US Army Corps of Engineers
St. Louis District

ENVIRONMENTAL ASSESSMENT WITH DRAFT FINDING OF NO SIGNIFICANT IMPACT

Wappapello Lake (Compartments 2, 6, and 8) Timber Stand Improvement Management Strategies

Prepared by:	For Information Contact:
Environmental Compliance Branch U.S. Army Corps of Engineers St. Louis District 1222 Spruce Street St. Louis Missouri 63103-2833	Ken Cook U.S. Army Corps of Engineers St. Louis District 314-331-8498 kenneth.m.cook@usace.army.mil

October 2011

Summary

The St. Louis District of the U.S. Army Corps of Engineers (Corps) is proposing to implement timber stand improvement (TSI) management strategies within three compartments at Wappapello Lake, Wayne County, Missouri. The work would be conducted over the next eight years and would include approximately 12,000 acres in 45 separate stands. This work is being accomplished in accordance with the Wappapello Lake Master Plan. In addition, an important component of the project is the restoration of Indiana bat habitat associated with mitigation obligations from the upgrade and expansion of U.S. Route 67 in Wayne County, MO. These activities are intended to insure the long range protection of the forest environment and support the practice of uneven aged management and diversification of species within the compartments, establishing a more stable biotic community. The lack of past management/manipulation has lead to a degraded overall forest component in even-aged stands, diseased and dying trees (particularly red oak species), open forest habitats, loss of nesting habitat, loss of filtering capabilities and undesirable tree species regeneration. The fundamental timber management program goals are to improve the reservoir watershed habitats through best management practices (BMP's) that reduce erosion, regenerate and promote forest tree and shrub species that benefit wildlife.

Wappapello Lake is located on the Upper St. Francis River in the southeastern part of Missouri. The dam site lies 22 miles southeast of Greenville, one mile southwest of Wappapello and 16 miles northeast of Poplar Bluff. The forest of Wappapello Lake reflects a common history of the entire Ozark Region. Forest land of the southeast Missouri hills prior to the 1930s was subjected to repeated fires and indiscriminate logging.

The Corps has prepared this document in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment (EA) describes and analyzes the direct, indirect, and cumulative effects for two alternatives for the TSI strategies. In addition to the Tentatively Selected Plan (Alternative 2), the Corps also evaluated a No Action alternative. Under the No Action alternative, current management plans would continue to guide management of the project area. No activities would be implemented to accomplish project goals.

In addition, this EA describes and summarizes the anticipated physical, biological, and social impacts of the proposed alternative management measures on the environment. Topics of discussion include, among others, (1) the federally endangered Indiana and gray bats, (2) existing and anticipated impacts to vegetation, water, and wildlife resources, (3) fuels management, (4) cultural and socioeconomic components, (5) compliance with relevant laws and regulations, and (6) inter-agency coordination.

Table of Contents

1 Introduction 1
1.1 Document Structure 1
1.2 Proposed Action 1
1.3 Purpose and Need 3
1.4 Objectives 3
1.5 Location 4
1.6 Scoping and Issues 9

2 Alternatives Including the Proposed Action 10
2.1 Alternative 1: No Action 10
2.2 Alternative 2: Implement TSI measures as written in the Wappapello Lake Master Plan (updated 2000) – Tentatively Selected Plan 10

3 Affected Environment and Environmental Consequences 17
3.1 General 17
3.2 Threatened and Endangered Species 18
3.3 Vegetation 21
3.4 Invasive/Undesirable Species Management 24
3.5 Water Resources 26
3.6 Wildlife 29
3.7 Fuels Management (Prescribed Fire) 30
3.8 Recreation 31
3.9 Soils 32
3.10 Air Quality 34
3.11 Infrastructure – Roads/Trails 35
3.12 Socio-economic 37
3.13 HTRW 37
3.14 Cultural 37
3.15 Relevant Laws and Regulations, Compliance 38

4 Coordination 41

5 List of Preparers 41

6 References 42

Draft Finding of No Significant Impact

Appendix A – Pertinent Correspondence
Appendix B – Environmental Checklist
Appendix C – Brown's Hollow Project

Table 1. Compartment treatment schedule by stand. ***Forty-five stands within roughly 12,000 acres would be managed for TSI over the life of the proposed project.*** **..... 14**
Table 2. Summary of effects by alternative. 16
Table 3. Endangered bat species known from the Wappapello Lake project area. 19

Figure 1. Map showing location of Compartments 2, 6, and 8. 2
Figure 2. Compartment 2. 6
Figure 3. Compartment 6. 7
Figure 4. Compartment 8. 8
Figure 5. Path of tornado for proposed timber salvage. 13

1 Introduction

1.1 Document Structure

The St. Louis District of the U.S. Army Corps of Engineers (Corps) has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the Tentatively Selected Plan and No Action alternative. The document is organized into five chapters:

Chapter 1. Purpose and Need for Action:
The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the Corps proposal for achieving that purpose and need. This section also details how the Corps informed the public of the proposal and how the public responded.

Chapter 2 Alternatives, including the Proposed Action:
This chapter provides a more detailed description of the Corps proposed action as well as the No Action alternative. These alternatives were developed based on issues raised by the interdisciplinary team, public and other agencies. This section also provides a summary table of the environmental consequences associated with each alternative.

***Chapter 3 Affected Environment and Environmental Consequences*:**
This chapter describes the environmental effects of implementing the Tentatively Selected Plan and the No Action alternative. This analysis consists of biological, physical, and social resources.

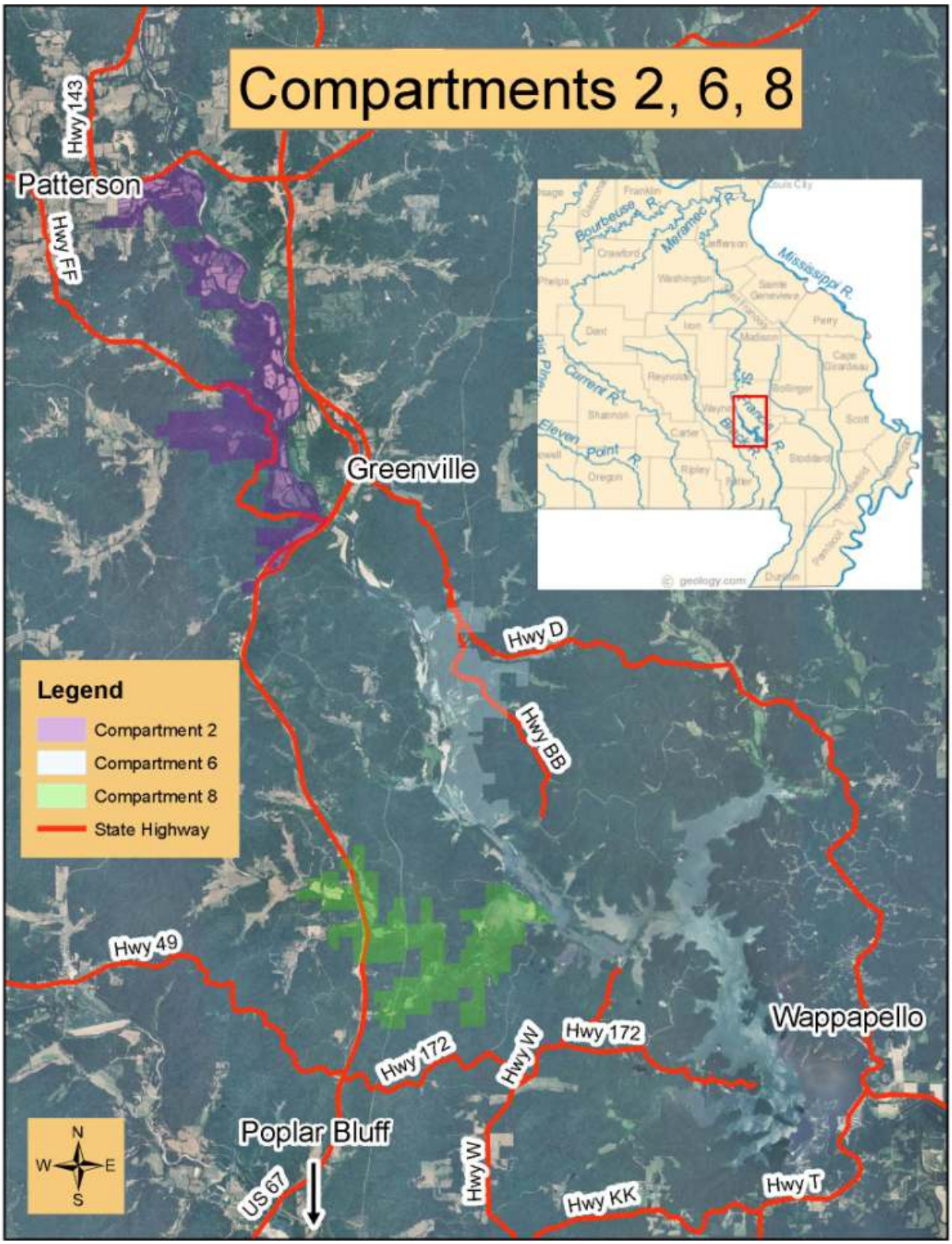
Chapter 4 Consultation and Coordination:
This chapter provides a list of preparers and agencies consulted during the development of the environmental assessment.

Appendices:
The appendices provide more detailed information to support coordination and scoping, Indiana bat mitigation, and other analyses presented in the environmental assessment.

1.2 Proposed Action

The Corps is proposing to implement timber stand improvement (TSI) management strategies within three compartments at Wappapello Lake, Wayne County, Missouri (Figure 1). The work would be conducted over the next eight years and would include approximately 12,000 acres in 45 separate stands. This work is being accomplished in accordance with the Wappapello Lake Master Plan, Design Memorandum No. 504, updated May 2000. In addition, an important component of the project is the restoration of Indiana bat habitat associated with mitigation obligations from the upgrade and expansion of U.S. Route 67 in Wayne County, MO. This mitigation is in accordance with the "*Cooperative agreement between the United States of America and the Missouri Department of Transportation for the Development of Indiana Bat Habitat*" (Missouri Highways and Transportation Commission, signed 5 August 2010, and U.S. Army Corps of Engineers, signed 30 August 2010, see Appendix A).

Figure 1. Map showing location of Compartments 2, 6, and 8.



1.3 Purpose and Need

Management of the Wappapello Lake forest is for the purpose of protecting, conserving and otherwise improving forest land to be utilized as a recreation, wildlife, watershed, and scenic resource. Forest management techniques insure the long range protection of the forest environment and support the practice of uneven aged management and diversification of species within the compartments, establishing a more stable biotic community. Timber harvests are accomplished for such purposes as timber stand improvement, disease and pest control, fire hazard reduction, removal prior to construction, and habitat management.

A quality timber management component at Wappapello Lake has been non-existent since the inception of the flood control reservoir. The lack of management/manipulation has lead to a degraded overall forest component in even-aged stands, diseased and dying trees (particularly red oak species), open forest habitats, loss of nesting habitat, loss of filtering capabilities and undesirable tree species regeneration (Eric Lemons Natural Resources Manager, Wappapello Lake, pers. comm.).

The fundamental timber management program goals are to improve the reservoir watershed habitats through best management practices (BMP's) that reduce erosion, regenerate and promote forest tree and shrub species that benefit wildlife. Special attention would be made to identify and protect cultural/historical resources, water quality, endangered species (esp. Indiana bat), invasive or undesirable species, and sensitive areas. Each stand would be managed according to a forest inventory and land classification. A 60-70% basal area component is targeted with removal of over-mature trees, inferior trees, and undesirable tree species. Snags, dens, and trees that retain value to wildlife would be favored standing or created within treatment areas.

The Wappapello Lake Project has a variety of forest cover types ranging from central upland hardwood forest to bottomland hardwood forest. These forests provide food and shelter for a variety of game and non-game species. Proper forest stocking, adequate understory growth and herbaceous plants provide excellent watershed filters. This filtering of silt and contaminants helps maintain good water quality for fish and other aquatic life. Proper forest management techniques and ecosystem management principles would be used to improve forest and wildlife habitats, while minimizing environmental damage. Management activities would be accomplished to meet the Corps objective of total ecosystem management by following specific forest and wildlife management prescriptions developed for individual stands within each compartment. Treatments and activities scheduled for Wappapello Lake are found in the Project Operations Management Plan (http://www.mvs.usace.army.mil/pm/wappapelloplan/masterplan.html, USACE 2000).

1.4 Objectives

Forest management shall be administered to meet the following long-range objectives:

(a) To incorporate a total ecosystem management philosophy.
(b) To provide for optimum watershed and erosion protection.
(c) To maintain and improve the native wildlife habitat and healthy indigenous trees for forest cover necessary for the recreational resources.

(d) To keep the forest in a healthy, vigorous growing condition, free from large outbreaks of insects and diseases.
(e) To avoid deterioration of the forest resource.
(f) To assure fully adequate and dependable future resources of readily available timber through sustained yield programs, reforestation, and accepted conservation practices, and to increase the value of such areas for conservation, recreation, and wildlife diversity.
(g) To provide habitat for the Indiana bat

1.5 Location

Wappapello Lake is located on the Upper St. Francis River in the southeastern part of Missouri. The dam site lies 22 miles southeast of Greenville, one mile southwest of Wappapello and 16 miles northeast of Poplar Bluff (Figure 1). Compartment descriptions are as follows (Figures 2-4):

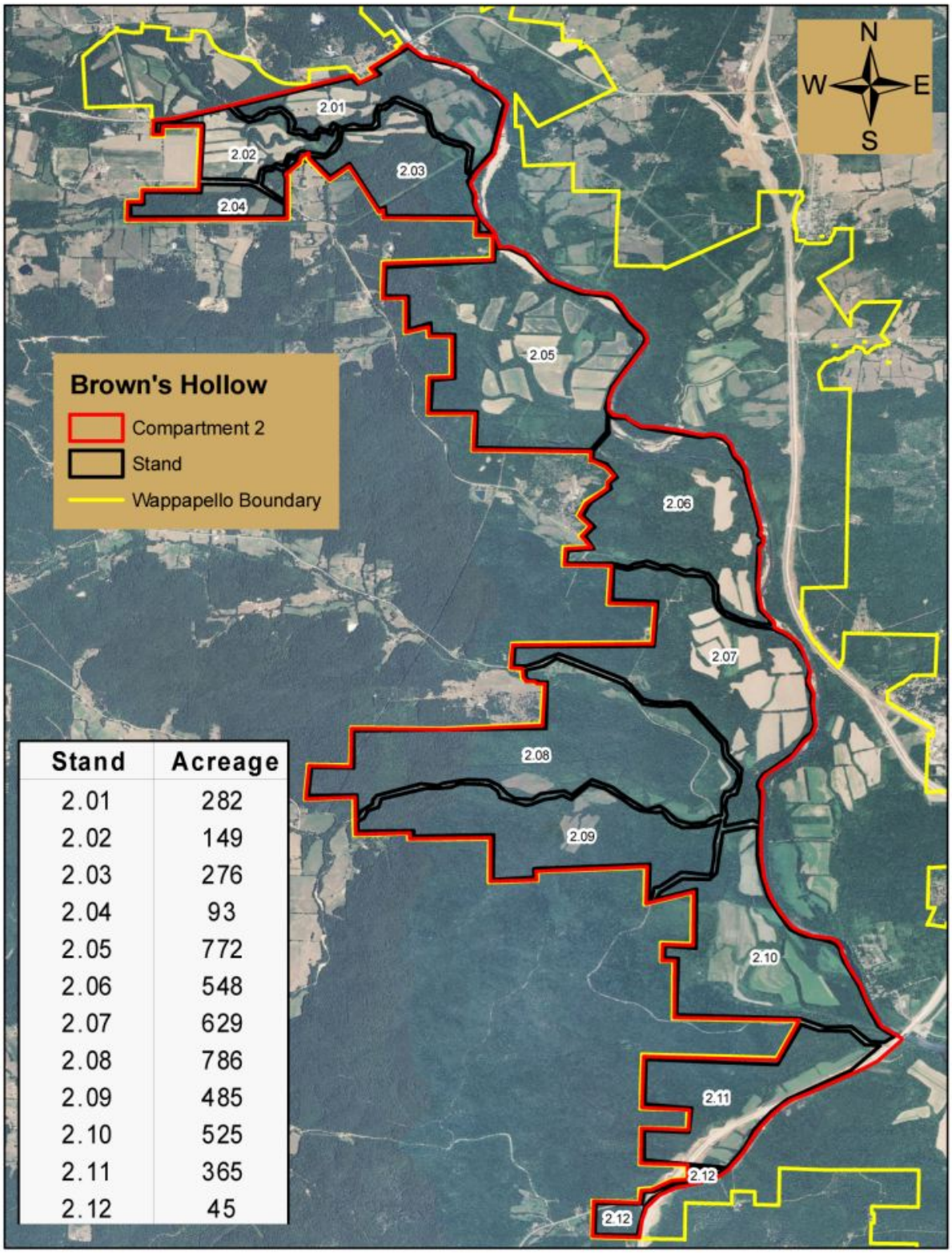
Compartment 2 is approximately 5500 acres (T 29N, R 5E, Sections 2, 3, 4, 10, 11, 14, 22, 23 and T 28N, R 5E, Sections 16, 17, 20, 21, 22, 27, 28, 34, 35) identified as Browns Hollow. It is comprised of 12 stands and is located on the west side of Wappapello Lake between Greenville, Missouri and Patterson, Missouri. The northernmost boundary is State Highway 34 and the southernmost boundary is US Highway 67. The western boundary is the signed and monumented Corps boundary line and the eastern boundary is Wappapello Lake. There are four major roads; State Highways 34/FF/A and US Highway 67 three Wayne County roads 313//378/380 and four Corps roads 26, 27, 28, and 29 that serve as access points. There is ten Corps parking areas, all allow camping and one boat ramp two gravel bars are available for lake/river access. The landscape is half forested with approximately 2500 acres of scrub shrub and open land communities managed in rotational mowing, disking, food plots and agricultural leases.

Compartment 6 is approximately 2500 acres (T 28N, R 6E, Sections 28, 29, 32, 33 and T 27N, R 6E, Sections 3, 4, 9, 10) identified as Blue Springs. It is comprised of 17 stands and is located on the east side of Wappapello Lake between Greenville, Missouri and Wappapello, Missouri. The northernmost boundary is Corps road 17 known as Sulfur Springs and the southernmost boundary is Corps road 14 known as Page Branch. The eastern boundary is the signed and monumented Corps boundary line and the western boundary is Wappapello Lake. There are two major roads; State Highway D and BB, two Wayne County roads 531/532 and five Corps roads 14, 15, 15A, 16, and 17 that serve as access points. There are eleven Corps parking areas, eight of which allow camping and three boat ramps for lake access. The landscape is mostly forested with approximately 400 acres of scrub shrub and open land communities managed in rotational mowing, disking and food plots.

Compartment 8 is approximately 4000 acres (T 27N, R 5E, Section 13; T 27N R 6E Sections 7, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30) identified as Otter Creek. It is comprised of 16 stands and is located on the west side of Wappapello Lake between Greenville, Missouri and Poplar Bluff, Missouri. The northernmost boundary is the signed and monumented Corps boundary line and Wayne County Road 546 and the southernmost boundary is the signed and monumented Corps boundary line. The eastern boundary is Wappapello Lake and the western boundary is the signed and monumented Corps boundary line. There are three major roads; US

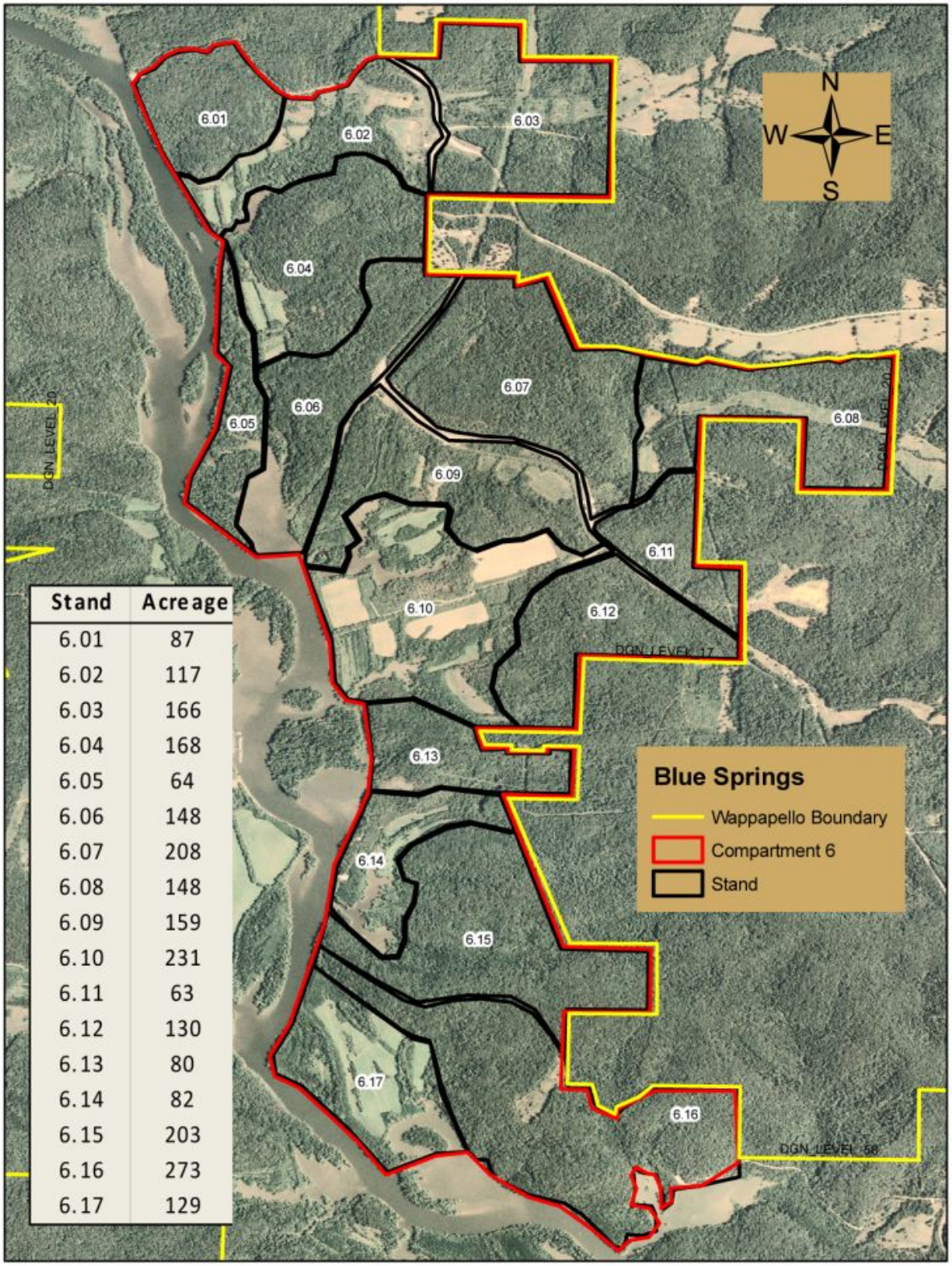
Highway 67, State highway 172 and PP, six Wayne County roads 403, 546, 547, 548, 549, 650 and two Corps roads 32 and 33 that serve as access points. There are eight Corps parking areas, two of which allow camping and three boat ramps for lake access. The landscape is mostly forested with approximately 450 acres of scrub shrub, agricultural lease and open land communities managed in rotational mowing, disking and food plots.

Figure 2. Compartment 2.



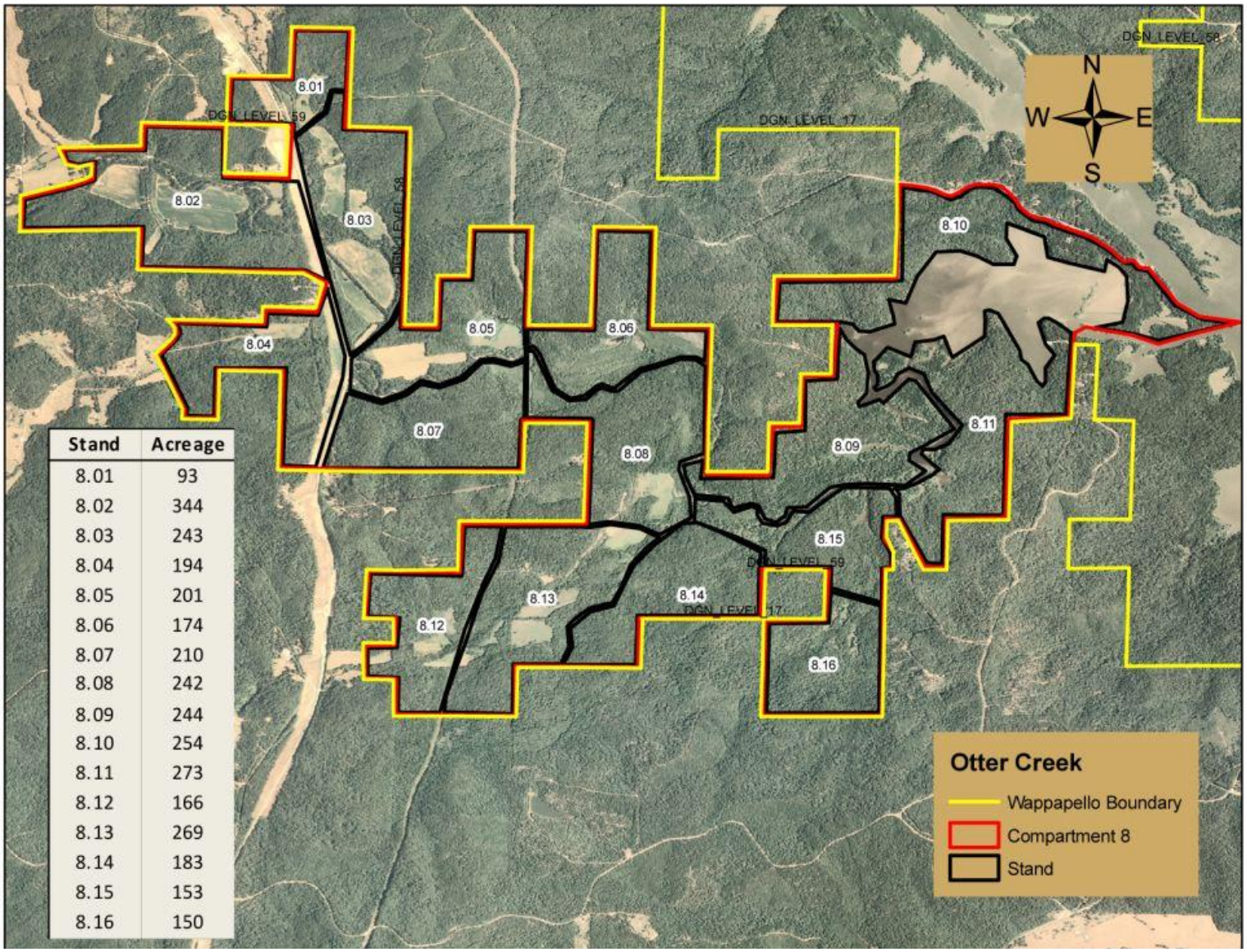
Stand	Acreage
2.01	282
2.02	149
2.03	276
2.04	93
2.05	772
2.06	548
2.07	629
2.08	786
2.09	485
2.10	525
2.11	365
2.12	45

Figure 3. Compartment 6.



Stand	Acreage
6.01	87
6.02	117
6.03	166
6.04	168
6.05	64
6.06	148
6.07	208
6.08	148
6.09	159
6.10	231
6.11	63
6.12	130
6.13	80
6.14	82
6.15	203
6.16	273
6.17	129

Figure 4. Compartment 8.



Stand	Acreage
8.01	93
8.02	344
8.03	243
8.04	194
8.05	201
8.06	174
8.07	210
8.08	242
8.09	244
8.10	254
8.11	273
8.12	166
8.13	269
8.14	183
8.15	153
8.16	150

1.6 Scoping and Issues

Scoping is an early and open process for identifying the significant issues related to a proposed action. An initial scoping letter was sent to agencies and other stakeholders (Appendix A) on 2 June 2011 to invite comment on the proposed action for Compartments 6 and 8. A follow-up scoping letter was sent on 25 July 2011 to the same distribution list to inform agencies and stakeholders that the Corps intended to expand the EA to include Compartment 2, an additional 5,500 acres, which includes a proposed timber salvage harvest from tornado damage sustained in May 2011.

