known to support EMRs. The existing IDNR road is a barrier to snake movement, a vehicle mortality threat, and creates a predation risk to snakes basking or attempting to cross the roadway. Additionally, the removal of the existing N-S portions of the IDNR and USACE roadways would eliminate a

barrier to snake movement and restore grassland habitat within an EMR high-use habitat patch. Thus, the road relocation should reduce the potential for overall road mortality, increase opportunities for migration and gene flow within the patch, and provide a more contiguous habitat block.

Road removal activities would be limited to periods when the Eastern Massasauga are in their hibernacula. For planning purposes, construction should be scheduled between 15 November and 15 February, unless otherwise deemed acceptable by the USFWS; and by IDNR while working on IDNR property.

According to the Eastern Massasauga Management Plan, Carlyle Lake, Illinois, 2018 (Section B, pages 5-6), construction activities in undeveloped areas involving land clearing and heavy equipment use should be limited to periods when the Eastern Massasauga are in the hibernacula. Many EMRs, particularly younger age-classes, may be observed partially emerged at burrow entrances at around 9°C (48° F) body temperature. Thus to err on the side of caution, construction activities should not occur at known Eastern Massasauga localities after substrate temperatures reach 9°C (48°F) (USACE 2018b).

Additionally, prior to beginning any construction activities, a pre-construction survey of the construction areas would be conducted, the construction zone would be fenced to limit snake movement into the area, and the fenced zone would need to be declared free of Eastern Massasauga. If EMRs are encountered in a construction zone, the procedures outlined in the Eastern Massasauga Management Plan, Carlyle Lake, Illinois, 2018, Appendix A: Protocol for Handling Eastern Massasaugas shall be followed (USACE 2018b).

Construction would be allowed to occur without fencing during the period Eastern Massasauga are in their hibernacula if a pre-construction survey determines that there are no hibernacula in the construction zone (USACE 2018b).

With these conditions and conservation measures in place, the St. Louis District has determined that the Proposed Action "*may affect, but not likely to adversely affect*" the Eastern Massasauga.

4.20.5 Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)

The Eastern Prairie Fringed Orchid occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, and even bogs. Within Illinois, it is currently restricted to the northern part of the State, predominantly in counties bordering Lake Michigan. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment.

Blossoms of the orchid often rise just above the height of the surrounding grasses and sedges. The more exposed flower clusters are more likely to be visited by the Hawk Moth pollinators, though they are also at greater risk of being eaten by White-tailed Deer. Seed capsules mature over the growing season and are dispersed by the wind from late August through September. Early decline was due to the loss of habitat, mainly conversion of natural habitats to cropland and pasture. Current decline is mainly due to the loss of habitat from the drainage and development of wetlands. Other reasons for the current decline include succession to woody vegetation, competition from non-native species and over-collection (USFWS 2018c).

"No Action" Alternative – Under the No Action Alternative, the existing roadways would not be realigned from IDNR and USACE properties to the higher elevation forested alignment on USACE property.

Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4) – Because the Eastern Prairie Fringed Orchid is not known to occur in the counties surrounding the Carlyle Lake Project, the St. Louis District has determined that the Proposed Action would have "*no effect*" on the Eastern Prairie Fringed Orchid.

4.20.6 Lakeside daisy (*Hymenoxys acaulis* var. *glabra*)

Lakeside daisy is an endemic restricted to the Great Lakes area, within which it is one of the region's rarest plants - naturally occurring at only a handful of sites. The Lakeside Daisy is currently known from only six sites in four northern counties (Tazwell, Will, DuPage, and Cook) within Illinois (USFWS 2016b).

This Lakeside Daisy is a long-lived perennial growing where few others can, on nearly barren limestone bedrock (dry, rocky prairie grassland underlain by limestone) in full sunlight. All individuals within a given population tend to bloom about the same time, producing the spectacular effect of a golden blanket across a rocky landscape. All the flower heads track the sun across the sky in unison. After about a week, the double notched petals fade before falling. Seed dispersal takes place about a month later. Lakeside daisy also reproduces vegetatively by rhizomatous growth (USFWS 2017).

The species is federally listed due to limestone quarrying, which has increased in recent years, destroying the daisy's habitat. Collectors may also pose a threat, since the daisy is now found in just a handful of sites. Fire suppression practices have eliminated the wildfires which once regularly cleared prairie grasslands of the encroaching woods. Now the expansion of shrubs and trees threatens the daisy, which needs full sun to survive (USFWS 2017).

