Biological Assessment

R.L. Harris Hydroelectric Project

FERC No. 2628

HARRIS DAM
RELICENSING

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1 INTRODUCTION AND DESCRIPTION OF THE ACTION AREA

Alabama Power Company (Alabama Power) owns and operates the R.L. Harris Hydroelectric Project (Harris Project), FERC Project No. 2628, licensed by the Federal Energy Regulatory Commission (FERC). The Harris Project consists of a dam, spillway, powerhouse, and those lands and waters necessary for the operation of the hydroelectric project and enhancement and protection of environmental resources. These structures, lands, and waters are enclosed within the FERC Project Boundary. Under the existing Harris Project license, the FERC Project Boundary encloses two distinct geographic areas, described below. As part of the Final License Application (FLA) for the Harris Project, Alabama Power is proposing to add or remove specific tracts to or from the Harris Project Boundary. This BA reflects the proposed Harris Project Boundary.

Harris Reservoir is the 9,870-acre reservoir (Harris Reservoir) created by the R.L. Harris Dam (Harris Dam). The lands adjoining the reservoir total approximately 7,545 acres (5,914 timbered) and are included in the FERC Project Boundary (Figure 1-1). This includes land to 795 feet mean sea level (msl)[1], as well as natural undeveloped areas, hunting lands, prohibited access areas, recreational areas, and all islands.

The Harris Project also contains 15,063 acres of land within the James D. Martin-Skyline Wildlife Management Area (Skyline WMA) located in Jackson County, Alabama (Figure 2-1). These lands are located approximately 110 miles north of Harris Reservoir and were acquired and incorporated into the FERC Project Boundary as part of the July 29, 1988 Harris Project Wildlife Mitigative Plan and the June 29, 1990 Wildlife Management Plan. These lands are leased to, and managed by, the State of Alabama for wildlife management and public hunting and are part of the Skyline WMA.

For the purposes of this BA, "Lake Harris Project" refers to the 9,870-acre reservoir and adjacent 7,545 acres (5,914 timbered) of Project land. "Skyline Project" refers to the 15,063 acres of Project land within the Skyline WMA in Jackson County. "Harris Project" refers to

[1] Also includes a scenic easement (to 800 feet msl or 50 horizontal feet from 793 feet msl, whichever is less, but never less than 795 feet msl).

all the lands, waters, and structures enclosed within the FERC Project Boundary, which includes both the Lake Harris Project and Skyline Project.

The Lake Harris Project and Skyline Project are located within two river basins: the Tallapoosa and Tennessee River Basins, respectively. The only waterbody managed by Alabama Power as part of their FERC license for the Harris Project is the Harris Reservoir.

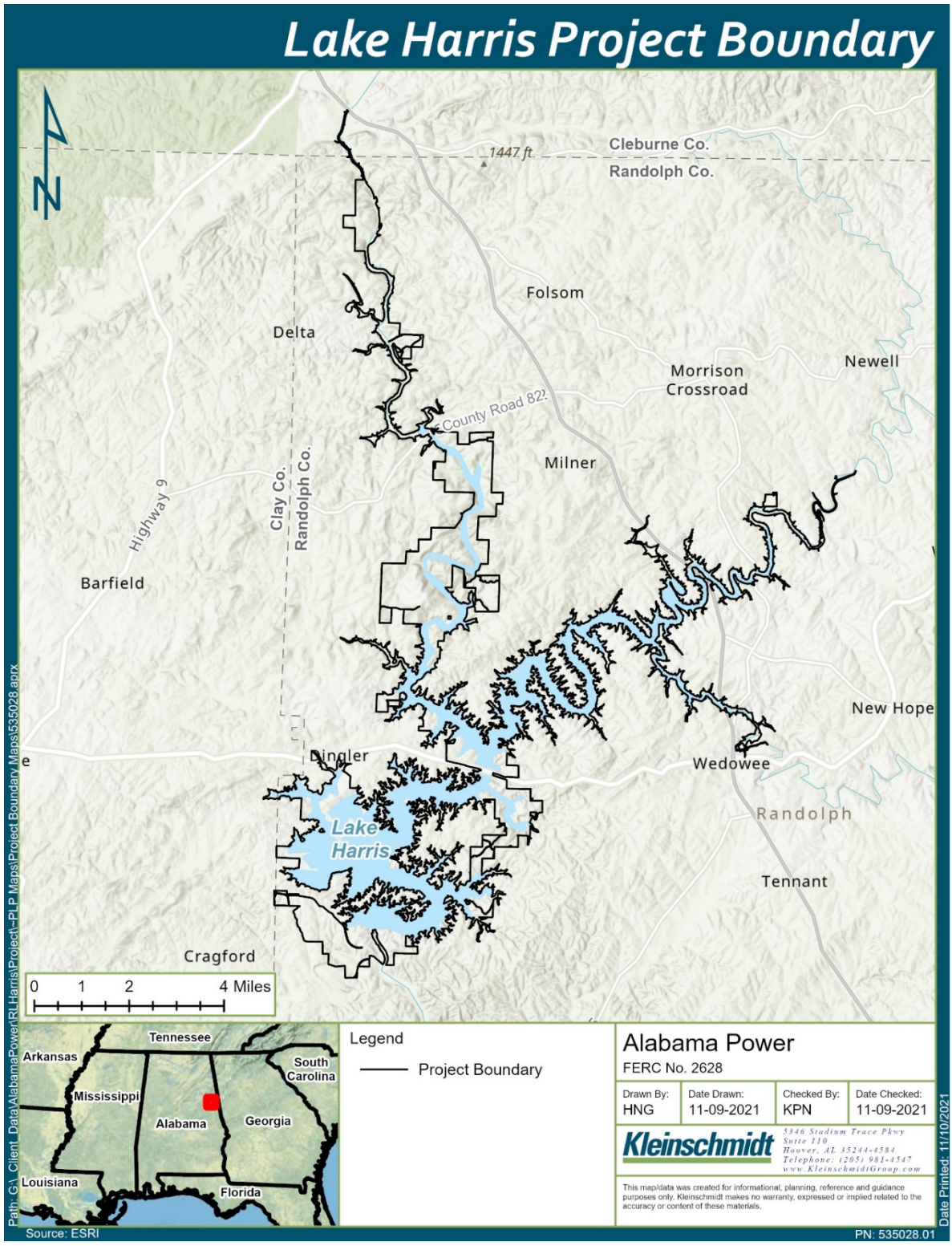

Figure 1-1 Lake Harris Project Boundary

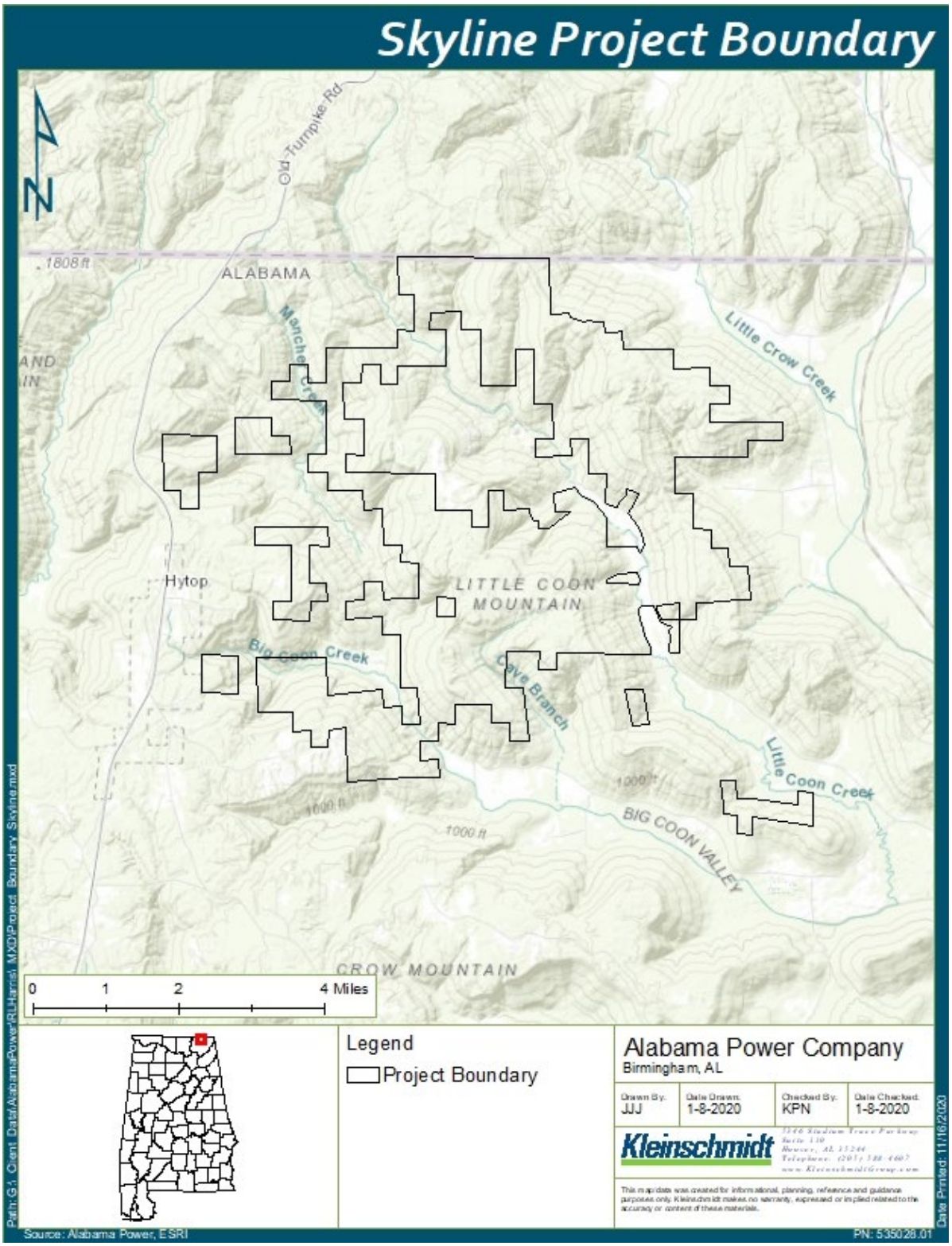

Figure 1-2 Skyline Project Boundary

2 SPECIES BACKGROUND

Alabama Power is relicensing the Harris Project, and the existing license expires in 2023. The relicensing process included a multi-year cooperative effort between Alabama Power, state and federal resource agencies, and interested stakeholders to address operational, recreational, and ecological concerns associated with hydroelectric project operations.