This EA analyzes and summarizes the physical, biological, and social impacts of the proposed alternative management measures on the environment. Several agencies participated in scoping NEPA requirements for this project including the U.S. Fish and Wildlife Service (USFWS), the Missouri Department of Conservation (MDC), the Missouri Department of Natural Resources (MDNR), the U.S. Forest Service (USFS) and the Missouri Department of Transportation (MoDOT). In accordance with laws and regulations, relevant resources potentially impacted by the action are addressed. One of the purposes of soliciting comments is to determine where there are any unresolved issues that affect a resource, the Tentatively Selected Plan, or other alternatives. During scoping the following issues associated with the Tentatively Selected Plan were identified.

Issue 1. Forest Management. A quality forest management component at Wappapello Lake has been non-existent since the inception of the flood control reservoir. The lack of management/manipulation has lead to a degraded overall forest component in even-aged stands, diseased and dying timber, open forest, loss of nesting habitat, loss of watershed filtering capabilities, undesirable tree species regeneration, and loss of timber product quality and market value. In addition, local public comment and perception have centered on the need for better forest/wildlife management in the project area.

Issue 2. Indiana Bat Mitigation. The improvement of existing forest conditions to enhance Indiana bat habitat associated with mitigation obligations from the upgrade and expansion of U.S. Route 67 in Wayne County, MO. Based on a cooperative agreement between the United States of America [Corps] and the Missouri Department of Transportation the on-the-ground mitigation is to be completed by the end of December, 2014.

Issue 3. Wildlife Habitat Quality. Declining mast production, closed canopy and lack of browse areas, low diversity of forbes and grasses, and general lack of diversity need to be addresses through TSI.

Issue 4. Fuel Loading. Prescribed fire should be utilized for vegetation modification and control where these benefits would promote diversity for wildlife habitats. Also, downed and aging timber has significantly increased fuel loading in the project area.

2 Alternatives Including the Proposed Action

This chapter describes the No Action alternative and one action alternative, or Tentatively Selected Plan, for achieving the project's purpose and need, and compares the alternatives in term of their environmental impacts and their achievement of objectives.

2.1 Alternative 1: No Action

NEPA requires that in analyzing alternatives to a proposed action a federal agency consider an alternative of "No Action." This alternative provides a baseline or reference against which to describe environmental effects of the action alternative. No TSI would be conducted on the forested lands of Wappapello Lake if this alternative was selected. Routine maintenance of the existing roads/trails and open land management would continue. Selection of this alternative would not foreclose the option for future management in this area

The no action alternative would continue to support a degrading forest ecosystem and further diminish watershed filtering capabilities that a more diverse uneven-aged ecosystem would enhance. Under this alternative some of the consequences would include: 1) persistence of undesirable even-aged stands; 2) increased potential for insect and disease infestation in adjacent woodland; 3) continued undesirable tree species regeneration; 4) increased numbers of diseased and dying timber; 5) loss of economic value of salvageable wood products; 5) continued closed-canopy and non-vegetated forest floor; 6) continued lack of diverse wildlife habitat, including browsing and nesting areas.

A no action alternative decreases overall forest health and quality habitat. Failure to allow sunlight to the forest floor extinguishes the ability for desired tree regeneration and decreases diversity of early succession vegetation that is extremely important for watershed protection. Open forest floors allow for increased runoff disallowing a roughness factor that removes impurities, accelerates erosion, minimizes uptake and increases the speed at which water enters tributaries.

A no action alternative creates a social and economic impact to a depressed rural community. Allowing valuable timber resources to become susceptible to disease, blow-down, and rot, creates a barrier between land managers and communities that have a market for such resources.

2.2 Alternative 2: Implement TSI measures as written in the Wappapello Lake Master Plan (updated 2000) – Tentatively Selected Plan

Timber stand improvement in administratively designated natural areas is authorized within the Wappapello Lake Master Plan, Section 12.04, Forest Management. As described above, the work would be conducted over the next eight years and would include approximately 12,000 acres in three compartments consisting of 45 separate stands (Figures 2-4).

Implementing TSI is imperative to moving a degraded forest system to a healthy and sustainable system. Present forest conditions and failure to implement management strategies would result in loss of habitat and economic value as listed in the abovementioned no action alternative.

Timber Stand Improvement activities within this option would 1) increase air flow and light to ground contact for pollination and forest regeneration 2) create multi-aged or uneven aged timber stands for overall wildlife habitat while increasing watershed protection through enhancement of annual, perennial and woody growth and 3) create early succession patch work openings for nesting, escape and thermal cover. More specifically, TSI activities would be conducted using the following guidelines to determine management techniques and treatments within or among stands:

Forest inventories would be updated to collect data and include species composition, diameter and age class distribution, slope, aspect, current wildlife habitat conditions and presence of unique habitat types.

Prescriptions would detail specific treatments within each stand to improve habitat conditions including TSI, snag creation, edge feathering, prescribed fire and other habitat manipulation activities.

Best Management Practices would consist of accepted and designed government and private forest management activities. These would include directional skidding, using existing road systems to reduce erosion, creation of water bars, and seeding of all haul roads and landings. Skid trails and stream management zones would be delineated prior to logging activities to buffer harvest from drainages, streams, and wetlands. Harvesting would be limited to dry weather only and no digging, excavation, or other subsurface soil alteration is required or permitted.

Monitoring regeneration through species dominance would be conducted annually. Desired tree species release practices would be implemented where overstocking of undesirable species occurs. All harvesting activities would be monitored and recorded by Wappapello Lake Project personnel.

Emerald Ash Borer (EAB) an invasive forest pest, was discovered in Wayne County, Missouri at the Greenville Recreation Area in 2008. Since discovery multiple sampling techniques have been implemented to collect data and delimit the spread of EAB. The EAB attacks all species of ash trees. Adults feed on the leaves, lay eggs on the branches, and the larvae use the tree as a host until emerging as a beetle. Due to the nature of ash mortality and in efforts to reduce the spread of EAB; ash trees that do not meet suitable bat habitat would be targeted for removal within the confines of the Wayne County quarantine.

Indiana Bat Habitat Enhancement would be an integral part of the Tentatively Selected Plan. Stemming from the cooperative agreement between the United States of America (represented by the Corps) and the MoDOT, the Corps has agreed to offset the impacts to Indiana bat habitat as a result of the expansion of the Highway 67 corridor in Wayne County by the end of December 2014 (Missouri Highways and Transportation Commission, signed 5 August 2010, and U.S. Army Corps of Engineers, signed 30 August 2010, see Appendix A). Enhancement through on-the-ground TSI action would satisfy MoDOT's responsibilities to the USFWS for the loss of Indiana bat habitat during construction (U.S Department of Transportation, Federal Highway Administration, and Missouri Department of Transportation 2005). The use of TSI would improve foraging and roosting habitat and is considered by the USFWS to be an acceptable

practice for improving Indiana bat habitat. In addition, the Corps has agreed to 1) assist MoDOT in the development of a report/review method to monitor progression of preparations toward the end goal of on-the-ground TSI through periodic contact with the Corps Wappapello Lake Project Office, (2) provide MoDOT with an annual report providing information including, but not limited to, total on-the-ground TSI acreage totals and methods, and (3) permit and allow MoDOT personnel access to conduct a site inspection of on-the-ground TSI prior to acceptance of the final report/review to close out the contract. At this time, specific areas for Indiana bat mitigation have not been selected and plans are to determine these areas once the timber has been thoroughly inventoried.

Further, Indiana bat habitat enhancement would be favored where possible through timber thinning and construction of linear corridors to create open canopy for travel and bugging areas for a diversity of bat species. Thinning activities would increase travel and allow sunlight to potential roost trees. All wolf trees, dead trees, split trees, trees that have cavities and trees with exfoliating bark would be favored for retention. Snags would be created as dictated by habitat type conditions to protect/provide a specific habitat for Indiana bats. Areas that have known roosts would be delineated and avoided.

As part of the TSI work proposed, further coordination would take place with the USFS, Corps, MoDOT, and USFWS regarding the Cooperative Agreement between MoDOT and the Corps and development of a detailed Indian bat restoration and mitigation plan. It is anticipated that this plan would be similar to the USFS Brown's Hollow Project (#26388) (Appendix C).

Tornado Salvage Harvest – As part of the Tentatively Selected Plan, a tornado damage harvest would be conducted on roughly 300 acres of compartment 2 (Figure 5). Tornado damage to this compartment occurred in May of 2011 and the salvage cut would be performed along the entire path of the tornado, within the Corps boundary. Trees damaged or felled by wind events such as a tornado can be salvaged if removed promptly. Usually little more than a year to harvest downed hardwoods, such as oaks, maples and walnuts, and shortleaf pine is recommended before rot sets in and the value of the timber decreases or is lost. Timber harvest activities would be closely monitored to adhere with abovementioned best management practices and post harvest activities would mirror TSI actions currently being proposed.

Figure 5. Path of tornado for proposed timber salvage.

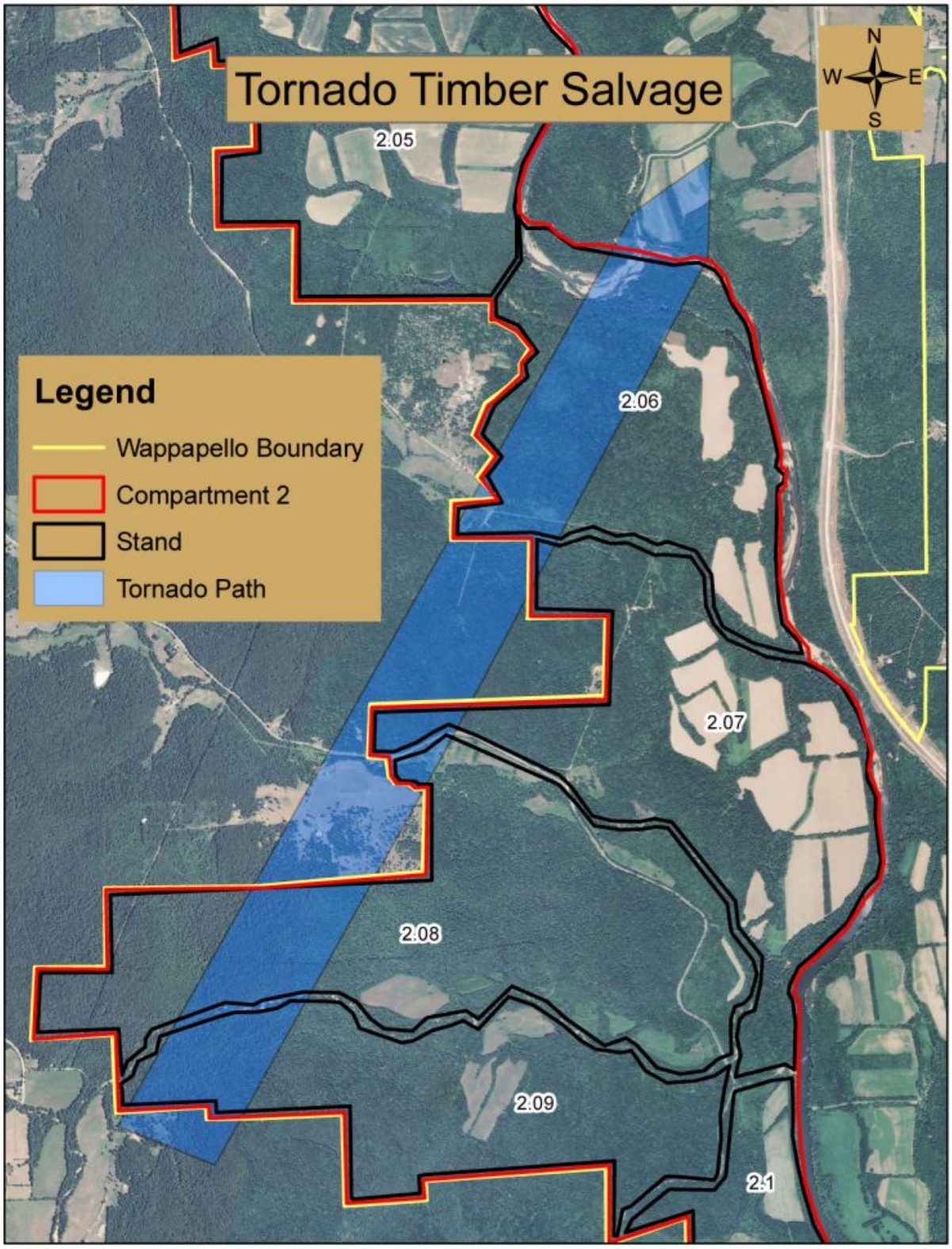


Table 1. Compartment treatment schedule by stand. *Forty-five stands within roughly 12,000 acres would be managed for TSI over the life of the proposed project.*

Compartment 2: Treatment Schedule

FY	Stand	Acres	Prescription
12	6,7,8,9	300	Tornado Salvage
13	9	485	Basal Area Reduction, Edge Effect
14	6	548	Basal Area Reduction, Edge Effect
15	3-11	641	Basal Area Reduction, Edge Effect
16	4,7,12	767	Basal Area Reduction, Edge Effect
17	1,5	1054	Basal Area Reduction, Edge Effect
18	2,10	674	Basal Area Reduction, Edge Effect
19	8	786	Basal Area Reduction, Edge Effect

Note: all basal area reduction would be evaluated for TSI practices after 10 years

Compartment 6: Treatment Schedule

FY	Stand	Acres	Prescription
12	16	273	Basal Area Reduction
13	4-13	168-80	Basal Area Reduction, Edge Effect
14	10-14	231-82	Basal Area Reduction, Edge Effect
15	15-17	203-129	Basal Area Reduction, Edge Effect
16	2-5-6	117-64-148	Basal Area Reduction, Edge Effect
17	12-3	130-166	Basal Area Reduction, Edge Effect
18	1-8-11	87-148-63	Basal Area Reduction, Edge Effect
19	7-9	208-159	Basal Area Reduction, Edge Effect

Note**:** all basal area reduction would be re-evaluated for TSI practices after 10 years

Compartment 8: Treatment Schedule

FY	Stand	Acres	Prescription
12	8-1	242-93	Basal Area Reduction, Edge Effect
13	14	183	Basal Area Reduction, Edge Effect
4	7-9	210-244	Basal Area Reduction
15	12-16	166-150	Basal Area Reduction, Edge Effect
16	4-11	194-273	Basal Area Reduction, Edge Effect
17	3-10	243-254	Basal Area Reduction, Edge Effect
18	5-6-15	201-174-153	Basal Area Reduction, Edge Effect
19	13-2	269-344	Basal Area Reduction, Edge Effect

Note**:** all basal area reduction would be re-evaluated for TSI practices after 10 year

2.2.1 General Management Techniques – (from USACE 2000). The following management techniques are proposed for the project area:

(1) All forests would be managed on an uneven-aged multiple-use, sustained yield and ecosystem management system. Treatments would be based on specific requirements for improvement of forest and wildlife habitats. Timber harvests shall be performed when necessary to promote accepted wildlife and forest management goals and objectives. Forest stands would not be harvested solely for revenue generation.

(2) Single Tree Selection is the selective removal of low quality, cull, diseased, over-mature or undesirable trees from a stand to achieve target stocking and wildlife habitat objectives. This technique is a tool used in uneven-aged management to encourage wider distribution of tree diameters, dominant species, age class and enhancement of forest reproduction. Because single tree selection promotes denser stands, frequent re-assessments or inventories are required. These re-assessments allow managers the ability to closely monitor compartments, therefore maintaining healthy forest and wildlife habitats.

(3) Group selection is a silvicultural technique requiring removal of large groups of trees to enhance regeneration and provide openings for wildlife. Generally, group selections range in size from one-fourth acre to five acres. Group selections on Wappapello Lake would not exceed three acres unless adequate justification is provided.

(4) Stand composition would be based on site-species relationships. Most of the forestland on Wappapello Lake contains an oak component; therefore, these species would be targeted for propagation. Efforts would be made to prevent monocultures, or single species stands. Exceptions would be made for small plantings of pine stands that do provide a specific habitat type for certain wildlife species. Stands suitable as pine-hardwood would be encouraged because historically, this type was once common on project lands.

(5) Prescribed burning would be used as a tool to help re-establish natural vegetative communities, including open oak or pine and pine-oak woodlands and accomplish and maintain wildlife habitat. Prescribed fire would also be utilized for vegetation modification and control where these benefits would promote diversity for wildlife habitats. Examples include old fields, pine stands, glades, and oak savannas. Burn frequency would be dependent on the requirements of the wildlife species, successional stage and fuel loads.

(6) Harvesting of forest products would be performed as a method of improving forest habitats. All harvesting activities would be performed in a manner that minimizes damage to residual trees, reproduction, and soils. This may require restrictions on equipment and the time of year harvesting would be scheduled. Existing roads and trails would be utilized when possible or temporary accesses would be used for the harvesting activities. After harvest, all roads would be planted in wildlife cover crops such as wheat, oats or rye grass. Waterbars would be placed at intervals necessary to prevent erosion.

Stream courses would be delineated and protected. Harvesting would be limited to single tree selection in stream management zones. All trees selected for removal would be marked with tree marking paint.

(7) Den trees, or trees that have potential as den trees, would be retained in all stands. Where practical, a standard rule would be to retain or develop 6 to 8 den trees per acre. Dead trees and snags, when not posing a threat to persons or property, would be left.

(8) When wildfire, disease, insects, floods or storms damage extensive numbers or acres of trees, every attempt would be made to remove these trees by salvage sale. Salvage operations would be performed as soon as practicable after the event to prevent deterioration of wood quality.

2.2.2 Treatments

Specific treatments for each stand within a compartment would be addressed in a prescription. It is essential to note that treatment and its extent would depend on each particular zone and its intended use. Other governing factors include: accessibility, influence zones, economics, weather, development timetable, etc. However, the following priorities generally apply:

(1) Establishment of suitable forest cover on recreation areas. There is a need for vegetative cover to serve as shade, screening, buffers, erosion control, and wildlife cover. Stands would be thinned as needed to maintain vigor and encourage the propagation of suitable wildlife species.
(2) Select open areas for reforestation and plant with desirable species.
(3) Protect steep banks from erosion.
(4) Develop and maintain a high population of desirable wildlife.
(5) Protect heavy-use areas from degradation.
(6) Re-establish suitable vegetative cover on areas denuded by overuse and high water.

All treatment of vegetative cover on public land must be guided by the objectives established for recreation and habitat maintenance. Revenue is also generated through specific timber management practices. An understanding of the requirements of a plant community and the limitations set upon it by the soil, water, insects, disease, and people are essential to any successful change or manipulation. All treatments are to be naturally feasible and not forced through continued maintenance.

Table 2. Summary of effects by alternative.

Resource	No Action	Tentatively Selected Plan
Threatened and Endangered Species	Unsuitable bat habitat. Would not fulfill obligation to USFWS for Indian bat mitigation	Improved Indiana bat habitats. Fulfills obligation to USFWS by year 2014.
Vegetation	Persistent even-aged stand. Undesirable species composition and non	Diverse multi-age forest with improved nesting and filtering capabilities.

	vegetated forest floor.	
Water Resources	Continued run-off/sedimentation	Filtering, stabilization and roughness characteristics
Wildlife	Low habitat diversity in even-aged stand.	Increased forest diversity would lead to wildlife benefits
Invasive Species Management	Spread of invasive forest pest.	Control invasive spread and removal of host trees
Recreation	Safety concerns, increased presence of dead snags.	Improve habitat for quality outdoor experiences
Soils	Unstable soils creating erosion	Root mass through regeneration stabilization
Noise and Air Quality	No impacts	Temporary impacts during tree removal and prescribed burns
Socioeconomic	Impacts due to loss of important resource	Stimulation through managed use of renewable resources

Alternatives Dropped From Further Consideration
Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public scoping and agency coordination did not result in suggestions or formation of new alternative methods for achieving the purpose and need for the proposal. Therefore, only the No Action and Tentatively Selected Plan are considered further.

3 Affected Environment and Environmental Consequences

This chapter summarized the biological, physical, and social environments of the affected project area relative to the alternatives under consideration. Relevant resources are addressed in terms of their present condition, their projected condition under the No Action alternative and the expected affects of the Tentatively Selected Plan.

3.1 General

The Forest of Wappapello Lake reflects a common history of the entire Ozark Region. Forest land of the southeast Missouri hills prior to the 1930s was subjected to repeated fires and indiscriminate logging. Also, laws of Wayne County provided open range until 1965. During the late 1930s and early 1940s, acquisition of property for Wappapello Lake curtailed logging on project property. The forest has now recovered; although fire scars are still apparent in many timber stands. The majority of the lands, which were not used for farming, were heavily forested with yellow pine, oak, walnut, poplar, hickory, ash, and cherry. While cutting became restricted in the foothills, the hardwoods to the south and east fell to agricultural clearing, channelization, and draining. This resulted in vastly reduced acreage of bottomland hardwoods. A tremendous

amount of shortleaf pine was cut during the harvests of the 1930s removing most of that species from the area. As a result most of the project timber is of the oak-hickory type. By controlling fire and curtailing cutting, forested areas have evolved into mature stands of equal age timber.

Many benefits are obtainable from the forest at Wappapello Lake. Among these products are high quality forested watersheds, erosion control, wildlife recreational opportunities, aesthetic beauty, and timber stands. The production of timber is not the ultimate objective at Wappapello Lake; however, in meeting the forest management objectives, timber has been harvested. Sustained yield of all of the products that the forest at Wappapello Lake produces (multiple-use management) is desirable, and management philosophy, guidelines, and technique are geared to achieve this goal when practicable.

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

3.2 Threatened and Endangered Species

This EA considers any possible effects of TSI activities on federal and state threatened and endangered species.

FEDERAL:

3.2.1 Existing

In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, the St. Louis District Planning, Programs, and Project Management Division, Environmental Branch requested the U. S. Fish and Wildlife Service provide a list of federally threatened or endangered species that may occur in the vicinity of the proposed project. In electronic messages dated 14 June and 22 August, 2011, the USFWS (Columbia, Missouri) provided input regarding two federally endangered bat species and their general habitat preferences (Table 3) that the project may affect, but would not likely adversely affect. The USFWS noted “because this is not a water resource project and because a biological opinion (BO) was written to address the original Route 67 Corridor Improvement project and subsequent improvements to Indian bat habitat, no Coordination Act Report is necessary” (Appendix A). All applicable efforts would be taken to minimize potential impacts to these species and their habitats.

Table 3. Endangered bat species known from the Wappapello Lake project area.

Species	Status	General Habitat
Indiana bat *Myotis sodalis*	Endangered	Roost in trees with loose bark; Hibernacula in caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests
Gray bat *Myotis grisescens*	Endangered	Roost and maternity colonies in caves year round; feed over rivers or reservoirs; need a corridor of forest riparian cover between roosting caves and foraging areas

Indiana bat (*Myotis sodalis*)

Indiana bats roost in living, injured (e.g., split trunks and broken limbs from lightning strikes or wind), dead or dying trees. Maintaining quality maternity colony roost trees (those trees used by female Indiana bats and their young) is essential to reproductive success and long term recovery goals for this endangered species. Indiana bat roost trees tend to be greater than 9 inches diameter at breast height (DBH) (optimally greater than 20 inches DBH) with loose or exfoliating bark. Most important are structural characteristics that provide adequate space for bats to roost. Preferred roost sites are located in forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost tree, which is usually within 0.6 miles of water. Indiana bats forage for flying insects (particularly moths) in and around the tree canopy of floodplain, riparian, and upland forests.

Indiana bats are known to use forested and riparian areas for foraging and roosting. Summer habitat requirements for the species are not well defined but the following are considered important: 1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas; 2) live trees (such as shagbark hickory and oaks) that have exfoliating bark; 3) stream corridors, riparian areas, and upland woodlots which provide foraging habitat.

Indiana bats have been documented in the Brown's Hollow area of Mark Twain National Forest, which is directly adjacent to compartment 2. Brown’s Hollow is within 3 miles of compartment 6. Nearly all of compartment 2 and the north ½ of compartment 6 are within known maternity habitat for Indiana bats. Compartment 8 is within 2.5 miles of known maternity habitat. It is likely that Indiana bats also occur in the project area. Measures to avoid direct take of the species should be taken. Such measures include determination of bat presence and use in the project area through surveys, location of primary and alternative roosts through capture and radio-telemetry of bats, and timing the on-the-ground work to occur during a time when bats are inactive.

Because Indiana bats tend to prefer canopy and mid- and under-stories that are relatively open, forest management practices, such as thinning, are being incorporated into habitat restoration plans for Indiana bats. These more typical forestry practices can be combined with habitat manipulations that are specific to Indiana bats and beneficial to other forest wildlife, such as selection of preferred roost tree species, retention/creation of snags, creation of foraging corridors, and goals for basal area that are more conducive to foraging and increase sun exposure

to potential roost trees. The proposed forest management plan for compartments 2, 6 and 8 could easily be tailored to include some of these Indiana bat specific measures.

Gray Bat (*Myotis grisescens*)

The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States, including Missouri. With rare exception, the gray bat roosts in caves year-round. In winter, most gray bats hibernate in vertical (pit) caves with cool, stable temperatures below 10 degrees Celsius. Summer caves, especially those used by maternity colonies, are nearly always located within a kilometer (0.6 mile) of rivers or reservoirs over which bats feed. The summer caves are warm with dome ceilings that trap body heat. Most gray bats migrate seasonally between hibernating and maternity caves, and both types of caves are located in Missouri. Gray bats are active at night, foraging for insects over water or along shorelines, and they need a corridor of forest riparian cover between roosting caves and foraging areas. They can travel as much as 20 kilometers (12 miles) from their roost caves to forage.

The gray bat also has been documented in the Brown's Hollow area of Mark Twain National Forest adjacent to compartment 2, within 3 miles of compartment 6, and within 7.5 miles of compartment 8. The documented individual was a pregnant female indicating that maternity habitat is likely in close proximity to the project area. Whereas, gray bats roost in caves year-round, disturbance to above ground roosts is not a concern as it is for Indiana bats. However, disturbance to cave roosts throughout the year should be avoided, especially disturbance to hibernacula in the winter when most forest management work occurs. At this time, no hibernacula or maternity caves have been documented in the project area. If bats are observed entering or exiting a cave, please contact our office for further guidance.

3.2.2 Alternative 1: No Action

Many parts of the areas would remain as unsuitable bat habitat. For the Indiana bat this alternative would not fulfill abovementioned mitigation obligations for Highway 67 construction. No additional foraging corridors would be created and canopies would remain closed diminishing restoration of suitable habitat.

3.2.3 Alternative 2: Tentatively Selected Plan

As mentioned above, TSI management actions would specifically target habitat improvements for the Indiana bat. Indiana bat habitat enhancement would be favored where possible through timber thinning and construction of linear corridors to create open canopy for travel and bugging areas for a diversity of bat species. Thinning activities would increase travel and allow sunlight to potential roost trees. All wolf trees, dead trees, split trees, trees that have cavities and trees with exfoliating bark would be favored for retention. Snags would be created as dictated by habitat type conditions to protect/provide a specific habitat for Indiana bats. Any TSI activities that would occur from mid-March through November 1st in potential Indiana bat habitats would first be coordinated with the USFWS to assure that no Indiana bats are present or would otherwise be adversely affected. Areas that have known roosts would be delineated and avoided.

These improvements would surely also benefit the gray bat. These TSI activities that incorporate appropriate avoidance measures, as described above, may affect, but are not likely to adversely affect the Indiana bat or the gray bat.

STATE of MISSOURI

The MDC responded to early project scoping by the Corps in a letter dated 26 September 2011 (Appendix A). In summary, regarding the Indiana bat, MDC felt that the strategy described is well planned. The MDC also felt that because Indiana bats are specifically targeted by the proposed action that it is important to include a specific goal to promote long-term recruitment and retention of large snags on a landscape scale – retaining some mature or over-mature trees that will become snags is one strategy to help achieve that goal.

A list of state Species of Conservation Concern is included with the MDC response letter. Several of the species listed are found in the nearby streams or located along river bluffs. Specifically, the MDC identifies the state Endangered Swainson's warbler which is known from the project area. Attached to their letter are suggested best management practices for the Swainson's warbler which would help minimize potential impacts to the species.

Further, the MDC supports the plan's need to address disease and insects that are affecting Missouri's forests through several control measures, including timber harvest. The MDC felt that this would be an important consideration in Missouri if healthy forests are to be maintained.

3.3 Vegetation

FOREST:

3.3.1 Existing

A forest inventory was conducted in Compartment 6 in July 1999. The total forested acreage in this compartment constituted 63% of the total acreage of the compartment. Bottomland hardwood stands comprise 331.4 acres or 12% of the total forested acreage, while upland stands comprise 2435 acres or 88% of the total forested acreage in this compartment.

