



**United States
Department of
Agriculture**

**Forest
Service**

April 2022



Biological Assessment and Evaluation North and South Tornado Clean Up Project Areas

**Land Between the Lakes National Recreation Area
Lyon County, Kentucky and Stewart County, Tennessee**

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Introduction

On December 10-11, 2021, two tornado events occurred on the far north and south portions of Land Between the Lakes. Through extensive remote sensing and ground surveys, Forest Service staff identified approximately 6,500 acres of National Forest System lands that have been affected by these events and that damaged trees need cleaned up. The acreage for cleanup regarding these events is in Lyon County, Kentucky (North Project Area) and Stewart County, Tennessee (South Project Area). Both tornado paths crossed the entire width of Land Between the Lakes with the northern path being the widest at up to one mile wide. The south path is approximately a quarter of a mile wide. See project record for maps of tornado path locations.

The Chief of the Forest Service designated the two tornado areas under the Healthy Forest Restoration Act (HFRA) on March 18, 2022. Per the HFRA authorization, a CE will be written for each project area.

Objectives

Objectives of this biological assessment and evaluation (BAE) for both project areas are to:

- Address implementation parameters for federally listed species identified in the U.S. Fish and Wildlife Service (FWS) Biological Opinion (BO) for The Land Between the Lakes National Recreation Area's Wildland Fire and Vegetation Management Program (FWS #2009-B-0084). We wrote an addendum to the 2009 Biological Assessment January 15, 2015, and the FWS modified the BO March 25, 2015. The BO addresses the effects of prescribe fire and vegetation management on federally listed threatened and endangered species.
- Compliance in accordance with the requirements of the Northern Long-eared bat Final 4(d) Rule and its associated January 5, 2016, range wide Programmatic Biological Opinion.
- Assess the effects of timber removal for Regional Forester's Sensitive species known to occur or that potential habitat occurs within the project areas.
- Provide biological input to ensure United States Forest Service (FS) compliance with the National Forest Management Act (NFMA) of 1976 and Forest Service Manual (FSM) 2670. For further information see Forest Service Manual (FSM) section 2672.4.

Purpose and Need

In accordance with the HFRA authorization, the primary purpose for removing damaged trees is for public safety and promotion of insect and disease resiliency.

This project will be instrumental in achieving two Area Plan Goals:

Goal 2: *"Emphasize partnerships and cooperation with citizen groups, community*

businesses, private corporations, tourism organizations, and government agencies.” The timber sale will benefit various local businesses by providing opportunities to bid on contracts and supply the workforce needed to accomplish the service work.

Goal 5: *“Use a collaborative approach to maintain and restore: 1) a diversity of plant and animal communities that support viability of associated plants, fish, and wildlife; and 2) sustainable levels of habitat and wildlife populations to support public demand for wildlife-related recreation.”* Removal of damaged timber will provide more sunlight near the ground that is massively covered with tree debris. It will improve spacing for plant growth, and water and nutrient dispersal for the remaining healthier trees to produce wildlife forage, hard mast, and increase the overall long-term survival of these trees. The new openings will be comprised of regenerating woody and herbaceous plant species that will benefit multiple wildlife populations, especially those in decline. Hunting and wildlife viewing opportunities and access will also be improved.

Proposed Management Actions and Affected Environment

Cleanup will involve removal of fallen trees and standing damaged trees, and temporary, creation of new access roads and reopening of old access roads. This will be done through commercial timber salvage sales.

We assessed four levels of damage severity in the project areas, light, medium, severe, and catastrophic. Salvage sale operations will be within forest stands that incurred medium, severe, and catastrophic damage. The total estimated acreage for all three damage categories within the Kentucky and Tennessee sale boundaries is 2,188 acres. Nearly fifty-five percent of these acres are categorized as catastrophic damage and a vast majority of the trees in this category are on the ground. Since the tornado events, heavy ice and rain saturated soils continue to weaken damaged standing trees in the project area. As such more trees are on the ground than from the initial tornado events. (Elizabeth Raikes, personal observation on Forest Service Road 112, February 9, 2022).