2.1 NEED FOR A BIOLOGICAL ASSESSMENT

The U.S. Fish and Wildlife Service (USFWS) regulations implementing Section 7 of the Endangered Species Act (ESA) require federal agencies to review their actions to determine whether they may affect listed species or designated critical habitat. USFWS guidance requires documentation of the basis for evaluating the likely effects of the action on listed species. A Biological Assessment (BA) can provide such documentation. Similarly, FERC guidance recommends the preparation of a BA, even where one is not required, in order to identify and resolve issues early in the licensing process. In keeping with this guidance, Alabama Power has prepared this BA in order to provide FERC and USFWS with an account of the likely effects on listed and proposed species and designated critical habitat from the continued operation of the Harris Project.

A BA evaluates the potential impacts of the action on listed or proposed species or designated or proposed critical habitats present in the action area and concludes whether such species or habitat are likely to be adversely affected by the action. The contents of the assessment are discretionary but generally include results of on-site inspections determining the presence or absence of listed or proposed species, analyses of the likely effects of the action on the species or critical habitat based on biological studies, review of literature, and/or the views of species experts. The assessment also describes any known, unrelated, future, non-federal activities (cumulative effects) reasonably certain to occur within the action area that are likely to affect the species or critical habitat. Information from previous draft environmental analysis documents and the draft license application have been modified and/or used to produce this assessment. One of the purposes of the BA is to help make the determination of whether the proposed action is "likely to adversely affect" listed species and/or critical habitat. To make such a determination, all listed, proposed, and candidate species and designated and proposed critical habitats potentially found in the action area have been addressed in this BA. Such an assessment helps to determine the need for formal consultation on listed species as

well as a conference for proposed species and an optional conference for candidate species.

Through the relicensing process, the *Final Threatened and Endangered Species Study Report*[2] (Kleinschmidt 2021a) was developed to determine what listed species and habitats may be affected by the Project. This study was designed and implemented with federal and state agencies including FERC, USFWS, Alabama Department of Conservation and Natural Resources (ADCNR), and stakeholders. Specific locations for surveys of species were determined in consultation with USFWS to identify areas with the highest likelihood of finding listed species. The *Final Threatened and Endangered Species Study Report* found that the only species that may be affected by the Project are the listed bats that may be potentially affected by timber harvest operations as outlined in the Wildlife Management Plan. However, since the filing of the *Final Threatened and Endangered Species Study Report*, the USFWS's *Information for Planning and Consultation* (IPaC) identified the threatened American Hart's-tongue Fern (*Asplenium scolopendrium var. americanum*) and the candidate Monarch Butterfly (*Danaus plexippus*) as species that are present in counties where the Harris Project is located. These species are therefore also included in the Summary of Analysis Section of this BA.

2.2 DETERMINATION OF EFFECT

The analyses included in this BA summarize all potential effects, both direct and indirect, of Alabama Power's proposed actions on federally listed species and designated critical habitats. Each analysis includes a determination of effect, which is consistent with the requirements under Section 7 of the ESA. Acceptable ESA determinations of effect include the following:

- No Effect – the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat.
- Not Likely to Adversely Affect – the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse impacts to the species. Insignificant effects are related to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be

[2] Accession No. 20210129-5393

able to meaningfully measure, detect, or evaluate insignificant effects or (2) expect discountable effects to occur.

- Likely to Adversely Affect – the appropriate conclusion if any adverse effects to listed species may occur as a direct or indirect result of the proposed action or interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action is considered "likely to adversely affect" the listed species or critical habitat. A determination of "likely to adversely affect" requires formal consultation with the USFWS under Section 7 of the ESA.

A summary of the determinations of effect for all species and critical habitats considered in this BA is included in the summary of analysis below.

2.3 CONSULTATION HISTORY

On August 10, 2018 FERC designated Alabama Power as their non-federal representative to execute the informal consultation pursuant to Section 7 under ESA. As part of the informal consultation process, a number of meetings have been held to facilitate development of this BA. Table 2-1 provides a comprehensive listing of all Section 7 meetings to date.

Table 2-1 Summary of Harris Project Section 7 Consultation Meetings

MEETING DATE	LOCATION	TOPICS DISCUSSED
June 14, 2017	USFWS Office, Daphne, AL	One-on-One Meeting with USFWS – Discussions on Integrated Licensing Process (ILP); Harris Project Schedule; Project Team; Relicensing Communication Tools; Existing Data, Preliminary Application Document (PAD) Questionnaire & Preliminary Issues
October 19, 2017	Wedowee, AL	Issue Identification Workshop - Discussions regarding the potential issues and data needs at the Harris Project.
April 24, 2018	Wedowee Marine South, Wedowee, AL (USFWS by phone)	Overview of the FERC Study Plan Process, the Study Plans, and the ILP. The meeting concluded with Harris Action Team (HAT) sign-ups.
September 20, 2018	Oxford Civic Center, Oxford, AL (USFWS by phone)	HAT[3] 3 Meeting – Study Plans and the feedback/comment process
August 27, 2019	Wendell Mitchell Conference Center, Greenville, AL	HAT 3 Meeting – Update on the Threatened and Endangered Species Study Plan
April 28, 2020	Conference Call	Initial Study Report (ISR) Meeting – Threatened and Endangered Species Study progress
November 5, 2020	Conference Call	HAT 3 Meeting – Update on the Threatened and Endangered Species Study
April 27, 2021	Conference Call	Updated Study Report (USR) Meeting – Threatened and Endangered Species Study progress
November 9, 2021	Email	Alabama Power sends USFWS a draft BA for their review

[3] Harris Action Teams (HATs) were developed during the January 31, 2018 Stakeholder Informational Meeting. HAT 3 includes the Threatened and Endangered Species Study.

2.4 SUMMARY OF ANALYSIS

Research conducted through IPaC identified a total of 22 endangered, threatened, or candidate species potentially present in counties where the Harris Project is located (Table 2-2), 20 of which were identified during the development of the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021a). The USFWS's Environmental Conservation Online System (ECOS) was used to specifically determine the location of species' ranges and areas of critical habitat relative to the Project Boundary. Critical habitat (CH) has been designated for 6 of the 20 species, including the Finelined Pocketbook, Indiana Bat, Rabbitsfoot, Slabside Pearlymussel, Southern Pigtoe, and Spotfin Chub. The only CH occurring near the Project Boundary was CH for the Finelined Pocketbook (*Hamiota altilis*) (Kleinschmidt 2021a). Critical habitat for this species occurs just upstream of the Lake Harris Project Boundary. Alabama Power conducted a desktop analysis that developed Geographic Information System (GIS) overlays of habitat information and maps to determine if further evaluation (i.e., field surveys) of any identified species and their habitat was warranted. Results of the desktop analysis are included in the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021a).

Results of the desktop analysis and subsequent consultation with the USFWS, ADCNR, and the Alabama Natural Heritage Program (ALNHP) confirmed the need for field surveys to determine the presence or absence of certain listed species or their habitat (Kleinschmidt 2021a). Field surveys were performed for five species, including the Palezone Shiner (*Notropis albizonatus*), Finelined Pocketbook, White Fringeless Orchid (*Platanthera integrilabia*), Price's Potato-bean (*Apios priceana*), and Red-cockaded Woodpecker (RCW) (*Picoides borealis*) to determine if there are existing specimens or suitable habitats within the Project Boundary. Survey locations for Palezone Shiner, Finelined Pocketbook, White Fringeless Orchid and Price's Potato-bean were selected in coordination with the USFWS and included areas with the greatest likelihood of detecting the species. Although Price's Potato-bean had been recently documented within the Project Boundary (USFWS 2016), no specimens were found during these surveys. For RCW, only one contiguous pine tract within the Project overlapped with the current USFWS published range, but other sites were evaluated for habitat suitability. Results of these surveys are included in *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021a), the Preliminary Licensing Proposal (Kleinschmidt 2021b). In sum, **no listed species were encountered during any of these surveys and the species, other**

than the Price's Potato-bean, are not otherwise known to occur within the boundaries of the Projects. Consequently, there should be no effect on the Palezone Shiner, Finelined Pocketbook or its designated CH, White Fringeless Orchid Price's Potato-bean, or the Red-cockaded Woodpecker due to the continued operation of the Harris Project.

Of the remaining 17 species identified by IPaC for the *Final Threatened and Endangered Species Study Report*, except for federally listed summer roosting bats, only the Little Amphianthus (*Gratiola amphiantha*) has been documented within the Project Boundary in the recent past. It was last documented within the Lake Harris Project Boundary in 1995, but three subsequent surveys conducted in 2018 and 2019 have failed to document the species (Diggs et al. 2020)[4], and the current habitat range provided by USFWS's ECOS no longer intersects the Lake Harris Project Boundary. Little Amphianthus is assumed to be extirpated from the site. The current habitat range of Morefield's Leather Flower has also changed since the *Final Threatened and Endangered Species Study Report* was filed. The habitat range was previously outside the Project Boundary but now intersects the Skyline Project Boundary; however, there are no published reports of Morefield's Leather Flower occurring with the Skyline Project Boundary. Further, the Spotfin Chub is presumed to be extirpated from the State with no CH within or adjacent to the Harris Project Boundary, there are no published reports or survey results identifying the Southern Pigtoe (or its CH) within or adjacent to the Harris Project Boundary, and the current habitat ranges for the remaining species (Alabama Lampmussel, Cumberland Bean, Fine-rayed Pigtoe Mussel, Pale Lilliput Mussel, Rabbitsfoot Mussel and its CH, Snuffbox Mussel, Shiny Pigtoe Mussel, and Slabside Pearlymussel and its CH) do not intersect the Harris Project Boundary. **Therefore, there should be no effect to any of these remaining species by continued operation of the Harris Project**.