The upland sites are predominately a mixed oak-hickory forest cover type. Typical dominant species found in the overstory are white oak, black oak, northern red oak, southern red oak, scarlet oak, post oak, and hickory species. Other species occurring in the overstory are white ash, shortleaf pine, black walnut, black cherry and sugar maple. The understory is comprised of sugar maple, elm, dogwood, beech, and persimmon.

Generally, the forests on upland sites are in fair condition. The stands vary in rotational maturity and range from fully to non-stocked with sawtimber size trees. The total volume for the upland stands is 7,354,499 board feet (Doyle), which averages to 3,020 board feet (Doyle) per acre. The forest canopy varies as well with some promoting the proliferation of shade tolerant species in the understory and limiting the success of oak/hickory regeneration, while others are open canopies with dense understories that harbor a variety of species.

Much of this compartment consists of shrub/scrub habitat. The majority of this habitat is lowland and was not inventoried because it is not forested. The existing bottomland stands are predominately bottomland soft hardwood forest cover types. Typical dominant species found in the overstory are sycamore, river birch, sweet gum and red maple. Other species occurring in the

overstory are hackberry, black walnut, silver maple and locust. The understory is comprised of red maple, locust, silver maple, persimmon, elm and river birch.

The bottomland stands are in poor condition. Most stands are riparian zones situated along Otter Creek and Mink Creek and immediately adjacent to Wappapello Lake, and are subject to periodic to frequent inundation. The total volume for the bottomland stands is 852,323 board feet (Doyle), which averages to 2,572 board feet (Doyle) per acre. These stands lack mast-producing trees, such as pin oak and nuttall oak, but still serve as riparian zones. Silviculture practices should be minimal in these stands. Bottomland reforestation efforts would be implemented in areas, such as open fields, adjacent to the stands in order to widen the riparian corridors. Emphasis would be placed on mast producing tree species. A comprehensive forest management plan for Compartment 6 would be developed to maintain a healthy, vigorous forest ecosystem and provide a diverse wildlife habitat.

A forest inventory was conducted in compartment 8 in June 1999. The total forested acreage in this compartment constituted 72% of the total acreage of the compartment. Bottomland hardwood stands comprise 563.9 acres or 20% of the total forested acreage, while upland stands comprise 2250.8 acres or 80% of the total forested acreage in this compartment.

The upland sites are predominately a mixed oak-hickory forest cover type. Typical dominant species found in the overstory are white oak, black oak, northern red oak, southern red oak, scarlet oak, post oak, and hickory species. Other species occurring in the overstory are white ash, shortleaf pine, black walnut, black cherry and sugar maple. The understory is comprised of sugar maple, elm, dogwood, beech, and persimmon.

Generally, the forests on upland sites are in fair condition. The stands vary in rotational maturity and range from fully to non-stocked with sawtimber size trees. The total volume for the upland stands is 9,883,565 board feet (Doyle), which averages to 4,391 board feet (Doyle) per acre. The forest canopy varies as well with some promoting the proliferation of shade tolerant species in the understory and limiting the success of oak/hickory regeneration, while others are open canopies with dense understories that harbor a variety of species.

The bottomland stands are predominately bottomland soft hardwood forest cover types. Typical dominant species found in the overstory are sycamore, river birch, sweet gum and red maple. Other species occurring in the overstory are hackberry, black walnut, silver maple and locust. The understory is comprised of red maple, locust, silver maple, red maple, persimmon, elm and river birch.

The bottomland stands are in fair condition. Most stands are riparian zones situated along the compartment creeks and those immediately adjacent to Wappapello Lake, and are subject to periodic inundation. The total volume for the bottomland stands is 2,159,049 board feet (Doyle), which averages to 3,828 board feet (Doyle) per acre. These stands lack mast-producing trees, such as pin oak and nuttall oak, but still serve as riparian zones. Silviculture practices should be minimal in these stands. Bottomland reforestation efforts would be implemented in areas, such as open fields, adjacent to the stands in order to widen the riparian corridors. Emphasis would be placed on mast producing tree species. A comprehensive forest management plan for

Compartment 8 would be developed to maintain a healthy, vigorous forest ecosystem and provide a diverse wildlife habitat.

A forest inventory was conducted in compartment 2 from 1996-2000. The total forested acreage in this compartment constituted 62% of the total acreage of the compartment. Bottomland hardwood stands comprise 592 acres or 21% of the total forested acreage, while upland stands comprise 75% of the total forested acreage in this compartment.

The upland sites are predominately a mixed oak-hickory forest cover type. Typical dominant species found in the overstory are white oak, black oak, northern red oak, southern red oak, scarlet oak, post oak, and hickory species. Other species occurring in the overstory are white ash, shortleaf pine, black walnut, black cherry and sugar maple. The understory is comprised of sugar maple, elm, dogwood, beech, and persimmon.

Generally, the forests on upland sites are in fair condition. The stands vary in rotational maturity and range from fully to non-stocked with sawtimber size trees. The total volume for the upland stands is 772,616 board feet (Doyle), which averages to 2,100 board feet (Doyle) per acre. The forest canopy varies as well with some promoting the proliferation of shade tolerant species in the understory and limiting the success of oak/hickory regeneration, while others are open canopies with dense understories that harbor a variety of species.

The bottomland stands are predominately bottomland soft hardwood forest cover types. Typical dominant species found in the overstory are sycamore, river birch, sweet gum and red maple. Other species occurring in the overstory are hackberry, black walnut, silver maple and locust. The understory is comprised of red maple, locust, silver maple, red maple, persimmon, elm and river birch.

Currently, large numbers of northern red, southern red, black and scarlet oaks are dying in central and northern Arkansas on the Ozark and Ouachita National Forests, and in southern Missouri on the Mark Twain National Forest (Dwyer et al. 2006). Site inventories to the project areas found evidence of a large percentage of older dead and dying trees. A severe drought in (2007, 2010) resulted in large areas of oak die-off in the in the project area. Other factors affecting timber resources are, flooding (spring of 2002, 2008, fall 2009, and 2011), ice (January 2009) and wind storm/tornadic events (May 2009/2011) have resulted in a number of trees being blown down in the project area.

Numerous stands of black and scarlet oak within the project area have reached maturity; many are dead or dying. Most black and scarlet oak stands in the project area are now between 70-100 years of age. Life expectancy of these species is generally 60-80 years for this area of Missouri, with few trees over 100 years of age. The Forest Plan directs that timber management, where appropriate, be used to sustain healthy and productive forests. Timber management activities in the form of commercial timber harvest would be utilized to address oak decline.

3.3.2 Alternative 1: No Action

Under the No Action alternative, no TSI activities would take place in the project compartments; thus, there would be no adverse impacts associated with new management activities. However,

consequences of no action include, among others, 1) persistence of undesirable even-aged stands; 2) increased potential and vulnerability for insect and disease infestation in adjacent woodland; 3) continued undesirable tree species regeneration; 4) increased numbers of diseased and dying timber; 5) loss of economic value of salvageable wood products, and 6) continued negative local public perceptions about Corps land management practices

3.3.3 Alternative 2: Tentatively Selected Plan

The principal objective in conducting TSI activities is to move treated stands toward the desired condition and maintain in a healthy, vigorous condition to meet resource management objectives. Timber harvests shall be performed when necessary to promote accepted wildlife and forest management goals and objectives. As mentioned, harvesting of forest products would be performed as a method of improving forest habitats. All harvesting activities would be performed in a manner that minimizes damage to residual trees, reproduction, and soils. This may require restrictions on equipment and the time of year harvesting would be scheduled. Because TSI is targeted to change forest dynamics, frequent re-assessments or inventories are required. These re-assessments allow managers the ability to closely monitor compartments, therefore maintaining healthy forest and wildlife habitats. Potential negative impacts to the forest from TSI activities are anticipated to be short-term and negligible.

With the proposed activities, wood fiber would be utilized, forest health/pathogen outbreak potential would be of minimal concern, and hazardous fuels would be diminished. The proposed post harvest activities would create young and vigorous stands capable of long term sustainability. Over time, the proposed activities would also contribute to a mosaic of varied age stands across the landscape.

In addition, the tentatively selected plan implements management practices that increases watershed protection and flood damage reduction with multi-aged forest and ground cover through regeneration. As communities within the headwaters of Wappapello Lake expand in industry and housing, once rolling hills and wooded areas are cleared, flattened and replaced with hard surfaces that have no filtering, retention or roughness characteristics that slow the speed at which water enters the St. Francis River and tributaries. This expansion and accelerated water movement makes a healthy sustainable forest crucial to watershed management. Regeneration and multi-aged forest increase stocking rates and roughness that diminishes soil erosion and slows the flow of water, minimizing flooding and allowing uptake and nutrient displacement. Though oak-hickory regeneration is targeted through TSI activities; byproducts of exposing the forest floor to sunlight is growth of forbes and other herbaceous species. This habitat is particularly important for browsing, nesting and escape cover for variety of wildlife species.

3.4 Invasive/Undesirable Species Management

3.4.1 Existing

INSECT:

Epidemic outbreaks of insects and damaging diseases are not common to the Ozark timberlands and recommended management practices to keep the forests in a healthy condition for use and enjoyment by the public as well as for wildlife management are part of the management

strategies. However, oak stands are vulnerable to insect and disease attacks. Dying and damaged trees, for example, are susceptible for infestation by red oak borers. The red oak borer is a forest insect pest species that permanently damages the wood of living oak trees, such as black and scarlet oaks. The loss in grade can amount to 40 percent of the current tree value for factory grade lumber in terms of reduced quality caused by larval tunnels (Hay 1972).

Most oaks in eastern North America are attacked by the borer. The common hosts are northern red oak, black oak, and Scarlet oak. Wood-inhabiting insects such as carpenter worms, timber worms, and carpenter ants use red oak borer tunnels to gain entry into oak trees. These and other pests extend and increase the damage begun by the red oak borer. Decay organisms also gain entry into oak heartwood through borer tunnels.

Woodpeckers are the most important recognized natural control agents of the red oak borer. Predation by formicid ants also provides some degree of natural control. However, the effectiveness of these natural predators is limited at best (Hay 1972). Research has shown that control of the red oak borer is best achieved by removing infested trees from timber stands by salvage harvest. Population reductions of 95 percent of red oak borer were achieved over a 5-year period using this approach. Salvage harvest treatments reduce the chances of subsequent borer attack in residual trees (Donley 1974).

Emerald Ash borer (EAB) is a small, metallic-green beetle native to Asia. As an adult it eats the leaves of ash trees and causes little damage to the trees, however, the EAB larvae burrow into the ash trees to feed on the inner bark (phloem), leaving meandering tunnels that disrupt the transport of water and nutrients and usually causes mortality of the tree within 3-4 years. EAB was discovered in Wayne County, Missouri in august 2008 at the Greenville Campground and Recreation Area becoming the furthest south and west known infestation. By 2010 the infestation had spread approximately 3 miles northeast and 2 miles southwest from the believed epicenter. Green ash is a common tree species to the Wappapello Lake area and the Corps is seeking to understand the current distribution and potential management strategies for ash to limit the impacts and spread of EAB. Currently quarantines have been placed on movement of wood products within and out of Wayne County. All timber management activities would be in accordance with state and federal quarantines.

NON-NATIVE INVASIVE PLANTS

The spread of non-native invasive plant (NNIP) species directly threatens the health of native ecosystems. These plants have characteristics that permit them to rapidly invade and dominate in new areas, often out-competing native plants for light, moisture, and nutrients. Some NNIP in the project area include isolated areas with tree of heaven, mimosa and one area with minimal kudzu. Sericea lespedeza is found all over the project on road sides and in old fields as is autumn olive.

3.4.2 Alternative 1: No Action

Past projects to control invasive insects and plants on the Forest have been authorized as small portions of larger vegetation management projects. Those limited actions have not been able to keep pace with the extent in which several invasive species spread and encroach into new areas.

3.4.3 Alternative 2: Tentatively Selected Plan

One of the purposes of this project is to protect and restore naturally-functioning native ecosystems on the Forest by controlling current and future threats of insect and NNIP infestations to the project area as well as the entire project managed by the Corps of Engineers. Control means, as appropriate include, eradicating, suppressing, reducing, or managing insect and NNIP populations, preventing spread of insect and NNIP from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions (Executive Order 13112 invasive species).

Infested areas in any of these locations would be selectively treated with an approved herbicide to control non-native competing plant species, such as fescue, sericea lespedeza, multiflora rose, and purple crown vetch. Herbicide application would be at or below the manufacturer's recommended application rate. Following herbicide treatment, these areas may be scarified, re-seeded and fertilized.

Contract provision would be used as a guide for timber sale purchasers to prevent the possible introduction and spread of invasive species during timber sale activities. This provision is part of a larger forest-wide program to identify areas of invasive species on sale area maps and require cleaning of equipment if it is being moved from a known area of infestation, or if the prior location of equipment cannot be identified, it would be assumed to be infested with seeds of invasive species of concern.

3.5 Water Resources

Surface water resources are located throughout the project area, with perennial rivers/streams and a number of intermittent streams feeding the St. Francis River. Wappapello Lake is a U.S. Army Corps of Engineers reservoir on the St. Francis River in Southeast Missouri. The lake was authorized primarily for flood control purposes by the 1936 Flood Control Act and has accompanying recreation and natural resources management purposes. The lake is confined by the steeply sloped Ozark Hills. At conservation pool 354.74 National Geodetic Vertical Datum (NGVD) the lake covers approximately 5,200 acres and is the lowest the lake is generally held to increase storage area from mid December to May. The rest of the year the lake is held at recreation pool 359.74 NGVD and encompasses approximately 8,000 acres.

Various small tributaries ranging from wet weather drains, intermittent or loosing streams and perennial streams meander through compartments 2, 6 and 8, ultimately draining into Wappapello Lake. Compartment 2 has a diverse classification of streams to include several unnamed tributaries and three named perennial streams Clark Creek, Big Lake Creek and Little Lake Creek within the compartment boundary. Compartment 6 has the same diversity with no named streams within its boundaries. Compartment 8 has the same diverse stream components and contains one of the largest tributaries to Wappapello Lake. This large tributary, Otter Creek is a perennial stream that dissects the compartment. Mink Creek is the only other named tributary within the compartment.

Wetlands within the project area are tentatively small in nature and are found throughout as scrub shrub communities in many of the floodplain swales and abandoned river channels. These wetland communities are usually found within the 1-2 year flood frequency zone and house

water tolerant tree species such as willow and maple in lower elevations and elm, ash, sweet gum, sycamore and cottonwood in higher elevations (Heitmeyer 2010).

EROSION:

3.5.1 Existing

Streambanks of tributaries to the Upper St. Francis River currently do not have excessive erosion, although protection of the streambanks is variable by stream (Boone 2010). Streams throughout the project area have adequate riparian corridors that were established when the property was purchased for flood control. Streams outside Corps administered lands have differing levels of protection; many areas are forested while others have been channelized and manipulated or have unlimited access from livestock. These areas are experiencing accelerated erosion and head cutting, which loosens the streambed, sending a cutting affect in an upstream manner while increasing sediment load downstream.

Currently forest floors are non-vegetated and have limited erosion diminishing characteristics. Steep slopes and wet weather drains are showing signs of increased erosion due to heavy rains flowing across open forest floors. Limited early succession vegetation allows accelerated runoff and increases the speed at which water enters tributaries. Recent flooding and wind storms have caused blow-down in mature timber loosening the forest floor and contributing to erosion.

3.5.2 Alternative 1: No Action

Forest floors would remain open without filtering and stabilizing function. This would increase overall erosion, adding sediment to tributaries and streams. Continued sedimentation added to streambeds would adversely impact most aquatic resources including fish, invertebrates, and plants, especially in terms of certain life history requirements.

3.5.3 Alternative 2: Tentatively Selected Plan

Mature tree removal would allow sunlight to the forest floor allowing regeneration of oak/hickory forest along with many other types of vegetation which would increasing “total stems per acre” or vegetative density. Increased stems equal increased ground stabilization and roughness, slowing water movement thus slowing erosion. To prevent erosion caused by harvest activities waterbars would be placed at intervals necessary to prevent erosion. Stream courses would be delineated and protected and forestry BMP’s would be in place prior to any timber harvesting to protect the chemical, physical and biological characteristics of streams in the project area – especially pre- and post-construction of access roads. Native vegetation would be re-established as soon as possible on any stream banks and riparian corridors denuded of vegetation. Harvesting would be limited to single tree selection in stream management zones.

As mentioned previously (section 3.3.3), the Tentatively Selected Plan implements management practices that increases watershed protection and flood damage reduction with multi-aged forest and ground cover through regeneration. As communities within the headwaters of Wappapello Lake expand in industry and housing, once rolling hills and wooded areas are cleared, flattened and replaced with hard surfaces that have no filtering, retention or roughness characteristics that slow the speed at which water enters the St. Francis River and tributaries. This expansion and accelerated water movement makes a healthy sustainable forest crucial to watershed

management. Regeneration and multi-aged forest increase stocking rates and roughness that diminishes soil erosion and slows the flow of water, minimizing flooding and allowing uptake and nutrient displacement.

QUALITY:

3.5.4 Existing

A water quality monitoring program is conducted (when funding is available) three times during the months of March through November. Samples are collected at three lake sites - one upstream site, one lake site, and one downstream site in the outlet channel in accordance with Engineering Regulation 1110-2-8154 Water Quality & Environmental management for Corps Civil Works Projects, and Engineer Technical Letter 1110-2-362 Environmental Engineering Initiatives for Water Management. This would include updating the water quality management priorities for the district's projects to ensure water quality meets the state and federal regulations for protection of human health and the environment, and for the safety and economic welfare of those at Corps projects. Ongoing goals include ensuring that downstream water quality meets all state and federal regulations, is suitable for aquatic and human life, and continue to evaluate trend analysis in relation to baseline conditions at all projects.

The State of Missouri has established criteria for contaminant levels in the state's water resources. These parameters include heavy metals, pesticides, herbicides, organics and other contaminants. The water quality sampling done reflects the minimal of parameters needed to indicate if the water is able to sustain adequate plant and animal growth and to ensure safety for human recreation.

The following parameters are analyzed: alkalinity, total organic carbon (TOC), iron, manganese, ammonia-nitrogen, nitrate-nitrogen, ortho-phosphate, total phosphate, silica, total suspended solids (TSS), total volatile suspended solids (TVSS), fecal coliform and fecal strepococcus bacteria, pH, dissolved oxygen, specific conductance, oxidation-reduction potential (ORP), chloride, chlorophyll, pheophytin-a, atrazine and alachlor.

In addition to water samples, sediment samples are taken once a year. This data provides supplemental information as to the relative amounts of contaminants transported by sediments versus contaminants dissolved in the water column. Trend analysis of this data is performed every five years. The parameters analyzed include: fourteen priority pollutant metals, total phosphate (TPO_4), Kjeldahl nitrogen, nitrate -N(NO_3), total solids, total organic carbon (TOC), chlorinated pesticides and PCBs. Annual water quality reports are written and submitted to each Corps lake project.

3.5.5 Alternative 1: No Action

Water quality would likely remain the same with potential increases in sediment due to lack of filtering capabilities expressed in mature timber stands.

3.5.6 Alternative 2: Tentatively Selected Plan

Temporary increases in sediment inputs during harvest may occur if periods of precipitation begin during logging operations. In preparation for such wet weather events the following

BMP's would be implemented: directional skidding, using existing road systems to reduce erosion, creation of water bars, and seeding off all haul roads and landings. Skidder trails and stream management zones would be delineated prior to logging activities to buffer harvest from drainages, streams, and wetlands. Harvesting would be limited to dry weather only and no digging, excavation, or other subsurface soil alteration is required or permitted.

Once TSI activities have been implemented, immediate results are expected with creation of light to ground contact. This manipulation would result in an explosion of plant growth that creates almost instant filtering dynamics.

Karst Topography – Springs, Sinkholes and Caves: There are several springs, caves and sinkholes in or near the proposed area. Resource managers would be vigilant that TSI activities near these resources do not adversely impact water quality, as Karst features can provide a more direct access to sensitive species and groundwater. Should the construction impact these areas, extra precautions would be necessary to protect these sensitive resources.

3.6 Wildlife

HABITAT:

3.6.1 Existing

As described above, there is an overall lack of timber age class diversity within the project area. Various species of wildlife need different age classed timber to support sustainability of populations. Where conditions are favorable TSI activities would transition mature forests to more uneven aged forest that offer a diverse ecosystem that is conducive to a wide variety of wildlife species and increases overall forest health for sustainability.

Where possible, TSI activities would be implemented to produce edge effect that is lacking in present landscape. Edge habitat is an important component to many ground nesting birds as well as small mammals. Where quality edge habitat exists on project lands, there are increases in wildlife sightings. Plant and animal communities established in mature timber or rare occurrences of unique habitat would be delineated during stand inventories and avoided. In order to provide a mature forest component for aesthetics and specific habitat, compartment 5 (Johnson Tract) located at the northern most boundary of compartment 6 would be managed as an old growth forest without TSI treatments.

Fauna typical of deciduous woodlands and its edge habitat exist at Wappapello Lake. Originally white-tailed deer, elk, black bear, mountain lion, bobcat, and gray wolf comprised the big game of the area. Wild turkeys were common. Because of unregulated hunting much of the big game was scarce by the mid-1800s in many parts of the Ozarks. Regulated hunting, conservation and habitat management has brought a revival of many species on Wappapello Lake project lands. Otters and beavers are found along the St. Francis River and lake as well as game species typical of edge habitats, such as eastern cottontails, bobwhite quail, and squirrels. Deer and wild turkeys are abundant in numbers. Migratory waterfowl use the lake for resting and feeding and are relatively abundant during the fall and winter months.

3.6.2 Alternative 1: No Action

Timber resources and habitat diversity is expected to decline as shade tolerant trees would replace mast producing trees. Browsing, nesting and escape cover habitats would not be restored and erosion would continue to increase. It is anticipated that wildlife species diversity would remain low, or below its biotic potential.

3.6.3 Alternative 2: Tentatively Selected Plan

Timber stand improvement would be performed when and where necessary to promote accepted wildlife and forest management goals and objectives. For example, utilizing commercial logging to achieve healthy forests and a range of vegetative age classes meets certain wildlife habitat objectives for the forest. A good way to produce more grassland wildlife habitat in forestland is to create temporary forest openings. Though oak-hickory regeneration is targeted through TSI activities; byproducts of exposing the forest floor to sunlight is essential for growth of forbes and other herbaceous species. This habitat is particularly important for browsing, nesting and escape cover for variety of wildlife species (e.g, deer, quail, turkey).

In general, the management of lands would be oriented toward the improvement of the habitat. The forest is managed to supply the habitat diversity required by forest and edge wildlife species. This involves a full range of silvicultural practices from planting to thinning and final harvest. The key to successful forest and wildlife management is to keep a healthy, vigorous, balanced forest. The balanced forest contains approximately fifteen percent to twenty percent regeneration. While normal forest management tends toward the balanced forest, special considerations may prevent the forest from reaching a totally balanced condition. Habitat requirements control the size, shape, and location of timber harvests. These requirements are important in providing adequate browse and nesting areas.

3.7 Fuels Management (Prescribed Fire)

3.7.1 Existing

The objectives of prescribed fire activities are to restore the ecological role of fire, maintain and enhance natural community types, and reduce current heavy buildups of fuels. Altered fire regimes have resulted from increased fire suppression efforts and decreased use of fire since European settlement. Altered fire regimes pose great threats to biodiversity, ecosystem sustainability, and public and firefighter safety. When ecosystems become overstocked with trees and shrubs, heavy fuels buildup, and the chances of catastrophic wildfires increase dramatically. This condition indicates that fire frequency has declined. As fire frequency declines the amount of fuels available for a fire to consume increase. Without fire to reduce buildups of fuels, conditions develop that lead to increased fire size, intensity, and severity. These conditions contribute to potential for damage to timber and other natural resources from wildfire events.

Glades, savannas and old field habitats are often and most beneficially managed with prescribed fire. All prescribed fires are conducted within the guidelines of an approved burn plan. Assessment criteria for each plan is fuel type, size, escape potential, adjoining hazards, topography, potential impact of smoke to traffic and potential impact of smoke to residential/industrial/high use areas. Prescribed burns would be conducted in each compartment

mentioned as conditions warrant to protect against wildfires and to promote healthy/diverse ecosystems.

3.7.2 Alternative 1: No Action

Under this alternative, fuel-loading conditions would not be reduced nor would biomass be removed through silvicultural treatments. Wildfires that could occur under conditions of increased fuel loading can be expected to burn at a higher intensity and over a larger area than would have occurred if fires had burned at historical fire frequencies. The probability of stand replacement wildfires could be expected to increase in the absence of fuel reduction through silvicultural treatments in this alternative. Fire exclusion would result in accumulation of additional hazardous fuel loads in untreated areas. Areas once managed as old field, savanna and glades would become overgrown in woody vegetation thus loosing the unique habitat that they provide.

3.7.3 Alternative 2: Tentatively Selected Plan

Prescribed fire would be utilized for vegetation modification and control where these benefits would promote diversity for wildlife habitats. Examples include old fields, pine stands, glades, and oak savannas. Burn frequency would be dependent on the requirements of the wildlife species, successional stage and fuel loads. In stands where regeneration produces a high volume of pine, fire management may be implemented to promote this habitat specific species.

Besides enhancing natural communities, other connected actions would occur. Commercial thinning and understory removal would be used to address hazardous fuel conditions and reduce the wildland fire risk to nearby communities. When looked at on the community level, fire carries out several functions essential to the perpetuation of many ecosystems. For example, fire is known to (1) prepare seedbeds, (2) increase species richness and cover, (3) influence the mosaic of age classes and vegetation types, (4) control plant community composition, (5) regulate the amount and type of fuel accumulation, (6) recycle nutrients, (7) increase or decrease forest insects and disease problems, and (8) directly influence wildlife habitat (Kilgore 1973, Parmeter 1977, Heinselman 1978). The initial response after fire is for oak and pine regeneration to occur, ground cover species to increase in abundance, richness, and cover, and wildlife to increase as a result.

3.8 Recreation

3.8.1 Existing

The recreational developments at Wappapello Lake are varied. Major activities of the visiting public consist of sightseeing, fishing, boating, water skiing, camping, picnicking, swimming, hiking, and hunting. Park and recreation areas have been developed which provide both extended-use and day-use opportunities. Included in these recreation areas are campsites, picnic sites, boat launching ramps, beaches, interpretive facilities, and hiking and nature trails. In addition, lands have been allocated for wildlife management. These wildlife areas are available for non-consumptive as well as consumptive recreational use.

Recreation areas within compartments 2, 6, and 8 consist of outdoor/primitive recreational opportunities. Camping is allowed in specific locations throughout each compartment where

sites consist of flat surfaces and fire rings; utilities and other services are not available at camping areas. Lake access is provided through maintained boat ramps and is available throughout the compartments. Ramps are used to access the lake for fishing and recreational boating.

The Ozark Trail follows a scenic and varied route from the St. Louis metropolitan area southwestward through the Ozarks of southern Missouri to the Arkansas border where it joins the Ozark Highlands Trail. It also includes the eastern loop that traverses the scenic St. Francois Mountains region where 4. 6 miles of the Ozark Trail meanders through compartments 2 and 8, offering beautiful scenery to hikers, bicyclists and horseback riders.

Outlying areas within all three compartments are used for special events partnered by the University of Missouri, National Wild Turkey Federation and Missouri Department of Conservation for mobility impaired deer hunts targeted for persons with ambulatory disabilities and youth turkey hunts targeted at introducing youth to outdoor activities. Other recreational activities within the three compartments include birding along field edges and trails and hunting of all game species.

3.8.2 Alternative 1: No Action

Lack of TSI management would affect recreation through the loss of aesthetics in diseased and dying timber, low quality wildlife habitat for viewing and consumptive purposes, and loss of valuable resources to the economy. Diseased and dying timber alongside trails pose overhead threats in falling limbs and windblown timber closes trails and interior access to visitors.

3.8.3 Alternative 2: Tentatively Selected Plan

Management guidelines for forest lands provide the general procedures for treatments necessary to increase the value of lands for present and future outdoor recreational use. All management must be objectively planned in order to obtain optimum public benefits that insure the conservation and improvement of all resources. These resources would be treated as an integrated whole with continuing concern for environmental quality. All treatments must be coordinated with other areas of reservoir management. Management requirements of public lands are unique as compared to other forest lands of the area, because of intensive recreation use and the quality level of watershed protection.

3.9 Soils

3.9.1 Existing

The most abundant soil association at Wappapello Lake is that of the Clarksville-Fullerton-Lebanon series found on the cherty-stony uplands. They are developed from cherty limestones and occasionally interbedded sandstone and some shallow loess. The Clarksville is a cherty silt loam. It possesses a grayish brown cherty silt loam surface over a yellowish brown cherty silt loam mid-layer with a light silty clay loam subsoil. The soil is excessively to moderately well drained. Major problems are droughtiness, steepness, erosiveness, and low fertility. On the flat ridgetops, the Fullerton series possesses a cherty fragipan at 18-30 inches.