"No Action" Alternative – Under the No Action Alternative, the existing roadways would not be realigned from IDNR and USACE properties to the higher elevation forested alignment on USACE property.

Tentatively Selected Road Alignment (Orange-White-Pink - Alternative 4) – The Lakeside Daisy is not known to occur in the counties surrounding the Carlyle Lake Project, and its habitat (dry, nearly barren, rocky, prairie grassland underlain by limestone) does not occur at Carlyle Lake. Therefore, the St. Louis District has determined that the Proposed Action would have "*no effect*" on the Lakeside Daisy.

5 CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

Climate change is a fundamental environmental issue, and is a particularly complex challenge given its global nature and inherent interrelationships among its sources, causation, mechanisms of action, and impacts. Climate change science is evolving, and is only briefly summarized here. In 1970, the level of atmospheric carbon dioxide was estimated at 325 parts per million (ppm) (CEQ 1970). Since 1970, the concentration of atmospheric carbon dioxide has increased at a rate of about 1.6 ppm per year (1970-2012) to approximately 396 ppm in December 2014 (current globally averaged value). Based on the United States Global Change Research Program as well as other scientific records, it is now well established that rising global atmospheric greenhouse gas emission concentrations are significantly affecting the Earth's climate (USACE 2015).

The approach at USACE is to consider the questions in need of climate change information at the geospatial scale where the driving climate models retain the climate change signal. At present, USACE judges that the regional, sub-continental climate signals projected by the driving climate models are coherent and useful at the scale of the 2-digit HUC (Water Resources Region) (Figure 18).

Within Water Resources Region 07, the general consensus in the recent literature points toward moderate increases in temperature and precipitation, and streamflow in the Upper Mississippi Region over the past century. In some studies, and some locations, statistically significant trends have been quantified. In other studies and locales within the Upper Mississippi Region, apparent trends are merely observed graphically but not statistically quantified. There has also been some evidence presented of increased frequency in the occurrence of extreme storm events (Villarini et al., 2013). Lastly, a transition point in climate data trends, where rates of increase changed significantly, was identified by multiple authors at approximately 1970 (USACE 2015).

There is strong consensus in the literature that air temperatures will increase in the study region, and throughout the country, over the next century. The studies reviewed here generally agree on an increase in mean annual air temperature of approximately 2 to 6 ºC (3.6 to 10.8 ºF) by the latter half of the 21st century in the Upper Mississippi Region. Reasonable consensus is also seen in the literature with respect to projected increases in extreme temperature events, including more frequent, longer, and more intense summer heat waves in the long term future compared to the recent past (USACE 2015).

Figure 18. Water Resources Region 07: Upper Mississippi Region Boundary.

Projections of precipitation found in a majority of the studies forecast an increase in annual precipitation and in the frequency of large storm events. However, there is some evidence presented that the northern portion of the Upper Mississippi Region will experience a slight decrease in annual precipitation. Additionally, seasonal deviations from the general projection patter have been presented, with some studies indicating a potential for drier summers. Lastly, despite projected precipitation increases, droughts are also projected to increase in the basin as a result of increased temperature and ET rates (USACE 2015).

A clear consensus is lacking in the hydrologic projection literature. Projections generated by coupling Global Climate Models (GCMs) with macro scale hydrologic models in some cases indicate a reduction in future streamflow but in other cases indicate a potential increase in streamflow. Of the limited number of studies reviewed here, more results point toward the latter than the former, particularly during the critical summer months (USACE 2015).

The trends and literary consensus of observed and projected primary variables noted above have been summarized for reference and comparison in the following figure (Figure 19) (USACE 2015).

The CEQ has issued draft guidance on how Federal agencies should consider the effects of greenhouse gas emissions and climate change in their evaluation of all proposed Federal actions. A Federal agency must (1) address the potential effects of a proposed action on climate as indicated by its greenhouse gas emissions; and (2) must discuss the implications of climate change for the environmental effects of a tentatively selected plan. In terms of the Proposed Project Area, existing greenhouse gas emissions would be temporary, short term, and primarily related to the emissions from gas and diesel fuel road construction machinery. The amount of greenhouse gas emissions from construction activities is considered to be negligible due to the limited duration. Post-construction it is expected that localized minor rises in greenhouse gas emissions would occur as a result of the resumption of vehicular traffic at the northwest end of the Dam East Recreation Area. It is anticipated that the Proposed Action would have no significant effect on climate change resulting from greenhouse gas emissions.