Damaged standing trees will be considered for removal provided they meet the requirements for merchantable timber identified in timber sale contract specifications. The creation of temporary haul roads will be necessary to access areas of timber salvage, and likewise, old roads will be temporarily reopened for this purpose. The temporary roads will be within the sale boundaries and will cross areas with and without tornado damage.

Overall, timber salvage sale operations are proposed on upwards of a combined 6,000 acres within the two project areas.

Botanical and wildlife ground surveys to assess the affected environment in this Biological Assessment and Evaluation (BAE) will not be completed prior to implementation of forest management activities. This is due to the extent of storm damage causing project areas to be

largely inaccessible. Instead, known, and potential habitat for federally listed and Regional Forester's Sensitive species, within the project areas, is being assessed using available field survey reports and project records.

Biological Assessment – Federally listed species

There are three federally listed bat species and one plant species known to occur on Land Between the Lakes that effects are assessed in this BAE.

The Forest Service, Southeast Region 8, last updated the federally listed species list for all Forest Service units in the Region on June 1, 2021. Changes to this list are forthcoming for proposed listing of the Northern Long-eared bat to endangered species status by the end of year 2022 (Federal Register Vol. 87, No. 56, March 23, 2022). Until that change occurs, this species will be evaluated in accordance with the NLEB 4(d) rule per correspondence from the FWS-KFO (March 28, 2022) and Region 8 Endangered Species Specialist (April 4, 2022).

Effects

Gray bat – (*Myotis grisescens*) - Endangered

There are no known summer or winter caves suitable for gray bat use on the Recreation Area. Potential foraging habitat along stream corridors occur within both project areas. Many of the stream corridors have been negatively impacted by downed tree debris that is clogging water flow. Down trees within stream corridors will be considered for removal using equipment that will allow reach access to merchantable trees within and adjacent to the stream channel. Damaged and down tree removal within stream corridors will help restore water flow within their channels and maintain water quality in accordance with Area Plan standards implementation. This proposed activity is not likely to adversely affect the gray bat.

Indiana bat – (*Myotis sodalis*) - Endangered

Potential roosting habitat is present in both project areas. Removal of standing suitable roosting trees is likely to adversely affect the Indiana bat. Not all standing damaged trees that are suitable for Indiana bat roosting will be removed. Trees will be removed based upon their merchantability and access needs to merchantable trees. Incidental take of Indiana bat is authorized for forest vegetation management on 2,200 acres annually on Land Between the Lakes (Biological Opinion 2015).

On March 25, 2022, we sent a letter to the FWS-KFO regarding forest vegetation management within the two project areas and associated Indiana bat incidental take. The total estimated combined damaged tree removal acreage within the two project areas does not exceed the total allowable acreage for incidental take. No other project activities for forest vegetation management have occurred in the Recreation Area that Indiana bat incidental take has been

implemented. On April 3, 2022, we received confirmation from FWS-KFO that we will not exceed our annual 2,200 acreage limit for forest vegetation management.

Northern Long-eared bat – (*Myotis septentrionalis*) – Threatened

Potential roosting habitat is present in both project areas. Removal of standing suitable roosting trees is likely to adversely affect the Northern Long-eared bat. Not all standing damaged trees that are suitable for Northern Long-eared bat roosting will be removed. Trees will be removed based upon their merchantability and access needs to merchantable trees. Adverse effects on the Northern Long-eared bat are assessed in the 2016 Final 4(d) Rule for this species. As part of implementing the 4(d) Rule, we submit to the FWS Kentucky Field Office (KFO) an annual forest vegetation management planning letter. On January 12, 2022, we submitted to the KFO our letter that included timber salvage sale operations within the two project areas.

Price's potato bean - (*Apios priceana*) - Threatened

Price's potato bean, a member of the pea family, is a perennial herbaceous vine that grows from one large spheroidal tuber. There are no known occurrences of the Price's potato bean within the project areas; however, potential habitat does occur in these areas. Potential habitat includes limestone outcrops, particularly adjacent to lakes and streams on mesic to dry slopes. Outcrops are areas of exposed bedrock. Surface exposures of bedrock are uncommon in Land Between the Lakes except along the shores of lakes and where streams have undercut the base of slopes (Harris, S.E. 1988).