On some gently to steeply sloping areas are soils of the Baxter-Dewleyville-Hagerston series. These are red cherty soils developed from cherty limestone. The soils are similar to the above, being suited for forests, grassland, and orchards. Huntington silt loam occupies the first terraces of the bottomland. This is a deep, well-drained, silty alluvial soil. On the extreme bottomlands Enis soils may be found. These are similar to the above.

3.9.2 Alternative 1: No Action

No new management activities would take place, nor any activities associated with the Tentatively Selected Plan. Therefore, no management-related appreciable changes in productivity of the land would occur. Soils would be impacted by regular maintenance and use of roads as well as any other planned and ongoing natural resource management activities. In the absence of wildfire, current runoff and erosion pattern would be maintained with no appreciable increases expected. This alternative is considered to have no effect on the soil resources in the area, since no activities are proposed with this alternative.

In general, forest areas would remain normally functioning, and soils would remain in good condition unless they are disturbed in areas where the terrain is hilly or steep. Mostly natural conditions would continue. Organic matter would continue to increase, with expected dead, beetle-killed, and blown-down trees contributing to the overall organic matter collecting on the ground.

3.9.3 Alternative 2: Tentatively Selected Plan

This alternative has the potential to impact soil resources as a result of harvest activities. The effects of these activities on soil resources in the project area can be described in terms of short and long term effects on the productivity of the soils. Short term effects are those considered lasting three years or less and are associated with the recovery period in which disturbed soils become reestablished with vegetative cover. In contrast, long term effects are associated with activities which displace the upper portions of the soil profile (topsoil). Many years are needed for the soil to recover its original productivity when the surface layers are removed. Severe compaction associated with rutting (created by heavy equipment operating when soils are too wet) is considered a long term impact. Wet soils would be avoided in project planning, and rutting would be smoothed during timber sale closure to reduce impacts from rutting. In conventional harvesting operations, the impacts of unbladed primary skid trails and unbladed log landings are considered to be short term impacts to soil productivity.

Important factors considered in evaluating effects to soil resources from this project are: the extent of the activity area and the extent of the activity area where long term soil productivity has been reduced. Effects to the soils from this project are considered not significant when 85 percent of the activity area retains its original long term soil productivity (Forest Service Handbook, R9, 2509.18, Soil Quality Monitoring).

General timber harvest areas are expected to recover quickly. Research has shown that the upper few inches of soil recovers quickly from compaction. This is primarily due to organic matter additions from logging debris, soil biota activity, freezing and thawing and plant root growth from existing and new vegetation. Recovery from compaction is slower in the 8 to 12 inch depth

zone, but compaction is not expected at these depths unless equipment operates in wet conditions.

Soil compaction would occur on the log landings and primary skid trails as a result of heavy equipment use with Alternative 2. Areas of concentrated use, such as log landings are most affected. This compaction would increase the bulk density and result in decreased pore space, infiltration rate**,** and water holding capacity. These effects are considered detrimental to plant growth. The degree and depth of compaction depends on the number of passes made by the equipment, and the moisture content of the soil at the time the passes are made. Changes in pore space do not normally occur on well drained soils, such as those that occur over most of the project area, until three or more passes have occurred. Compacted areas would be ripped and seeded to help mitigate the effects of compaction and promote re-vegetation.

Rutting would occur if equipment operates on wet soils as well; therefore wet soils would be avoided in logging plans. Seasonal soil wetness is difficult to predict, but when soils are prone to high seasonal water tables, dry season or logging on frozen soils is preferred. When rutting occurs in the general harvest area, it is considered a long term effect. Literature shows that the effects of the severe compaction that rutting produces can reduce plant growth for many decades.

Soil movement (erosion) can occur on long unimpeded slopes, where mineral soil material is exposed to raindrop impact and overland water flow. Soils on upper slopes can lose productive topsoil as it moves down slope with water. Soil erosion may occur where bare soil is exposed on a slope as a result of equipment tracking difficulties (spinning wheels), bladed skid roads and landings, or where logs are dragged across the soil repeatedly. The placement of the landings on gentle topography prevents long unimpeded runs. The presence of vegetative soil cover, and logging debris; which is commonly found on harvested areas, would prevent long unimpeded runs.

3.10 Air Quality

3.10.1 Existing

The project is located in Wayne County, MO, which is currently designated unclassifiable/Attainment for all national ambient air quality standards (Appendix A), Pertinent Correspondence, letter from MDNR dated June 30, 2011). The Environmental Protection Agency defines attainment areas as “A geographic area in which levels of a criteria air pollutant meets the health-based primary standard (NAAQS) for the pollutant” (US EPA 2001). The activities associated with this proposed project should not significantly affect local or regional air quality.

3.10.2 No Action

Under this alternative large, possibly uncontrollable wildland fires could occur since there would be no management treatment to reduce growing fuel accumulations. Many years of fire suppression actions have reduced the amount of acres burned naturally, thus increasing the amount of available fuels for a wildland fire.

Smoke from uncontrolled wildfires has potential to affect an area for several days. This situation may occur during multiple events (i.e. more than one uncontrolled wildland fire). An uncontrolled wildland fire also has potential to spread from or into areas outside of the project area. Under this alternative, only after a wildland fire is reported and determined that the associated smoke is or may cause health and/or safety concerns, can Standards and Guidelines and other mitigation measures be identified and implemented. The severity of these potential air quality impacts resulting from wildfires can be mitigated through the resource management activities (i.e., harvesting and prescribed burning) proposed in the Tentatively Selected Plan.

3.10.3 Tentatively Selected Plan

The following effects are likely to occur over short periods of time (less than a ½ day following the treatment):

- Increased particulate matter and carbon monoxide concentrations for short periods of time (< a half day)
- Eye, nose and throat irritations
- Decreased visibility along travelways
- Odor/nuisance of smoke

Slash created from timber harvesting activities may increase smoke intensities if the first burns are conducted shortly after timber harvesting has occurred. After the first post-timber harvest burn, most fine fuels created from the logging slash would be consumed. Medium to large diameter fuels (greater than ¼") may take several burns to reduce.

General potential air quality impacts that may be associated with TSE in the project area are anticipated to be short-term and temporary. TSI activities would cause dust and exhaust fumes from harvesting operations. These impacts are considered short term. Equipment operation, activities, or processes performed by the contractor shall be in accordance with all federal and state air emission and performance laws and standards. The contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the contractor in accomplishing the specified harvest activities shall be in strict accordance with the laws of the State or States in which the work is being performed and all federal emission and performance laws and standards. In the event that air pollution occurs due to harvest activities, the contractor shall take all necessary steps to rectify the situation to the satisfaction of the contracting officer. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to federal, state, and/or local allowable limits at all times.

3.11 Infrastructure – Roads/Trails

3.11.1 Existing

There are approximately 5 miles of State maintained roads, 6 miles of County maintained roads, 8 miles of Corps maintained roads and 14 miles of decommissioned roads within the project area. The decommissioned roads are mostly on ridgetops and would require minimal blading and rocking to use as haul roads and landing sites.

3.11.2 No Action

Road maintenance in the Forest compartments would continue according to the Wappapello Lake Traditional Access Plan. In an effort to provide safe and adequate public access around the lake while protecting the natural resources, a Traditional Access Plan was prepared and approved that recommended the accesses to be maintained and remain open to the public and those to be closed. In addition, the plan identified areas on public land where primitive camping is allowed, and the regulations and facilities necessary to support primitive camping areas

3.11.3 Tentatively Selected Plan

Existing roads and trails would be utilized when possible or temporary accesses would be used for the harvesting activities. Most ridge tops in the project area has roads that have been decommissioned for wildlife and aesthetics protection. For TSI activities these roads would be temporally opened up to stay within the footprint of pre-existing roads. After harvest, all roads would be closed at both ends with tree tops and planted in wildlife cover crops such as wheat, oats or rye grass.

Road Maintenance and Reconstruction

Road maintenance and reconstruction would result in short-term increases in erosion and sediment production, but would lead to long-term reductions in sedimentation and erosion within the watershed.

Temporary Road Construction

Roads generally contribute the greatest amount of erosion and sediment in any forest system. Temporary road construction would likely increase short-term erosion potential. Additionally, the road is expected to be an additional source of sediment while it is in use. By reopening existing trails with blading and rocking as needed, construction would take place on areas which have been previously disturbed. Thereby reducing overall disturbance compared to construction on previously undisturbed sites.

There are a number of decommissioned roads in the Project Area that would be used as temporary haul roads. This would reduce the amount of new roads needed, thereby reducing the amount of associated erosion.

The management activities proposed under this environmental analysis would result in some soil disturbance. This disturbance would be a result of new temporary road construction, road reconstruction and timber harvests. The temporary roads that are on the steeper slopes and/or cross intermittent or ephemeral drainages would be the primary source of erosion. The erosion increase would be highest during construction and would eventually subside as the roads become stable and vegetated. This may take up to one full growing season, but can be shorter if the seed mix and growing season are compatible. Closing and obliteration of the temporary roads is critical in bringing the erosion rate down to pre-harvest and pre-construction levels. Using the mitigation measures listed in this assessment and the Forest Plan Standards and Guidelines would reduce the amount of erosion.

3.12 Socio-economic

Wayne County, Missouri is very rural and has struggled in the recent past with employment losses in the manufacturing and services sectors. The forest products industry has been and continues to play a large role for employment and economic opportunity to the local population. The harvest of forest products from Wappapello Lake Project would provide a source of highly desirable forest products such as sawlogs, specialty wood, pulpwood and firewood. Job opportunities would be supported through the harvest, milling, and sale of products such as lumber, chips and shavings. The direct impact of cash flow resulting from the sale of these items would benefit the local communities. The improvement of the forest habitats would encourage consumptive users of wildlife, such as hunters, trappers, fishermen; as well as non-consumptive users such as bird watching, camping, hiking, cycling. These users would infuse capital into local communities through the sale of fuel, motels, camping fees, sales taxes, dining, and groceries.

3.13 HTRW

An Environmental Condition of Property is not required in accordance with ER200-2-3 for this activity. However, an Environmental Checklist (EC) was conducted to document environmental compliance. The EC did not reveal any non-compliance (Appendix B).

3.14 Cultural

A review of existing records indicate that many of the areas have not been formally surveyed as provided for in the National Historic Preservation Act of 1966, as amended (NHPA). The stands projected for timber cutting in FY2012, however, were surveyed in September, 2011. Stands 6.16, 8.1, and 8.8 were surveyed with a single historic site consisting of foundations of a building constructed prior to 1934 being recorded in Stand 6.16. The construction date was derived from historic U.S. Geological Survey topographic maps. Also in Stand 6.16, site 23WE9, was relocated to establish an avoidance buffer around the site. Finally, the area southeast of Silva, Missouri, which was damaged by a tornado was surveyed and no sites were found. Site 23WE439 was relocated and lies outside of the proposed project area.

With the exception of the stands scheduled for cutting in FY2012, the project area has not yet been surveyed for historic properties. Therefore, archaeological surveys would be required to determine the existence of any cultural resources within each stand. After the identification of cultural resources, each resource would require evaluation as an historic property as defined by the NHPA. Based upon the identification and evaluation of each resource, the USACE would establish buffers around historic properties to prohibit disturbance of the properties. Missouri State Historic Preservation Office (MOSHPO) would be consulted throughout this process and any determinations of significance and eligibility for nomination to the National Register of Historic Places would be fully coordinated with MOSHPO through the execution of a Memorandum of Agreement stipulating the specific procedures to be followed. The identification and evaluation process would be conducted on an annual basis as each stand is scheduled for cutting. In the event that a cultural resource is discovered during the actual timber cutting operation, work in the immediate area would be stopped until consultation with MOSHPO and evaluation of the resource is completed. In all cases, avoiding disturbance to cultural resources would be the primary means of preserving historic properties.

3.15 Relevant Laws and Regulations, Compliance

3.15.1 Fish and Wildlife Coordination Act

Project plans have been coordinated with the U.S. Fish and Wildlife Service and informal scoping and correspondence for this EA took place primarily during the summer 2011. In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, the St. Louis District Planning, Programs, and Project Management Division, Environmental Branch requested the U. S. Fish and Wildlife Service provide a list of federally threatened or endangered species that may occur in the vicinity of the proposed project. In electronic messages dated 14 June and 22 August, 2011, the USFWS (Columbia, Missouri) provided input regarding two federally endangered bat species and their general habitat preferences (Table 3) that the project may affect, but would not likely adversely affect. The USFWS noted "because this is not a water resource project and because a biological opinion (BO) was written to address the original Route 67 Corridor Improvement project and subsequent improvements to Indian bat habitat, no Coordination Act Report is necessary" (Appendix A). All applicable efforts would be taken to minimize potential impacts to these species and their habitats.

Because the USFWS concurs that the proposed project is not likely to adversely affect the species evaluated in this EA, this precludes the need for further action on this project as required under Section 7 of the Endangered species act of 1973, as amended. If implemented, the project, as proposed, would be in full compliance. Should this project be modified, or new information indicate listed or proposed species may be affected, consultation or additional coordination with the USFWS, as appropriate, would be initiated.

3.15.2 Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations)

Executive Order 12898 requires "to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report of the National Performance Review, each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its program, policies and activities on minority population and low-income populations…" This project would not have any adverse impacts on minority and low-income populations.

Also included with environmental justice are concerns pursuant to EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children under the age of 18. These risks are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come into contact with or ingest." This work has been reviewed for compliance with these orders and it has been determined that the proposed action would not adversely affect or have significant impacts on the health or environment of children.

3.15.3 Clean Water Act (Sections 401 and 404)

No jurisdictional wetlands, waterways or other Waters of the United States would be affected by the proposed access, repair, and construction methods associated with this project. All streams,

wet weather drains and wetlands would be delineated at time of inventory and avoided during TSI activities. 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.

3.15.4 Executive Order 13186 - Responsibilities of Federal Agencies to Protect Migratory Birds

These migratory bird conventions impose substantive obligations on the United States for the conservation of migratory birds and their habitats, and through the Migratory Bird Treaty Act, the United States has implemented these migratory bird conventions with respect to the United States. This EO directs Executive departments and agencies to take certain actions to further implement the Act. Timber stand improvement actions taken during this project would consider migratory birds and take every step practical to minimize impacts to their habitat. This action is not likely to adversely affect migratory birds.

3.15.5 Executive Order 11990 (Protection of Wetlands)

Under this Executive Order, Federal agencies shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. No staging areas or other construction areas would encroach or impact wetlands. Therefore, the TSI would be in full compliance with this Executive Order.

3.15.6 Bald and Golden Eagle Protection Act of 1940

On August 9, 2007 the bald eagle was removed from the federal list of threatened and endangered species. It remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The Bald and Golden Eagle Protection Act prohibits unregulated take of bald eagles. The Fish and Wildlife Service recently finalized a rule defining “take” that includes “disturb.” “Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (USFWS 2007).

Bald eagle nests are known to exist within and near the proposed project area. One nest exists on the banks of the St. Francis River at the northernmost part of compartment 2 and two other nests are located east of compartments 6 and 8. One nest is along the south shoreline, east of Chaonia Landing and the other is located immediately downstream of Wappapello dam. These nests are monitored by Corps personnel annually to determine activity and the number of fledglings being produced. The period January 1 to March 1 is important for initiating nesting activity and March 1 to May 15 is the most critical time for incubation and rearing of young. The USFWS has recommended that to fully assess the potential impacts of the project on bald eagles, refer to the National Bald Eagle Management Guidelines: (http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf), which include recommendations to avoid effects to eagles. Project construction timing and activities would be consistent with the recommendations outlined in the guidelines.

3.15.7 Environmental Regulatory Constraints

The EA is subject to compliance review with all applicable environmental regulations and guidelines. The National Environmental Policy Act is considered as in partial compliance until the District Engineer's signing of the Finding of No Significant Impact. The National Historic Preservation Act would be considered as in partial compliance until there is concurrence from the State Historic Preservation Officer on the District's EA conclusions.

Federal Policies	Compliance
Bald Eagle Protection Act, 42 USC 4151-4157	Full
Clean Air Act, 42 USC 7401-7542	Full
Clean Water Act, 33 USC 1251-1375	Full
Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC 9601-9675	Full
Endangered Species Act, 16 USC 1531-1543	Full
Farmland Protection Policy Act, 7 USC 4201-4208	Full
Fish and Wildlife Coordination Act, 16 USC 661-666c	Full
Food Security Act of 1985, 7 USC varies	Full
Migratory Bird Treaty Act, 1918	Full
Land and Water Conservation Fund Act, 16 USC 460d-4601	Full
National Environmental Policy Act, 42 USC 4321- 4347	Partial[1]
National Historic Preservation Act, 16 USC 470 et seq.	Partial[2]
Noise Pollution and Abatement Act, 42 USC 7691-7642	Full
Resource, Conservation, and Rehabilitation Act, 42 USC 6901-6987	Full
Rivers and Harbors Appropriation Act, 33 USC 401-413	Full
Water Resources Development Acts of 1986 and 1990	Full
Floodplain Management (EO 11988 as amended by EO 12148)	Full
Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities (EO 11282 as amended by EO's 11288 and 11507)	Full
Protection and Enhancement of Environmental Quality (EO 11991)	Full
Protection and Enhancement of the Cultural Environment (EO 11593)	Full
Protection of Wetlands (EO 11990 as amended by EO 12608)	Full

Full compliance: having met all requirements of the statute for the current stage of planning
1 Full compliance to be achieved with the District Engineer's signing of the Finding of No Significant Impact
2 Full compliance to be achieved with the State Historic Preservation Officer's concurrence in the District's EA conclusions.

3.15.8 Relationship between Short-Term Use and Long-Term Productivity

The local short-term impacts of the recommended action and the use of resources for it are consistent with the maintenance and enhancement of long-term productivity for the local area, region, and nation. Creation of the project would support growth and development of employment and population in the region.

4 Coordination

Cooperation with state and federal agencies presently exists in several aspects of forest management. Extensive portions of project boundary adjoin land of state and federal agencies. Therefore, continued coordination and cooperation is imperative in such areas as fire control, forest insects and disease detection, encroachment, etc. Also, an exchange of information is highly beneficial. Cooperating agencies include: USFS Mark Twain National Forest; USFWS Mingo National Wildlife Refuge; Natural Resources Conservation Service; MDC Division of Forestry; University of Missouri; and the MDNR. Indiana bat mitigation was a coordinated effort between the USFWS, MoDOT, and Corps, and lead to the cooperative agreement between the United States of America and the MoDOT.

Cultural resources coordination for timber stand improvements at Wappapello Lake with federally recognized Indian Tribes consisted of the following. On 6 June 2011 a letter was sent to the 11 federally recognized tribes that have stated that they have an interest with the land surrounding Wappapello Lake. The first letter explained the project and the project area; but, due to an increase in the project area a second letter was sent to the tribes on 12 August 2011. Of the 11 tribes contacted only three tribes have thus far indicated that they would like to consult on this project: (1) United Keetoowah Band of Cherokee, (2) Osage Nation and, (3) the Delaware Nation. The tribes would be kept informed and consultation would take placed as needed.

5 List of Preparers

Name	**Role**
Eric Lemons	Natural Resources Manager, Wappapello Lake
Ken Cook	Biologist, St. Louis District Corps
James Barnes	Archaeologist, St. Louis District Corps
Rick Archeski	Hazardous, Toxic, Radioactive Waste Specialist, St. Louis District Corps
Shauna Marquardt	US Fish and Wildlife Service, Columbia MO

6 References

Boone, m. 2010. St. Francis River watershed. Missouri Department of Conservation (http://mdc.mo.gov/fish/watershed/).

Donley, D. E. 1974. Wood borer losses in Appalachian oak, Southern Limberman 8(1974), pp. 115-118.

Dwyer, J. P., and J. M. Kabrick, J. J. Wetteroff. 2006. Do improvement harvests mitigate oak decline in Missouri Ozark forests? Northern Journal of Applied Forestry. 24(2):123-128.

Hay, C. J. 1972. Woodpecker predation on red oak borer in black, scarlet and norther red oak. Annals Entomological Society of America 5(6):1421-1423.

Heinselman,Miron L. 1978. Fire in wilderness ecosystems. In: Hendee,John C.;Stankey,George H.;Lucas,Robert C. Wilderness management.Misc.Pub.No.1365. Washington,DC: U.S. Department of Agriculture,Forest Service: 249-278.

Heitmeyer, M. E. 2010. An evaluation of ecosystem restoration and management options for St. Francis River floodplain lands at Wappapello Lake, Missouri. Greenbrier Wetland Services report 10-03. Blue Heron Conservation Design and Printing LLC, Bloomfield, MO.

Kilgore, B. M. 1973. Impact of prescribed burning on a sequoia-mixed conifer forest. Proceedings of the Tall Timbers Fire Ecology Conference 12:345-375.

Ozark Trail Brochure. Ozark Trail Council (www.ozarktrail.com)

Parmeter, J. R., Jr. 1977. Effects of fire on pathogens. In: Proceedings of the symposium of fire and fuel management in Mediterranean ecosystems. 1977 August 1-5. Palo alto, California.

USACE (U.S. Army Corps of Engineers). 2000. Wappapello Lake Master Plan, Design Memorandum No. 504, May 2000.

US Department of Transportation, Federal Highway Administration, and Missouri Department of Transportation. 2005. Final Environmental Impact Statement, Route 67, Madison, Wayne and Butler Counties, Missouri, approved by Federal Highway Administration June 22, 2005.

US EPA. 2001. *National Air Quality and Emissions Trends Report, 1999.* EPA 454/ R-01-004, USEPA, Office of Air Quality Planning and Standards. March.

USFWS (U.S. Fish and Wildlife Service). 2007. Protection of Eagles; Definition of ‘‘Disturb’’. Federal Register 72(107): 31132- 31139.

FINDING OF NO SIGNIFICANT IMPACT
Wappapello Lake (Compartments 2, 6, and 8) Timber Stand
Improvement Management Strategies

I. I have reviewed and evaluated this document concerning the proposed implementation of timber stand improvement (TSI) management strategies within three compartments at Wappapello Lake, Wayne County, Missouri. The proposed work would be conducted over the next eight years and would include approximately 12,000 acres in 45 separate stands. This work is being accomplished in accordance with the Wappapello Lake Master Plan, Design Memorandum No. 504, updated May 2000. In addition, an important component of the project is the restoration of Indiana bat habitat associated with mitigation obligations from the upgrade and expansion of U.S. Route 67 in Wayne County, MO.

II. As part of this evaluation, I have considered:
   a. Existing Resources and Future without Authorized Plan (No Action) Alternative.
   b. Impacts to Existing and Future Resources under the Tentatively Selected Plan.

III. The possible consequences of these alternatives have been studied for physical, biological, cultural, social and economic effects. Issues evaluated as part of my review included the impacts of the TSI activities on quality forest management, Indiana bat mitigation, wildlife habitat quality and fuel loading. No significant impacts were identified. In addition:
   a. Federally listed endangered and threatened species will not be adversely impacted.
   b. There would be no appreciable degradation to the physical environment (e.g., soils, air quality, and water quality).
   c. There would be no significant impacts to the biological components of the project (e.g., vegetation, wildlife, aquatic organisms).
   d. No significant impacts from invasive/undesirably species management or fuels management.
   e. There would be no adverse impacts to historic properties.
   f. The "no action" alternative was evaluated and determined to be unacceptable because it did not address the purpose and need for a quality timber management component at Wappapello Lake.
   g. The project is in compliance with all relevant laws and regulations.

IV. Based upon the analysis and evaluation of the Tentatively Selected Plan and the No Action alternatives presented in this Environmental Assessment dated …2011, and since no adverse impacts were identified in a public review period that ended on ….2011, I have determined that implementation of the Tentatively Selected Plan would not result in any significant adverse impacts to the human environment. Therefore, no Environmental Impact Statement will be prepared prior to proceeding with this action.

Date _____

_____
Christopher G. Hall
Colonel, U.S. Army
District Engineer

ENVIRONMENTAL ASSESSMENT

Wappapello Lake (Compartments 2, 6, and 8) Timber Stand Improvement Management Strategies

APPENDIX A

Pertinent Correspondance

CONTENTS:

A. Cooperative Agreement between the Corps and MO Department of Transportation, 30 August 2010 ..... A-1
B. Corps Scoping Letter 1 June 2011 ..... A-8
C. Tribal Coordination Scoping Letter, Roberta Hayworth, 6 June 2011 ..... A-13
D. USFS, Jim McDonald 7 June 2011 ..... A-20
E. USFWS, Shauna Marquardt, 14 June 2011 ..... A-21
F. Sierra Club, Mo Chapter, 23 June 2011 ..... A-24
G. MDNR, Mark Miles, State Historic Preservation Office, 29 June 2011 ..... A-25
H. MDNR, Department of Natural Resources, Robert D. Stout, 30 June 2011 ..... A-26
I. Hank Dorst, Mark Twain forest Watchers 1 July 2011 ..... A-30
J. Corps Wappapello scoping letter signed 28 July 2011 ..... A-31
K. Betty Denney, 5 August 2011 ..... A-34
L. Tribal Coordination Scoping Letter, Roberta Hayworth, 12 August 2011 ..... A-35
M. United Keetoowah Band of Cherokee Indians in Oklahoma, 18 August 2011 ..... A-38
N. USFWS, Shauna Marquardt, 22 August 2011 ..... A-39
O. Delaware Nation, 26 August 2011 ..... A-40
P. MDNR, Robert Stout, 31 August 2011 ..... A-41
Q. MDC, Janet Sternburg, 26 September 2011 ..... A-45

ENVIRONMENTAL ASSESSMENT

Wappapello Lake (Compartments 2, 6, and 8) Timber Stand Improvement Management Strategies

APPENDIX A

Pertinent Correspondance

CONTENTS:

A. Cooperative Agreement between the Corps and MO Department of Transportation, 30 August 2010 ..... A-1
B. Corps Scoping Letter 1 June 2011 ..... A-8
C. Tribal Coordination Scoping Letter, Roberta Hayworth, 6 June 2011 ..... A-13
D. USFS, Jim McDonald 7 June 2011 ..... A-20
E. USFWS, Shauna Marquardt, 14 June 2011 ..... A-21
F. Sierra Club, Mo Chapter, 23 June 2011 ..... A-24
G. MDNR, Mark Miles, State Historic Preservation Office, 29 June 2011 ..... A-25
H. MDNR, Department of Natural Resources, Robert D. Stout, 30 June 2011 ..... A-26
I. Hank Dorst, Mark Twain forest Watchers 1 July 2011 ..... A-30
J. Corps Wappapello scoping letter signed 28 July 2011 ..... A-31
K. Betty Denney, 5 August 2011 ..... A-34
L. Tribal Coordination Scoping Letter, Roberta Hayworth, 12 August 2011 ..... A-35
M. United Keetoowah Band of Cherokee Indians in Oklahoma, 18 August 2011 ..... A-38
N. USFWS, Shauna Marquardt, 22 August 2011 ..... A-39
O. Delaware Nation, 26 August 2011 ..... A-40
P. MDNR, Robert Stout, 31 August 2011 ..... A-41
Q. MDC, Janet Sternburg, 26 September 2011 ..... A-45

CCO Form: DE09
Approved: 11/02 (GWS)
Revised: 10/09 (ASB)
Modified: 5/10 (ASB)

Route 67, Wayne County
Job No. J0P0931D

COOPERATIVE AGREEMENT BETWEEN THE UNITED STATES OF AMERICA AND THE MISSOURI DEPARTMENT OF TRANSPORTATION FOR THE DEVELOPMENT OF INDIANA BAT HABITAT

THIS COOPERATIVE AGREEMENT shall be effective when executed by the parties hereto, which are the United States of America, represented by the U.S. Army Corps of Engineers (hereinafter, "COE"), and the Missouri Highways and Transportation Commission (hereinafter, "MHTC"), acting by and through the Missouri Department of Transportation (hereinafter, "MoDOT"):

WITNESSETH:

WHEREAS, MHTC is an agency of the State of Missouri, created by the Constitution of Missouri which governs and controls MoDOT, an executive department of Missouri state government; and

WHEREAS, MoDOT is the operational executive department by and through which the MHTC governs, controls and administers the Missouri State Highway System, and through which the MHTC complies with its duties and obligations under Federal and State law; and

WHEREAS, the COE is authorized by 31 U.S.C. Section 6305 to enter into an cooperative agreement with a State to transfer something of value to the State to carry out a public purpose, rather than having the COE acquire property or services by purchase, lease or barter for COE's direct benefit or use; and

WHEREAS, the COE has civil works legislative and regulatory authority and has broad vegetative and natural resource management responsibilities under the Forest Cover Act of 1960 (Public Law 86-717) on its administered water resource projects, including managed forest land in Wayne County in Missouri; and

WHEREAS, MoDOT as the designated representative for the Federal Highways Administration, entered into formal consultation under Section 7 of the Endangered Species Act with the United States Fish and Wildlife Service (hereinafter, "FWS") for impact to Indiana bat (*Myotis sodalis*) habitat impacts resulting from the construction of Route 67 Corridor Improvements in Wayne County, Missouri; and

WHEREAS, the COE Wappapello Lake Project Office and MoDOT proposal to satisfy MoDOT's mitigation responsibility to FWS by completing Timber Stand Improvements on forested land to benefit the Indiana bat as provided for in this agreement has been approved by FWS provided that the on-the-ground mitigation is completed by the end of December, 2014; and

NOW THEREFORE, in consideration of the mutual covenants and promises set forth in this legal document, the parties agree as follows:

(1) PURPOSE: The purpose of this Agreement is to enhance Indiana bat habitat through on-the-ground Timber Stand Improvements in Wayne County, Missouri by the end of December 2014 that will satisfy MoDOT mitigation responsibilities to FWS for the loss of Indiana bat habitat resulting from the construction of Route 67 Corridor Improvements.

