Smoky Mountain Hydropower Project

Recertification Application to the Low Impact Hydropower Institute

FERC Project No. 2169

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INTRODUCTION

Brookfield Renewable (Brookfield) is providing this application to the Low Impact Hydropower Institute (LIHI) for recertification of the Smoky Mountain Hydropower Project (Smoky Project). The Smoky Project consists of the Santeetlah and Cheoah developments, located on the Cheoah and Little Tennessee rivers in Graham and Swain Counties, North Carolina, and the Chilhowee and Calderwood developments, located on the Little Tennessee River in Blount and Monroe Counties, Tennessee. The four developments are licensed with the Federal Energy Regulatory Commission (FERC) as the Smoky Mountain Hydro Project (FERC No. 2169).

PART I. FACILITY DESCRIPTION

The key features of the Santeetlah Development are described in Table 1.

Table I-1. Facility Description Information for the Santeetlah Development.

Item	*Information Requests*	*Response (and references to further details)*
Name of the Facility	Facility name (use FERC project name if possible)	Smoky Mountain Hydroelectric Project (FERC No. 2169) *Santeetlah Development*
Location	River name (USGS proper name)	Cheoah River
	Watershed name	Lower Little Tennessee HUC 006010204
	Nearest town(s), county(ies), and state(s) to dam	Lake Santeetlah, Graham County, North Carolina
	River mile of dam above next major river	9.3
	Geographic latitude of dam	35°22'39" N
	Geographic longitude of dam	83°52'36" W
Facility Owner	Application contact names	See Part V of LIHI certification application for more information
	Facility owner company and authorized owner representative name.	Brookfield Smoky Mountain Hydro, L.P. Ashley Thomas
	FERC licensee company name (if different from owner)	Same as above
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	FERC Project Number 2169 New license issued January 25, 2005 The Smoky Project Settlement Offer was filed with FERC on May 7, 2004. License expires on February 28, 2045
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	License for a Major Project
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	WQC Issue Date: July 27, 2014 Issuing Agency: North Carolina Division of Water Resources Identification: DWR 03-0191 V3 The original 401 WQC for the Project was issued November 8, 2004. On June 27, 2014,

		NCDWR issued a revised 401 WQC to allow for more flexibility in scheduling high flow events and create additional recreational opportunities.
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories	Order Approving Settlement and Issuing New License (January 25, 2005) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10382034 Final Environmental Assessment for Hydropower License (September 10, 2004) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127 North Carolina 2014 WQC: https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=13652166 Relicensing Settlement Agreement: https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10149198
Powerhouse	Date of initial operation (past or future for pre-operational applications)	1928
	Total installed capacity (MW)	49.2 MW
	Average annual generation (MWh) and period of record used	Actual annual generation is filed with FERC each year. The average annual generation from 2017 to 2019 is 1,646,207 MWh. Annual generation reported in the 2005 LIHI application was 1,445,585 MWh from 1982 to 2001.
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.)	The Santeetlah Development is a storage facility that is operated in a store and release mode. Santeetlah Reservoir is mostly operated to maintain high recreational elevations during the summer months, followed by fall drawdown to allow for collection of rainfall and runoff during the late fall, winter and early spring.
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	Generating Units: 2 Type: vertical Francis units