However, there is habitat for the threatened Northern Long-eared Bat (NLEB) (*Myotis septentrionalis*) and endangered Indiana Bat (*Myotis sodalis*) at the Lake Harris Project and Skyline Project. These species are assumed to use the surrounding habitat for at least part of their life history. Accordingly, timber management strategies that could impact these species are analyzed in the BA.

[4] Accession No. 20210412-5746

In addition, habitat for the federally protected Gray Bat (*Myotis grisescens*) occurs within the Skyline Project Boundary, with approximately 10,782 acres of karst geology occurring. The Gray Bat uses caves for both winter hibernaculum and summer roosting. Therefore, the Gray Bat should not be affected by timber management operations. Moreover, there have been no reports of overwintering or summer roosting occurrences within the Skyline Project Boundary. There is also no known habitat for the Gray Bat within the Lake Harris Project. **Accordingly, there should be no effect to the Gray Bat by the continued operation of the Harris Project.**

An additional two species, the threatened American Hart's-tongue Fern and the candidate Monarch Butterfly, were identified by IPaC as potentially occurring in counties within the Harris Project after the filing of the *Final Threatened and Endangered Species Study Report*[5]. These species were therefore not included in the desktop assessment or in consultation with USFWS on the need to conduct surveys. American Hart's-tongue Fern's current habitat range intersects the Skyline Project Boundary, but neither of the two known occupied locations in Alabama are within the Skyline Project Boundary (USFWS 2012). **Therefore, there should be no effect to the American Hart's-tongue Fern by the continued operation of the Harris Project.**

Due to the migratory nature of the Monarch Butterfly, their current habitat range includes the entire United States, with the exception of Alaska. The Monarch Butterfly requires sources of nectar and milkweed, which are present on Project lands. Conservation activities implemented by Alabama Power that beneficially impact this species are included in the BA.

For the reasons listed above, only implementation of the proposed Wildlife Management Plan, which includes timber management practices, right-of-way maintenance, and the pollinator projects,[6] have the potential to impact any federally listed or candidate species.

[5] FERC noted the presence of the threatened American Hart's-tongue Fern and the candidate Monarch Butterfly in a letter filed on September 28, 2021 (Accession No. 20210928-3028)

[6] The pollinator project is part of The Preserves, Alabama Power's 65 public recreational sites located along its 3,500 miles of shoreline in the state. The company currently maintains pollinator-friendly plots at some of those sites. Alabama Power works with a company to develop a specific seed blend for each soil and habitat type to attract pollinators such as bees, butterflies, moths, and beetles.

Table 2-2 Federally Listed and Candidate Species Potentially Occurring Within the Project Boundary

Common Name	Scientific Name	Counties	Recent Documented Occurrence (1995-2021) in Project Boundary	Federal Status[1]	Species DOE[2]
Birds					
Red-cockaded Woodpecker[3]	*Picoides borealis*	Clay & Randolph	None	E	NE
Fish					
Palezone Shiner[3]	*Notropis albizonatus*	Jackson	None	E	NE
Spotfin Chub	*Erimonax monachus*	Jackson	None[5]	TDCH	NE
Mussels					
Finelined Pocketbook[3]	*Hamiota altilis*	Cleburne	None	TDCH	NE
Alabama Lampmussel	*Lampsilis virescens*	Jackson	None	E	NE
Cumberland Bean	*Venustaconcha trabalis*	Jackson	None	E	NE
Fine-rayed Pigtoe	*Fusconaia cuneolus*	Jackson	None	E	NE
Pale Lilliput	*Toxolasma cylindrellus*	Jackson	None	E	NE
Rabbitsfoot	*Theliderma cylindrica*	Jackson	None	TDCH	NE
Shiny Pigtoe	*Fusconaia cor*	Jackson	None	E	NE
Snuffbox	*Epioblasma triquetra*	Jackson	None	E	NE
Southern Pigtoe	*Pleurobema georgianum*	Clay & Cleburne	None	EDCH	NE
Slabside Pearlymussel	*Pleuronaia dolabelloides*	Jackson	None	EDCH	NE
Mammals					
Indiana Bat	*Myotis sodalis*	Clay, Cleburne, Randolph, Chambers, Tallapoosa, & Jackson	Assumed present	EDCH	LAA[4]
Northern Long-eared Bat	*Myotis septentrionalis*	Clay, Cleburne, Randolph, Chambers,	Assumed present	T	NLAA

Common Name	Scientific Name	Counties	Recent Documented Occurrence (1995-2021) in Project Boundary	Federal Status[1]	Species DOE[2]
		Tallapoosa, & Jackson			
Gray Bat	*Myotis grisescens*	Jackson	None	E	NE
Plants					
Little Amphianthus	*Gratiola amphiantha*	Randolph, Chambers, & Tallapoosa	Yes[5]	T	NE
White Fringeless Orchid[3]	*Platanthera integrilabia*	Clay, Cleburne, Chambers, Tallapoosa & Jackson	None[6]	T	NE
Price's Potato-bean[3]	*Apios priceana*	Jackson	Yes[6]	T	NE
Morefield's Leather Flower	*Clematis morefieldii*	Jackson	None	E	NE
American Hart's-tongue Fern	*Asplenium scolopendrium var. americanum*	Jackson	None	T	NLAA
Insects					
Monarch Butterfly	*Danaus plexippus*	Clay, Cleburne, Randolph, Chambers, Tallapoosa, & Jackson	Assumed Present	C	N/A

1 Federal Status – E (listed as Endangered); T (listed as Threatened); EDCH (listed as Endangered and has Designated Critical Habitat); TDCH (listed as Threatened and has Designated Critical Habitat); C (Candidate)

2 Determination of Effect (DOE) - NE (No Effect); NLAA (Not Likely to Adversely Affect); LAA (Likely to Adversely Affect); n/a (Not Applicable – species does not have designated Critical Habitat or Critical Habitat does not occur in the vicinity of the proposed action)

3. Recommended for additional field surveys to document potential occurrence within Project Boundary. RCW proposed for downlisting as Threatened in 2020.

4 Likely to adversely affect due to timber operations at Skyline. Not likely to adversely affect Lake Harris populations if they occur.

5 Presumed extirpated at this time.

6 Recent surveys by Alabama Power did not detect.

2.5 SUMMARY OF THE PROPOSED ACTION

Alabama Power has had an active forest management program since World War II. Shortly after World War II, timber stands were inventoried, and long-range timber management plans were developed. These plans directed an all-aged, sustained-yield management scheme with the forest rotation age of 60 years. Under this management strategy, trees would be grown to an average age of 60 years and would produce forest products on a continuous basis. Saw timber would be harvested on 16 year cutting cycles and pulpwood would be thinned as a secondary product at interim periods of 10 years.

In the early 1970s, the cutting cycle for saw timber was lengthened to 20 years because power skidders were being used. As a result, more volume was being cut per acre and more reseeding was occurring (from the additional exposure of mineral soil caused by the skidders). The extended cutting cycle allowed for per acre volumes to recover and the young seedlings to put on additional volume. This all or uneven-aged management scheme has produced a notably diverse forest both in terms of species composition and in forest products. The result is not only the production of valuable high-quality products but the production of diverse quality habitat for both game and non-game wildlife species. These planned and controlled forest management practices have, over the years, aided in the protection of the watersheds of the associated reservoirs that indirectly have enhanced the fisheries habitat of these lakes, rivers, and streams. These practices have also produced habitats that have promoted and sustained several rare and endangered species of plants and animals.

2.6 TIMBER DESCRIPTION

Contemporary timber stands on Project lands at Lake Harris are dominated by Mixed Pine-Hardwood, with natural longleaf pine, natural pine, upland hardwood, and planted pine comprising lesser percentages. Timber stand composition on the 5,914 acres within the Lake Harris Project Boundary is summarized in Table 2-1 and Figure 2-1.

Table 2-3 Timber Stand Composition on Lake Harris Project Boundary

Stand Type	Percent Cover	Acreage
Mixed Pine-Hardwood	48	2,838
Natural Pine	22	1,275
Pine Plantation	6	372
Upland Hardwood	24	1,429
Total	**100**	**5,914**