(2) MHTC/MODOT COMMITMENTS: MHTC and MoDOT agree:

(A) To convey a sum equal to estimates provided by COE **($45,000.00)** for preparatory work including forest inventory, tree marking, and completion of an Environmental Assessment on areas to be managed on COE forested land for Timber Stand Improvements in Wayne County, Missouri,

(B) To develop, in cooperation with COE, a report/review method to monitor progression of preparations toward end goal of on-the-ground Timber Stand Improvements through periodic contact with COE Wappapello Lake Project Office, Wappapello, Missouri,

(C) To conduct a site inspection of on-the-ground Timber Stand Improvements by end December 2014 prior to acceptance of final report and termination of this agreement.

(3) COMMITMENTS OF THE COE: The COE agrees:

(A) To conduct activities leading to the eventual on-the-ground Timber Stand Improvements action in Wayne County, Missouri on COE forested land for the benefit of the federally endangered Indiana bats (*Myotis sodalis*). These activities should include forest inventory, tree marking, and completion of an Environmental Assessment for said action,

(B) To assist MoDOT in the development of a report/review method to monitor progression of preparations toward end goal of on-the-ground Timber Stand Improvements through periodic contact with COE Wappapello Lake Project Office, Wappapello, Missouri,

(C) To provide MoDOT with an annual report providing information including, but not limited to, total on-the-ground Timber Stand Improvement acreage totals and methods.

(D) To complete a portion of on-the-ground Timber Stand Improvement action sufficient to satisfy MoDOT's commitment for habitat mitigation on COE land by the end of December 2014 as required by FWS.

(E) To permit and allow MoDOT personnel access to conduct a site inspection of on-the-ground Timber Stand Improvements prior to acceptance of final report/review to close out this contract.

(4) MHTC/MODOT AND THEIR STAFF ARE NOT FEDERAL AGENTS OR EMPLOYEES: It is understood and agreed that the obligations of MHTC/MoDOT and their agents, employees, consultants, contractors or representatives under this Agreement shall not be considered to fall within the scope of Federal employment. Furthermore, neither MHTC nor MoDOT or their agents, employees, consultants, contractors or representatives shall be considered as agents or employees of the Federal Government, and no status or benefits of federal employment will be conferred to any state agent, employee, consultant, contractor or representative under the terms of this Agreement.

(5) PAYMENT: The amount to be paid to the COE by MHTC as full remuneration for the performance of all services to satisfy MHTC's commitments is not to exceed **Forty-five thousand dollars ($45,000.00).** This amount will be transferred to the COE (upon this signed and executed agreement) when MHTC releases mitigation funds for the Route 67 Corridor Improvements project in calendar year 2010.

(6) DURATION AND EXTENSION: This Agreement shall become effective when executed by the parties hereto. This Agreement shall continue in full force and effect from the date of execution through the December 31, 2014, or until such time that the Timber Stand Improvements have been completed sufficiently and approved to satisfy MoDOT's commitment for Indiana bat habitat mitigation on COE land, as determined by FWS, whichever comes first.

(7) MHTC/MoDOT's REPRESENTATIVE: MoDOT's District Engineer, District 10, is designated as the Commission's representative for the purpose of administering the provisions of this Agreement. The Commission's representative may designate by written notice other persons having the authority to act on behalf of the Commission in furtherance of the performance of this Agreement.

(8) COE REPRESENTATIVE: The District Engineer for the St. Louis District, U.S. Army Corps of Engineers, is designated as the COE's representative for the purpose of administering the provisions of this Agreement. The COE's representative may designate by written notice other persons having the authority to act on behalf of the Contractor's representative in furtherance of the performance of this Agreement.

(9) NOTICES: Any notice or other communication required or permitted to be given hereunder shall be made in writing and shall be deemed received three (3) days after mailing by United States mail, First Class postage prepaid, or upon actual receipt of the notice when delivery is made by personal service, express courier or facsimile delivery. Absent contrary written instructions by the party, notices shall be addressed or sent as follows:

(A) To the District, Corps of Engineers:

To the District, Corps of Engineers:
Peggy O'Bryan
Attention: CEMVS-OD
1222 Spruce Street
St. Louis, Mo 63103-2833
Phone: 314-331-8100
FAX: 314-331-8738

To the District, Corps of Engineers, Wappapello Lake Project Office:
Cynthia Jackson
Wappapello Lake Project Office
10992 Highway T
Wappapello, Mo 63966-9603
Phone: 573-222-8562
FAX: 573-222-8313

(B) To MHTC and/or MoDOT:
District 10 Engineer
Missouri Department of Transportation
2675 North Main Street
P.O. Box 160
Sikeston, MO 63801

(10) ASSIGNMENT: Neither MHTC nor COE shall assign, transfer or delegate any interest in this Agreement without the prior written consent of the other party. However, both parties recognize the right of COE to retain qualified engineering design, land surveying or other firms to assist in or complete the design of the Timber stand improvement projects, if they elect to do so.

(11) NONDISCRIMINATION ASSURANCE: With regard to any work contracted by COE for construction pursuant to this Agreement, COE agrees as follows:

(A) Civil Rights Statutes: COE and their contractors shall comply with all state and federal statutes relating to nondiscrimination, including but not limited to Title VI and Title VII of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d and 2000e, *et seq.*), as well as any applicable titles of the Americans with Disabilities Act. In addition, if MHTC/MoDOT's contractors are providing services or operating programs on behalf of MoDOT or MHTC, they each shall comply with all applicable provisions of Title II of the Americans with Disabilities Act.

(B) Administrative Rules: To the extent they apply to and govern COE's Timber stand construction work on COE property, COE and their contractors shall comply with the administrative rules of the U.S. Department of Transportation regarding nondiscrimination in federally-assisted programs of the U.S. Department of Transportation (49 CFR Subtitle A, Part 21), which rules are incorporated herein by reference and made part of this Agreement.

(C) Nondiscrimination: COE and their contractors shall not discriminate on the grounds of the race, color, religion, creed, sex, disability, national origin, age or ancestry of any individual in the selection and retention of subcontractors, including procurement of materials and leases of equipment. COE's contractors shall not participate either directly or indirectly in the discrimination prohibited by 49 CFR 21.5, including employment practices.

(D) Solicitations for Subcontracts, Including Procurements of Material and Equipment: These assurances concerning nondiscrimination also apply to subcontractors and suppliers of COE's contractors.

(E) Information and Reports: COE's contractors shall provide all information and reports required by their contract, or orders and instructions issued pursuant thereto, and will permit access to their books, records, accounts, other sources of information and their facilities, as may be determined by MoDOT, COE, or the U.S. Department of Transportation (where applicable) to be necessary to ascertain compliance with this or other contract orders and instructions. Where any information required of COE's contractors is in the exclusive possession of another who fails or refuses to furnish this information, that contractor shall so certify to MoDOT, and shall set forth what efforts it has made to obtain the information.

(F) Sanctions for Noncompliance: In the event any COE contractor fails to comply with the nondiscrimination provisions of their Agreement, MHTC or COE shall impose such contract sanctions on them as MHTC or COE may determine to be appropriate under their contract, which sanctions may include, but are not limited to:

1. Withholding of payments under that agreement until the contractor or its subcontractor complies; and/or

2. Cancellation, termination or suspension of that agreement, in whole or in part.

(G) Incorporation of Provisions: COE shall make certain that their contractors and engineering design firms include these nondiscrimination provisions in every design or construction subcontract relating to the Timber Stand improvements, including procurements of materials and leases of equipment, unless exempted by law or instructions issued by MHTC, COE, or an appropriate federal or state agency having regulatory jurisdiction. These design firms and contractors will take such action with respect to any subcontract or procurement as MHTC, COE, or an appropriate federal or state agency may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that in the event a contractor or engineering firm becomes involved or is threatened with litigation by a subcontractor or supplier as a result of following such directions, that firm may request MHTC, COE or the appropriate federal or state agency to enter into such a dispute or litigation to fully protect the interests of the State of Missouri or the United States.

(14) TERMINATION OF THIS AGREEMENT: This Agreement may be terminated if the parties mutually so agree in a written document, executed by authorized representatives of each party. That termination shall become effective Thirty (30) days after the termination agreement is signed, or as the termination agreement may otherwise provide. If the

agreement has not already been terminated, once MoDOT has accepted the final report this agreement will terminate automatically.

(15) DBE REQUIREMENTS: COE will advise any prospective contractors or engineering firms they may retain to design or construct the timber stand improvement features of any required goals for participation by disadvantaged business enterprises (DBEs) which will apply to their design or construction contracts for that work. Those firms that are subject to a DBE participation contract goal, because the work is funded by the U.S. Department of Transportation, shall submit for COE approval a DBE goal or plan in accordance with 49 CFR Part 26. These design firms and construction contractors shall comply with any DBE participation plan or goal applicable to their work that is approved by COE, and with all applicable requirements of 49 CFR Part 26, as it may be amended.

(16) SUCCESSORS AND ASSIGNS: The provisions of this Agreement shall apply to and be binding upon the parties executing this Agreement, their successors, assigns, representatives and affiliates, including officers, employees, agents, and any persons acting under, through or for a party to this Agreement.

(17) SECTION HEADINGS: All section headings contained in this Agreement are for the convenience of reference only and are not intended to define or limit the scope of any provision of this Agreement.

(18) ENTIRE AGREEMENT: This Agreement represents the entire understanding between the parties regarding this subject, and supersedes all prior written or oral communications between the parties regarding this subject.

IN WITNESS WHEREOF, the parties hereto have executed this Cooperative Agreement as of the date and year last written below:

Executed by the COE on this 30 day of Aug, 2010.

Executed by the MHTC on this 5 day of Aug., 2010.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION,

By Roberta Broeker

Title Chief Financial Officer

Attest:

Secretary to the Commission

Approved as to Form:

Commission Counsel

U.S. ARMY CORPS OF ENGINEERS

By Peggy A. O'Bryan

Title Chief, Operations Readiness Regulatory

Attest:

By Cynthia H. Jackson

Title Operations Manager

Approved as to Form:

By Peggy A. O'Bryan

Title ~~Chief, Operations Readiness Regulatory~~ Div

Mark Wunsch

Assistant District Counsel

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

1 June 2011

Planning, Programs, and
Project Management Division,
Environmental Branch

Dear Sir or Madam:

The St. Louis District of the U.S. Army Corps of Engineers (Corps), is seeking your comments on a proposed action to implement timber stand improvement (TSI) management strategies on two timber compartments at Wappapello Lake, Wayne County, Missouri (see enclosed map and compartment descriptions). The purpose of this scoping letter is to inform interested parties of the proposed management activities and to solicit comments. Management activities will be conducted over the next ten years and would include approximately 6500 acres in 33 separate stands. The objectives of the management strategies include the maintenance and improvement of native wildlife habitat and healthy indigenous trees, creation of Indiana Bat habitat, and increased watershed erosion protection. The Corps will be preparing an Environmental Assessment (EA) with Draft Finding of No Significant Impact (FONSI) in compliance with the National Environmental Policy Act (NEPA). You are receiving this letter because you may be interested in the project.

A quality timber management component at Wappapello Lake has been non-existent since the inception of the flood control reservoir. The lack of management/manipulation has lead to a degraded overall forest component in even-aged timber, diseased and dying timber, open forest, loss of nesting habitat, loss of filtering capabilities and undesirable tree species regeneration.

The current recommendation would consist of the following general management techniques:

(1) All forests will be managed on an uneven-aged multiple-use, sustained yield and ecosystem management system. Treatments will be based on specific requirements for improvement of forest and wildlife habitats. Timber harvests shall be performed when necessary to promote accepted wildlife and forest management goals and objectives. Forest stands will not be harvested solely for revenue generation.

(2) Single Tree Selection is the selective removal of low quality, cull, diseased, over-mature or undesirable trees from a stand to achieve target stocking and wildlife habitat objectives. This technique is a tool used in uneven-aged management to encourage wider distribution of tree diameters, dominant species, age class and enhancement of forest reproduction. Because single tree selection

promotes denser stands, frequent re-assessments or inventories are required. These re-assessments allow managers the ability to closely monitor compartments, therefore maintaining healthy forest and wildlife habitats.

(3) Group selection is a silvicultural technique requiring removal of large groups of trees to enhance regeneration and provide openings for wildlife. Generally, group selections range in size from one-fourth acre to five acres. Group selections on Wappapello Lake will not exceed three acres unless adequate justification is provided.

(4) Stand composition will be based on site-species relationships. Most of the forestland on Wappapello Lake contains an oak component; therefore, these species will be targeted for propagation. Efforts will be made to prevent monocultures, or single species stands. Exceptions will be made for small plantings of pine stands that do provide a specific habitat type for certain wildlife species. Stands suitable as pine-hardwood will be encouraged because historically, this type was once common on project lands.

(5) Prescribed fire will be utilized for vegetation modification and control where these benefits will promote diversity for wildlife habitats. Examples include old fields, pine stands, glades, and oak savannas. Burn frequency will be dependent on the requirements of the wildlife species, successional stage and fuel loads.

(6) Harvesting of forest products will be performed as a method of improving forest habitats. All harvesting activities will be performed in a manner that minimizes damage to residual trees, reproduction, and soils. This may require restrictions on equipment and the season harvesting as scheduled. Existing roads and trails will be utilized when possible or temporary accesses will be used for the harvesting activities. After harvest, all roads will be planted in wildlife cover crops such as wheat, oats or rye grass. Waterbars will be placed at intervals necessary to prevent erosion. Stream courses will be delineated and protected. Harvesting will be limited to single tree selection in stream management zones. All trees selected for removal will be marked with tree marking paint.

(7) Den trees, or trees that have potential as den trees, will be retained in all stands. Where possible, a standard rule will be to retain or develop 6 to 8 den trees per acre. Dead trees and snags, when not posing a threat to persons or property, will be left.

(8) When wildfire, disease, insects, floods or storms damage extensive numbers or acres of trees, every attempt will be made to remove these trees by salvage sale. Salvage operations will be performed as soon as practicable after the event to prevent deterioration of wood quality.

Major issues to be addressed include protection of threatened and endangered species, protection of important cultural resources, impacts to vegetation, water resources and wildlife, and

invasive/undesirable species management. The scope of the environmental analysis will include the direct, indirect and cumulative impacts to all applicable resources

Please provide any comments or issues you may have regarding this project. For questions, comments please contact: Mr. Ken Cook of our Environmental Analysis Branch, telephone 314-331-8498 **facsimile number** (314) 331-8606, or **e-mail** at kenneth.m.cook@usace.army.mil. Written comments may be sent to our address below, ATTN: Environmental Branch (PM-E, Cook). Please respond by close of business on July 1, 2011.

Address:
US Army Corps of Engineers
St. Louis District
Environmental Branch PD-E
1222 Spruce St.
St. Louis, MO 63103-2833

Sincerely,

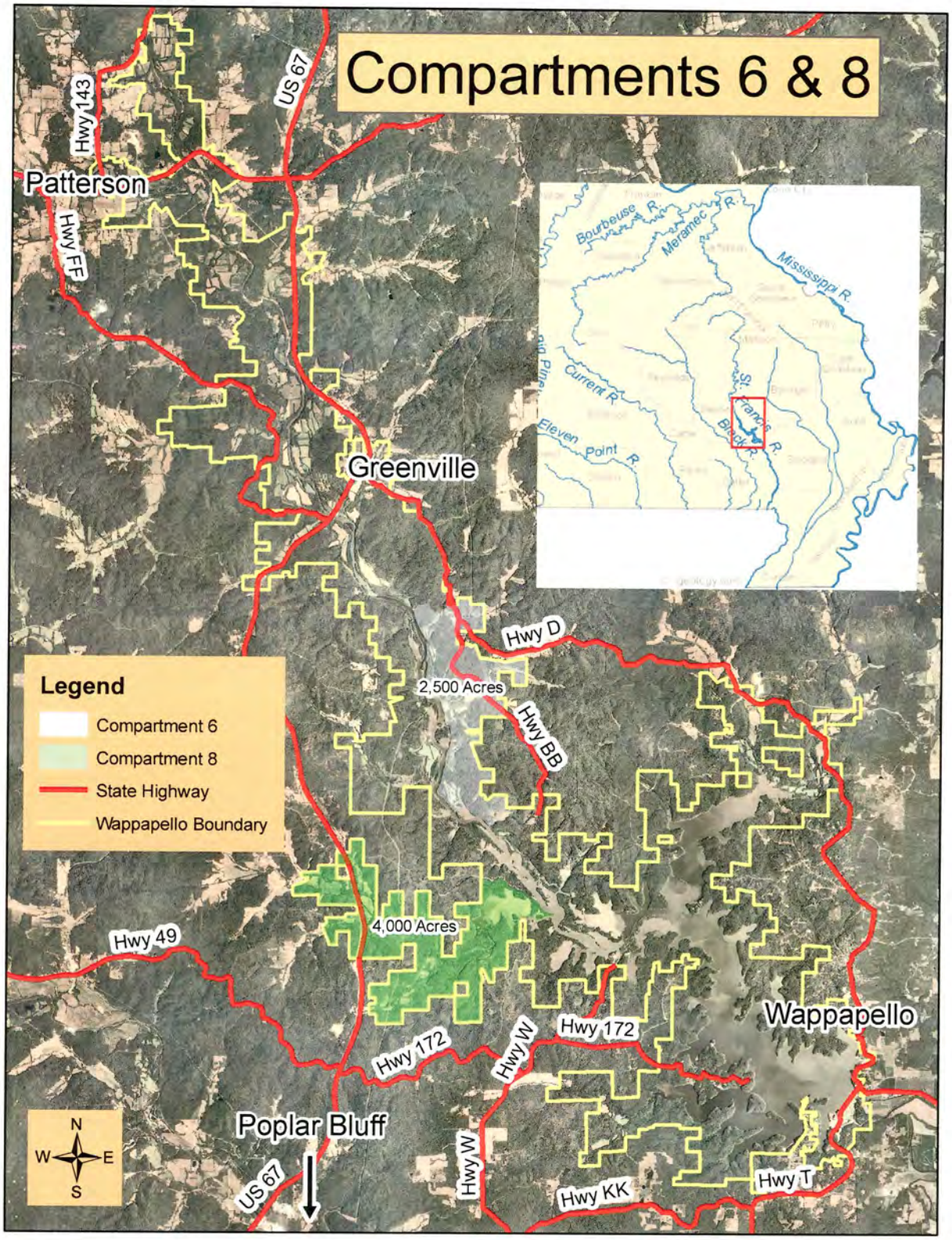
Thomas Keevin

Thomas M. Keevin, Ph.D
Chief, Planning and Environmental Branch

Compartment Descriptions

Compartment 6 is approximately 2500 acres (T 28N, R 6E, Sections 28, 29, 32, 33 and T 27N, R 6E, Sections 3, 4, 9, 10) identified as Blue Springs. It is comprised of 17 stands and is located on the east side of Wappapello Lake between Greenville, Missouri and Wappapello, Missouri. The northernmost boundary is Corps road 17 known as Sulphur Springs and the southernmost boundary is Corps road 14 known as Page Branch. The eastern boundary is the signed and monumented Corps boundary line and the western boundary is Wappapello Lake. There are two major roads; State Highway D and BB, two Wayne County roads 531/532 and five Corps roads 14, 15, 15A, 16, and 17 that serve as access points. There is eleven Corps parking areas, eight of which allow camping and three boat ramps for lake access. The landscape is mostly forested with approximately 400 acres of scrub shrub and open land communities managed in rotational mowing, disking and food plots.

Compartment 8 is approximately 4000 acres (T 27N, R 5E, Section 13; T 27N R 6E Sections 7, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30) identified as Otter Creek. It is located on the west side of Wappapello Lake between Greenville, Missouri and Poplar Bluff, Missouri. The northernmost boundary is the signed and monumented Corps boundary line and Wayne County Road 546 and the southernmost boundary is the signed and monumented Corps boundary line. The eastern boundary is Wappapello Lake and the western boundary is the signed and monumented Corps boundary line. There are three major roads; US Highway 67, State highway 172 and PP, six Wayne County roads 403, 546, 547, 548, 549, 650 and two Corps roads 32 and 33 that serve as access points. There are eight Corps parking areas, two of which allow camping and three boat ramps for lake access. The landscape is mostly forested with approximately 450 acres of scrub shrub, agricultural lease and open land communities managed in rotational mowing, disking and food plots.


Compartments 6 & 8
Patterson
Hwy 143
Hwy FF
US 67
Greenville
Hwy D
2,500 Acres
Hwy BB
4,000 Acres
Hwy 49
Hwy 172
Hwy W
Wappapello
Poplar Bluff
Hwy KK
Hwy T
Legend
Compartment 6
Compartment 8
State Highway
Wappapello Boundary
N
W
E
S
Bourbeuse R.
Meramec R.
Mississippi R.
Current R.
Eleven Point R.
St. Francis R.
Black R.

COPY

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

COPY

REPLY TO
ATTENTION OF:

June 6, 2011

Engineering and Construction Division
Curation and Archives Analysis Branch

Mr. Scott Miller, Governor
Absentee-Shawnee Tribe
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74810-9381

COPY

Dear Governor Miller:

The St. Louis District of the U.S. Army Corps of Engineers (Corps), is seeking your comments on a proposed action to implement timber stand improvement (TSI) management strategies on two timber compartments at Wappapello Lake, Wayne County, Missouri (see enclosed map and compartment descriptions). The purpose of this scoping letter is to inform interested parties of the proposed management activities and to solicit comments. Management activities would be conducted over the next 10 years and would include approximately 6500 acres in 33 separate stands. The objectives of the management strategies include the maintenance and improvement of native wildlife habitat and healthy indigenous trees, creation of Indiana Bat habitat, and increased watershed erosion protection. The Corps will be preparing an Environmental Assessment (EA) with Draft Finding of No Significant Impact (FONSI) in compliance with the National Environmental Policy Act (NEPA). You are receiving this letter because you may be interested in the project.

A quality timber management component at Wappapello Lake has been non-existent since the inception of the flood control reservoir. The lack of management/manipulation has lead to a degraded overall forest component in even-aged timber, diseased and dying timber, open forest, loss of nesting habitat, loss of filtering capabilities and undesirable tree species regeneration.

The current recommendation would consist of the following general management techniques.

(1) All forests would be managed on an uneven-aged multiple-use, sustained yield and ecosystem management system. Treatments would be based on specific requirements for improvement of forest and wildlife habitats. Timber harvests shall be performed when necessary to promote accepted wildlife and forest management goals and objectives. Forest stands would not be harvested solely for revenue generation.

(2) Single Tree Selection is the selective removal of low quality, cull, diseased, over-mature, or undesirable trees from a stand to achieve target stocking and wildlife habitat objectives. This technique is a tool used in uneven-aged management to encourage wider distribution of tree diameters, dominant species, age class and enhancement of forest reproduction. Because single tree selection promotes denser stands, frequent reassessments or inventories are required. These reassessments allow managers the ability to closely monitor compartments, therefore maintaining healthy forest and wildlife habitats.

(3) Group selection is a silvicultural technique requiring removal of large groups of trees to enhance regeneration and provide openings for wildlife. Generally, group selections range in size from one-fourth acre to five acres. Group selections on Wappapello Lake would not exceed three acres unless adequate justification is provided.

(4) Stand composition would be based on site-species relationships. Most of the forestland on Wappapello Lake contains an oak component; therefore, these species would be targeted for propagation. Efforts would be made to prevent monocultures, or single species stands. Exceptions would be made for small plantings of pine stands that provide a specific habitat type for certain wildlife species. Stands suitable as pine-hardwood would be encouraged because, historically, this type was once common on project lands.

(5) Prescribed fire would be utilized for vegetation modification and control where these benefits would promote diversity for wildlife habitats. Examples include old fields, pine stands, glades, and oak savannas. Burn frequency would be dependent on the requirements of the wildlife species, successional stage, and fuel loads.

(6) Harvesting of forest products would be performed as a method of improving forest habitats. All harvesting activities would be performed in a manner that minimizes damage to residual trees, reproduction, and soils. This may require restrictions on equipment and the time of year harvesting is scheduled. Existing roads and trails would be utilized when possible or temporary accesses would be used for the harvesting activities. After harvest, all roads would be planted in wildlife cover crops such as wheat, oats or rye grass. Waterbars would be placed at intervals necessary to prevent erosion. Stream courses would be delineated and protected. Harvesting would be limited to single tree selection in stream management zones. All trees selected for removal would be marked with tree marking paint.

(7) Den trees, or trees that have potential as den trees, would be retained in all stands. Where possible, a standard rule would be to retain or develop six to eight den trees per acre. Dead trees and snags, when not posing a threat to persons or property, would be left.

(8) When wildfire, disease, insects, floods, or storms damage extensive numbers or acres of trees, every attempt would be made to remove these trees by salvage sale. Salvage operations would be performed as soon as practicable after the event to prevent deterioration of wood quality.

Major issues to be addressed include protection of threatened and endangered species, protection of important cultural resources, impacts to vegetation, water resources and wildlife, and invasive/undesirable species management. The scope of the environmental analysis would include the direct, indirect and cumulative impacts to all applicable resources.

If you have further questions or need additional information concerning this project, please contact Ms. Roberta L. Hayworth at 314-331-8833, roberta.l.hayworth@usace.army.mil. Written comments may be sent to US Army Corps of Engineers, St. Louis District, ATTN: CEMVS-EC-Z (Hayworth), 1222 Spruce St., St. Louis, MO 63103-2833. Please respond by close of business on July 15, 2011.