The proposed activities are likely to adversely affect individual Price's potato bean plants should they be present during tree removal operations in these areas, 2010 BO (FWS-2009-0084). In accordance with the BO, the Forest Service staff agreed to locate and survey limestone outcrops for existing and for their potential to support Price's potato bean. Additionally, if Price's potato bean is present, no soil disturbing activities (including skidding or temporary road construction) will occur within 200 feet of the outcrop. If Price's potato bean is not present soil disturbing activity may occur, and the site will be cataloged as a potential restoration area for future expansion (e.g., transplanting or seeding) of this species. Due to the severity of the tornado damage in both project areas, limestone outcrops are not reasonably accessible to survey prior to timber salvage sale operations.

The removal of over-story tree canopy shading, resulting from the tornado damage, and further salvage sale removal of damaged down trees from outcrop sites are likely to benefit this species if present. This is provided that the plants survive soil disturbance associated with the proposed forest management activities. Trees falling on individual plants or heavy equipment crushing plants may occur but is unlikely due to the typically limited distribution of Price's potato bean on the Recreation Area. Tree and shrub shading is one of several factors that affect Price's potato bean growth and reproduction. The amount of downed damaged trees in portions of the project

areas is so extensive that the debris is shading the ground within an estimated ten feet of the ground. This is a major change from the former over-story canopy height. Shade tree and shrub removal has been completed at all five known sites on Land Between the Lakes during the non-growing season, between 2009 and 2021. Canopy removal on these sites has greatly improved plant vine, flower, and bean pod production.

Price's Potato Bean Survey Design Criteria

To acknowledge that pre-operational surveys are not possible prior to salvage sale implementation, the following survey design criteria will be implemented.

All damaged tree removal that occurs within 200 feet of a rock outcrop will be documented and reported to the Threatened and Endangered Species (TES) Coordinator. These areas will be surveyed for the presence of Price's potato bean after salvage sale operations are completed. If unintended harm occurs to Price's potato bean, Forest Service will report the incident and location to the FWS-KFO. All limestone outcrop surveys, and new findings of the Price's potato bean will be reported in the Annual Biological Opinion Report provided to the FWS-KFO. (Elizabeth Raikes communications with Carrie Allison, FWS-KFO, April 22, 2022).

Biological Evaluation – Regional Forester's Sensitive species

Sixteen species are currently on the Regional Forester's Sensitive species list for Land Between the Lakes. The R8 Threatened and Endangered Species Coordinator updated this list for Land Between the Lakes on March 8, 2022. Ten of the sixteen species are evaluated in this BAE as the species and/or their habitat occurs within the project areas. Environmental baseline data for Regional Forester's Sensitive species is evaluated in the Biological Evaluation for the Area Plan (2004) and other sources as specified for each species that have been recently added to the list.

Effects

Rafinesque's big-eared bat - *Corynorhinus rafinesquii*

The Rafinesque's big-eared bat has not been found to occur on Land Between the Lakes. Potential habitat occurs within the two project areas.

This bat uses caves for summer roosting habitat, and they generally stay near the entrance of the cave. There are no suitable caves on Land Between the Lakes. This bat has also been found to roost in trees in summer. They prefer trees that are in more open and lit conditions. This type potential roosting habitat is present in the project areas as standing damaged trees. Not all standing damaged trees will be removed, thus reducing the potential for direct impacts. Conversely, there will be several standing lightly damaged trees within the project area that are not being considered for removal. Only damaged down and standing trees on moderate to catastrophically damaged sites are authorized for removal if they are merchantable. Retention of

damaged standing trees created by the storm event is likely to be a beneficial indirect impact for this species with provision of potential roosting habitat.

Because the Rafinesque's big-eared bat is not known to occur on Land Between the Lakes, thus reducing the likelihood that it would occur in salvaged standing dead trees, and that many potential roost trees will remain, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Eastern small-footed bat - *Myotis leibii*

The Eastern small-footed bat has not been found to occur on Land Between the Lakes. Potential habitat occurs within the two project areas.