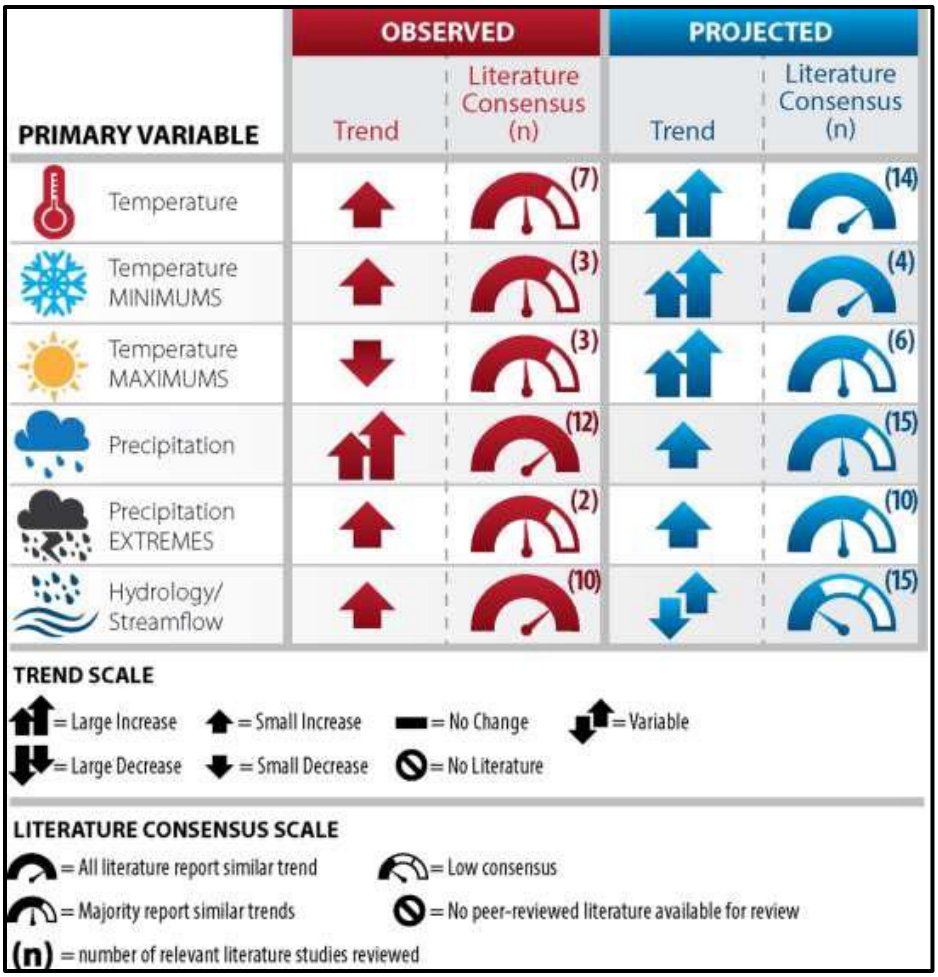

Figure 19. Summary matrix of observed and projected climate trends and literary consensus.

6 CUMULATIVE IMPACTS

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR Section 1508.7). Cumulative effects are defined as, "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Cumulative impacts are studied to enable the public, decision-makers, and project proponents to consider the "big picture" effects of a project on the community and the environment. In a broad sense, all impacts on affected resources are probably cumulative; however, the role of the analyst is to narrow the focus of the cumulative effects analysis to important issues of national, regional, or local significance (CEQ, 1997).

The Council on Environmental Quality (CEQ) issued a manual entitled Considering Cumulative Effects Under the National Environmental Policy Act (1997). This manual presents an 11 step procedure for addressing cumulative impact analysis. The cumulative effects analysis for the Proposed Action followed these 11 steps, shown in Table 4. The following subsections address scoping, the affected environment, and environmental consequences of the Proposed Action.

Table 4. CEQ's 11 step approach for assessing cumulative impacts.