Sincerely,

Michael K. Trimble, Ph.D.
Chief, Curation and Archives
Analysis Branch

COPY

COPY

Enclosures

Copy Furnished:

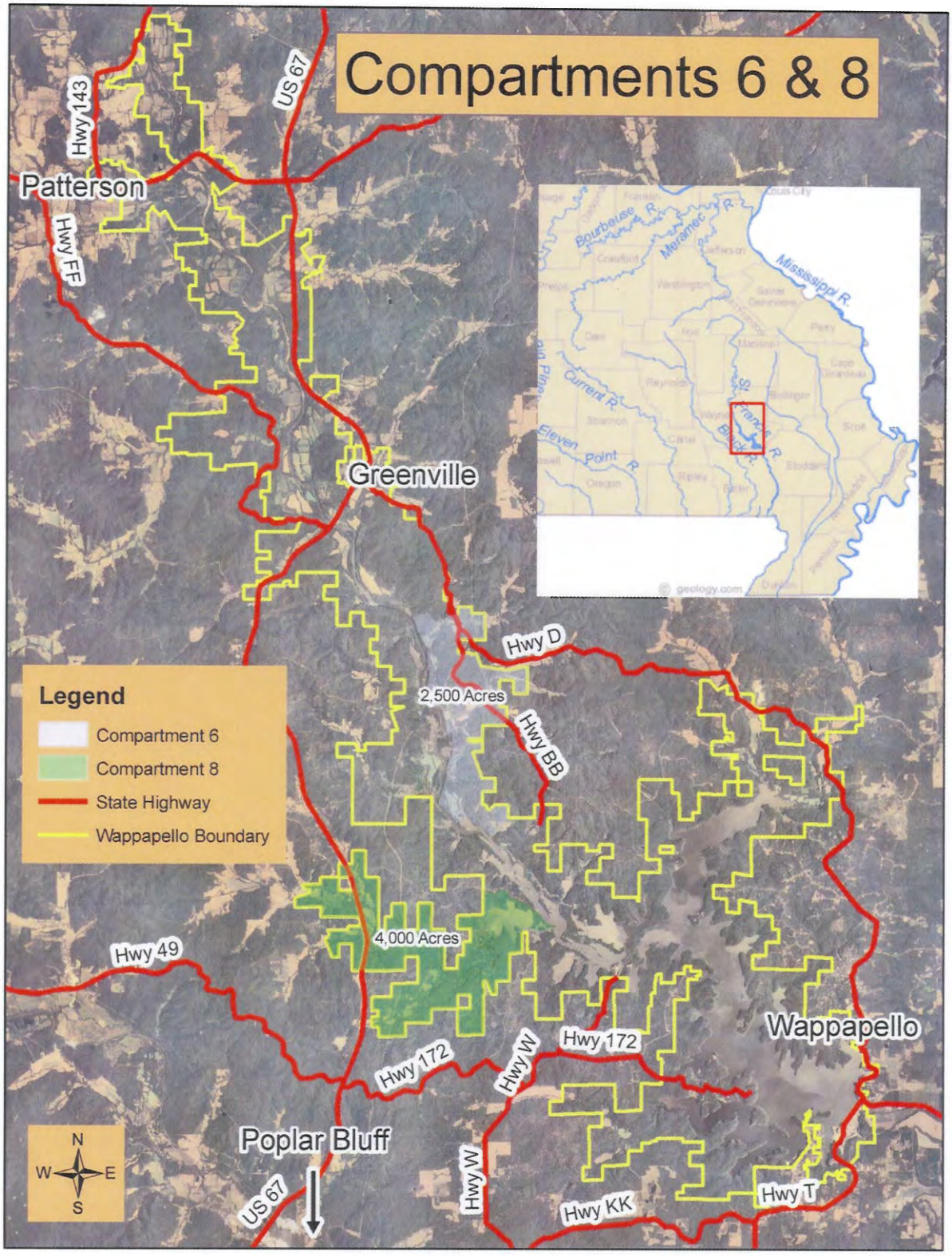
Henrietta Ellis

COPY

Compartment Descriptions

Compartment 6 is approximately 2500 acres (T 28N, R 6E, Sections 28, 29, 32, 33 and T 27N, R 6E, Sections 3, 4, 9, 10) identified as Blue Springs. It is comprised of 17 stands and is located on the east side of Wappapello Lake between Greenville, Missouri and Wappapello, Missouri. The northernmost boundary is Corps road 17 known as Sulphur Springs and the southernmost boundary is Corps road 14 known as Page Branch. The eastern boundary is the signed and monumented Corps boundary line and the western boundary is Wappapello Lake. There are two major roads; State Highway D and BB, two Wayne County roads 531/532 and five Corps roads 14, 15, 15A, 16, and 17 that serve as access points. There is eleven Corps parking areas, eight of which allow camping and three boat ramps for lake access. The landscape is mostly forested with approximately 400 acres of scrub shrub and open land communities managed in rotational mowing, disking and food plots.

Compartment 8 is approximately 4000 acres (T 27N, R 5E, Section 13; T 27N R 6E Sections 7, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30) identified as Otter Creek. It is located on the west side of Wappapello Lake between Greenville, Missouri and Poplar Bluff, Missouri. The northernmost boundary is the signed and monumented Corps boundary line and Wayne County Road 546 and the southernmost boundary is the signed and monumented Corps boundary line. The eastern boundary is Wappapello Lake and the western boundary is the signed and monumented Corps boundary line. There are three major roads; US Highway 67, State highway 172 and PP, six Wayne County roads 403, 546, 547, 548, 549, 650 and two Corps roads 32 and 33 that serve as access points. There are eight Corps parking areas, two of which allow camping and three boat ramps for lake access. The landscape is mostly forested with approximately 450 acres of scrub shrub, agricultural lease and open land communities managed in rotational mowing, disking and food plots.


Compartments 6 & 8
Patterson
Hwy 143
Hwy FF
US 67
Greenville
Hwy D
2,500 Acres
Hwy BB
Legend
Compartment 6
Compartment 8
State Highway
Wappapello Boundary
4,000 Acres
Hwy 49
Hwy 172
Hwy W
Wappapello
Poplar Bluff
US 67
Hwy W
Hwy KK
Hwy T
N
W
E
S
Bourbeuse R.
Meramec R.
Mississippi R.
Current R.
Eleven Point R.
St. Francis R.
Black R.
geology.com

Same letter Sent
Tribal Leaders

Mr. Scott Miller, Governor
Absentee-Shawnee Tribe
2025 S. Gordon Cooper Drive
Shawnee, OK 74810-9381

Ms. Glenna J. Wallace, Chief
Eastern Shawnee Tribe
P.O. Box 350
Seneca, MO 64865

Mr. Ron Sparkman, Chairman
Shawnee Tribe
P.O. Box 189
Miami, OK 74355

Mr. Chad Smith, Principal Chief
Cherokee Nation of Oklahoma
P.O. Box 948
Tahlequah, OK 74465

Mr. George Wickliffe, Chief
United Keetoowah Band of Cherokee
P.O. Box 746
Tahlequah, OK 74464

Mr. Kerry Holton, President
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Ms. Paula Pechonick, Chief
Delaware Tribe of Oklahoma
170 N. Barbara
Bartlesville, OK 74006

Mr. Thomas E. Gamble, Chief
Miami Tribe
P.O. Box 1326
202 S. Eight Tribes Trail
Miami, OK 74355

Mr. John D. Red Eagle, Principal Chief
Osage Nation
P.O. Box 779
Pawhuska, OK 74056

Mr. John Froman, Chief
Peoria Tribe
118 S. Eight Tribes Trail
P. O. Box 1527
Miami, OK 74355

Mr. John Berrey, Chairman
Quapaw Tribe
P.O. Box 765
Quapaw, OK 74363

Same Letter Sent
Tribal Representatives

Ms. Henrietta Ellis
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe
2025 S. Gordon Cooper Drive
Shawnee, OK 74810-9381

Ms. Robin DuShane
NAGPRA Representative
Eastern Shawnee Tribe
P.O. Box 350
Seneca, MO 64865

Ms. Kim Jumper
Historic Preservation Office
Shawnee Tribe
P.O. Box 189
Miami, OK 74355

Ms Jody Hays
Tribal Administrator
Shawnee Tribe
P.O. Box 189
Miami, OK 74355

Dr. Richard Allen
NAGPRA Representative
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Ms. Lisa Stopp
Tribal Historic Preservation Office
United Keetoowah Band of Cherokee
P.O. Box 746
Tahlequah, OK 74464

Ms. Tamara Francis
NAGPRA Representative
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Dr. Bryce Obermeyer
Delaware Tribe of Oklahoma
1420 C of E Drive
Emporia, KS 66801

Mr. George Strack
Tribal Historic Preservation Officer
Miami Tribe
P.O. Box 1326, 202 S Eight Tribes Trail
Miami, OK 74355

Dr. Andrea Hunter
Osage Nation
Historic Preservation Office
627 Grandview
Pawhuska, OK 74056

Mr. Frank Hecksher
Peoria Tribe
118 S. Eight Tribes Trail
P.O. Box 1527
Miami, OK 74355

Ms. Jean Ann Lambert
Tribal Historic Preservation Officer
Quapaw Tribe of Oklahoma
P.O. Box 765
Quapaw, OK 74363

Cook, Kenneth M MVS

From: McDonald, Jim [jamcdonald@fs.fed.us]
Sent: Tuesday, June 07, 2011 2:42 PM
To: Cook, Kenneth M MVS
Cc: Bryan, Becky; Paxton, Bill
Subject: Letter of 1 June 2011 re: Timber Stand Improvement Strategies, Wappapello Lake Vicinity

Categories: WAPPAPELO

Mr. Cook,

Thank you for the scoping letter regarding the Corps' proposed timber stand improvement activities. The most appropriate office for comment on this proposal is our Poplar Bluff Ranger District, 1420 Maud Street. Phone: 573-785-1475. Bill Paxton is the Environmental Coordinator for Poplar Bluff, and I will fax him a copy of your letter.

Notwithstanding the fact that substantive responses are most likely to come from Poplar Bluff, I would appreciate it if you would continue to send copies of public documents related to the proposal (requests for comment, EA, etc.) to me. You may substitute my name for Pat Rowell's at 626 E. Wisconsin Ave., Suite 700, Milwaukee, WI 53202. I am very interested in seeing how the Corps approaches analysis of such proposals. Thanks in advance.

--

Jim McDonald

US Forest Service, Eastern Region

Regional Environmental Coordinator

(414) 297-3659

Cook, Kenneth M MVS

From: Shauna_Marquardt@fws.gov
Sent: Tuesday, June 14, 2011 2:24 PM
To: Cook, Kenneth M MVS
Cc: Lemons, Eric G MVS
Subject: Wappapello Lake Timber Stand Improvement

Categories: WAPPAPELO

Hi Ken,

This message is in response to your inquiry about the timber managment project that will take place on 6500 acres of COE lands near Wappapello.
Because this is not a water resource project and because a biological opinion (BO) was written to address the original Route 67 Corridor Improvement project and subsequent improvments to Indiana bat habitat, no Coordination Act Report is necessary.

Thank you for sending the Cooperative Agreement between MODOT and COE. I sent the 2007 BO to you in an e-mail earlier today. Based on these two documents it appears that MODOT coveyed to COE $45,000 for Indiana bat habitat restoration on 460 acres to fulfill requirements outlined in the Reasonable and Prudent Measures of the 2007 BO. I would like to handle the large timber managment project and the Indiana bat habitat restoration project as related but separate efforts. We can address concerns regarding Listed Species and other Fish and Wildlife Resources for the EA for the umbrella project and then get into more specifics for the Indiana bat habitat restoration project. Because the restoration effort was required in the 2007 BA, the measures to meet these requirements need to be tracked separately even though they are occuring in the same project area.

I offer the following comments on the umbrella timber managment plan relative to Listed Species and Fish and Wildlife Resources in the project
area:

Listed Species

Indiana Bat (Myotis sodalis) - Indiana bats roost in living, injured (e.g.
split trunks and broken limbs from lightning strikes or wind), dead or dying trees.
Maintaining quality maternity colony roost trees (those trees used by female Indiana bats and their young) is essential to reproductive success and long term recovery goals for this endangered species. Indiana bat roost trees tend to be greater than 9 inches diameter at breast height
(dbh) (optimally greater than 20 inches dbh) with loose or exfoliating bark. Most important are structural characteristics that provide adequate space for bats to roost. Preferred roost sites are located in forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost tree, which is usually within 0.6 miles of water. Indiana bats forage for flying insects (particularly moths) in and around the tree canopy of floodplain, riparian, and upland forests.

Indiana bats are known to use forested and riparian areas for foraging and roosting. Summer habitat requirements for the species are not well defined but the following are considered important: 1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas; 2) live trees (such as shagbark hickory and oaks) that have exfoliating bark; 3) stream corridors, riparian areas, and upland woodlots which provide foraging habitat.

Indiana bats have been documented in the Brown's Hollow area of Mark Twain National Forest that is within 3 miles of compartment 6. Pregnant females were captured indicating active maternity habitat. It is likely that Indiana bats also occur in the project area. Measures to avoid direct take of the species during the maternity period should be taken. Such measures include determination of bat presence and use in the project area through surveys, location of primary and alternative roosts through capture and radio-telemetry of bats, and timing the on-the-ground work to occur during a time when bats are inactive.

Because Indiana bats tend to prefer canopy and mid- and under-stories that are relatively open, forest managment practices, such as thinning, are being incorporated into habitat restoration plans for Indiana bats. These more typical forestry practices can be combined with habitat manipulations that are specific to Indiana bats and benefical to other forest wildlife, such as selection of preferred roost tree species, retention/creation of snags, creation of foraging corridors, and goals for basal area that are more conducive to foraging and increase sun exposure to potential roost trees. The proposed forest management plan for compartments 6 and 8 could easily be tailored to include some of these Indiana bat specific measures.

Gray Bat (Myotis grisescens) - The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States, including Missouri. With rare exception, the gray bat roosts in caves year-round.
In winter, most gray bats hibernate in vertical (pit) caves with cool, stable temperatures below 10 degrees Celsius. Summer caves, especially those used by maternity colonies, are nearly always located within a kilometer (0.6 mile) of rivers or reservoirs over which bats feed. The summer caves are warm with dome ceilings that trap body heat. Most gray bats migrate seasonally between hibernating and maternity caves, and both types of caves are located in Missouri. Gray bats are active at night, foraging for insects over water or along shorelines, and they need a corridor of forest riparian cover between roosting caves and foraging areas. They can travel as much as 20 kilometers (12 miles) from their roost caves to forage.

The gray bat also has been documented in the Brown's Hollow area of Mark Twain National Forest within 3 miles of compartment 6. The documented individual was a pregnant female indicating that maternity habitat is likely in close proximity to the project area. Whereas, gray bats roost in caves year-round, disturbance to above ground roosts is not a concern as it is for Indiana bats. However, disturbance to cave roosts throughout the year should be avoided, especially disturbance to hibernacula in the winter when most forest managment work occurs. At this time, no hibernacula or maternity caves have been documented in the project area. If bats are observed entering or exiting a cave, please contact our office for further guidance.

Fish and Wildlife Resources

Bald Eagle (Haliaeetus leucocephalus) - Bald eagle nests are known to exist near the proposed project area on the western shore of Lake Wappapello.
One nest is within 2.5 miles and two more nests have been documented within
8 miles of compartment 8. Although bald eagles are no longer protected under the Endangered Species Act, federal protections remain in place under the Bald and Golden Eagle Protection and Migratory Bird Treaty Acts. The period January 1 to March 1 is important for initiating nesting activity and March 1 to May 15 is the most critical time for incubation and rearing of young. To fully assess the potential impacts of the project on bald eagles, refer to the National Bald Eagle Management Guidelines:
(http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf
), which include recommendations to avoid effects to eagles. Please ensure that project construction timing and activities are consistent with the recommendations outlined in the guidelines.

As this timber managment project develops, I would like to visit with you more about opportunities to execute some of the bat-specific habitat measures mentioned above. It seems like there is a great opportunity for coordination among the USFS, COE, MODOT, and USFWS to create a substantial complex of suitable Indiana bat habitat in the Brown's Hollow area. It would be highly beneficial to have data on bats and forest stands pre- and post- treatment and I would like to explore options for collecting such data. We have alot to learn about Indiana bats and the best ways to restore their habitat. Projects such as this are extremely valuable in filling in some of those gaps in knowledge. I think it would be helpful to all parties to have a field trip to Brown's Hollow/Wappapello with representatives from all agencies present to discuss this effort. I would like to have Megan Harris from the USFS present and she is out of the office until July and I will be out the first week in July. We can talk about the prescriptions that are being implemented on the MTNF and what similar practices could be carried over to COE lands.

Thank you for the opportunity to comment on the timber management project at Wappapello Lake. If you have any questions or need further information please do not hesitate to contact me. I look forward to working with you on this project.

Shauna

~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*

Shauna R. Marquardt
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, MO 65203
573/234-2132 x174 (office)
573/289-7610 (cell)
573/234-2181 (fax)

~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*~*

SIERRA CLUB
FOUNDED 1892
MISSOURI CHAPTER

Missouri Chapter

7164 Manchester Ave, Saint Louis, MO 63143
Phone: (314) 644-1011
http://missouri.sierraclub.org

June 23, 2011

Mr. Thomas Keevin, Ph.D
Chief, Planning and Environmental Branch
U. S. Army Corps of Engineers, St. Louis District, Environmental Branch PD-E
1222 Spruce St. , St. Louis, MO 63103-2833

To Mr. Keevin,

Thanks for the opportunity to comment on the proposed timber stand improvement management strategies at Wappapello Lake, Wayne County, Missouri.

1. Regarding wildfire, flood, or storm damage to extensive numbers of trees, the proposed use of salvage operations to immediately remove damaged trees treats these events as catastrophes that demand intervention rather than natural events that benefit the ecology of the region. As mentioned elsewhere in the letter, dead trees have value as den trees. They also stabilize the soil and regulate water flow and their eventual decay recycles nutrients back to the forest. The plan objective to improve wildlife habitat and prevent soil erosion is better served without salvage operations on a large scale except under the most extraordinary circumstances.

2. Where logging is needed to improve the forest, the plan calls for protection of streams. It is important that both perennial and intermittent streams be protected and this should be specifically stated in the plan.

3. The letter states that the plan will address Indiana bat habitat. We hope the plan will be specific on how these bats will be protected, both foraging and roosting, and how their populations can be increased.

Thank you for consideration of these comments.

Cheryl Hammond, Conservation Chair, Missouri Sierra Club (email: info@todaydata.com)

Cheryl Hammond

Caroline Pufalt, Conservation Committee Member

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

June 29, 2011

Kenneth M. Cook
Environmental Analysis Branch
Corps of Engineers, St. Louis District
1222 Spruce Sstreet
St. Louis, Missouri 63103-2833

Re: Timber Stand Improvements, Lake Wappapello (COE) Wayne County, Missouri

Dear Mr. Cook:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR part 800, which require identification and evaluation of cultural resources.

We have reviewed the information provided concerning the above referenced project. We have determined that there is a moderate to high potential for the presence of archaeological sites near and within the area of the proposed project, as indicated by the topographic location, and that an archaeological survey, with deep testing as deemed appropriate, should be conducted. This survey should be completed prior to the initiation of project-related construction activities.

A list of independent archaeological contractors who can perform such services is available through the Department of Natural Resources, Division of Administrative Support. The list can be obtained by calling (573) 751-0958 and requesting the "archaeological contractors list." Note that any 36 CFR Part 61 qualified archaeologist may perform an archaeological survey. If you choose a contractor not on the list, please be certain to include his or her curriculum vitae in the report. We would appreciate one (1) hard copy and one (1) pdf copy of the archaeological survey report when it is finished so we may complete the review and comment process.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call Ms. Deel at 573/751-7862. Please be sure to include the SHPO Log Number (**021-WE-11**) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Mark A. Miles
Director and Deputy
State Historic Preservation Officer

c Joe Cothern, EPA
Michael Trimble, COE/STL

Recycled Paper

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

June 30, 2011

Mr. Ken Cook
US Army Corps of Engineers
St. Louis District
Environmental Branch PD-E
1222 Spruce St.
St. Louis, MO 63103-2833

Re: Timber Stand Improvement Project at Wappapello Lake

Dear Mr. Cook:

As requested in Mr. Thomas M. Keevin's letter dated June 1, the Missouri Department of Natural Resources (department) has reviewed the project information provided. This project consists of a proposed action to implement timber stand improvement management strategies at Wappapello Lake in Wayne County. The department offers the following comments for your consideration.

Ambient Air Quality
The project is located in Wayne County, which is currently designated unclassifiable/Attainment for all national ambient air quality standards. You should be aware that the U.S. Environmental Protection Agency has recently established new ambient air quality standards for nitrogen dioxide (NO2) and sulfur dioxide (SO2) and is considering new, stricter ozone and particulate matter standards, which could impact this area in the future. The activities associated with this proposed project should not significantly affect local or regional air quality.

Open burning
State regulation 10 CSR 10-6.045 prohibits the open burning of tires, petroleum-based products, asbestos containing materials, and trade wastes except as otherwise allowed by the rule. Open burning that causes or contributes to a public health hazard, nuisance, or a hazard to vehicular or air traffic is not allowed.

State regulation 10 CSR 10-6.045 only allows for open burning of vegetative debris from land clearing operations outside the city limits of an incorporated area or municipality and outside of the Kansas City, St. Louis and Springfield Metropolitan Areas and at a distance of more than 200 yards from the nearest inhabited dwelling. For open burning of vegetative waste that does not meet these restrictions, the department's Regional Office responsible for that location must be

Recycled Paper

notified to determine if a permit to allow the burning can be issued. The Southeast Regional office can be reached at 573-840-9750.

Fugitive Dust
State regulation 10 CSR 10-6.170 restricts particulate matter emissions from leaving the premises of origin. Efforts must be made to prevent any fugitive dust that may result from any activities associated with this proposed project from leaving the property where it originated.

Best Management Practices (BMPs): Forestry and stormwater BMPs must be in place prior to any timber harvesting to protect the stream's chemical, physical and biological characteristics, especially pre- and post-construction of access roads. The Missouri Department of Conservation provides protocols and BMPs to protect the soil and water quality during timber harvesting. Streams and wetlands must be protected from stormwater carrying sediment or other pollutants into them. Re-establish native vegetation as soon as possible on any stream banks and riparian corridors denuded of vegetation. Heavy equipment must stay out of the water as much as possible.

Unclassified Streams: The property contains many unclassified waters. Unclassified streams are protected by the general water quality criteria outlined in 10 CSR 20-7.031(3). One should be vigilant that activities near unclassified waters do not exceed general water quality criteria.

Classified Streams: Two classified waters exist in the Otter Creek-Compartment 8. Otter Creek, Water Body Identification Number 2962, is classified for six miles as a permanently-flowing water with the designated beneficial uses of protection of aquatic life and human health-fish consumption, livestock and wildlife watering, and whole body contact recreation-Category B. The Otter Creek flows generally from northwest to southeast. Wet Fork, Water Body Identification Number 2964, is classified for 2.4 miles as a permanently-flowing water with the designated beneficial uses of protection of aquatic life and human health-fish consumption, livestock and wildlife watering, and whole body contact recreation-Category B. As a tributary to Otter Creek, Wet Fork flows generally from the northwest to the southeast. Through their designated beneficial uses, the streams shall be protected by numeric water quality criteria contained in 10 CSR 20-7.031(4) and Table A. One should be vigilant that activities near classified waters do not exceed general or numeric water quality criteria.

Karst Topography – Losing Streams: According to existing data, a few losing streams appear to the west and northwest of the proposed area. We recommend that you contact the department's Division of Geology and Land Survey to determine if there is more recent data and potentially additional sites. Should losing streams be found, additional precautions and BMPs should be put in place to protect the area's sensitive water quality and ecology at all times. Losing streams are protected by stringent effluent regulations [10 CSR 20-7.015(1)(A)(3) and (4)] and Water Quality Standards [10 CSR 20-7.031(1)(N), (4)(C) and (11)]. One should be vigilant that activities near losing streams do not violate the above referenced effluent regulations or water quality standards.

Karst Topography – Springs, Sinkholes and Caves: There are several springs, caves and sinkholes in or near the proposed area. One should be vigilant that activities near these resources do not adversely impact water quality, as Karst features can provide a more direct access to sensitive species and groundwater. Should the construction impact these areas, extra precautions may be necessary to protect these sensitive resources.

Sensitive Waters: According to the current information available, there are no cold water fisheries, outstanding state and national resource waters, metropolitan no-discharge streams, or biocriteria reference locations within or near the property.

Classified Lakes: Wappapello Lake, Water Body Identification Number 7336, is classified as an 8,200-acre impoundment with the designated beneficial uses of protection of aquatic life and human health-fish consumption, livestock and wildlife watering, secondary contact recreation and whole body contact recreation-Category A. Through its designated beneficial uses, the lake shall be protected by numeric water quality criteria contained in 10 CSR 20-7.031(4) and Table A. One should be vigilant that activities near classified waters do not exceed general or numeric water quality criteria.

Impaired Waters: Wappapello Lake is listed as impaired for chlorophyll, nitrogen, and phosphorus due to rural nonpoint source pollution for its entire 8,200 acres. Be sure that any activities related to the project do not increase the amount of pollutants impairing the lake.

Water Quality Certification: A permit under Section 404 of the Clean Water Act issued by the U.S Army Corps of Engineers and a Water Quality Certification under Section 401 will be required should any jurisdictional wetlands or streams be impacted. Should any jurisdictional waters be impacted, please contact the department's 401 Certification Unit at (573) 751-1300 for more information.

National Wetland Inventory: According to the National Wetland Inventory Data, there are potentially wetlands on the property, mostly around the impoundment and streams. If wetlands are found, take care to avoid and then minimize any impacts through alternatives analyses before compensatory mitigation is considered. If wetlands are not directly impacted but are near any land disturbance, take care to protect the water quality, especially due to sedimentation.

Land Disturbance Permits: Should work disturbing an area of one acre or more be a part of the proposed action, a Land Disturbance Permit is required to be acquired prior to any earth work. Please contact the department's Southeast Regional Office at (573) 840-9750 for permit information.

The department has issued a current land disturbance permit near the project area at Holiday Landing Wetland Area, NPDES Permit No. MO-R109FH9. The permit has three outfalls and was issued August 19, 2010.

Public Drinking Water Protection Areas: One public drinking water well 20 year travel time zone exists in or near the project area. Should the sponsor operate near the known well, determine if the project will impact unknown wells, or if additional information is needed please contact the department's Public Drinking Water Branch at (573) 751-5331.

Public Land: The Department does not have any property near the project area. Mark Twain National Forest surrounds the property. Contact the U.S. Forest Service for information.

Ecological Drainage Unit: The property lies within the Ozark/Upper St. Francis/Caster Ecological Drainage Unit.

Watersheds: The proposed project location is in the Caldwell Creek-St. Francis River Sub-Watershed (HUC 08020202 05 06) and Otter Creek Sub-Watershed (HUC 08020202 05 05).

Geospatial Data: Department geospatial data is available upon request, and all published data is available on the Missouri Spatial Data Information Service website at http://msdis.missouri.edu/.

The department appreciates the opportunity to review this project and provide comments. If you have any additional questions or concerns, please feel free to contact me at 573-751-7402 or Ms. Kelsey Thompson of my staff at 573-751-6856.

Sincerely,

DEPARTMENT OF NATURAL RSOURCES

Robert D. Stout
Chief of Policy

RDS:ktj

Cook, Kenneth M MVS

Subject: FW: Wappapello Lake Timber Management Proposal

-----Original Message-----
From: hank dorst [mailto:whiteoak@gotrain.org]
Sent: Friday, July 01, 2011 3:15 PM
To: Cook, Kenneth M MVS
Subject: Wappapello Lake Timber Management Proposal

Mr Ken Cook

Environmental Analysis Branch
US Army Corps of engineers

We support the proposal to use Uneven Age Management to manage timber in Compartments 6 and 8 at Wappapello Lake as described in the scoping letter of June 1, 2011.
As per reference to creation of Indiana bat habitat, we refer you to the Brown's Hollow Project on the Poplar Bluff Ranger District of the Mark Twain National Forest.

Who will be the siliviculturalist / timber management team? Will this be managed in-house or by contract?

Please keep us informed as the Environmental Assessment process continues.

Sincerely, Hank Dorst
Coordinator, Mark Twain Forest Watchers
July 1, 2011

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

28 July 2011

Environmental Compliance Branch

Dear Sir or Madam:

The St. Louis District of the U.S. Army Corps of Engineers (Corps) recently sought your comments on a proposed action to implement timber stand improvement (TSI) management strategies on two timber compartments at Wappapello Lake, Wayne County, Missouri. The purpose of this letter is to inform you that the Environmental Assessment (EA) has been expanded to include an additional compartment (Compartment 2) composed of 12 stands on approximately 5,500 acres – see compartment description below and enclosed map. Timber stand improvements activities would be similar to those mentioned in the 1 June 2011 scoping letter and would also be conducted over the next ten years. The primary objectives of the TSI management strategies include the maintenance and improvement of native wildlife habitat and healthy indigenous trees, creation of Indiana Bat habitat, and increased watershed erosion protection. In addition, a salvage timber harvest from May 2011 tornado damage is proposed on roughly 135 acres and would be conducted as soon as possible following compliance with the National Environmental Policy Act.

Major issues to be addressed in the EA include protection of threatened and endangered species, protection of important cultural resources, impacts to vegetation, water resources and wildlife, and invasive/undesirable species management. The scope of the environmental analysis will include the direct, indirect and cumulative impacts to all applicable resources

Please provide any comments or issues you may have regarding this project. For questions, comments please contact: Mr. Ken Cook of our Environmental Analysis Branch, telephone 314-331-8498 **facsimile number** (314) 331-8606, or **e-mail** at kenneth.m.cook@usace.army.mil. Written comments may be sent to our address below, ATTN: Environmental Compliance Branch (PM-E, Cook). Please respond by close of business on August 30, 2011.