Habitat for this species is mostly hilly or mountainous, near deciduous or coniferous forest. It forages over ponds and streams within riparian forests, upland forests, clearings, and ridgetops. Foraging flights tend to be slow and often within a few meters of the ground or water surface. Warm season roosts may be primarily in cracks and crevices of rocky outcrops or talus slopes. They have also been found in buildings, in expansion joints and guardrail crevices of bridges, hollow trees, spaces beneath loose tree bark, and road cuts. This species relies heavily on rock roosts or similar man-made structures during the summer months. Roosts often are exposed to the sun but also may be under moderate to extensive cover (NatureServe Explorer 2022).

Potential foraging habitat occurs within the project area. The tornado events created several thousand acres of open canopy foraging opportunities. The proposed cleanup in the project areas will help restore open stream channel for low flying foraging over these corridors and over ground. Potential roosting habitat is present in the project areas as standing damaged trees and ledges of limestone outcrops. Not all standing damaged trees will be removed, thus reducing the potential for direct impacts. Conversely, there will be several standing lightly damaged trees within the project area that are not being considered for removal. Only damaged down and standing trees on moderate to catastrophically damaged sites are authorized for removal if they are merchantable. Retention of damaged standing trees created by the storm event is likely to be a beneficial indirect impact for this species with provision of potential roost habitat. Limestone outcrops in the project area are associated with lake shorelines and streams. This habitat is uncommon in the project area and will not be impacted by the proposed salvage sale operations in accordance with Area Plan Standards implementation.

Because the Eastern small-footed bat is not known to occur on Land Between the Lakes, thus reducing the likelihood that it would occur in salvaged standing dead trees, that many potential roost trees will remain, that limestone outcrop habitat will not be impacted, and foraging habitat will be improved, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Little Brown bat – *Myotis lucifugus*

The Little brown bat is known to occur on Land Between the Lakes and potential habitat occurs within the two project areas.

Habitat for this species is wide-ranging with this species often using man-made structures for resting and maternity sites. Maternity colonies commonly are in warm sites in buildings such as attics and other structures, also infrequently in hollow trees. Foraging habitat requirements are generalized; foraging occurs over water, along the margins of lakes and streams, or in woodlands near water (NatureServe Explorer 2022).

Potential foraging habitat occurs within the project area. The tornado events created several thousand acres of canopy foraging opportunities. The proposed cleanup in the project areas will help restore open stream channel for foraging over these corridors and within newly created open forest habitat. Potential roosting habitat is present in the project areas as standing damaged trees. Not all standing damaged trees will be removed, thus reducing the potential for direct impacts. Conversely, there will be several standing lightly damaged trees within the project area that are not being considered for removal. Only damaged down and standing trees on moderate to catastrophically damaged sites are authorized for removal if they are merchantable. Retention of damaged standing trees created by the storm event is likely to be a beneficial indirect impact for this species with provision of potential roost habitat.

Because the Little brown bat infrequently uses hollow trees and these trees are not considered merchantable timber, that many potential roost trees will remain and, in time, may become hollow, and foraging habitat will be improved, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Tri-colored bat - *Perimyotis subflavus*

The Tri-colored bat is known to occur on Land Between the Lakes and potential habitat occurs within the two project areas.

These bats are associated with forested landscapes, where they forage near trees (including forest perimeters) and along waterways. In many areas, foraging occurs in riparian areas. Maternity and other summer roosts probably are mainly in dead or live tree foliage, caves, and rock crevices may be used as night roosts between foraging forays. Maternity colonies also may utilize tree cavities, sometimes these are in open site that would not be tolerated by most other bats (NatureServe Explorer 2022).

Potential foraging habitat occurs within the project area. The tornado events created several thousand acres of open canopy foraging opportunities. The proposed cleanup in the project areas

will help restore open stream channel for foraging over and along the margins of these corridors and forest perimeters. Potential roosting habitat is present in the project areas as standing damaged trees and ledges of limestone outcrops. Not all standing damaged trees will be removed, thus reducing the potential for direct impacts. Conversely, there will be several standing lightly damaged trees within the project area that are not being considered for removal. Only damaged down and standing trees on moderate to catastrophically damaged sites are authorized for removal if they are merchantable. Retention of damaged standing trees created by the storm event is likely to be a beneficial indirect impact for this species with provision of potential habitat. Limestone outcrops in the project area are associated with lake shorelines and streams. This habitat is uncommon in the project area and will not be impacted by the proposed salvage sale operations in accordance with Area Plan Standards.