		Description: Two identical units with a design capacity of 33,000 HP at design head of 640 feet and a speed of 450 rpm Minimum Capacity:249 cfs (each) Maximum Capacity: 419 cfs (each)
	Trashrack clear spacing (inches), for each trashrack	One Trashrack with clear spacing of 2.375"
	Dates and types of major equipment upgrades	The original generators for Units 1 and 2 were installed in 1928 and rewound in 1982 and 1985, respectively. Runners were replaced in Unit 1 in 1966 and in Unit 2 in 1968. Unit 1 and 2 generators were rewound in 2003 and 2004, respectively. The present runners and wicket gates in Units 1 and 2 were installed in 2008. Turbine rehabilitation was also completed in 2008.
	Dates, purpose, and type of any recent operational changes	There have been no recent operational changes.
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	There have been no recent regulatory facility upgrades.
Dam or Diversion	Date of original construction and description and dates of subsequent dam or diversion structure modifications	The Santeetlah Development was constructed between 1925 and 1928.
	Dam or diversion structure height including separately, the height of any flashboards, inflatable dams, etc.	Dam Height: 216 feet Flashboards: N/A
	Spillway elevation and hydraulic capacity	Spillway elevation: 1928.9 feet with 12-foot-high gates Hydraulic Capacity: 157,707 cfs at 1959.9 feet (walkway deck)
	Tailwater elevation (provide normal range if available)	1753.9 feet to 1761.0 feet
	Length and type of all penstocks and water conveyance structures between the impoundment and powerhouse	There are six pipeline and five tunnel sections that convey water from the intake to the powerhouse, a total distance of approximately 5 miles. Except for two steel lined tunnels, the tunnel sections, located in rock, are concrete lined and horseshoe shaped with a diameter of 11 feet. The steel pipeline sections are 11 feet in diameter. The penstock bifurcation

		starts immediately downstream of the base of the surge tank and includes two remote-controlled motor operated Dow pivot valves. The two steel penstocks of varying diameter ranging from 8 feet at the top to 7 feet at the bottom, extend from the valves down the 60 degree slope to the turbines.
	Dates and types of major infrastructure changes	1938: Lowered arch crest 1999: Intake gate replaced 2006 – 2007: Tainter gate modifications, including mini gates for minimum glow and automation for high flow releases. 2014 – 2015: Tainter gate modifications to facilitate gate operation without binding
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	The purpose of the project is for power generation.
	Source water	Cheoah River
	Receiving water and location of discharge	Little Tennessee River at RM 56.5
Conduit	Date of conduit construction and primary purpose of conduit	1928 Purpose: to convey water to turbines for power production.
Impoundment and Watershed	Authorized maximum and minimum water surface elevations	Maximum: 1940.9 feet Minimum: 1931.0 feet
	Normal operating elevations and normal fluctuation range	Maximum operating head is at a normal full pond elevation of 1940.9 feet, and minimum operating head is at a drawdown of 9.9 feet (1931.0 ft) from December 1st to March 1st in accordance with the Santeetlah operating guide curve.
	Gross storage volume and surface area at full pool	Gross Storage Volume: 156,360 acre-feet Surface area: 2,881 acres
	Usable storage volume and surface area	Usable storage capacity: 27,000 acre-feet (with a drawdown of approximately 10 feet) Surface area: 2,881 acres

	Describe requirements related to impoundment inflow, outflow, up/down ramping and refill rate restrictions.	Maximum drawdown limit is about 4 feet during the summer recreational season (July to mid- September) and about 10 feet during the winter season (December to March) Seasonal drawdown averaging approximately 6 feet; begins mid-September and continues through late fall/winter. The reservoir generally refills in March.
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	There are no dams upstream of Santeetlah Development.
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Cheoah Development, Brookfield Smoky Mountain Hydropower LP, RM 0 (Cheoah River) RM 51.2 (Little Tennessee River), FERC Project Number: P-2169 * No downstream dams provide upstream fish passage.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	The Tennessee Valley Authority manages releases from Fontana Dam to control the volume of water released on the Little Tennessee River.
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control.	The total area within the FERC Project Boundary is approximately 8,300 acres (5,800 acres of water and 2,500 acres of land).
Hydrologic Setting	Average annual flow at the dam, and period of record used	The approximate average annual flow at the Santeetlah Development based on flow data collect from 2014 through 2019 at the development is 490 cfs.
	Average monthly flows and period of record used	The approximate average monthly flows at the Santeetlah Development based on flow data collect from 2014 through 2019 at the development are as follows: January – 630 cfs February – 894 cfs March – 714 cfs April – 701 cfs May – 484 cfs June – 336 cfs July – 314 cfs