CEQ's 11-Step Approach for Assessing Cumulative Impacts	
Component	**Steps**
Scoping	1. Identify resources
	2. Define the study area for each resource
	3. Define time frame for analysis
	4. Identify other actions affecting the resources
Describing the Affected Environment	5. Characterize resource in terms of its response to change and capacity to withstand stress
	6. Characterize stresses in relation to thresholds
	7. Define baseline conditions
Determining the Environmental Consequences	8. Identify cause-and-effect relationships
	9. Determine magnitude and significance of cumulative effects
	10. Assess the need for mitigation of significant cumulative effects
	11. Monitor and adapt management accordingly

Scoping – Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impacts of activities in and around Carlyle Lake. Prior to settlement, the northern third of the Carlyle Lake watershed was predominately comprised of prairies, while the southern two-thirds contained more forests. Today however, forests cover only about 13% of the watershed. This includes a 7,000 acre tract of floodplain forest, which is the largest contiguous block of this type of forest remaining in the state of Illinois. Agriculture is the predominant land use within the watershed. Currently, 82% of the land is used for agricultural purposes, while the state average is 78%. Since 1978, the number of farms has decreased by 25% and the acreage tilled has decreased by only 6%. These changes in land-use clearly had adverse impacts on the natural resources addressed in this document.

The most significant past action was the construction and development of Carlyle Lake between 1958 and 1967, when approximately 26,000 acres of various habitat types were lost as a consequence. Currently, the lake is surrounded by a thin band of degraded grasslands, wetlands, and upland and bottomland forest totaling approximately 11,120 acres (Phillips et al. 2002; Dreslik 2005; Shepard et al. 2008b). Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative effects of activities in and around Carlyle Lake. Past Actions include the construction and operation of the reservoir, management of the recreation sites surrounding the reservoir, and development of residential, commercial, and industrial facilities throughout the area, in addition to the regional agricultural development. All of these actions and developments have had varying levels of impacts on the physical and natural resources in the region. The development for human use of Carlyle Lake in the form of campgrounds and associated buildings, boat ramps, playgrounds, parking lots and the road network have had direct and indirect effects on local natural resources. For example, cumulative effects could relate to salts or chemicals used on local roads or within campgrounds or chemicals used in agriculture that leach to the Carlyle Lake area. Many of these developments have had beneficial impacts on the region's socioeconomic resources. In addition, many of the historic adverse impacts associated with development and urbanization such as wildlife habitat losses, changes in drainage patterns, and air and water pollution have been offset throughout the years by the resource stewardship efforts of the Corp, IDNR, and other management partners on the Carlyle Lake project area. These efforts include conservation of unique ecological areas such as those occupied by the EMR, park development, and outreach and education.

Describing the Affected Environment – Existing and future actions contribute to the adverse and beneficial cumulative impacts in and around the reservoir. As above, existing and future actions primarily include the operation and maintenance of the Carlyle Lake management areas. The 2016 Master Plan for the Carlyle Lake Project 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 waters at Carlyle Lake. In the case of the Proposed Dam East Recreation Area Road Relocation and EMR Habitat Restoration project, adverse impacts are primarily associated with tree clearing required for expansion of the mowed maintenance road and construction of the paved roadway, aggregate shoulder, and drainage ditches. Conservation measures in the form of tree clearing restriction dates would be implemented to protect federally listed bat species. Beneficial impacts for Eastern Massasauga would accrue from the elimination of the N-S roadways in and approaching the IDNR property. Conservation measures in the form of construction restriction dates and environmental conditions would be implemented to protect the federally listed Eastern Massasauga. Furthermore, there are no plans for any additional road development in the Carlyle Lake Project Area.

Determining the Environmental Consequences – Within the Carlyle Lake Project Area, adverse impacts are generally offset through resource stewardship efforts such as conversion of agricultural fields or formerly used parking areas to wooded areas through tree planting, or implementation of a multi-purpose forest management plan. The programmatic approach to project management allows for future development plans and mitigation responses to be adapted to address actions that may involve adverse consequences such as the tree removal required for this road relocation. This approach allows the USACE and other management partners at Carlyle Lake to continue to reduce the contribution of its activities to regional detrimental cumulative impacts to the environment and/or threatened or endangered species, through proactive actions and adaptive resource management strategies.

Additionally, USACE had worked tirelessly with IDNR to incorporate EMR habitat restoration into this road relocation project. This joint effort would ultimately result in removing the existing N-S portion of the USACE and IDNR roadway that runs through the IDNR inholding in order to prevent road-kill mortalities/injuries of the federally threatened EMR that have been documented along this stretch of road. This road runs through one of the area's largest EMR populations (Dreslik 2005, Baker et al. 2016) and road mortalities of the EMR on the existing IDNR road are among the highest in the Carlyle Lake area. The relocation of the road to USACE property would provide properly maintain recreational and stewardship access to the northwest parts of the Dam East Recreation Area, and although it would traverse forested habitat, it is habitat which is accepted as unsuitable for the EMR (Dreslik 2005, Joe Smothers 2017 pers. com.), and the majority of the alignment has been mowed for approximately 20 years. It is anticipated that road mortalities to EMR in this area would appreciably decrease with relocation of the existing road, as vehicular traffic on the IDNR road would be eliminated. Additionally, the removal of the existing N-S portions of the IDNR and USACE roadways would eliminate a barrier to snake movement and restore grassland habitat within an EMR high-use habitat patch. Thus, the road relocation should reduce the potential for overall road mortality, increase opportunities for migration and gene flow within the patch, and provide a more contiguous habitat block.