Because not all damaged standing trees are going to be salvaged, that limestone outcrop habitat will not be impacted, and foraging habitat within and adjacent to stream corridors and forest perimeters will be improved, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Northern Pine Snake - *Pituophis melanoleucus melanoleucus*

The Northern pine snake is known to occur on Land Between the Lakes and potential habitat occurs within the two project areas.

The Northern pine snake is found in the south and central sections of Land Between the Lakes. Over most of its range, this snake is restricted to areas of dry, loose soil. In Land Between the Lakes, it prefers open areas associated with oak-hickory forest (Snyder, D.H., et.al. 2016). One of the major threats to this species is habitat loss (Burger, J., & Zappalorti, R. T. 2011).

The proposed management may directly impact this species if present during sale operations. However, the machinery related ground noise is most likely to cause the pine snake to avoid areas of operation, thus reducing potential encounters. Timber salvage sale operations will be occurring within former oak-hickory forests that were primarily closed canopy. The removal of down and standing trees are likely to have an indirect beneficial impact for the Northern pine snake by improving habitat and foraging opportunities.

Because the Northern pine snake is not likely to be present in sale operation areas during equipment operations, thus reducing potential direct impacts, and that this species is likely to be benefitted indirectly from habitat enhancement, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

American Bumblebee - *Bombus pensylvanicus*

The American bumblebee is known to occur on Land Between the Lakes and potential habitat occurs within the two project areas.

Open grassland habitats and other open old fields are likely to be the most suitable habitat for this species in its range. These many grassland habitat types are of conservation concern and exist only in small remnants. Since this species prefers above ground nesting in natural grasslands or agricultural fields, it is particularly susceptible to habitat loss and management activities (NatureServe Explorer 2022).

The proposed management may directly impact this species if it has taken up residency in down and standing damaged trees planned for removal or present in the pathway of equipment while on site. The American bumble bee will be indirectly benefited with the creation of new openings from the reduction in forest overstory created by the tornado events and by retention of down and standing trees within lightly damaged trees areas on the landscape. Only damaged down and standing trees on moderate to catastrophically damaged sites are authorized for removal if they are merchantable. The new open forest canopy conditions and tree removal will allow sunlight, water, and nutrient flow to the ground to stimulate flowering vegetation for the bumble bee to forage.

Because the American bumble bee may be directly impacted if present in trees planned for removal, be run over on the ground in areas of operation, and be indirectly benefited by habitat creation and retention, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Monarch butterfly – *Danaus plexippus*

The Monarch butterfly is known to occur on Land Between the Lakes and potential habitat occurs within the two project areas.

Monarch butterflies require nectar bearing wildflowers to provide them with the energy and nutrients for their development and reproductive organs. During the breeding season they are associated with milkweeds, roadsides, fields, croplands, marshes wet meadows, waste lots, and watercourses.

The proposed management may directly impact this species if on desirable vegetation in the pathway of equipment accessing damaged trees. Desirable vegetation for foraging and egg laying by the monarch, is going to be primarily in fields and in the understory of storm damaged forest. Portions of the open lands were impacted by storm damage and will not provide beneficial foraging vegetation until the down tree debris is cleaned up. The monarch butterfly will be indirectly benefited with the creation of new openings from the reduction in forest overstory created by the tornado events. The new open forest canopy conditions and tree removal will allow sunlight, water, and nutrient flow to the ground to stimulate flowering vegetation for the monarch butterfly to forage and vegetation to lay their eggs.

Because the monarch butterfly is likely to fly off from areas that equipment would be passing through, the monarch eggs on vegetation are most likely to be directly impacted, and this species will be indirectly benefited by habitat creation, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Rough rattlesnake-root – *Prenanthes aspera*

The Rough rattlesnake-root is not known to occur within the project areas; however potential habitat for this species may be enhanced with down tree debris removal. This species is associated with barrens, prairie, and woodland habitat. There may be inclusions of this type of habitat within the former forested areas. The very first population of this species was recently discovered on Land Between the Lakes in October 2021. It was found to occur in an area that canopy tree removal was completed on rocky soils associated with one of our five Price's potato bean sites. The proposed management actions may have beneficial impacts on this species habitat.