		August – 223 cfs September – 174 cfs October – 280 cfs November – 398 cfs December – 753 cfs
	Location and name of closest stream gauging stations above and below the facility	Upstream: N/A Downstream: USGS 0351706800 Cheoah River Near Bearpen Gap Near Tapoco, NC
	Watershed area at the dam (in square miles). Identify if this value is prorated and provide the basis for proration.	176 square miles Daily mean flow data for the Santeetlah Development was estimated, without proration, based on flow data collected at the development by Brookfield.
Designated Zones of Effect	Number of zones of effect	There are three zones of effect at the Santeetlah Development (See Appendix A).
	Upstream and downstream locations by river miles	Zone 1: 9.3 to 15.3 Zone 2: 9.3 to 0 (51.0 – Little Tennessee River) Zone 3: 56.5 Little Tennessee River)
	Type of waterbody (river, impoundment, by-passed reach, etc.)	Zone 1: Impoundment Zone 2: Bypass Reach Zone 3: Discharge from Powerhouse
	Delimiting structures or features	Zone 1: From the head of Santeetlah Lake, downstream approximately 6.0 miles to the Santeetlah dam. Zone 2: from the Santeetlah dam, downstream along the bypassed reach approximately 9.3 miles. Zone 3: is the discharge point into the Cheoah Reservoir.
	Designated uses by state water quality agency	The North Carolina Division of Water Resources (NCDWR) classifies the waters of the Santeetlah reservoir as Class B water with a Trout Waters Supplemental Classification. The Cheoah River downstream of Santeetlah dam is classified as Class C water with a Trout Waters Supplemental Classification.

		Link to NCDWR Classification Codes: https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications#DWRPrimaryClassification

Table I-2. Facility Description Information for the Cheoah Development.

Item	*Information Requests*	*Response (and references to further details)*
Name of the Facility	Facility name (use FERC project name if possible)	Smoky Mountain Hydroelectric Project (FERC No. 2169) *Cheoah Development*
Location	River name (USGS proper name)	Little Tennessee River
	Watershed name	Lower Little Tennessee HUC: 06010204
	Nearest town(s), county(ies), and state(s) to dam	Tapoco, Graham and Swain Counties, NC
	River mile of dam above next major river	51.2
	Geographic latitude of dam	35°26'56"N
	Geographic longitude of dam	83°56'9"W
Facility Owner	Application contact names	See Part V of LIHI certification application for more information
	Facility owner company and authorized owner representative name.	Brookfield Smoky Mountain Hydro, L.P. Ashley Thomas
	FERC licensee company name (if different from owner)	Same as above
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	FERC Project Number 2169 New license issued January 25, 2005 The Smoky Project Settlement Offer was filed with FERC on May 7, 2004. License expires on February 28, 2045
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	License for a Major Project
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	WQC Issue Date: July 27, 2014 Issuing Agency: North Carolina Division of Water Resources Identification: DWR 03-0191 V3 The original 401 WQC for the Project was issued November 8, 2004. On June 27, 2014, NCDWR issued a revised 401 WQC to allow for more flexibility in scheduling high flow events and create additional recreational opportunities.

	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories	Order Approving Settlement and Issuing New License (January 25, 2005) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10382034 Final Environmental Assessment for Hydropower License (September 10, 2004) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127 North Carolina 2014 WQC: https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=13652166 Relicensing Settlement Agreement: https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10149198
Powerhouse	Date of initial operation (past or future for pre-operational applications)	1919
	Total installed capacity (MW)	143.7 MW
	Average annual generation (MWh) and period of record used	Actual annual generation is filed with FERC each year. The average generation from 2017 to 2019 is 1,646,207 MWh. Annual generation reported in the 2005 LIHI application was 1,445, 585 MWh from 1982 to 2001.
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.)	The Cheoah development located on the Little Tennessee River is operated in a "modified run-of-river" mode. In the modified run-of-river mode, inflow and outflow from the developments typically balance out on a daily basis. Generally, Cheoah capacity is exceeded by releases from Fontana.
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	Generating Units: 5 Type: Vertical Francis Units Description: Units 1 - 4: Four identical generating units with a design capacity of 33,000 HP at design head of 185 feet and a speed of 171.5 rpm