Source: Alabama Power Timber Stand Data

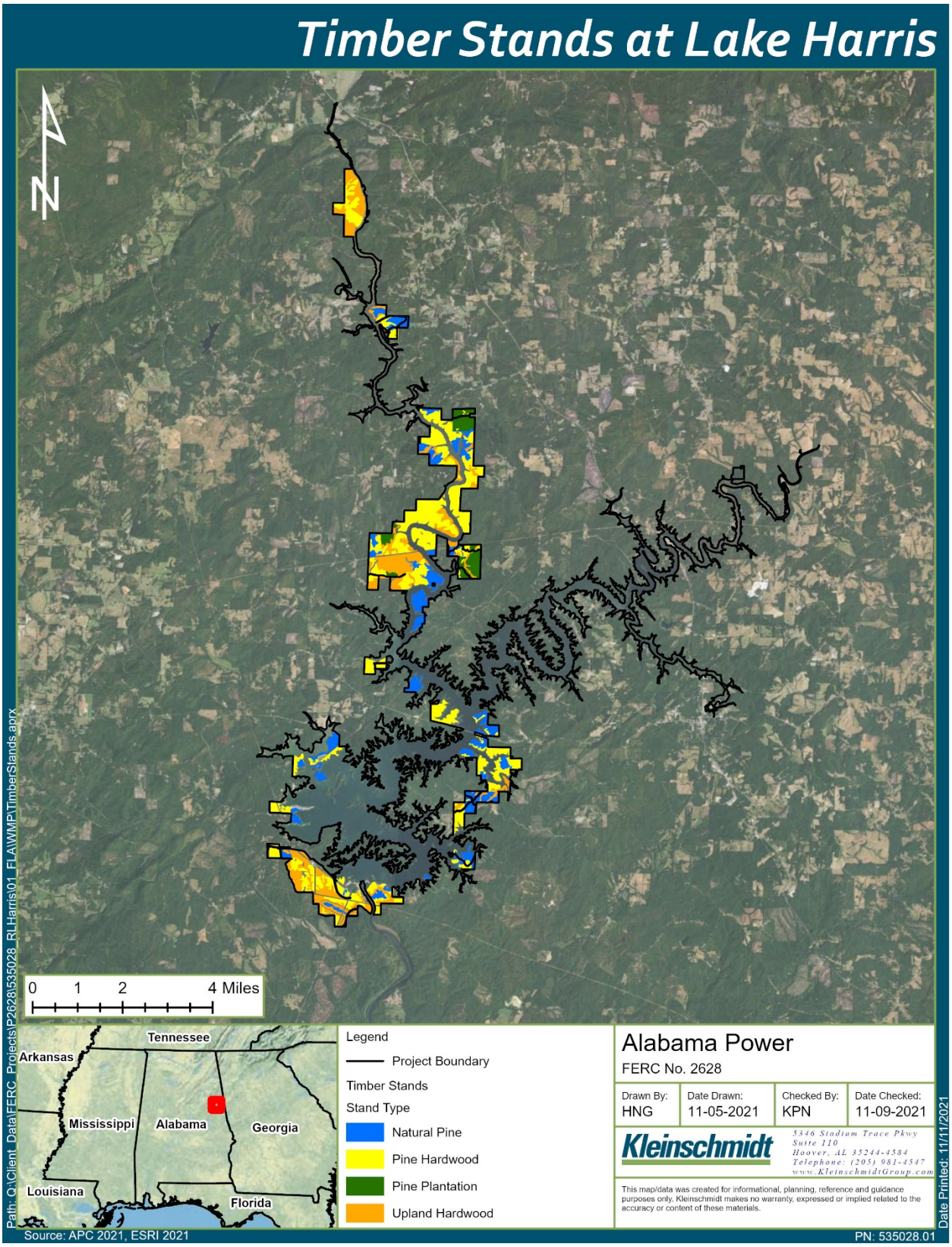

Figure 2-1 Lake Harris Timber Stands

Contemporary timber stands on Skyline Project lands are dominated by Upland Hardwood. Most of the timber stands are mature to over-mature mixed hardwood forest, made up primarily of various upland species of Red (*Quercus rubra*) and White Oak (*Quercus alba*), Yellow Poplar (*Liriodendron tulipifera*), hard and soft maple (*Acer* spp.), and hickory (*Carya* spp.). There is a small component of Shortleaf (*Pinus echinata*), Loblolly (*Pinus taeda*), and Virginia Pine (*Pinus virginiana*). Historically, past harvesting practices have focused on removing higher value red and white oak timber, resulting in many stands that are dominated by maple, hickory, Yellow Poplar, and Chestnut Oak (*Quercus montana*). Most stands have closed canopies resulting in little or no desirable understory species to provide the potential for future stands. Timber stand composition on the 15,063 acres within the Skyline Project Boundary is summarized in Table 2-4 and Figure 2-2.

Table 2-4 Timber Stand Composition on Skyline Project Boundary

Stand Type	Percent Cover	Acreage
Mixed Pine-Hardwood	Less than 1	23
Upland Hardwood	99	14,430
Bottomland Hardwood	Less than 1	610
Total	**100**	**15,063**

Source: Alabama Power Timber Stand Data

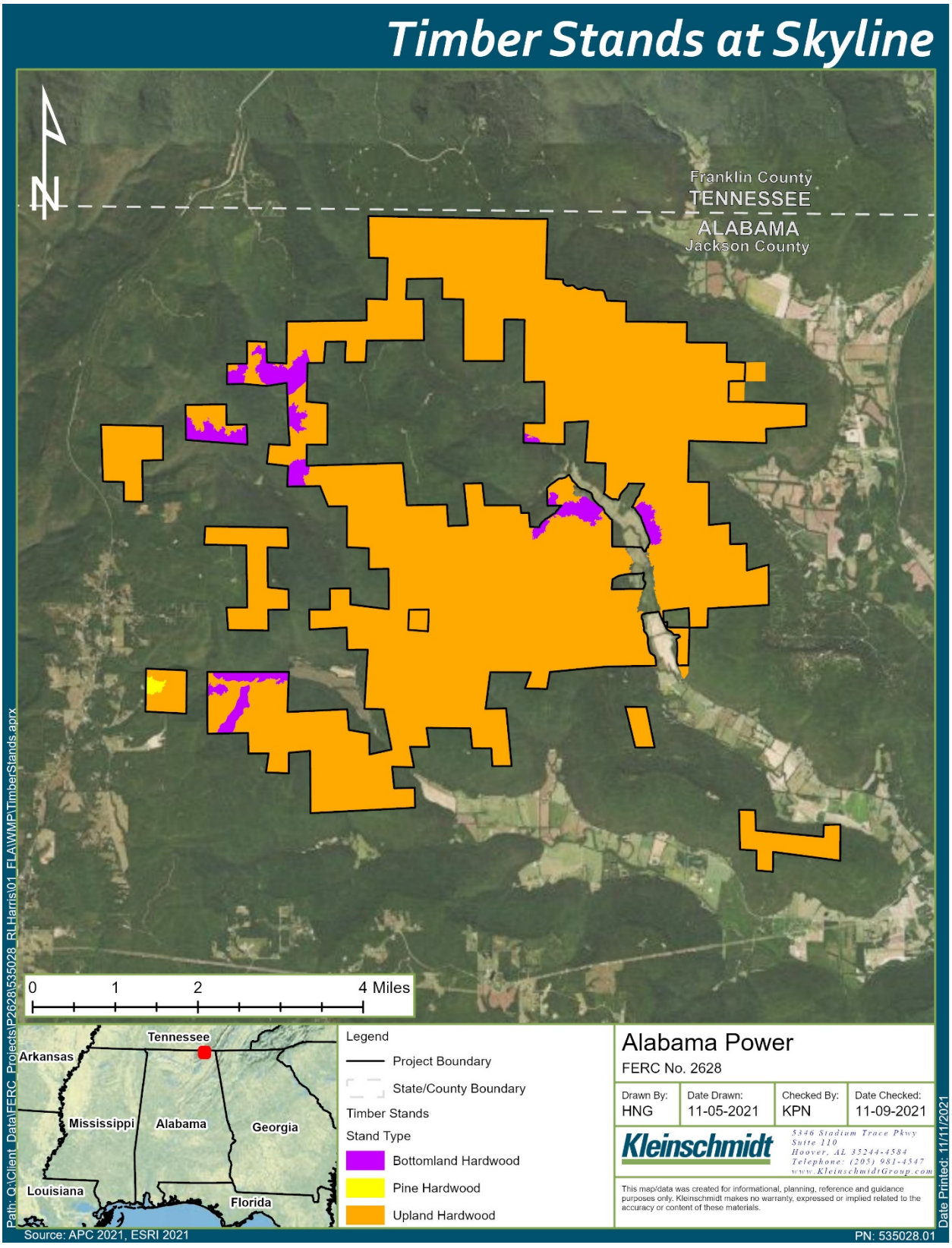

Figure 2-2 Skyline Timber Stands

2.6.1 LAKE HARRIS TIMBER HARVEST

Alabama Power will continue to utilize selective cutting as the primary means of timber harvest at Lake Harris. Specifically, only trees marked for harvest will be cut. Furthermore, only live, standing pine trees 15" DBH (diameter at breast height) and greater will be marked for harvest. No hardwood of any species is harvested at the Lake Harris Project, and no timber at all is harvested within the streamside management zones (SMZ). The remaining overstory after a selective harvest will be grown until the trees reach sawtimber size (>= 15" DBH). At that time, standing, live pine trees 15" DBH and greater will be selectively harvested. Typically, this is a 20-year cutting cycle. Furthermore, trees with potential roost tree characteristics (exfoliating bark, cracks, crevices, or hollows) will not be marked for cutting and will be retained. Exceptions to this would be to allow for salvage operations that may be necessary due to wind, fire, or insect damage, or to facilitate artificial regeneration of pine species. Currently, Alabama Power utilizes prescribed burns on approximately 160 acres every two years.

From 2016 through 2020, Alabama Power harvested at total of 257 acres at Lake Harris, comprised wholly by two sales resulting in an average of 128.5 acres per sale. If Alabama Power conducts at least one sale per year on average, it will result in 5,140 acres harvested over the life of the license (40 years). This likely represents a conservative estimate, as Alabama Power will not conduct a timber harvest every year. Because it is difficult to estimate the size and frequency of salvage operations, they will not be included in overall harvest estimates.

2.6.2 LAKE HARRIS PRESCRIBED FIRE

Alabama Power will utilize prescribed burns on approximately 160 acres every two years. These burns will be conducted on timbered land adjacent to Flat Rock Park. Initially this will occur during the dormant season. After fuel loads are adequately reduced, growing season burns may be performed.

2.6.3 SKYLINE PROJECT TIMBER HARVEST

The objective of timber management at Skyline is to ensure long-term health and sustainability of the forest, while enhancing wildlife management through ecological diversity and habitat improvement. Increasing the oak component of the forest through

selective harvesting and natural regeneration is a primary goal. Prudent timber management ensures the long-term health and sustainability of the forest while increasing the oak component over time.

Harvesting will follow a shelterwood prescription (regeneration method), as well as addressing intermediate management objectives of thinning. For the regeneration harvests, less desirable species across all size classes will be targeted for removal, and over-mature oak timber (≥ 19" DBH) will also be removed. This results in a residual stand of trees. Furthermore, a review of stand data since 2014 show a residual trees per acre (TPA) ranging from 30-100 TPA with most approximating 100 TPA. Shag bark hickory are not harvested and are retained in most stands. Alabama Power will continue to harvest timber at Skyline according to this prescription. This type of harvesting will allow for at least two age classes to become established in treated stands, increasing options for future management. It will also change the light levels reaching the forest floor, in an attempt to favor the intermediately shade tolerant oak over less shade tolerant species such as red maple and yellow poplar. By carefully selecting residual trees, growth will be concentrated on desirable species and choices can be made to retain trees that will contribute to other objectives (wildlife, aesthetics, biodiversity). Occasionally, there may be the need to create wildlife openings on top of the mountains. These areas could average 15 acres in size, and all timber will be harvested in these areas. These prescriptions will provide and maintain optimal ecological diversity and improved wildlife habitat. Exceptions to this would be to allow for salvage operations that may be necessary due to wind, fire, or insect damage, or to facilitate natural regeneration of oak species. Prescribed burns are not utilized at Skyline.