Barbed rattlesnake root – *Prenanthes barbata*

The Barbed rattlesnake root is known to occur within the South Project Area and potential habitat occurs within the North Project Area.

This plant occurs in prairies and barrens and dry woodlands. On Land Between the Lakes potential habitat includes forest cover in open-type conditions and grasslands on xeric and dry sites. In the Area Plan FEIS the forest habitat cover-types that this species may occur is referred to as Xeric and Dry Open Forest, Xeric and Dry Grassland, and Woodland Associates.

Prior to 2007 open lands with the occurrence of this species were mowed, disked, and planted. As a result of these operations the plant remained primarily in vegetative non-flowering status. These fields were taken out of cultivation with the implementation of the Revised Continued Maintenance of Open Lands Environmental Assessment, 2007 based upon field survey findings in 2006. The proposed management may directly impact this species if present on the landscape within the pathway of equipment causing it to be crushed and uprooted. The Rattlesnake root may be indirectly benefitted by the new tornado created open canopy conditions on xeric and dry site types. Removal of the downed trees will help allow sunlight, water, and nutrient flow to the ground to stimulate the growth of this plant.

Because there is a known location of this plant within the South Project Area, the following *Design Criteria* will be implemented to avoid damage to this plant and its immediate surrounding habitat:

The location will be provided to the Contract Officer for contract work avoidance. All forest management equipment used to remove down and standing trees within the adjacent forest area

will be excluded from the known site. The site shall not be used for skidding, loading, log landings or other heavy equipment disturbance activity.

Because of implementing the above Design Criteria for Barbed rattlesnake-root, knowing that it can withstand some landscape disturbance, and there are likely indirect benefits of removing down damaged trees, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Nodding rattlesnake-root – *Prenanthes crepidinea*

The Nodding rattlesnake-root is only known from the Bear Creek floodplain in southern Land Between the Lakes in Stewart County, Tennessee. This species is widespread but occurs somewhat infrequently. It is primarily threatened by logging of floodplain forests and by invasion of habitat by garlic mustard. Found in shaded to open areas, often alluvial soils, in rich woods, along streams and prairies. Heavy shading at the known location prevents flowering.

The proposed management is not likely to have a direct impact on this plant as it is only known from one location. Most of the salvage sale operations are planned to occur in mesic to xeric dry site types. There are few areas in each project area that Riparian Forest exists. In the North Project area Riparian Forest is associated with Lake Barkley shoreline and Demumbers Creek-Bay. In the South Project area Riparian Forest is in Rayburn Hollow, Dry Fork Creek, and Panther Creek vicinities. Nodding rattlesnake-root may be indirectly benefited in riparian forested areas that down and standing trees are removed. Removal of this vegetation may allow sunlight, nutrients, and water to stimulate the growth of this species if present.

Because there is only one known location for this plant on the Recreation Area and it is outside the project area, there isn't much riparian habitat that tree removal is proposed, and that tree removal may indirectly benefit this species if present, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Tansy rosinweed – *Silphium pinnatifidum*

The Tansy rosinweed or Prairie Dock is known to occur on Land Between the Lakes and potential habitat occurs within the two project areas.

Tansy rosinweed occurs primarily in open barrens, glades, and prairies, usually on limey parent material. It may also occur in remnant barrens and prairies, generally at roadsides or in fencerows (NatureServe 2022). In Land Between the Lakes, this plant has been observed to occur on gravelly sites within and adjacent to riparian corridors and in association with open canopy conditions. Tansy rosinweed can withstand heavy equipment of tractors and disturbance of mowing as it has a very deep root system (Elizabeth Raikes, personal observation).

Because the proposed action may have short term direct impacts on Tansy Rosinweed from heavy equipment if present in areas of tree removal, and tree removal will indirectly benefit this species by allowing nutrients, light, and rain to access its root system, the proposed action may impact individuals but not likely to cause a trend to federal listing or a loss of viability.