		Unit 5: One generating unit with a design capacity of 45,000 HP at design head of 185 feet and a speed of 171.4 rpm. Maximum Capacity: Units 1 -4: 1932 cfs (each) Unit 5: 2198 cfs Minimum Capacity: Units 1 -4: 1083 cfs (each) Unit 5: 1197 cfs
	Trashrack clear spacing (inches), for each trashrack	Units 1-4 Trashrack Spacing 4.750” Unit 5 Trashrack Spacing 4.750”
	Dates and types of major equipment upgrades	1919: The original generators for Units 1, 2 and 3 were installed. 1925: Unit 4 was installed 1949: Unit 5 was installed 2013: The upgrades to Units 1, 2, 3 and 4 were completed.
	Dates, purpose, and type of any recent operational changes	There have been no recent operational changes.
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	Unit 5 Upgrade is scheduled for upgrade tentatively in year 2022 to increase total station capacity to 144.7 MW.
Dam or Diversion	Date of original construction and description and dates of subsequent dam or diversion structure modifications	The Cheoah Development was constructed between 1916 and 1919.
	Dam or diversion structure height including separately, the height of any flashboards, inflatable dams, etc.	Dam Height: 229 feet Flashboards: N/A
	Spillway elevation and hydraulic capacity	Spillway Elevation: 1257.8 feet with 19-foot-high gates Hydraulic Capacity: 205,900 cfs at 1286.8 (top of dam)
	Tailwater elevation (provide normal range if available)	1087.8 ft to 1081.8 ft

	Length and type of all penstocks and water conveyance structures between the impoundment and powerhouse	Water is conveyed from the headwater through four steel penstocks each is 13.5 feet diameter and 231 to 267 feet long. The Unit 5 penstock starts out as a 17-foot-diameter concrete conduit extending along the downstream face of the dam. This concrete section extends for 112 feet and the remaining 375 feet is a steel penstock reducing to 16 feet in diameter at the lower end.
	Dates and types of major infrastructure changes	1950: Tainter gate modifications, structural member replacements 2011 – 2012: Tainter gate modifications, structural member replacements
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	The purpose of the project is for power generation.
	Source water	Little Tennessee River
	Receiving water and location of discharge	Little Tennessee River at RM 51.2
Conduit	Date of conduit construction and primary purpose of conduit	Original Three Penstocks: 1919 Fourth Penstock: 1925 Fifth Penstock: 1949 Purpose: to convey water to turbines for power production.
Impoundment and Watershed	Authorized maximum and minimum water surface elevations	Maximum: 1276.8 feet Minimum: 1268.8 feet
	Normal operating elevations and normal fluctuation range	Normal Pool: 1276.8 feet The Cheoah Reservoir is operated with a normal daily fluctuation of 1 to 2 feet and a maximum daily fluctuation of 4 to 5 feet to meet system demands. There is no seasonal drawdown at Cheoah Reservoir due to its limited storage capacity.
	Gross storage volume and surface area at full pool	Gross volume: 35,000 acre-feet Surface area: 644 acres
	Usable storage volume and surface area	Usable volume: 4,200 acre-feet Surface area: 644 acres

	Describe requirements related to impoundment inflow, outflow, up/down ramping and refill rate restrictions.	The Cheoah development located on the Cheoah River and is operated in a "modified run-of-river" mode. In the modified run-of-river mode, inflow and outflow from the developments typically balance out on a daily basis. Generally, Cheoah capacity is exceeded by releases from Fontana.
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Fontana Dam, Tennessee Valley Authority, RM 60 * No upstream dams provide downstream fish passage.
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Calderwood Development, Brookfield Smoky Mountain Hydropower LP, RM 43.6, FERC Project Number: P-2169 Chilhowee Development, Brookfield Smoky Mountain Hydropower LP, RM 33.6, FERC Project Number: P-2169 Tellico Dam, Tennessee Valley Authority, RM 0. * No downstream dams provide upstream fish passage.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	The Tennessee Valley Authority manages releases from Fontana Dam to control the volume of water released on the Little Tennessee River.
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control.	The total area within the FERC Project Boundary is approximately 8,300 acres (5,800 acres of water and 2,500 acres of land).
Hydrologic Setting	Average annual flow at the dam, and period of record used	The approximate average annual flow at the Cheoah Development based on flow data collect from 2014 through 2019 at the development is 4,391 cfs.
	Average monthly flows and period of record used	The approximate average monthly flows at the Cheoah Development based on flow data collect from 2014 through 2019 at the development are as follows: January – 7,087 cfs February – 5,427 cfs