Address:
US Army Corps of Engineers
St. Louis District
Environmental Compliance Branch PD-E
1222 Spruce St.
St. Louis, MO 63103-2833

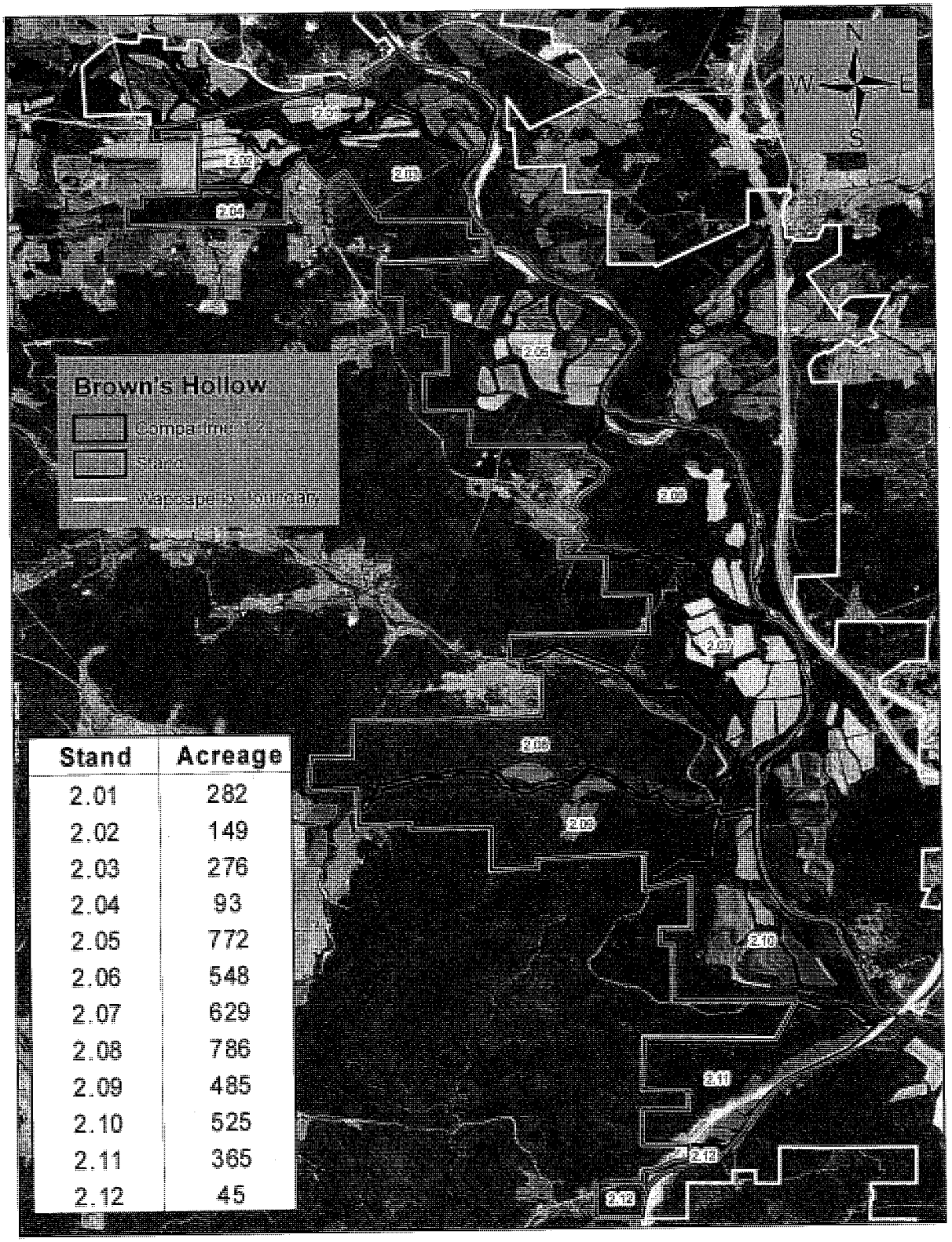
Sincerely,

Thomas Keevin

Thomas M. Keevin, Ph.D
Chief, Planning and Environmental Branch

Compartment 2 Description

Compartment 2 is approximately 5500 acres (T 29N, R 5E, Sections 2, 3, 4, 10, 11, 14, 22, 23 and T 28N, R 5E, Sections 16, 17, 20, 21, 22, 27, 28, 34, 35) identified as Browns Hollow, and is comprised of 12 stands located on the west side of Wappapello Lake between the Greenville, Missouri and Patterson, Missouri. The northernmost boundary is State Highway 34 and the southernmost boundary is US Highway 67. The western boundary is the signed and monumented Corps boundary line and the eastern boundary is Wappapello Lake. There are four major roads; State Highways 34/FF/A and US Highway 67 three Wayne County roads 313//378/380 and four Corps roads 26, 27, 28, and 29 that serve as access points. There are ten Corps parking areas, all allow camping and one boat ramp two gravel bars are available for lake/river access. The landscape is half forested with approximately 2500 acres of scrub shrub and open land communities managed in rotational mowing, disking, food plots and agricultural leases.



Stand	Acreage
2.01	282
2.02	149
2.03	276
2.04	93
2.05	772
2.06	548
2.07	629
2.08	786
2.09	485
2.10	525
2.11	365
2.12	45

Cook, Kenneth M MVS

Subject: FW: TSI Management at Wappapello Lake, Wayne County, MO

-----Original Message-----
From: Becky Denney [mailto:dardenney@sbcglobal.net]
Sent: Friday, August 05, 2011 10:17 PM
To: Cook, Kenneth M MVS
Subject: TSI Management at Wappapello Lake, Wayne County, MO

Attn: Environmental Compliance Branch (PM-E, Cook)

Dear Sir:

I would like to comment on the proposed action to do TSI and to expand that to a 3rd compartment at Wappapello Lake, Wayne County, MO.

I am supportive of efforts to control or prevent invasive species and believe early intervention is best with as little use of chemical as possible.

The forest at Wappapello Lake is extremely important to the ecological health of the area and lake and to the recreational value as well. It is important that a variety of species and various sizes of trees be a part of the forest so there is resiliency so the forest can recover from extreme weather, even tornados. Best Practices must be used so that equipment and roads don't cause erosion of soil and damage to trees and other native plants.

Thank you,

Betty Denney
Dardenney@sbcglobal.net
6410 Arthur Ave
St. Louis, MO 63139
314-645-3394

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

August 12, 2011

COPY

Engineering and Construction Division
Curation and Archives Analysis Branch

Mr. Scott Miller, Governor
Absentee-Shawnee Tribe
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74810-9381

Dear Governor Miller:

In a letter dated June 6, 2011, the St. Louis District, U.S. Army Corps of Engineers sought your comments on a proposed action to implement timber stand improvement (TSI) management strategies on two timber compartments at Wappapello Lake, Wayne County, Missouri. The purpose of this letter is to inform you that the Environmental Assessment (EA) has been expanded to include an additional compartment (Compartment 2) composed of 12 stands on approximately 5,500 acres (see enclosed map with Compartment 2 description). Timber stand improvement activities would be similar to those mentioned in the June 6, 2011, letter and would also be conducted over the next ten years. The primary objectives of the TSI management strategies include the maintenance and improvement of native wildlife habitat and healthy indigenous trees, the creation of Indiana Bat habitat, and increased watershed erosion protection. In addition, a salvage timber harvest from May 2011 tornado damage is proposed on roughly 135 acres and would be conducted as soon as possible following compliance with the National Environmental Policy Act.

Major issues to be addressed in the EA include protection of threatened and endangered species, protection of important cultural resources, impacts to vegetation, water resources and wildlife, and invasive/undesirable species management. The scope of the environmental analysis will include the direct, indirect, and cumulative impacts to all applicable resources.

COPY

All tribes affiliated with Wappapello Lake have been notified about this work. If your tribe would like to consult on this project, please notify us by September 23, 2011, so you can be added to the consultation list. If your tribe has no interest in this work, please notify us as soon as possible and we will remove you from the consultation list. If you have any questions regarding this matter, please contact Ms. Roberta L. Hayworth, Native American Coordinator, at (314) 331-8833, or by electronic mail at roberta.l.hayworth@usace.army.mil. A copy of this letter is being furnished to Ms. Henrietta Ellis.

Sincerely,

Chris Kellar

for Michael K. Trimble, Ph.D.
Chief, Curation and Archives
Analysis Branch

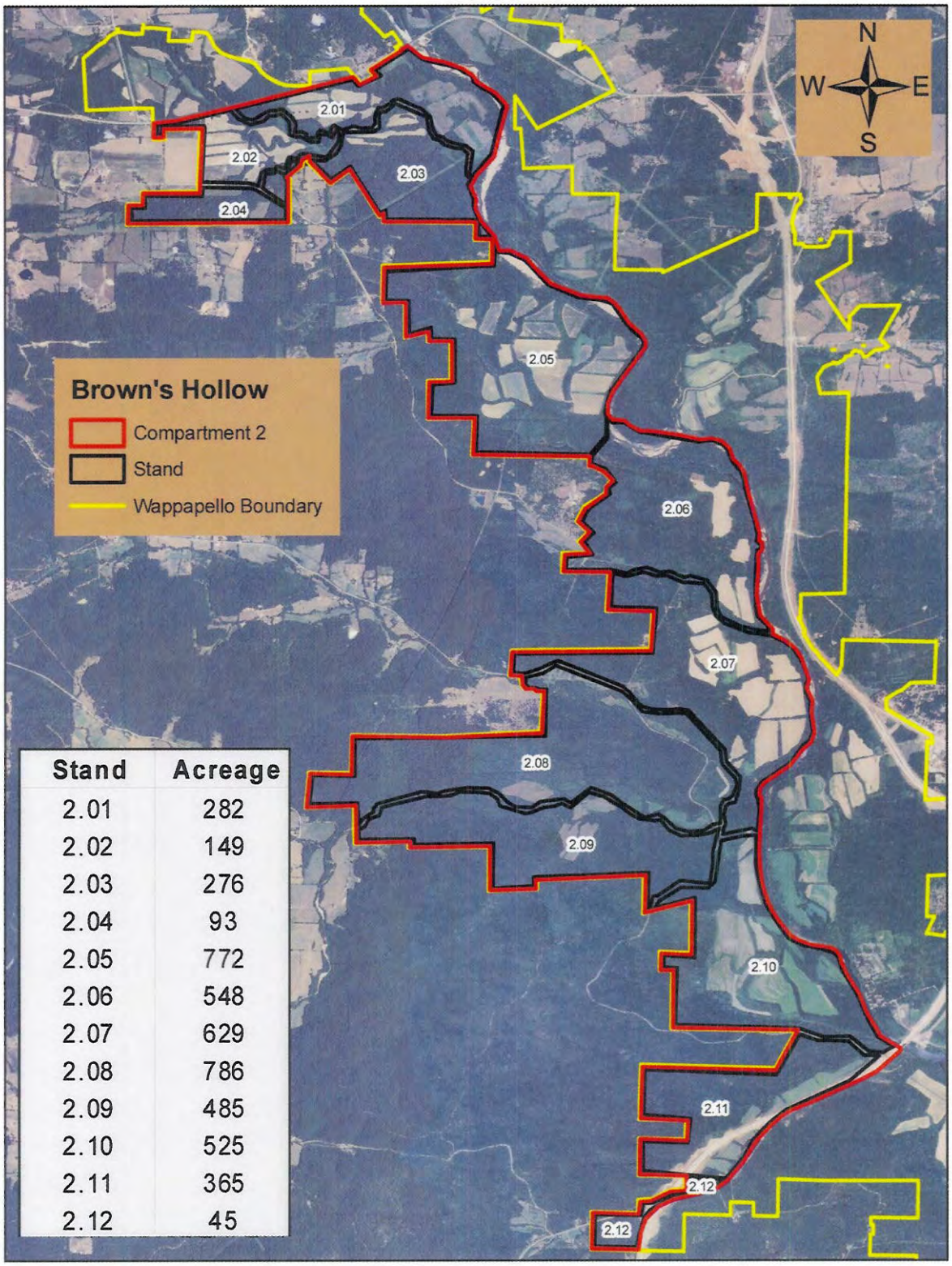
Enclosures

COPY

ENCLOSURES

Compartment 2 Description

Compartment 2 is approximately 5,500 acres (T 29N, R 5E, Sections 2, 3, 4, 10, 11, 14, 22, 23 and T 28N, R 5E, Sections 16, 17, 20, 21, 22, 27, 28, 34, 35) identified as Browns Hollow and is comprised of 12 stands located on the west side of Wappapello Lake between Greenville, Missouri, and Patterson, Missouri. The northernmost boundary is State Highway 34, and the southernmost boundary is US Highway 67. The western boundary is the signed and monumented Corps boundary line, and the eastern boundary is Wappapello Lake. The four major roads are, State Highways 34, FF, and A; US Highway 67; Wayne County roads 313, 378, and 380; and Corps roads 26, 27, 28, and 29 that serve as access points. There are 10 Corps parking areas that allow camping, one boat ramp, and two gravel bars available for lake/river access. The landscape is half forested with approximately 2,500 acres of scrub shrub and open land communities managed in rotational mowing, disking, food plots, and agricultural leases.



Stand	Acreage
2.01	282
2.02	149
2.03	276
2.04	93
2.05	772
2.06	548
2.07	629
2.08	786
2.09	485
2.10	525
2.11	365
2.12	45

From: Lisa Larue [llarue@unitedkeetoowahband.org]
Sent: Thursday, August 18, 2011 4:43 PM
To: Hayworth, Roberta L MVS
Subject: Wappapello Lake, Wayne County, MO

Follow Up Flag: Follow up
Flag Status: Flagged

The United Keetoowah Band of Cherokee Indians in Oklahoma has no objection to this project. However, as always, if any human remains are inadvertently discovered, please cease work and notify us immediately.

Lisa LaRue

Acting Tribal Historic Preservation Officer

United Keetoowah Band of Cherokee Indians in Oklahoma

918-822-1952

From: Shauna_Marquardt@fws.gov
Sent: Monday, August 22, 2011 3:39 PM
To: Cook, Kenneth M MVS
Subject: Re: Fw: Wappapello T&E compartment 2 (UNCLASSIFIED)
Attachments: T&E_USFWS_Shauna_rev.doc

Categories: WAPPAPELO

Ken,

I have attached the revised section of the EA. Because this area is right in the thick of known Indiana bat maternity habitat we need to make sure we have all the measures included. Work should occur after Nov. 1 and be finished by March 31st, althought March 15th is a more conservative date that the Mark Twain Nat'l Forest uses if they know they are in sensitive areas. This might be a good measure to include at least for compartment 2.

Retention of snags and a long-term supply of available roost trees through natural senescence or human manipulation will be important points to emphasize.

(See attached file: T&E_USFWS_Shauna_rev.doc)

~*

Shauna R. Marquardt
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, MO 65203
573/234-2132 x174 (office)
573/289-7610 (cell)
573/234-2181 (fax)

~*

From: Jason Ross [JRoss@delawarenation.com]
Sent: Friday, August 26, 2011 10:22 AM
To: Hayworth, Roberta L MVS
Subject: re: TSI Management Strategies on Two Timber Compartments

Hello Ms. Hayworth,

The Delaware Nation Tribal President Mr. Kerry Holton recently received correspondence from Mr. Michael Trimble regarding the project listed below.

The St. Louis District, U.S. Army Corps of Engineers and the proposed action to implement timber stand improvement (TSI) management strategies on two timber compartments located with Wayne County, Missouri at Wappapello Lake. Also, the Environmental Assessment(EA) being expanded to include an additional compartment.

The Delaware Nation Cultural Preservation Director, Ms. Tamara Francis has reviewed the information provided and has determined that the Delaware Nation will continue as a consulting party. However, our interest is historical. Inadvertent discoveries of prehistoric nature will not be consulted on.

Thank you again for taking the time and effort to properly consult with the Delaware Nation.

Best Regards,

Jason Ross

Museum/Section 106 Assistant

Cultural Preservation Department

The Delaware Nation

P.O. Box 825

Anadarko, OK 73005

PH# 405) 247-2448

FAX# 405) 247-8905

www.delawarenation.com <http://www.delawarenation.com>

Cook, Kenneth M MVS

From: Stout, Robert [robert.stout@dnr.mo.gov]
Sent: Wednesday, August 31, 2011 11:00 AM
To: Cook, Kenneth M MVS
Subject: Compartment 2 TSI management

Categories: WAPPAPELO

Mr. Cook,

As requested in Mr. Thomas M. Keevin's letter dated August 1, the Missouri Department of Natural Resources (department) has reviewed the project information provided. This project consists of a proposed action to implement timber stand improvement management strategies at Wappapello Lake in Wayne County. The department offers the following comments for your consideration.

Ambient Air Quality

The project is located in Wayne County, which is currently designated unclassifiable/Attainment for all national ambient air quality standards. You should be aware that the U.S. Environmental Protection Agency has recently established new ambient air quality standards for nitrogen dioxide (NO2) and sulfur dioxide (SO2) and is considering new, stricter ozone and particulate matter standards, which could impact this area in the future. The activities associated with this proposed project should not significantly affect local or regional air quality.

Open burning

State regulation 10 CSR 10-6.045 prohibits the open burning of tires, petroleum-based products, asbestos containing materials, and trade wastes except as otherwise allowed by the rule. Open burning that causes or contributes to a public health hazard, nuisance, or a hazard to vehicular or air traffic is not allowed.

State regulation 10 CSR 10-6.045 only allows for open burning of vegetative debris from land clearing operations outside the city limits of an incorporated area or municipality and outside of the Kansas City, St. Louis and Springfield Metropolitan Areas and at a distance of more than 200 yards from the nearest inhabited dwelling. For open burning of vegetative waste that does not meet these restrictions, the department's Regional Office responsible for that location must be notified to determine if a permit to allow the burning can be issued. The Southeast Regional office can be reached at 573-840-9750.

Fugitive Dust

State regulation 10 CSR 10-6.170 restricts particulate matter emissions from leaving the premises of origin. Efforts must be made to prevent any fugitive dust that may result from

any activities associated with this proposed project from leaving the property where it originated.

Best Management Practices (BMPs): Forestry and stormwater BMPs must be in place prior to any timber harvesting to protect the stream's chemical, physical and biological characteristics, especially pre- and post-construction of access roads. The Missouri Department of Conservation provides protocols and BMPs to protect the soil and water quality during timber harvesting. Streams and wetlands must be protected from stormwater carrying sediment or other pollutants into them. Re-establish native vegetation as soon as possible on any stream banks and riparian corridors denuded of vegetation. Heavy equipment must stay out of the water as much as possible.

Unclassified Streams: The property contains many unclassified waters. Unclassified streams are protected by the general water quality criteria outlined in 10 CSR 20-7.031(3). One should be vigilant that activities near unclassified waters do not exceed general water quality criteria.

Karst Topography – Losing Streams: According to existing data, a few losing streams appear to the west and northwest of the proposed area. We recommend that you contact the department's Division of Geology and Land Survey to determine if there is more recent data and potentially additional sites. Should losing streams be found, additional precautions and BMPs should be put in place to protect the area's sensitive water quality and ecology at all times. Losing streams are protected by stringent effluent regulations [10 CSR 20-7.015(1)(A)(3) and (4)] and Water Quality Standards [10 CSR 20-7.031(1)(N), (4)(C) and (11)]. One should be vigilant that activities near losing streams do not violate the above referenced effluent regulations or water quality standards.

Karst Topography – Springs, Sinkholes and Caves: There are several springs, caves and sinkholes in or near the proposed area. One should be vigilant that activities near these resources do not adversely impact water quality, as Karst features can provide a more direct access to sensitive species and groundwater. Should the construction impact these areas, extra precautions may be necessary to protect these sensitive resources.

Sensitive Waters: According to the current information available, there are no cold water fisheries, outstanding state and national resource waters, metropolitan no-discharge streams, or biocriteria reference locations within or near the property.

Classified Lakes: Wappapello Lake, Water Body Identification Number 7336, is classified as an 8,200-acre impoundment with the designated beneficial uses of protection of aquatic life and human health-fish consumption, livestock and wildlife watering, secondary contact recreation and whole body contact recreation-Category A. Through its designated beneficial uses, the lake shall be protected by numeric water quality criteria contained in 10 CSR 20-7.031(4) and Table A. One should be vigilant that activities near classified waters do not exceed general or numeric water quality criteria.

Impaired Waters: Wappapello Lake is listed as impaired for chlorophyll, nitrogen, and phosphorus due to rural nonpoint source pollution for its entire 8,200 acres. Be sure that any activities related to the project do not increase the amount of pollutants impairing the lake.

Water Quality Certification: A permit under Section 404 of the Clean Water Act issued by the U.S Army Corps of Engineers and a Water Quality Certification under Section 401 will be required should any jurisdictional wetlands or streams be impacted. Should any jurisdictional waters be impacted, please contact the department's 401 Certification Unit at (573) 751-1300 for more information.

National Wetland Inventory: According to the National Wetland Inventory Data, there are potentially wetlands on the property, mostly around the impoundment and streams. If wetlands are found, take care to avoid and then minimize any impacts through alternatives analyses before compensatory mitigation is considered. If wetlands are not directly impacted but are near any land disturbance, take care to protect the water quality, especially due to sedimentation.

Land Disturbance Permits: Should work disturbing an area of one acre or more be a part of the proposed action, a Land Disturbance Permit is required to be acquired prior to any earth work. Please contact the department’s Southeast Regional Office at (573) 840-9750 for permit information.

The department has issued a current land disturbance permit near the project area at Holiday Landing Wetland Area, NPDES Permit No. MO-R109FH9. The permit has three outfalls and was issued August 19, 2010.

Public Drinking Water Protection Areas: One public drinking water well 20 year travel time zone exists in or near the project area. Should the sponsor operate near the known well, determine if the project will impact unknown wells, or if additional information is needed please contact the department’s Public Drinking Water Branch at (573) 751-5331.

Public Land: The Department does not have any property near the project area. Mark Twain National Forest surrounds the property. Contact the U.S. Forest Service for information.

Ecological Drainage Unit: The property lies within the Ozark/Upper St. Francis/Caster Ecological Drainage Unit.

Watersheds: The proposed project location is in the Caldwell Creek-St. Francis River Sub-Watershed (HUC 08020202 05 06) and Otter Creek Sub-Watershed (HUC 08020202 05 05).

Geospatial Data: Department geospatial data is available upon request, and all published data is available on the Missouri Spatial Data Information Service website at http://msdis.missouri.edu/.

The department appreciates the opportunity to review this project and provide comments. If you have any additional questions or concerns, please feel free to contact me at 573-751-7402 or Ms. Kelsey Thompson of my staff at 573-751-6856.

Robert Stout

Office of the Director

573-751-7402 office

573-619-0262 cell

573-751-6727 FAX

MISSOURI DEPARTMENT OF CONSERVATION

Headquarters

2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180

Telephone: (573) 751-4115 ▲ www.MissouriConservation.org

ROBERT L. ZIEHMER, Director

September 26, 2011

Mr. Ken Cook
Department of the Army
St. Louis District Corps of Engineers
1222 Spruce Street
St. Louis, MO 63103-2833

RE: Environmental Assessment for Wappapello Lake (Compartments 2, 6, and 8) Timber Stand Improvement Management Strategies

Dear Mr. Cook:

Thank you for providing the Missouri Department of Conservation (Department) the opportunity to provide input to the project referenced above. The work proposed at the Wappapello Lake Project includes the implementation of timber stand improvement measures on over approximately 12,000 acres in three compartments during the next eight years. The work is further described in the Wappapello Lake Master Plan that was updated in 2000.

Department staff reviewed the proposed action and we believe it covers the majority of our forestry and wildlife concerns. We offer the following comments and information on the project for your consideration.

1. A goal of the project is to improve existing forest conditions to enhance Indiana bat habitat associated with mitigation obligations from the upgrade and expansion of U.S. Route 67 in Wayne County. We believe the strategy described in the environmental assessment is well planned. However, because Indiana bats are specifically targeted by the proposed actions, the Department's Indiana bat expert believes it is important to also include a specific goal to promote long-term recruitment and retention of large snags on a landscape scale. Retaining some mature or over-mature trees that will become snags is one strategy to help achieve that goal.

2. The Department has had successful results with logging companies who have successfully completed training and maintained certification pursuant to the Missouri Forest Products Association's Professional Timber Harvester training, or it approved equivalent. If allowed by Corps' business practices, we encourage the Corps to also require that their contract loggers meet this training condition.

3. A list of state Species of Conservation Concern is included as an attachment to this response. Several of the species listed are found in the nearby streams or located along river bluffs. Use of best management practices while conducting the forest practices will ensure minimal impacts to the streams. Additionally, the Swainson's warbler (state listed Endangered)

COMMISSION

DON C. BEDELL
Sikeston

JAMES T. BLAIR, IV
St. Louis

DON R. JOHNSON
Festus

BECKY L. PLATTNER
Grand Pass

is known form the project area. Following the attached best management practices for the Swainson's warbler will help minimize potential impacts to this species.

4. The plan identifies the need to address disease and insects that are affecting Missouri's forests through several control measures, including timber harvest. This is an important consideration in Missouri if healthy forests are to be maintained, and we support its inclusion as a project need.

5. Because one of the goals of the project is to improve summer maternity habitat for Indiana bats, does project monitoring include evaluating use of the treated areas by Indiana bats, pre- and post-treatment?

Once again, thank you for the opportunity to review and provide input to this project. If you have any questions on our response, please contact me by e-mail at janet.sternburg@mdc.mo.gov or by phone at 573-522-4115, Extension 3372.

Sincerely,

JANET E. STERNBURG
POLICY COORDINATOR

Attachments

Common Name	Scientific Name	Federal Status	State Status	State Rank*	Township	Range	Section	Notes
Cerulean warbler	*Dendroica cerulea*			S2S3	28N	6E	32	East side of island, upstream of Holliday Landing
Little leaved alum root	*Heuchera parviflora* var. *parviflora*			S1	27N	6E	4	Hall's bluff along the St. Francis River
A leatherflower	*Clematis viorna*			S1	27N	6E	18	Rocky outcrops above Otter Creek
Loesel's twayblade	*Liparis loeselii*			S2	27N	6E	19	Found in wet area laong the west side of Highway 67 ROW
Alligator snapping turtle	*Macrochelys temminckii*			S2	29N	5E	4	Adjacent to Sec 4; Bugville Hole
Alligator snapping turtle	*Macrochelys temminckii*			S2	29N	5E	9	St. Francis River
Swainson's warbler	*Limnothlypis swainsonii*		E	S2	29N	5E	9	St. Francis River; Logan Creek; canebreaks
Cerulean warbler	*Dendroica cerulea*			S2S3	29N	5E	9	St. Francis River; Logan Creek
A clubmoss	*Lycopodium digatatum*			S2	29N	5E	14	Hubble Creek area
Swainson's warbler	*Limnothlypis swainsonii*		E	S2	29N	5E	22	St. Francis River; canebreaks
Cerulean warbler	*Dendroica cerulea*			S2S3	29N	5E	22	St. Francis River
Water hyssop	*Mecardonia acuminata*			S1	27N	6E	32	North half of section; along Otter Creek tributary
Bald Eagle	*Haliaeetus leucocephalus*			S3	27N	7E	19	Magill Point, Lilly Hollow. Nest empty in 2006
Indiana bat	*Myotis sodalis*	E	E	S1	28N	5E	15	Brown's Hollow
Gray bat	*Myotis grisescens*	E	E	S3	29N	5E	land grant	Adjacent to Sec 5; Carter's bat work from 2002/3
Southeastern bat	*Myotis austroriparius*			S1	29N	5E	land grant	Adjacent to Sec 5; Carter's bat work from 2002/3
St. Francis River crayfish	*Orconectes quadruncus*			S2	29N	5E	6	And in adjacent land grant parcel near Sec. 5/Logan Creek
Longnose darter	*Percina nasuta*		E	S1	30N	5E	32	St. Francis River in Sam A. Baker SP
Alligator snapping turtle	*Macrochelys temminckii*			S2	30N	5E	32	St. Francis River in Sam A. Baker SP
St. Francis River crayfish	*Orconectes quadruncus*			S2	30N	5E	33	St. Francis River in Sam A. Baker SP
*State Ranks								
S1: Critically Imperiled								
S2: Imperiled								
S3: Vulnerable								
S#S#: Range								

Best Management Practices

MISSOURI DEPARTMENT OF CONSERVATION

Swainsons warbler

Limnothlypis swainsonii

Common name • Swainsons warbler
Scientific name • Limnothlypis swainsonii
State status • Endangered

Ecology

Swainsons warblers are secretive, neotropical migrants that nest in southeastern United States and winter in Belize and on Caribbean islands. In Missouri, they may be found in the southeastern part of the state, as well as in favorable habitat along the southern border. Swainsons warblers inhabit and breed in stands of giant cane (Arundinaria gigantea) within extensively forested landscapes along stream and river flood plains. To be used by these birds, these areas must have high canopy cover and dense vegetation. Breeding begins in April, with females building nests approximately 2-10 feet above the ground. Clutches typically have three eggs. Young hatch after 13-15 days of incubation, leave the nest at 10-12 days and remain with the adults for another two-three weeks. Swainsons warblers prey on insects that they find among leaf litter.

Reasons for Decline

There are no records indicating Swainsons warblers were ever common in Missouri. However, large-scale timber harvests and conversion of bottomland forests to agriculture and reservoirs has likely caused dramatic declines in populations. In particular, cane removal eliminates preferred breeding habitat for these migratory birds.