Migratory Bird Species

The bald eagle (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*) are known to nest within the project areas, primarily in association with lake shorelines, bays, and intermittent and perennial streams. These species also construct nests on communication towers and utility rights-of-way transmission pole structures. The osprey will place their nest on just about any high position platform adjacent to water (Elizabeth Raikes, personal observations). Favored bald eagle nest trees are typically large diameter trees with strong lateral limbs and are in stands with open canopies. Nest trees in an open canopy forest have an unobstructed flight path to the nest and a wide field of view of surrounding habitat. This preference results in bald eagles selecting large, dominant nest trees in areas with previous timber harvest or along edges of forests.

Within the North Project Area there once was a bald eagle's nest in the Moss Creek Area. That nest fell down in 2020. One other nest was active on the east end of this project area in 2021; however, it was in the direct path of the tornado and is not likely present due to the severe damage sustained at the site. There is one bald eagle nest in the South Project Area on a pine-hardwood forest site that sustained light tornado damage. This nest if still present, is more than 660 feet from the nearest moderate to catastrophic damaged area that is likely to be considered for tree removal.

In accordance with the U.S. Fish and Wildlife Service National Bald Eagle Management Guidelines (2007), the nest in the South Project Area is sufficiently far enough away that no restrictive tree removal work area measures need to be considered. Because the storm occurred right before most of the bald eagle nesting begins on Land Between the Lakes, there is a possibility that based on the locations that the bald prefers to nest, new nests could now exist along the forest edges of the two tornado paths, primarily in the vicinity of water. The bald eagle will travel upwards of 2.5 miles inland on forested sites.

Bald Eagle Protection Design Criteria per National Bald Eagle Management Guidelines

Timber Operations and Forestry Practices

- Avoid clear cutting or removal of overstory trees within 330 feet of the nest at any time.
- Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, after eggs laid in another nest within the territory have

hatched.

- Off-road vehicle use. No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet. *Note: Breeding season on Land Between the Lakes can begin as early as October and go through July depending upon the bald eagle pair.*
- Should a bald eagle nest be found within the project areas prior to or during forest management activities, the Threatened and Endangered Species Coordinator shall be notified and the appropriate protection measures implemented.

Osprey and Nest Protection Design Criteria

Ospreys and their nests are protected under the Migratory Bird Treaty Act. The nest is protected up until after the osprey fledglings and adults leave the nest. If this species is observed within the sale area, make note of occurrence and report to the Threatened and Endangered Species Coordinator.

Non-Native Invasive Species

Non-native invasive plant species are problematic within Land Between the Lakes. To prevent and control further spread of non-native invasive plant species and imported fire ants, equipment brought to the project area from outside of Land Between the Lakes shall be cleaned of soil and seed/root material before coming to Land Between the Lakes.

Conclusion

If any new locations of Federally listed, Regional Forester's Sensitive Species, Bald eagle, and Osprey are found within or adjacent to the proposed project area, please notify the Threatened and Endangered Species Coordinator to determine if any different action needs to be considered and/or the appropriate Area Plan standards implemented to protect the new location(s).

References and Information Sources

Land and Resource Management Plan (Area Plan)
Land Between the Lakes National Recreation Area
Management Bulletin R8-MB-119A
December 2004

Vol. 1 & 2 Final Environmental Impact Statement for the Area Plan (FEIS)
Land Between the Lakes National Recreation Area
Management Bulletin R8-MB-119B
December 2004

Biological Assessment for the Area Plan (BA)
Land Between the Lakes National Recreation Area
October 2004

Biological Evaluation for the Area Plan (BE)
Land Between the Lakes National Recreation Area
November 2004

Biological Assessment and Evaluation for Crossroads Prescribed Fire Project
Land Between the Lakes National Recreation Area
February 2011

Biological Evaluation for Hurricane Creek Timber Salvage Sale
Land Between the Lakes National Recreation Area
September 2011

Continued Maintenance of Open Lands, Revised Environmental Assessment
Land Between the Lakes National Recreation Area September 2007

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Land Between the Lakes National Recreation Area
December 2011

Record of Decision for the FEIS and Area Plan
Land Between the Lakes National Recreation Area
Management Bulletin R8-MB-119D
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4/22/2022

DATE