7 RELATIONSHIP OF PLAN TO ENVIRONMENTAL REQUIREMENTS

The relationship of the Tentatively Selected Plan (Alternative 4 - Orange-White-Pink Road Alignment with EMR Habitat Restoration) to environmental requirements, environmental acts, and/or executive orders is shown in Table 5.

Table 5. Federal Policy Compliance Status.

Federal Policy	Compliance Status
National Environmental Policy Act, 42 USC 4321-4347	Partial[1]
Water Resources Development Acts of 1986, 1990, 2000 and 2007	Full
Migratory Bird Treaty Act of 1918, 16 USC 703-712	Full
Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC 9601-9675	Full
Resource Conservation and Recovery Act, 42 USC 6901-6987	Full
Farmland Protection Policy Act, 7 USC 4201-4208	Full
Endangered Species Act, 16 USC 1531-1543	Partial[2]
Food Security Act of 1985, 7 USC varies	N/A
Land and Water Conservation Fund Act, 16 USC 460d-461	N/A
National Historic Preservation Act, 16 USC 470 et seq.	Full
Noise Control Act, 42 USC 7591-7642	Full
Clean Air Act, 42 USC 7401-7542	Full
Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities (EO 11282 as amended by EOs 11288 and 11507)	Full
Protection and Enhancement of the Cultural Environment (EO 11593)	Full
Floodplain Management (EO 11988 as amended by EO 12148)	Full
Protection of Wetlands (EO 11990 as amended by EO 12608)	Full
Protection and Enhancement of Environmental Quality (EO 11991)	Full
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898)	Full
Protection of Migratory Birds (EO 13186)	Full
Bald and Golden Eagle Protection Act, 42 USC 4151-4157	Full

Clean Water Act, 33 USC 1251-1375	Full
Rivers and Harbors Act, 33 USC 401-413	Full
Fish and Wildlife Coordination Act, 16 USC 661-666c	Partial[2]

[1] Full compliance after submission for public comments and signing of FONSI

[2] Required permits, coordination will be sought during document review

8 COORDINATION, PUBLIC VIEWS, AND RESPONSES

Notification of this Draft Environmental Assessment and unsigned Finding of No Significant Impact was sent to the officials, agencies, organizations, and individuals listed below for review and comment (Table 5). Additionally, an electronic copy is available on the U.S. Army Corps of Engineers St. Louis District's website during the public review period at: http://www.mvs.usace.army.mil/Missions/ProgramsProjectManagement/PlansReports.aspx

Please note that the Finding of No Significant Impact is unsigned. These documents will be signed into effect only after having carefully considered comments received as a result of this public review.

To assure compliance with the National Environmental Policy Act, Endangered Species Act, and other applicable environmental laws and regulations, coordination with these agencies will continue as required throughout the planning and construction phases of the proposed road relocation and EMR habitat restoration.

Table 5. Notification of availability of a draft Environmental Assessment and unsigned Finding of No Significant Impact was sent to the following entities.

U.S. Senator Richard Durbin (IL) Attn: Kappy Scates 711 Hart Senate Building Washington, DC 20510	U.S. Senator Tammy Duckworth (IL) Attn: Robin Cromer G12 Dirksen Senate Office Building Washington DC 20510
U.S. Representative John Shimkus (IL District 15) Attn: Mike Hall 2217 Rayburn House Office Building Washington, DC 20515	Kenneth A. Westlake US EPA, Region 5 (IL) 77 West Jackson Blvd E19J Chicago, IL 60604-3590