Typically, one to two harvest units will be targeted annually, and Alabama Power will be responsible for administering the timber sale. From 2016 through 2020, Alabama Power harvested (thinned) a total of 983 acres for an annual average of 164 acres per sale. Individual harvest units vary in size and are sometimes combined resulting in multiple harvest units harvested within the same year. Wildlife openings are selected in collaboration with ADCNR, average approximately 15 acres and occur approximately once every five years. For a conservative estimate, Alabama Power will assume that one 15-acre clear-cut is conducted annually to create wildlife openings. Using the 164 average acres per sale, at two sales per year plus 15-acres a year for wildlife openings would result in 13,720 acres over the life of the 40-year license. At this rate (343 acres/year), it would take more than 40 years to cut across the entire Skyline Project Area. Because it is difficult to

estimate the size and frequency of salvage operations, they will not be included in overall harvest estimates.

2.6.4 TIMBER HARVEST CONSERVATION ACTIONS

Alabama Power will adhere to current USFWS guidance concerning known hibernacula and maternity roost trees. However, there are no known NLEB or Indiana Bat hibernacula or maternity roost trees occurring within the Lake Harris or Skyline Project Boundaries or within the buffer zones established by currently published avoidance guidance for both species. Regarding the NLEB, there are no known hibernacula occurring within 0.25 miles of the Lake Harris or Skyline Project Boundaries, and no known maternity roosts occur within 150 feet of the Project Boundaries. Regarding the Indiana Bat, there are no P3 or P4[7] hibernacula occurring within 5 miles of the Lake Harris or Skyline Project Boundaries, and no known maternity roosts occur within 2.5 miles of the Project Boundaries. Furthermore, there are no P1 or P2[8] hibernacula occurring within the state or within 10 miles of the Lake Harris or Skyline Project Boundaries. Alabama Power will continue consulting the ALNHP and USFWS's Alabama Ecological Services Field Office regarding locations of any known maternity roost trees and hibernacula. If NLEB or Indiana Bat hibernacula or maternity roost trees are identified in areas within the Lake Harris or Skyline Project Boundaries, Alabama Power will adhere to the most up-to-date USFWS avoidance guidance, which, for the NLEB currently include limiting the cutting, trimming, or destruction of trees on Project land within 0.25 miles of known hibernacula during any time of the year and prohibits removal of trees within 150 feet of known maternity roosts from June 1 - July 31, except for removal of hazardous or fallen trees for protection of human life (USFWS 2016). Avoidance guidance and streamlined consultation for the NLEB can be found on USFWS's website. Avoidance guidance for the Indiana Bat can be found in Range-wide Indiana Bat Protection and Enhancement Plan Guidelines (2009).

Alabama Power will continue working with the USFWS to develop forestry management plans that are protective of listed species that may be present within the Harris Project Boundary.

[7] Priority 3 (P3) have current or observed historic winter populations 50 to 1,000 Indiana Bats. Priority (P4) have current or observed historic populations of less than 50 bats.

[8] Priority 1 (P1) have current or observed historic winter populations of greater or equal to 10,000 Indiana Bats. Priority 2 (P2) have current or observed historic populations of greater than 1,000 but less than 10,000 bats.

2.6.4.1 LAKE HARRIS TIMBER HARVEST CONSERVATION ACTIONS

Occasionally, a tree exhibiting potential roost characteristics for the Indiana Bat and NLEB may be inadvertently damaged during harvest. If this occurs to a high-quality potential roost tree[9] (Missouri's Field Office Technical Guide- Policy and Procedures 2003, USFWS 2015) outside the approved clearing season (October 15-March 31), Alabama Power will contact the USFWS Daphne Field Office. A particular emphasis will be made to avoid damaging potential high-quality roost trees during the pup season (May 1-July 15). For the southeast, the nonvolant period for the Indiana Bat occurs earlier than other regions, likely from May 1-July 15 (A. Edelman, J. Stober, pers. Comm. 2016 as cited in USFWS 2016 c). Recent surveys summarized by the South Carolina Department of Natural Resources (SCDNR) also observed early pupping in NLEBs (SCDNR 2019).

Selective harvest of only live pine trees 15" DBH and greater while avoiding trees that exhibit potential roost characteristics as well as implementation of published avoidance guidance if new maternity or hibernacula locations are discovered should avoid any potential adverse impacts to both listed bat species. Specifically, implementation of the above guidance will adhere to conditions outlined in the 4 (d)-rule for the NLEB, and no further consultation should be required for this species. In addition, the trees harvested under the described plan above do not meet the criteria for potential Indiana Bat roosting habitat. If a specific timber harvest plan does not adhere to the published avoidance guidelines or harvest prescriptions change, further consultation may be required.

2.6.4.2 SKYLINE PROJECT TIMBER HARVEST CONSERVATION ACTIONS

Alabama Power will retain snags and live trees exhibiting damage, basal openings, or hollowing of the bole. Occasionally, a snag or potential roost tree exhibiting some of these characteristics will be inadvertently damaged during harvest. However, every attempt is made to avoid these trees during harvest with a particular emphasis placed on avoiding high quality snags (9-inch DBH and greater) during the pupping season (May 1-July 15). As mentioned above, the shelterwood prescription used during timber harvest at Skyline will result in approximately 30-100+ TPA retained with most cuts resulting in a TPA greater than 100 with most Shagbark Hickories retained. This, with a minimum of a 60-year cutting

[9] Live/or snag greater than 9" DBH with exfoliating bark, crevice, crack, or hollow

cycle, will result in a residual stand of high-quality potential roost trees retained on the landscape.

3 STATUS OF THE SPECIES/CRITICAL HABITAT

The following section describes in general the NLEB, Indiana Bat, and Monarch Butterfly. The NLEB was listed as threatened on April 2, 2015, with a final rule published in the Federal Register on January 14, 2016 (USFWS 2015a). A 4(d) rule outlining exempted activities and avoidance criteria has been published (2016a). Critical habitat has not been designated for the NLEB (USFWS 2016b). The Indiana Bat was listed as endangered on March 11, 1976 (USFWS 1977), with critical habitat designated on September 24, 1977 (USFWS 1977). Designated critical habitat does not occur in the Action Area (Lake Harris and Skyline Project) and therefore is not addressed within this document. On December 17, 2020, the USFWS issued notice that listing the Monarch Butterfly as an endangered or threatened species was warranted but precluded by higher priority listing actions (85 Fed. Reg. 81813). The Monarch Butterfly remains a candidate species.

3.1 NORTHERN LONG-EARED BAT

3.1.1 SPECIES DESCRIPTION AND LIFE HISTORY

All references describing NLEBs were originally cited in and compiled from documents posted on the USFWS' Federal Register notifications and rulemakings.

A medium-sized bat species, the NLEB's adult body weight averages 5 to 8 grams (g) (0.2 to 0.3 ounces), with females tending to be slightly larger than males (Caceres and Pybus 1997). Average body length ranges from 77 to 95 millimeters (mm) (3.0 to 3.7 inches (in)), tail length between 35 and 42 mm (1.3 to 1.6 in), forearm length between 34 and 38 mm (1.3 to 1.5 in), and wingspread between 228 and 258 mm (8.9 to 10.2 in) (Caceres and Barclay 2000; Barbour and Davis 1969). Pelage (fur) colors include medium to dark brown on its back; dark brown, but not black, ears and wing membranes; and tawny to pale-brown fur on the ventral side (Nagorsen and Brigham 1993; Whitaker and Mumford 2009). As indicated by its common name, the NLEB is distinguished from other Myotis species by its relatively long ears (average 17 mm (0.7 in); Whitaker and Mumford 2009) that, when laid forward, extend beyond the nose up to 5 mm (0.2 in; Caceres and Barclay 2000). The tragus (projection of skin in front of the external ear) is long (average 9 mm (0.4 in); Whitaker and Mumford 2009), pointed, and symmetrical (Nagorsen and Brigham 1993; Whitaker and Mumford 2009).

The NLEB has a diverse diet including moths, flies, leafhoppers, caddisflies, and beetles (Nagorsen and Brigham 1993; Brack and Whitaker 2001; Griffith and Gates 1985), with diet composition differing geographically and seasonally (Brack and Whitaker 2001). The most common insects found in the diets of NLEBs are lepidopterans (moths) and coleopterans (beetles) (Brack and Whitaker 2001; Lee and McCracken 2004; Feldhamer et al. 2009; Dodd et al. 2012), with arachnids also being a common prey item (Feldhamer et al. 2009). Mature forests are an important habitat type for foraging NLEBs (Caceres and Pybus 1997). Occasional foraging also takes place over small forest clearings and water, and along roads (van Zyll de Jong 1985).

NLEBs hibernate during the winter months to conserve energy from increased thermoregulatory demands and reduced food resources. NLEBs predominantly overwinter in hibernacula that include caves and abandoned mines. Hibernacula used by NLEBs are typically large, with large passages and entrances (Raesly and Gates 1987), relatively constant, cooler temperatures (0 to 9 °C (32 to 48 °F) (Raesly and Gates 1987; Caceres and Pybus 1997; Brack 2007), and with high humidity and no air currents (Fitch and Shump 1979; Van Zyll de Jong 1985; Raesly and Gates 1987; Caceres and Pybus 1997). The sites favored by NLEBs are often in very high humidity areas, to such a large degree that droplets of water are often observed on their fur (Hitchcock 1949; Barbour and Davis 1969). To a lesser extent, NLEBs have also been observed overwintering in other types of habitat that resemble cave or mine hibernacula, including abandoned railroad tunnels, (Service 2015, unpublished data). However, the species has not been found overwintering in other habitat without the same types of conditions found in suitable caves or mines to date.

During summer habitat use, the NLEB appears to be somewhat flexible in tree roost selection, selecting varying roost tree species and types of roosts throughout its range. NLEBs have been documented to roost in many species of trees, including: black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), silver maple (*Acer saccharinum*), black locust (*Robinia pseudoacacia*), American beech (Fagus grandifolia), sugar maple (Acer saccharum), sourwood (Oxydendrum arboreum), and shortleaf pine (Pinus echinata) (e.g., Mumford and Cope 1964; Clark et al. 1987; Sasse and Pekins 1996; Foster and Kurta 1999; Lacki and Schwierjohann 2001; Owen et al. 2002; Carter and Feldhamer 2005; Perry and Thill 2007; Timpone et al. 2010). NLEBs most likely are not dependent on certain species of trees for roosts throughout their range; rather, many tree species that form suitable cavities or retain bark will be used by the bats opportunistically (Foster and Kurta 1999).