Specific Recommendations

Swainsons warblers have very narrow habitat requirements and, thus, are dependent upon protection and restoration of canebrakes, swamps and thickets in moist bottomland woods.

→ Project activities should not occur within 100 feet of wetland habitat within the range of this species between April 1 and October 1 since these birds stay near breeding habitat until migration.

→ Erosion and sediment controls should be implemented, maintained and monitored for the duration of the project.

→ Maintain special habitat features such as tall dense stands of giant cane, overstory canopy and leaf litter on ground to provide habitat for Swainsons warblers.

→ Draining or destroying known wetland habitat along streams should be avoided.

→ Forests should be thinned occasionally between October 1 and April 1 to allow for new growth.

General Recommendations

Refer to Management Recommendations for Construction Projects Affecting Missouri Wetlands and Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers.

Information Contacts

For further information regarding regulations for development in wetlands, rivers and streams, contact:

Missouri Department of Conservation
Policy Coordination Section
P.O. Box 180
2901 W. Truman Blvd
Jefferson City, MO 65102-0180
Telephone:573/751-4115

Missouri Department of Natural Resources
Division of Environmental Quality
P.O. Box 176
Jefferson City, MO 65102-0176
Telephone:573/526-3315

U.S. Army Corps of Engineers
Regulatory Branch
700 Federal Building
Kansas City, MO 64106-2896
Telephone:816/983-3990

U.S. Environmental Protection Agency
Water, Wetlands, and Pesticides Division
901 North 5th Street
Kansas City, KS 66101
Telephone:913/551-7307

U.S. Fish and Wildlife Service
Ecological Services Field Office
608 E. Cherry Street, Room 200
Columbia, MO 65201
Telephone:573/876-1911

Disclaimer

These Best Management Practices were prepared by the Missouri Department of Conservation with assistance from other state agencies, contractors and others to provide guidance to those people who wish to voluntarily act to protect wildlife and habitat. Compliance with Best Management Practices is not required by the Missouri wildlife and forestry law nor by any regulation of the Missouri Conservation Commission. Other federal, state or local laws may affect construction practices.

6/2000

ENVIRONMENTAL ASSESSMENT

Wappapello Lake (Compartments 2, 6, and 8) Timber Stand Improvement Management Strategies

APPENDIX B

Environmental Checklist

ENVIRONMENTAL CHECKLIST
For
ST. LOUIS DISTRICT CORPS PROJECTS

GENERAL INSTRUCTIONS: This checklist will be used to document environmental compliance under NEPA and Section 404/401 of the CWA on all new construction projects or real estate actions conducted at St. Louis District COE Projects. The checklist also contains questions relating CERCLA and RCRA issues that will be used to evaluate the need for various local, state and federal permits. Please fill out pages 1-3 and forward to CO-T.

DATE: 22 August 2011

NAME OF PROJECT: Timber Stand Improvement Management Strategies/Tornado Damage Timber Salvage

LOCATION: Wappapello Lake: Brown Hollow, Blue Springs, Otter Creek

LEGAL DESCRIPTION: T 27N - R 5E - S 13, T 27N R6E S 3,4,7,9,10,15,16,17,18,19,20,21,22,27,28,29,30 – T 28N R 5E S 16,17,20,21,27,28,34,35 – T 28N R 6E S 28,29,32,33 – T 29 N R5E S 2,3,4,10,11,14,22,23
COUNTY: Wayne

BRIEF DESCRIPTION OF PROJECT (include photographs, maps and/or drawings):
Timber stands within project area will be inventoried and a prescription written to maximize wildlife habitat, watershed protection, healthy and sustainable forest, and regeneration. Timber salvage operations will take place in areas severely damaged by a tornado.

ANTICIPATED EFFECTS ON THE ENVIRONMENT AS A RESULT OF PROCEEDING WITH THIS PROJECT:

IS THIS ACTIVITY INCLUDED IN THE MASTER PLAN?	YES ☒	NO ☐	Initial _____
IS THIS ACTIVITY INCLUDED IN THE OMP?	YES ☒	NO ☐	Initial _____
IS THIS ACTIVITY INCLUDED IN A WORKPLAN?	YES ☒	NO ☐	Initial _____
IS THIS ACTIVITY INCLUDED IN THE PMP?	YES ☒	NO ☐	Initial _____

Project Manager initiating Environmental review Eric S Lemon DATE: 8/22/11

Operation Manager's review Cynthia Jackson DATE: 8/22/11

Technical Operations review (CO-T) Lyn O'Neil DATE: 8/22/11

Recommended Action _____

PM-E Biological review required	YES ☒	(CX#____,EA,EIS)	NO ☐	Initials LN	DATE: 8/22/11
ED-Z Cultural review required	YES ☒	(CX#____,EA,EIS)	NO ☐	Initials LN	DATE: 8/22/11
CO-F review required	YES ☐		NO ☒	Initials LN	DATE: 8/22/11
ED-HQ further action required	YES ☐	Action _____	NO ☒	Initials R	DATE: 8/22/11

① EA is being done by PD-E (Ken Cook)
② Cultural Surveys + coordination w/ tribes + SHPO are being done by EC-Z (J. Barne

CERCLA/RCRA REVIEW

Will the activity involve the storage of hazardous substances or materials (flammable/combustible, compressed gases, pesticides or acids)? YES ☐ NO ☒

If yes, list substances/materials:_____

If so will the site be covered in the spill plan? YES ☐ NO ☐

Will the activity result in a change of the hazardous waste generator status? YES ☐ NO ☒

Will the site store, accumulate or transfer hazardous waste? YES ☐ NO ☒

Will the activity result in a real property transaction? YES ☐ NO ☒

If yes, has a Environmental Baseline Survey been conducted? YES ☐ NO ☐

Is there a change in land use or the site Development Plan requiring a state permit or license? YES ☐ NO ☒

Will fuels be dispensed (temporarily or permanently) at the site? YES ☐ NO ☒

Does the activity involve the installation, removal or upgrade of storage tanks containing petroleum products, hazardous substances or wastes? YES ☐ NO ☒

Are there any pipelines located on the site? YES ☒ NO ☐

Will solid waste be generated at the site? YES ☐ NO ☒

Will construction, demolition or remodeling of facilities result in disturbance of asbestos, PCB's or Lead-Based Paint? YES ☐ NO ☒

Are there wastewater discharges associated with the activity regulated by outside agencies creating any of the following:

- Stormwater runoff
- Dredge fill
- Wastewater treatment
- Septic systems
- Vehicle washing
- Industrial waste systems
- Lines which bypass treatment structures

requiring a National Pollution Discharge Elimination System (NPDES) permit? YES ☐ NO ☒

Does the activity result in the operation of a public drinking water system, wellhead, swimming pool or beach regulated by state EPA or Public Health agencies or federal agencies enforcing the Clean Water Act? YES ☐ NO ☒

Will the activity involve construction, painting, venting or open burning that will require an Air Emissions Permit? YES ☐ NO ☒

NATURAL/CULTURAL RESOURCES REVIEW

Does the activity result in the removal of trees? YES ☒ NO ☐
If YES, list the species name and number to be removed. Tree removal will be based on total Basal area determined during inventory and overall forest health. A target of 60-70 % basal area is Desired for regeneration, watershed protection, and wildlife habitat.

Are state and/or federal threatened/endangered/candidate species located in the project area?
YES ☒ NO ☐
If YES, list the species. Indiana Bat, Gray Bat, Bald Eagle

Will the project result in the modification or destruction of wetlands or the discharge of dredge material into the waters of the United States? YES ☐ NO ☒
If YES, estimate the acreage to be altered. _____

Will the project result in the modification or destruction of Farmland? YES ☐ NO ☒
If YES, estimate the acreage to be altered. _____

Does the proposed project area contain known cultural properties? YES ☒ NO ☐
If YES, describe and list site numbers. Sites are being surveyed and delineated by ED-Z prior to Timber operations.

Has all or a portion of the proposed project area previously been professionally surveyed for cultural resources? YES ☐ NO ☒
If YES, list dates. _____

ENVIRONMENTAL ASSESSMENT

Wappapello Lake (Compartments 2, 6, and 8) Timber Stand Improvement Management Strategies

APPENDIX C

Brown's Hollow Project

Project Summary: Brown's Hollow Project (#26388)

The Project

The Brown's Hollow Project is intended to benefit the Indiana bat, an endangered species, by improving roosting, foraging , and drinking areas for the species within the project area. It involves establishing foraging corridors and roosting sites. Pond dam maintenance would occur to maintain long-term water sources and ephemeral pools would be constructed to provide additional drinking and foraging areas. Decommissioning of non-System roads and trails would minimize disturbances to the species.

Location

The project area is located within Wayne County, Missouri, within Township 28 North Range 5 East, Sections 9, 10, 15, 16, 21 and 22. The area is generally located west of U.S. Highway 67 and west of the St. Francis River and Lake Wappapello. The nearest rural community is Greenville, Missouri, approximately 2 miles east of the project area (Vicinity Map).

The project area consists of Compartments 28 and 29, identified on the Vicinity Map. Together, they total approximately 4,027 acres. Of this total, an estimated 2,399 acres are National Forest System managed lands, 1,050 acres are Corps of Engineers (COE) managed lands, and 780 acres are in private ownership.

Background

The Indiana bat is a small, insect-eating, migratory bat that occurs in 20 States in the eastern half of the United States. It has been listed as endangered since 1967. It hibernates colonially in caves and mines during winter. In spring, reproductive females migrate from winter caves and form maternity colonies where they bear and raise their young in wooded areas. On the Mark Twain National Forest (MTNF), all maternity colonies have been documented in dead trees of various species. Most of the bats use the space under loose bark to bear and raise their young, but a split in the bole of one tree was also documented on MTNF. Both males and females return to hibernation sites in late summer or early fall to mate and later enter hibernation.

Missouri is home to about 13% of the world's estimated Indiana bat population. The Mark Twain National Forest has four (4) caves in which the Indiana bat hibernates. These caves are surveyed every two years, and bat population numbers at those caves have been known to greatly fluctuate. Further information regarding the Indiana bat in Missouri can be found at the Missouri Department of Conservation website at http://mdc.mo.gov/nathis/endangered/endanger/bat/ and at the US Fish and Wildlife Service website at http://www.fws.gov/midwest/endangered/mammals/inba/index.html.

Indiana bats have been documented in the project area. Indiana bats were first discovered 12 miles southeast of the project area in September 2002, when Indiana bats were trapped on COE lands in the Lost Creek area near Lake Wappapello. In 2003, surveys were again conducted at Lost Creek and elsewhere around Lake Wappapello and the St. Francis River.

In July 2003, two lactating Indiana bats were captured on COE lands north of the project area. However, these bats were not radio-tracked, so there was no further information about their movement or habitat use. Also in summer 2003, Forest Service Northern Research Station (NRS) personnel trapped bats on MTNF lands in the Brown's Hollow area about 2 miles from the earlier COE capture sites, but captured no Indiana bats.

On May 22, 2004, NRS and the Poplar Bluff District Wildlife Biologist tracked two pregnant Indiana bats that were fitted with transmitters. Subsequently, a primary maternity roost tree on National Forest System lands was documented within the project area. Several secondary roost trees were also located.

Indiana bats practice site fidelity, meaning they return to the same general vicinity year after year. Because roost trees are ephemeral, lasting only a few years before they fall to the ground and become unusable by the Indiana bat, a survey was contracted by the Missouri Department of Transportation (MODOT) in 2008 to document new maternity roost sites. As a result of that work, two primary roost trees were identified; one on COE lands and one on National Forest lands. Secondary roosts were also documented, along with a male roost tree.

Since the discovery of the maternity area, the project area was designated an Area of Influence (AOI) for the Indiana bat in 2004 under an amendment to the 1986 Mark Twain National Forest land and Resource management Plan (1986 Forest Plan). Designation of the AOI and implementation of an amendment to the 1986 Forest Plan occurred on National Forest System lands only. It was re-classified as a 2.1 Management Prescription in the 2005 Mark Twain National Forest Land and Resource Management Plan (Forest Plan), implemented in September 2005. The Forest Plan can be accessed at: www.fs.usda.gov/goto/mtnf/projects. This prescription can be found in the Forest Plan on pages 3-11 through 3-12.

The district has discussed various resource management activities that could be done in the area to benefit the Indiana bat since then. A district Interdisciplinary Team (IDT) of resource specialists was formed and first met on December 10, 2009 to discuss the project area and its site-specific needs, and possible management activities to benefit the bat. Additional meetings were held on August 6, 2010 and October 6, 2010. This Proposed Action is a result of these IDT meetings.

Purpose and Need

The purpose of, and need for, this site-specific project is to benefit the Indiana bat by improving roosting, foraging, and drinking habitat for the species. In addition, road decommissioning would reduce disturbances to the bat, and pond maintenance and ephemeral pools would provide long-term foraging and drinking areas for the species.

The project proposal is consistent with Forest-wide goals and objectives, and the 2.1 Management Prescription. Also, it would fulfill a commitment to Missouri Department of Transportation associated with the widening of Highway 67 to a four-lane, divided highway. MODOT began widening Highway 67 within the project area in 2009, with work expected to be completed in 2011. As mitigation for loss of potential Indiana bat habitat for this highway widening on National Forest lands, MODOT would partially fund activities within the project area that would benefit the Indiana bat.

Proposed Action

The Proposed Action consists of site-specific resource management activities directed toward improving roosting, foraging, and other conditions for the Indiana bat. It is intended to meet the Purpose and Need described above. Proposed resource management activities would occur on national forest managed lands only.

The project area does not contain any acreage designated as critical habitat or proposed as critical habitat for any federally listed threatened or endangered species. It is not located within

a wilderness, wilderness study area, national recreation area, inventoried roadless area, or research natural area and heritage resources clearance would be completed before any decision is made by the Responsible Official, Poplar Bluff District Ranger Douglas F. Oliver.

Proposed resource management activities within the project area intended to benefit the Indiana bat include:

- **Establishment of 18 foraging corridors totaling an estimated 56 acres.** This generally involves developing linear corridors, approximately 100 feet in width that would zig-zap across the tops of ridges in an east-west and west-east direction (Proposed Activities Map). They would be generally open with few trees, preferably white oaks, hickory, and short-leaf pine. The beginning of the corridors would be set back from the roads approximately 30-50 feet with a short stretch of trees between the roads and foraging corridors to provide a visual barrier. Temporary roads used to access these foraging corridors would be blocked to prevent vehicle access with earthen berms, large rocks or gates.

  Commercial timber harvest would be used to create these linear corridors that range from 1.9 to 6.2 acres in size. They would range in length from 835 to 2,700 feet long, generally located near or on the tops of ridges that run east-west and west-east off of System roads.

- **Understory Removal treatments on the north sides of the 18 foraging corridors and in 10 other stands on an estimated 370 acres to improve habitat conditions for the Indiana bat.** Understory Removal would occur on an estimated 370 acres to provide optimal roosting habitat for the Indiana bat. This generally entails felling live trees 9" and smaller in diameter at breast height (DBH) with chainsaws in parts of 29 stands total. Another 10 stands would receive understory removal treatments only, also to benefit the bat. Understory removal would provide more open areas under the canopy of the forest, making it easier for bats to maneuver through those areas while hunting prey. It may also allow more sunlight to reach those snags that serve as potential roosting areas. Collectively, Understory Removal treatment acres comprise an estimated 39.9% of total stand acres.

  Proposed Understory Removal treatment stands were determined by the district silviculturist and wildlife biologist identifying stands with longer-lived tree species like white oak and shortleaf pine present. These stands were those stands selected for treatment because other stands in the project area high in scarlet and black oak are beginning to thin out as trees die and fall to the ground. This naturally-occurring senescence is resulting in stands high in scarlet and black oak having less than the optimal canopy cover for the Indiana bat. Therefore these stands were not considered good candidates for understory removal treatments.

  In addition, a minimum of 1 snag per 200 linear feet of foraging corridor would be provided as roost sites. Where snags are lacking, trees may be girdled to provide additional roosting habitat. This involves banding the tree with a chainsaw or axe around it's circumference to kill it. These snags would be created over a fifteen year period to provide a relatively continuous supply of roosting habitat in areas where it does not exist.

- **Pond maintenance activities around five ponds.** Pond maintenance activities involve utilizing chainsaws or other hand tools to remove vegetation from around five existing pond dams within the project area. Three of the ponds are in Compartment 28 (stands 44,

45, and 49), and two are in Compartment 29 (stands 74 and 80) (Attachment 2-Compartment Maps and Attachment 3 - Project Activities Spreadsheet). This would ensure long-term drinking and foraging areas are available, and improve flight access to these areas for the Indiana bat. No large mechanized equipment would be used to perform pond maintenance activities.

- **De-commissioning of 1 unclassified non-System road.** Decommissioning this road (Non-System Road 8317) is intended to benefit the Indiana bat by minimizing vehicular disturbances to the species and developing additional foraging habitat. The Forest Plan directs that the Forest maintain a transportation system which provides the minimum permanent road access needed to meet resource management objectives be developed and maintained (Forest Plan, Goal 2.3, Transportation System, p. 1-5). Unless under special use permit authorization or needed for administrative purposes, these types of roads are generally decommissioned. Decommissioning involves removing a road from existence, and may include scarifying the road bed and re-planting with native or non-invasive plant species.

  Non-System Road 8317 (0.31 miles) would be "daylighted" prior to decommissioning activities. "Daylighting" involves opening up the road corridor on both sides of the road by felling some of the trees and leaving them adjacent to or across the decommissioned road. The principal reason for this "daylighting" is to improve the ability of this road to serve as a foraging corridor for the Indiana bat.

  Old road ruts on Non-System Road 8317 may be re-shaped and left as drinking and foraging areas for the Indiana bat. These temporary pools of water are considered vernal pools, vernal ponds or ephemeral pools. These areas are devoid of fish dry during the hottest part of the year, and thus provide areas of successful insect production available as food sources for the Indiana bat.

Relationship to the Forest Plan

The project is consistent with the Forest Plan. The Forest Plan can be accessed at: www.fs.usda.gov/goto/mtnf/projects

Guidance for management of Threatened, Endangered, and Sensitive Species (TES) such as the Indiana bat is found on pages 2-6 through 2-8 of the Forest Plan. Forest Plan Standards (**in Bold type**) and Guidelines relevant to this project are to:

- **Carry out Forest Service responsibilities for the conservation of endangered and threatened species and habitat identified through interagency consultation with the U.S. Fish and Wildlife Service.**
- **Manage federally listed species in accordance with approved species recovery plans (FSM 2672.21). Manage Regional Forester Sensitive Species (RFSS) in accordance with approved Conservation Agreements and Strategies.**

Direction in the Forest Plan specific to the Indiana bat applicable to this project is to:

Maintain trees with characteristics of suitable roosts (i.e., dead or dying with exfoliating bark or large living trees with flaking bark) wherever possible with regard for public safety and accomplishment of overall resource goals and objectives.

Identify and remove hazard trees between November 1 and April 1 whenever possible.

Using the current, accepted technology, determine the location of summer roost trees and foraging areas for female Indiana bats.

Hibernacula

There are no known hibernacula present within the project area. However, should one or more be discovered during project activities, the following Standards would apply:

Prohibit removal of suitable roost trees and prescribed burning within the 20 acres of old growth and 130 acres of forest or mature woodland surrounding an Indiana bat hibernacula during the swarming and staging periods. Determine dates individually for each cave (normally between September 1 and November 1 and between March 15 and April 30 respectively.)

Maternity Colonies

The following Standards would apply.

If occupied Indiana bat maternity roost trees are discovered, protect them from physical disturbance until they naturally fall to the ground.

Based on site-specific consultation, designate an area of use (foraging and roosting) based on site conditions, radio-tracking or other survey information, and best available information regarding maternity habitat needs.

Minimize human disturbance in the maternity colony areas of use until the colony has left the maternity area for hibernation.

Maintain or enhance the character of the site year-round by:

Maintaining an adequate number of snags, including known roost trees;

Maintaining large live trees to provide future roosting opportunities; and

Maintaining small canopy gaps (and/or opening the mid-story) to provide a continual supply of foraging habitat.

Male Roost Trees

Protect known male roost trees from physical disturbance until they naturally fall to the ground.

Protect occupied Indiana bat male roost trees discovered during the summer season (not migration), from physical disturbance by designating a 75-foot radius buffer zone around the tree(s). The buffer zone shall remain in place until hibernation season begins (around November 1.)

Prohibit ground-disturbing activity or timber harvest within the buffer zone.

The Programmatic Biological Opinion for the Forest Plan provides additional requirements. Correspondence with the Columbia, Missouri office of the U.S. Fish and Wildlife Service has also taken place regarding the development of this project for the Indiana bat. Reasonable and Prudent Measures and related Terms and Conditions required to minimize incidental take of the Indiana bat would be followed with the implementation of this project.

Decision to be Made

The decision to be made is whether or not to implement these activities to benefit the Indiana bat.

The Proposed Action generally falls in a category of decisions established by the Chief of the Forest Service as routine actions that do not normally, in and of themselves, individually or cumulatively, have a significant effect on the quality of the human environment and therefore may be excluded from documentation in an environmental assessment. However, the project does fall within two sub-categories of actions that require scoping, a project or case file, and any decision to proceed must be documented in a decision memo. The sub-categories are found in the Forest Service Handbook 1909.15; specifically:

Category 32.2(6):

"Timber stand and/or wildlife habitat improvement activities which do not include the use of herbicides or do not require more than one mile of low standard road construction." [36 CFR 220.6(e)(6)]; and

Category 32.2 (12):

"Harvest of live trees not to exceed 70 acres, requiring no more than ½ mile of temporary road construction." [36 CFR 220.6(e)(12)].

The District Ranger of the Poplar Bluff Ranger District is the responsible official for deciding whether or not to proceed with the proposed action for the Brown's Hollow Project. He may decide to select:

1. the Proposed Action;
2. modify the Proposed Action; or
3. defer making a decision at this time.

His decision may include mitigation measures in addition to the Forest Plan Standards and Guidelines considered for this project. Documentation and rationale of included modifications and additional measures would be made in the decision document. Any decision would be implemented in compliance with all federal, state and local laws, regulations or requirements and the standards of the Forest Plan.

Scoping Period

To comment or obtain additional site specific information on this project, you can do so in a number of ways. You can use the attached "Public Comment Form" if you wish, but it is not required. Methods for you to comment include:

- In writing: Contact, Poplar Bluff Ranger District, P.O. Box 988, Poplar Bluff, MO, 63902. Attention: **Brown's Hollow Project (#26388)**
- Telephone: Contact, Bill Paxton, Environmental Coordinator at the Poplar Bluff Ranger District Office during business hours (8:00 a.m. – 4:30 p.m. CST) at 573-785-1475, or in person at 1420 Maud Street, Poplar Bluff, MO 63901.
- Fax: Address to: **Brown's Hollow Project (#26388)**
- E-mail: bpaxton@fs.fed.us. Acceptable formats for electronic comments are: text or HTML e-mail, Adobe Portable Document Format (PDF), or formats printable in Microsoft Office applications.

Please specify **Brown's Hollow Project (#26388)** on your subject line in any correspondence.

Please provide your comments on this proposal by June 3, 2011. Comments received in response to this proposal, including names and addresses of those who comment, will become part of the public record and will be available for public review and inspection.

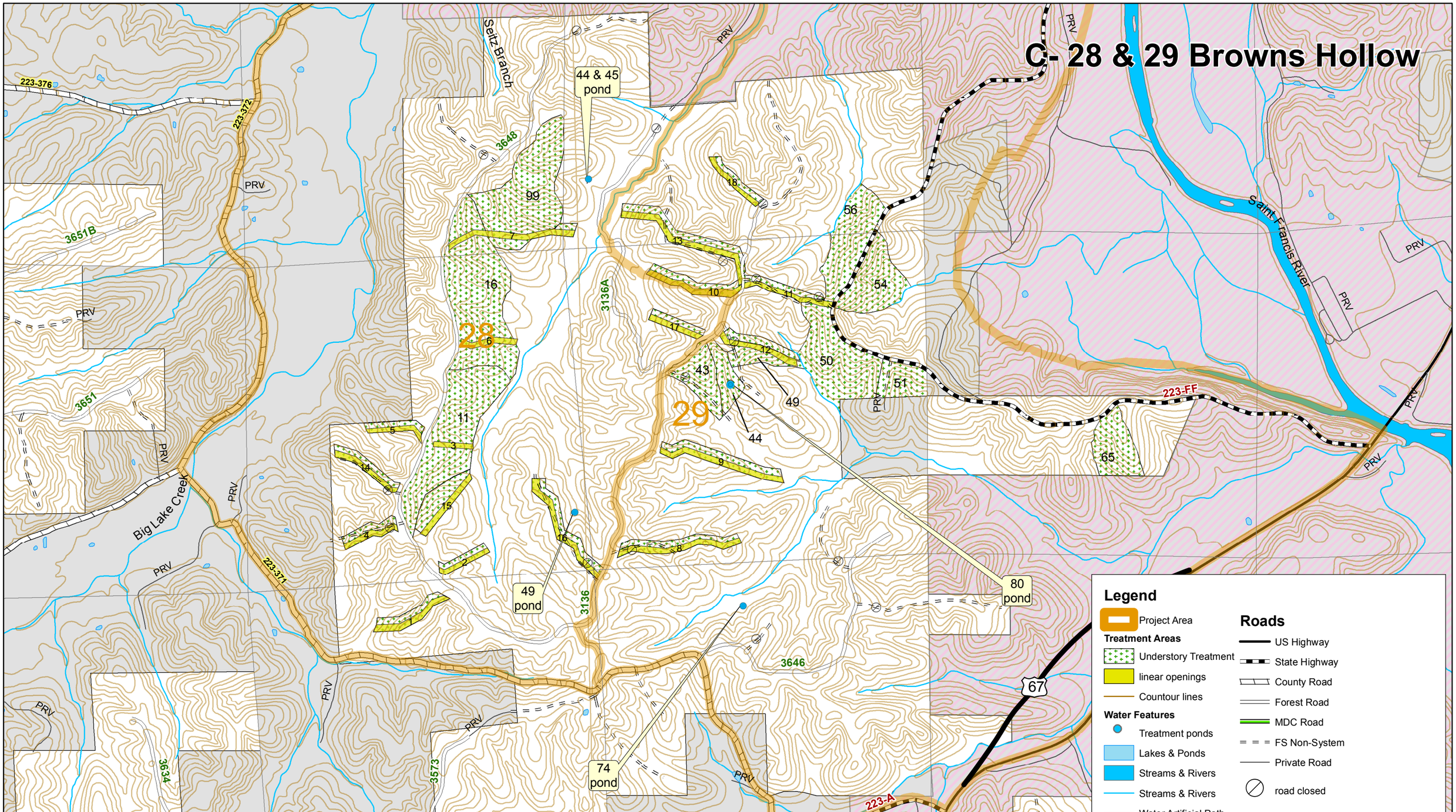
Send any fax comments to (573) 785-0267. Please specify **Brown's Hollow Project (#26388)** on the subject line. Submit all e-mail comments to: bpaxton@fs.fed.us.

Office hours (for those delivering comments by hand) at our office at 1420 Maud Street in Poplar Bluff are 8:00 a.m. to 4:30 p.m. Monday – Friday. Oral comments must be provided at the Responsible Official's office during these office hours. Acceptable formats for electronic comments are: text or HTML e-mail, Adobe Portable Document Format (PDF), or formats printable in Microsoft Office applications.

Contact Person(s)

To obtain further information regarding the Proposed Action, please contact Bill Paxton, Environmental Coordinator, or Megan York-Harris, Wildlife Biologist, at (573) 785-1475, (573) 785-0267 (FAX), or e-mail at bpaxton@fs.fed.us or myorkharris@fs.fed.us. You may also contact Doug Oliver, District Ranger, at the same phone number for information.

C- 28 & 29 Browns Hollow



Legend

- Project Area
- **Treatment Areas**
  - Understory Treatment
  - linear openings
  - Countour lines
- **Water Features**
  - Treatment ponds
  - Lakes & Ponds
  - Streams & Rivers
  - Streams & Rivers
  - Water Artificial Path
- **MTNF Townships**
  - Township & Range
  - Section

Roads

- US Highway
- State Highway
- County Road
- Forest Road
- MDC Road
- FS Non-System
- Private Road
- road closed

Ownership

- USDA FOREST SERVICE
- Private and Other
- Corp of Engineers Lake Wappapello

0.25 0.125 0 0.25 Miles

1:17,688

The USDA Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. Using GIS products for purposes other than those for which they were intended may yield inaccurate or misleading results. The USDA Forest Service reserves the right to correct, update, modify, or replace GIS products without notification.