Matt Mangan Acting Field Supervisor U.S. Fish and Wildlife Service Marion Illinois Suboffice (ES) 8588 Route 148 Marion, Illinois 62959	Adam Rawe Resource Planner Impact Assessment Section Illinois Department of Natural Resources One Natural Resources Way Springfield, IL 62702
Sierra Club, Piasa Palisades Group 200 W 3rd Street #251 Alton, IL 62002	Representative John Cavaletto IL House District 107 1370 W. Main Street, Suite A P.O. Box 1264 Salem, IL 62881
The Nature Conservancy Illinois Field Office 8 S. Michigan Avenue, Suite 900 Chicago, IL 60603	State Representative Charlie Meier IL House District 108 121 Broadway Suite 1 Highland, IL 62249
Izaak Walton League of America Ron Moore, President Illinois Division 55 Ridgecrest Drive Decatur, IL 62521	State Senator Kyle McCarter Senate District 54 310 W. Gallatin Vandalia, IL 62471
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Carlyle Lake SFWMA Attn: Zach Donoho R.R. 2 Box 233 Vandalia, IL 62231	City of Carlyle Attn: JoAnn Hollenkamp 850 Franklin Street Carlyle, IL 62231
Breese Journal Attn: Vicky Albers 8060 Old Hwy. 50 P.O. Box 405 Breese, IL 62230	Union Banner Attn: Mark Hodapp 17549 County Farm Rd Carlyle, Illinois
Belleville News Democrat Attn: Cathleen Wesemann 120 South Illinois PO Box 427 Belleville, IL 62222	St. Louis Post Dispatch Attn: Tim Bross 900 North Tucker Boulevard St. Louis, MO 63101
Vandalia Leader Union Attn: Rich Bauer 229 S. Fifth Street Vandalia, IL 62471	Centralia Sentinel Attn: Newsroom 232 East Broadway Centralia, Illinois 62801

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FINDING OF NO SIGNIFICANT IMPACT

Dam East Recreation Area Road Relocation
and
Eastern Massasauga Habitat Restoration
Carlyle Lake – Clinton County, Illinois

1. In accordance with the National Environmental Policy Act, I have reviewed and evaluated the documents concerning the proposed road relocation and Eastern Massasauga habitat restoration at the Carlyle Lake Dam East Recreation Area (DERA).

2. An existing service road would be paved and serve as a direct access road to the northwestern part of DERA. Additionally, in partnership with IDNR, and in compliance with Section (a)(1) of the Endangered Species Act, a highly degraded and hazardous roadway on adjacent IDNR and USACE properties would be reclaimed for road material and planted with native grasses to reduce habitat fragmentation and road mortality within prime habitat for the federally endangered Eastern Massasauga (EMR). The USACE has prepared this document in compliance with the National Environmental Policy Act and other relevant federal and state laws and regulations. This Environmental Assessment describes and analyzes the direct, indirect, and cumulative effects for the Dam East Recreation Area Road Relocation and Eastern Massasauga Habitat Restoration project.

3. As part of this evaluation, I have considered:

   a. Existing Resources and Future without the Proposed Action - No Action Alternative.

   b. Impacts to Existing and Future Resources under Alternative 4 - Orange-White-Pink Road Alignment with EMR Habitat Rehabilitation.

4. The possible consequences of these alternatives have been studied for physical, environmental, cultural, social and economic effects. Significant factors evaluated as part of my review include:

   a. The Proposed Action would greatly facilitate the recreation mission of Carlyle Lake; promote efficient land management; reduce habitat fragmentation and road mortality within prime EMR habitat; and would allow for increased migration and gene flow among EMR within this critical habitat patch.

   b. The Proposed Action would not adversely impact the physical environment (e.g., topography; geology; soils; land use; water quality; air quality; prime and unique farmland; traffic and roadways; greenhouse gases, or climate change).

c. There are no significant hazardous and toxic waste (HTRW) issues anticipated.

d. The project would not adversely impact the socioeconomic environment (e.g., recreation, aesthetics, noise, recreation; or demographics).

e. No disproportionately high and adverse human health or environmental impacts on minority populations or low-income populations would occur (environmental justice).

f. No significant impacts are anticipated to biological resources, including wetlands, bottomland hardwood forests, or fish and wildlife resources.

g. The proposed work would have no effect upon significant known historic properties or archaeological resources.

h. No adverse impacts to federally threatened or endangered species are anticipated.

i. No significant climate change impacts are anticipated.

j. No significant cumulative impacts are anticipated.

5. Based on the disclosure of the Proposed Action's impacts contained within the Environmental Assessment, no significant impacts to the environment are anticipated. The Proposed Action has been coordinated with the appropriate resource agencies, and there are no significant unresolved issues. Therefore, an Environmental Impact Statement will not be prepared prior to proceeding with the Dam East Road Relocation and Eastern Massasauga Habitat Restoration project as identified in this Environmental Assessment.

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Date

Bryan K. Sizemore
Colonel, U.S. Army
District Engineer