Results from studies have found the diameters of roost trees selected by NLEBs vary greatly (Sasse and Pekins 1996; Schultes 2002; Perry 2014, pers. comm.; Lereculeur 2013; Carter and Feldhamer 2005; Foster and Kurta 1999; Lacki and Schwierjohann 2001; Owens et al. 2002; Timpone et al. 2010; Lowe 2012; Perry and Thill 2007; Lacki et al. 2009). NLEBs typically use summer habitat from the middle of May through the middle of August (USFWS 2014 as cited in TVA 2017).

Mating occurs from late July in northern regions to early October in southern regions (Whitaker and Hamilton 1998; Whitaker and Mumford 2009; Caceres and Barclay 2000; Amelon and Burhans 2006). Copulation occasionally occurs again in the spring (Racey 1982) and can occur during the winter as well (Kurta 2014, in litt.). Hibernating females store sperm until spring, exhibiting delayed fertilization (Racey 1979; Caceres and Pybus 1997). Ovulation takes place near the time of emergence from hibernation, followed by fertilization of a single egg, resulting in a single embryo (Cope and Humphrey 1972; Caceres and Pybus 1997; Caceres and Barclay 2000); gestation is approximately 60 days, based on like species (Kurta 1995).

Maternity colonies, consisting of females and young, are generally small, numbering from about 30 (Whitaker and Mumford 2009) to 60 individuals (Caceres and Barclay 2000). Adult females give birth to a single pup (Barbour and Davis 1969). Birthing within the colony tends to be synchronous, with the majority of births occurring around the same time (Krochmal and Sparks 2007). Parturition (birth) likely occurs in late May or early June (Caire *et al.* 1979; Easterla 1968; Whitaker and Mumford 2009) but may occur as late as July (Whitaker and Mumford 2009). Recent findings by the South Carolina Department of Natural Resources have documented pupping starting in early May (SCDNR 2019). Juvenile volancy (flight) often occurs by 21 days after birth (Krochmal and Sparks 2007, Kunz 1971) and has been documented as early as 18 days after birth (Krochmal and Sparks 2007). Maximum lifespan for NLEBs is estimated to be up to 18.5 years (Hall et al 1957).

3.1.2 POPULATION DYNAMICS AND STATUS DISTRIBUTION

In the United States, the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to South Carolina (Whitaker and Hamilton 1998; Caceres and Barclay 2000; Simmons 2005; Amelon and Burhans 2006). The species' range in the United States includes all or portions of the following 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois,

Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Historically, the species has been most frequently observed in the northeastern United States and in the Canadian Provinces of Quebec and Ontario, with sightings increasing during swarming and hibernation periods (Caceres and Barclay 2000). More than 1,100 NLEB hibernacula have been identified throughout the species' range in the United States, although many hibernacula contain only a few (1 to 3) individuals (Whitaker and Hamilton 1998). Known hibernacula (sites with one or more winter records of NLEBs) include: Alabama (2), Arkansas (41), Connecticut (8), Delaware (2), Georgia (3), Illinois (21), Indiana (25), Kentucky (119), Maine (3), Maryland (8), Massachusetts (7), Michigan (103), Minnesota (11), Missouri (more than 269), Nebraska (2), New Hampshire (11), New Jersey (7), New York (90), North Carolina (22), Oklahoma (9), Ohio (7), Pennsylvania (112), South Carolina, (2), South Dakota (21), Tennessee (58), Vermont (16), Virginia (8), West Virginia (104), and Wisconsin (67). NLEBs are documented in hibernacula in 29 of the 37 States in the species' range. However, additional locations have been discovered since these data were summarized. To date, there are 8 known hibernacula in Alabama (USFWS 2016a). Other States within the species' range have no known hibernacula (due to no suitable hibernacula present, lack of survey effort, or existence of unknown retreats).

The United States portion of the NLEB's range is discussed by the UFWS in four parts: eastern range, Midwest range, southern range, and western range. The status of the species in both Georgia and Alabama, within the southern range, is included below as well as an assessment of the impacts of white nose syndrome. White-nose syndrome (WNS) is currently the predominant threat to the species (UWFWS 2013).

In Georgia, NLEB winter records are rare (Georgia Department of Natural Resources (GA DNR) 2014, in litt.). However, this species is commonly captured during summer mist-net surveys (GA DNR 2014, in litt.). Twenty-four summer records were documented between 2007 and 2011. Mist-net surveys were conducted in the Chattahoochee National Forest in 2001-2002 and 2006-2007, with 51 total individual records for the species (Morris 2012, unpublished data). WNS was first detected in the State in the winter of 2012-2013. With historically small numbers of NLEBs found in hibernacula surveys in Georgia, it is difficult

to draw conclusions regarding population trends based on hibernacula surveys. WNS-related mortality has been documented in cave dwelling bats in the State; however, NLEB mortality has not been documented to date.

Surveys conducted during the Southeast Bat Diversity Network bat blitz in 2008 reported the NLEB to be rather common in late summer/early fall swarm at known bat caves in Alabama (Sharp 2014, unpublished data). Summer surveys in Alabama, mostly conducted between 2001 and 2008, have documented 71 individual captures, including both males and reproductively active females (Sharp 2014, unpublished data). WNS was first documented in Alabama in the winter of 2011-2012.

There simply was not historically adequate effort expended to determine how abundant the species was in States such as Georgia and Alabama. Due to this lack of surveys, historical variability of winter populations, or lack of standardized data, it is difficult to draw conclusions about winter population trends pre- and post-WNS introduction in these states. Similarly, summer population trends are also difficult to summarize due to a lack of surveys or standardized data.

3.1.3 OCCURRENCE IN HARRIS PROJECT AREA

NLEBs are known to occur at eight hibernacula (six in the northern part of the state and two in central Alabama) and three roost trees (all in the northern part of Cleburne County) in the state (USFWS 2016a). All known sites occur outside the Harris Project Area. Furthermore, no known hibernacula occur within 0.25 miles of the Harris Project Boundary, and no known maternity roosts occur within 150 feet of the Harris Project Boundary. All known occurrences of NLEB are outside of established avoidance guidance buffers. For specific 4(d) guidance see the following website: https://www.fws.gov/daphne/es/Bats/NLEB%20Consultation%20Map2.pdf.

The USFWS use very similar approaches to estimate number of occupied acres, number of maternity colonies, and number of individuals for National Wildlife Refuges and Tennessee Valley Authority (TVA) areas in USFWS (2015b) and USFWS (2018) respectively. They use an assumed occupancy rate of 29.1 % and 14% respectively, 1000 acres per colony, and 45 females/males/pups per colony. Where the two approaches differ is in an assumed 90.43 % overlap of active colonies (USFWS 2018). The occupancy rate of 29.1% from USFWS 2015b was derived from summary survey data collected in National Forest

in Alabama and likely represent a reasonable estimate for Skyline and Lake Harris lands. An overlap rate was not used in the calculations. The resulting estimations are as follows:

Skyline:

- 15,063 forested acres x 0.291 occupancy rate = 4,383.3 occupied acres
- 4,383 occupied acres/1,000 acres per colony = 4.38 colonies
- 4.38 colonies x 45 females/males/pups = 591.75 individuals

Lake Harris

- 6,269 forested acres x 0.291 occupancy rate = 1,824.28 occupied acres
- 1,824.28 occupied acres/1,000 acres per colony = 1.82 colonies
- 1.82 colonies x 45 females/males/pups = 246.28 individuals

3.2 INDIANA BAT

3.2.1 SPECIES DESCRIPTION AND LIFE HISTORY

A medium-sized bat species, the Indiana Bat's adult body weight averages 6 to 9 grams (g) (0.2 to 0.3 ounces). Typical forearm length is between 35 and 41 mm (1.4 to 1.6 in) with a wingspread between 240 and 267 mm (9.5 to 10.5 in) (Mirarchi et al 2004). The dorsum is typically chestnut to dark gray in color but occasionally almost black. The ventral fur is lighter in color ranging from slate gray to cinnamon. Individual hairs are strongly bicolor with light tips and dark bases. The tragus (projection of skin in front of the external ear) is pointed and the calcar is slightly keeled. The interfemoral membrane is attached to the base of the toe as opposed to the ankle as it is in Gray Bats (Mirarchi et al 2004).

Indiana Bats eat a variety of prey items including moths, beetles, midges, and flies. However, they feed entirely on flying insects. Moths are the most common prey item (Brack and LaVal 1985, as cited in USFWS 2015b). They are also known to feed on Hymenoptera (wasps and flying ants) and Homoptera (treehoppers), stoneflies and lacewings (Brack and LaVal 1985, as cited in USFWS 2015b). Diet varies seasonally, with age, and gender (USFWS 2007 as cited in USFWS 2015b).

Indiana Bats hibernate, in large clusters, in cool, humid caves under 50°F but above freezing. However, very few caves within the bats range demonstrate these characteristics

and as of 2013, the ten largest known hibernacula comprised 70% of the known population (USFWS 2007 as cited in TVA 2017). None of these occur within the Harris Project Boundary. In addition, they will occasionally hibernate in abandoned mines or manmade structures such as railroad tunnels, dams, or aqueducts (USFWS 2007 as cited in TVA 2017).

Indiana Bats emerge from hibernation during the spring and migrate to summer roost areas. Males will typically roost individually or in small groups known as "bachelor" colonies while females are known to congregate in groups (averaging from 60-100 bats) known as "maternity" colonies (Mirarchi et al 2004, TVA 2017). Indiana Bats will use a variety of tree species exhibiting the proper characteristics (cracks, crevices, exfoliating bark) but typical roost trees are dead or dying trees, in the early to mid-stages of decay, that retain large slabs of peeling bark (USFWS 2016c). Maternity colonies will typically be comprised of one or more primary roost trees surrounded by a network of an additional 8-25 roost trees (Callahan et al 1997 and Kurta et al 2002 as cited in USFWS 2016c). Optimal primary roost trees are typically greater than 16 inches DBH and secondary roost trees are generally greater than 9 inches DBH (USFWS 2015b). However, females have been documenting using roost trees as small as 5.5 inches DBH (Kurta 2005 as cited in USFWS 2015b) and males have been documented using trees as small as 2.5 inches DBH (Gumbert et al as cited in USFWS 2015b). Furthermore, Indiana Bats typically use roost trees that receive sunlight for more than half the day (TVA 2017).

During late summer or early fall, Indiana Bats migrate back to areas near hibernacula where they mate. Fertilization is delayed until spring (Mirarchi et al 2004). Females give birth to a single pup during late May to early June with the pup becoming volant between early June to early August (USFWS 2016c). During the first two months of life, pups are unable to fly (nonvolant) (TVA 2017). For the southeast, the nonvolant period occurs earlier than other regions, likely from May 1-July 15 (A. Edelman, J. Stober, pers. Comm. 2016 as cited in USFWS 2016 c). Average life span ranges from 14-15 years (Thompson 1982 as cited in USFWS 2015b).

3.2.2 POPULATION DYNAMICS AND STATUS DISTRIBUTION

In the United States, the species' range reaches from Oklahoma, Iowa, and Wisconsin east to Vermont, south to Northwesters Florida (USFWS 2016c). As of 2015, there were 27 Priority 1 hibernacula distributed throughout the following seven states: Illinois (1),

Indiana (7), Kentucky (6), Missouri (8), New York (3), Tennessee (1), and West Virginia (1). An additional 56 Priority 2, 166 Priority 3, and 272 Priority 4 hibernacula have been documented in 24 states (USFWS 2016c). According to estimates by the USFWS 2013b (as cited in USFWS 2015b), Indiana Bats were documented hibernating in 17 states, but 91% of the range wide population hibernated in just four states (Indiana, Kentucky, Illinois, and Missouri) (USFWS 2013b as cited in USFWS 2015b). As of 2016, only three known "major" hibernacula occurred in Alabama with the largest population comprised of 93 individuals (TVA 2017). None of these are within the Harris Project Boundary.

Indiana Bats are more widely distributed during the summer roosting season with most occurrences in the upper Midwest (USFWS 2015b and USFWS 2016c). However, maternity roosts have been documented as far south as Alabama (TVA 2017). None of these are within the Harris Project Boundary or within established buffer zones relative to the Harris Project.

As of 2015, range wide populations estimates were 523,636 bats, a 17.6% decrease from 2007 population estimates (USFWS 2016c). Research (Hall 1962, Myers 1964, and LaVal and LaVal 1980 as cited in USFWS 2015b) suggest a nearly equal sex ratio. Population estimates were obtained from bi-annual winter surveys and represent a 40% decline from 1967 estimates (TVA 2017).

Four recovery units (RU) have been developed for the Indiana Bat: Ozark-Central RU, Midwest RU, Appalachia RU, and the Northeast RU. Ninety-six percent of the 2015 population estimate occurred in just two of these recovery units, the Ozark-Central and Midwest RU, but all four experienced declines from previous estimates (TVA 2017). Several factors have been cited as contributing to population declines including disturbance of wintering caves and summer roost areas, changes in land use, and white-nose syndrome (USFWS 2015b). WNS has been attributed to significant declines in many species of hibernating bats and is considered the most significant threat to the Indiana Bat (USWFS 2015b).

3.2.3 OCCURRENCE IN HARRIS PROJECT AREA

Both hibernacula and summer roost trees have been documented in Alabama (USFWS 2016c and TVA 2017). However, none of these occur within the Harris Project Boundary or within the established avoidance buffers. Specifically, there are no P3 or P4 hibernacula occurring within 5 miles of the Skyline Project Boundary, and no known maternity roosts

occur within 2.5 miles of the Harris Project Boundary. Furthermore, there are no P1 or P2 hibernacula occurring within the state or the established 10-mile buffer zones. Avoidance guidance for the Indiana Bat can be found at the following link: https://www.fws.gov/daphne/es/Bats/Indiana%20Bat.html.

However, the Indiana Bat is assumed present where suitable habitat occurs. Various assumptions have been used to estimate population, occupied acres, and number of maternity colonies. For example, the USFWS used an occupancy of 1.4-1.2% and a 12,566 acres per colony estimate to calculate occupied acres and subsequent number of colonies within certain National Refuges (USFWS 2015b) and National Forest (USFWS 2016c). They then assumed that 60 adult females, 60 adult males, and 60 pups occurred in each colony (USFWS 2016c). This was used to estimate population numbers within the Action Area. Some of these refuges and the National Forest where population estimates were applied occur in Alabama and could be used as surrogates for estimates within the Harris Project Area.

In developing a biological opinion for certain TVA activities, the USFWS used recent surveys conducted in the TVA region and then used percent of population estimates for the entire range wide population to estimate number of individuals within the Action Area (USFWS 2018). There have been no population surveys conducted for the Harris Project Area so we propose to use the number of acres within Project, the average occupancy rate (1.3%) derived as an average from the two used above, number of acres per colony, and the number of individuals per colony used by the USFWS while developing biological opinions for the United States Forest Service and National Refuges to estimate occupied acres, number of maternity colonies, and population numbers for the Skyline and Lake Harris Project Areas. Applying this would result in the following estimates for Skyline and Lake Harris, respectively.

Skyline:

- 15,063 forested acres x 0.013 occupancy rate = 195 occupied acres
- 195 occupied acres/12,566 acres per colony = 0.0156 colonies
- 0.0156 colonies x 60 females/males/pups = 2.8 individuals.

Lake Harris

- 6,269 forested acres x 0.013 occupancy rate = 81.50 occupied acres
- 81.5 occupied acres/12,566 acres per colony = 0.0065 colonies
- 0.0065 colonies x 60 females/males/pups = 1.167 individuals.

3.3 MONARCH BUTTERFLY

3.3.1 SPECIES DESCRIPTION AND LIFE HISTORY

The Monarch Butterfly has bright orange wings with black veins surrounded by a black border with a double row of white spots inside the border on the upper side of the wings. The bright colors of the wings warn predators that ingesting them may be toxic.

During breeding season, Monarch Butterflies lay their eggs on milkweed leaves, and larvae emerge within two to five days (Zalucki 1982 as cited in USFWS 2020; CEC 2008 as cited in USFWS 2020). Between nine and 18 days, the larvae develop through five larval instars while feeding on the milkweed and building toxins as defense against predators (Parsons 1965). The larvae then pupate into chrysalises and emerge 6-14 days later as adult butterflies (USFWS 2020). Breeding seasons produce multiple generations of Monarch Butterflies. Adults typically live for approximately two to five weeks, but overwintering adults can enter a state of reproductive suspension, or diapause, and live six to 9 months (Cockrell et al. 1993 as cited in USFWS 2020; Herman and Tatar 2001 as cited in USFWS 2020). The Monarch Butterfly's life cycle can vary depending on geographic location. Monarch Butterflies breed year-round in many regions, but individual butterflies in temperate climates like eastern and western North America migrate long distances and live for an extended period of time due to reproductive diapause (Herman and Tatar 2001 as cited in USFWS 2020). Monarchs Butterflies in eastern and western North America begin migrating to their overwintering locations in the fall (USFWS 2020). Migratory butterflies in eastern North America mainly fly south or southwest to mountainous overwintering regions in central Mexico (Solensky 2004 as cited in USFWS 2020). Between February and March, surviving Monarch Butterflies cease reproductive diapause and mate at their overwintering sites before departing from their breeding grounds (Leong et al. 1995 as cited in USFWS 2020; van Hook 1996 as cited in USFWS 2020).

In eastern North America, Monarch Butterflies travel from Mexico to Canada over two to three successive generations, breeding along the migration route (Flockhart et al. 2013 as

cited in USFWS 2020). They travel as far north as they are physiologically able based on climate and available vegetation (USFWS 2020). Three to five generations of Monarch Butterfly are produced in a given year, depending on environmental conditions (Brower 1996 as cited in USFWS 2020).

Adult Monarch Butterflies require a diversity of blooming sources of nectar during breeding and migration (spring through fall) and utilize a variety of roosting trees along the fall migration route (USFWS 2020). They also require milkweed for oviposition and larval feeding, and the timing of both the Monarch Butterfly's breeding and the availability of nectar and milkweed is important for survival (USFWS 2020). In non-migratory populations, individuals require nectar and milkweed year-round (USFWS 2020).

Eastern Monarch Butterflies that overwinter in Mexico require a very specific microclimate that primarily consists of oyamel fir trees (*Abies religiosa*) on which monarchs roost in dense clusters (Williams and Brower 2015 as cited in USFWS 2020). Overwintering sites are located in mountainous areas between elevations of 2,900 and 3,300 meters. The oyamel fir forest provides protection from rain, snow, wind, hail, and excessive sunlight (Williams and Brower 2015 as cited in USFWS 2020).

3.3.2 POPULATION DYNAMICS AND STATUS DISTRIBUTION

Due to the migratory nature of the Monarch Butterfly, their current habitat range includes the entire United States, with the exception of Alaska. In western North America, Monarch Butterflies migrate in the spring from Coastal California toward the Rockies and the Pacific Northwest over multiple generations and migrate back to overwintering sites in coastal California in the fall (Urquhart and Urquhart 1977 as cited in USFWS 2020; Nagano et al. 1993 as cited in USFWS 2020). In eastern North America, Monarch Butterflies migrate in the spring from Mexico to Canada over two to three generations and breed along the way (Flockhart et al. 2013 as cited in USFWS 2020). The migratory eastern North American populations have unique physical characteristics such as larger bodies and elongated wings compared to non-migratory populations (Altizer and Davis 2010 as cited in USFWS 2020) and greater lipid reserves than the western North America population (Brower et al. 1995 as cited in USFWS 2020) and possibly a longer reproductive diapause (Herman et al. 1989 as cited in USFWS 2020). The eastern North America population also exhibits lower rates of infect by the protozoan parasite *Ophryocystis elektroscirrha* (Altizer et al. 2000 as cited in USFWS 2020) and unique genetic variation (USFWS 2020).

Long-term census data suggests populations of Monarch Butterfly are in decline due largely to the availability and quality of milkweed and overwintering habitat. Milkweed loss is mostly a result of the use of herbicide on agricultural lands. Other factors include the availability of nectar sources in the breeding and along migratory routes areas (Thogmartin et al. 2017b as cited in USFWS 2020), exposure to broad-spectrum insecticides, and climate change (USFWS 2020). Loss of migratory populations can impair the species' ability to adapt to changes in the future (USFWS 2020).

3.3.3 OCCURRENCE IN HARRIS PROJECT AREA

Due to the migratory nature of the Monarch Butterfly, this species' current habitat range covers the entirety of both the Lake Harris and Skyline Project Boundaries. Occurrences within the Project Boundary are most likely during fall and spring migration and during the spring breeding period (USFWS 2020).

4 EFFECTS OF TIMBER HARVEST AND PRESCRIBED FIRE IN LAKE HARRIS PROJECT

4.1 TIMBER HARVEST EFFECTS AND RESPONSE

Timber on Lake Harris will be selectively harvested as outlined in Section 2.6.1. Potential roost trees will not be marked for harvest and there should be no affect to available roost trees. However, studies have documented both positive and negative responses to timber harvest outside of direct impact to potential roost trees (O'Keefe 2009, Caylor 2011 as cited in USFWS 2016c). Positive responses included increased fitness resulting from increased access to or increased abundance of prey items (USFWS 2016c) and increased light exposure/solar radiation to potential roost trees (USFWS 2015b and SCDNR 2019). Canopy openings created through selective harvest have been hypothesized to assist the development of pups (USFWS 2015b). Perry and Thill 2007 as cited in USFWS 2015b, discovered that female NLEBs used roosts in harvested areas at a greater rate than those in unharvested areas and hypothesized that higher use resulted from increased light due to the canopy openings. Similarly, there could be a positive effect on foraging habitat through mid-story reduction (decreased clutter) (USFWS 2015b). Furthermore, prescriptions such as shelterwood harvest, with retention of snags, have been shown to improve Indiana Bat roosting habitat (McGregor et al 1999 as cited in USFWS 2016c). However, preferences for contiguous forest cover and older growth stands have also been demonstrated in NLEBs (Cryan et al 2001, Yates and Muzika 2006, as cited in USFWS 2015b).

Negative effects could potentially include annoyance, reduced fitness, harassment, and harm. Reduced foraging opportunities and reduced availability of fall staging access could result from timber harvest even if potential roost trees are not harvested. However, no hibernacula have been identified in the Lake Harris Project Area. In addition, given the low occupancy rates and amount of available foraging habitat, limited foraging habitat availability is likely not having a limiting effect (USFWS 2018).

4.2 PRESCRIBED FIRE EFFECTS AND RESPONSE

Prescribed fire will be used to enhance, for recreation, approximately 160 acres of timbered land adjacent to the Flat Rock Park. Both dormant season and growing season burns will be used, but burns are expected to be conducted during the dormant season

initially to reduce fuel loads. Fires will be conducted on a 2-year rotation. It is expected that there will be both positive and negative effects.

Previous studies have demonstrated that bats will use burned forest stands for roosting (Johnson et al 2010b as cited in USFWS 2016c) and that Indiana Bats may even prefer burned stands (Perry et al 2016 as cited in USFWS 2016c). Potential beneficial effects include the creation of snags, reduction of midstory, and increased prey abundance (Perry 2012 as cited in USFWS 2016c).

Smoke and fire could also negatively affect tree roosting bats. However, the location where bats roost could determine the level of effect. For example, bats roosting lower under bark are more likely to be affected by heat and smoke than those roosting higher inside cavities (Perry 2012 as cited in USFWS 2016c). Furthermore, Carter et al 2002 as cited in USFWS 2016c, suggested that forest dwelling bats would have a low risk of direct injury or mortality resulting from prescribed fire. The greatest risk would be to non-volant pups, but bats are able to carry their young in some instances (Davis 1970 as cited in USFWS 2016c). It is also unlikely that carbon monoxide would reach critical levels (Dickinson et al 2010 as cited in USFWS 2016c) and low intensity fires should not reach temperatures that could cause direct tissue damage in tree roosting bats (USFWS 2016c).

4.3 DETERMINATION OF EFFECTS

Exemptions under the NLEB's 4(d) rule, associated biological opinion, and adherence to published avoidance criteria preclude the need to analyze effects to NLEB resulting in a may affect, but not likely to adversely affect determination for the species.

The effect to any Indiana Bat summer roost habitat is insignificant and discountable, resulting in a not likely to adversely affect determination for this species. A total of approximately 2 acres a year (using occupancy rate from Section 3.2.3 and harvest description from Section 2.6.1) to assumed occupied habitat may be impacted. Only live pine trees exhibiting no damage are harvested at Lake Harris. Potential roost trees are retained on the landscape. During salvage operations, live/healthy potential roosts and at least 5 snags per acre, if available, from the largest size class are retained. Further, considering that only 0.0065 colonies (Section 3.2.3) are likely to occur within the entire Lake Harris Project Action Area, it is unlikely that a maternity roost tree would be inadvertently affected. If you were to round the number of colonies to one, there would

still only be 10-20 roost trees on the landscape at Lake Harris with 1-3 of those serving as the primary roost tree (USFWS 2007 as cited in USFWS 2015b).

5 EFFECTS OF TIMBER HARVEST IN SKYLINE PROJECT

5.1 TIMBER HARVEST EFFECTS AND RESPONSE

Timber activities at Skyline have the potential to affect roost habitat in addition to foraging, staging, and fall migration habitat. Effects to the availability of foraging, staging, and fall swarming habitat is discussed above (Section 4.1) and will be expressed as number of acres affected multiplied by the occupancy rate. Harvest of potential roost trees could have different effects depending on when the action occurs. Potential roost tree harvest could occur anytime during the active season, but we will consider that all tree harvest occurs during the non-volant pup season (May1-July 15). This will result in a conservative estimate of number of individuals affected.

Studies have documented both positive and negative responses to timber harvest. Positive responses discussed above include increased access to prey items, increased prey abundance, and increased light exposure/solar radiation to potential roost trees (O'Kefe 2009, Caylor 2011 as cited in USFWS 2016c). Prescriptions such as shelterwood harvest, with retention of snags, have been shown to improve Indiana Bat roosting habitat (McGregor et al 1999 as cited in USFWS 2016c). Furthermore, Indiana Bats may be able to survive the felling of a maternity roost tree. In one documented occurrence, a maternity roost tree was felled and a colony including 34 Indiana Bats was discovered. This included one dead lactating female, 3 dead non-volant pups and 30 live non-volant pups. Some live pups were placed back on the felled tree and some were transferred to a nearby bat house. Bats were observed flying around the felled tree and by the next morning all pups were gone. Lactating females were later captured nearby in a mist net, suggesting that the colony had relocated. A maternity roost was discovered nearby and assumed the new colony roost tree (Belwood 2002 as cited in USFWS 2016c). Although higher losses have been documented in other instances of felled maternity roost trees (USFWS 2018), some survival was also documented.

Effects to colony and social dynamics of Indiana Bats and NLEBs due to roost tree removal have also been discussed. Kurta 2005 as cited in USFWS 2018, found that removal of a primary roost could impact the social structure of the colony. Similarly, Sparks et al 2003 and Silvis et al 2014a as cited in USFWS 2018, observed colony fragmentation with roost tree removal. Conversely, Silvis et al 2014b as cited in USFWS 2018, found that roost availability was not correlated with social dynamics. However, further studies indicated

that loss of enough secondary roost trees could contribute to colony fragmentation (Silvis et al 2015 as cited in USFWS 2018).

The size of the Skyline Project Area makes it difficult to separate effects to different types of habitat based on use (fall swarming, foraging, staging, etc.). Therefore, all non-lethal negative effects (harassment, reduced fitness, decreased foraging) described below will be expressed as total number of occupied acres affected and represents a conservative estimate considering not all habitat would be considered quality habitat for any specific life history requirement. Applied conservation measures (snag retention, high remaining TPA, retention of damaged/dying trees, retention of most shag bark hickory) should minimize the potential impacts, could improve foraging habitat, and would be beneficial in the long term.

Similar to USFWS 2015b and USFWS 2016c, we will use the annual number of acres harvested and the occupancy rate to quantify the number of acres affected. Given the home range of a typical Indiana Bat or NLEB colony, in addition to the small number of acres harvested annually, the chance that a maternity roost tree would be harvested is relatively low. Although take of Indiana Bats is unlikely to happen, it can't be completely discounted. Assumptions used by USFWS 2015b and USFWS 2016c (see Sections 3.1.3 and 3.2.3) about occupancy, number of acres per colony, the number of females, males, and non-volant pups in an colony, and an exposure rate of 10% (USFWS 2018) will be used to estimate number of individuals affected.

5.2 DETERMINATION OF EFFECTS

Exemptions under the 4(d) rule and adherence to published avoidance criteria would result in a may affect, but not likely to adversely affect determination for the NLEB related to timber activities within Skyline Project.

The likelihood of affecting a maternity roost tree and resulting mortality is insignificant and discountable. However, habitat used for other purposes could be affected, resulting in decreased fitness, reduced foraging, reduced staging, and reduced fall swarming, expressed as number of acres impacted (Section 5.1) and will result in a may affect, likely to adversely affect determination for the Indiana Bat. Therefore, initiation of formal consultation is necessary.

6 VOLUNTARY CONSERVATION ACTIONS FOR MONARCH BUTTERFLY

6.1 VOLUNTARY CONSERVATION ACTIONS

As a candidate species, the Monarch Butterfly is provided no legal protections. However, through its pollinator projects, Alabama Power is working to strengthen natural habitat for the Monarch Butterfly, as well as other pollinators such as bees, moths, and beetles. For example, Little Fox Creek on the shorelines of Lake Harris contains one of Alabama Power's pollinator plots developed with plants chosen for that specific habitat in order to benefit species such as the Monarch Butterfly. Alabama Power is committed to continuing its pollinator conservation efforts.

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