		March – 5,081 cfs April – 2,170 cfs May – 3,160 cfs June – 3,661 cfs July – 3,066 cfs August – 3,747 cfs September – 4,083 cfs October – 4,305 cfs November – 5,235 cfs December – 5,690 cfs
	Location and name of closest stream gauging stations above and below the facility	Upstream: USGS 03503000 Little Tennessee River at Needmore, NC Downstream: N/A
	Watershed area at the dam (in square miles). Identify if this value is prorated and provide the basis for proration.	1,608 square miles Daily mean flow data for the Cheoah Development was estimated, without proration, based on flow data collected at the development by Brookfield.
Designated Zones of Effect	Number of zones of effect	There are two zones of effect at the Cheoah Development (See Appendix A).
	Upstream and downstream locations by river miles	Zone 4: 51.2 to 60.2 Zone 5: 51.0 to 51.2
	Type of waterbody (river, impoundment, by-passed reach, etc.)	Zone 4:Impoundment Zone 5: Downstream
	Delimiting structures or features	Zone 4: From the head of Cheoah Impoundment (downstream of Fontana Dam), downstream approximately 8.9 miles to the Cheoah dam. Zone 5: From the Cheoah dam, downstream approximately 0.2 miles to the confluence with Cheoah River.
	Designated uses by state water quality agency	The NCDWR classifies the waters of the Little Tennessee River in vicinity of the Cheoah Development as Class C water with a Trout Waters Supplemental Classification. Link to NCDWR Classification Codes: https://deq.nc.gov/about/divisions/water-

		resources/planning/classification-standards/classifications#DWRPrimaryClassification

Table I-3. Facility Description Information for the Calderwood Development.

Item	*Information Requests*	*Response (and references to further details)*
Name of the Facility	Facility name (use FERC project name if possible)	Smoky Mountain Hydroelectric Project (FERC No. 2169) *Calderwood Development*
Location	River name (USGS proper name)	Little Tennessee River
	Watershed name	Lower Little Tennessee HUC: 06010204
	Nearest town(s), county(ies), and state(s) to dam	Maryville, Blount and Monroe Counties, Tennessee
	River mile of dam above next major river	43.6
	Geographic latitude of dam	35°29'34"N
	Geographic longitude of dam	83°58'47"W
Facility Owner	Application contact names	See Part V of LIHI certification application for more information
	Facility owner company and authorized owner representative name.	Brookfield Smoky Mountain Hydro, L.P. Ashley Thomas
	FERC licensee company name (if different from owner)	Same as above
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	FERC Project Number 2169 New license issued January 25, 2005 The Smoky Project Settlement Offer was filed with FERC on May 7, 2004. License expires on February 28, 2045
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	License for a Major Project
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	WQC Issue Date: April 29, 2004 Issuing Agency: Tennessee Department of Environment and Conservation Identification: NRS 03-055.
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories	Order Approving Settlement and Issuing New License and Tennessee WQC (January 25, 2005) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10382034

		Final Environmental Assessment for Hydropower License (September 10, 2004) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127 Relicensing Settlement Agreement: https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198
Powerhouse	Date of initial operation (past or future for pre-operational applications)	1930
	Total installed capacity (MW)	140.4 MW
	Average annual generation (MWh) and period of record used	Actual annual generation is filed with FERC each year. The average generation from 2017 to 2019 is 1,646,207 MWh. Annual generation reported in the 2005 LIHI application was 1,445, 585 MWh from 1982 to 2001.
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.)	The Calderwood Development located on the Little Tennessee River is operated in a "modified run-of-river" mode. In the modified run-of-river mode, inflow and outflow from the developments typically balance out on a daily basis.
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	Generating Units: 3 Type: vertical Francis units Description: Three identical units with a design capacity of 56,000 HP Minimum Capacity: 2214 cfs (each) Maximum Capacity: 3,400 cfs (each)
	Trashrack clear spacing (inches), for each trashrack	Trashrack clear spacing of 6"
	Dates and types of major equipment upgrades	There have been no major equipment upgrades at the powerhouse. There have been no major repairs at Calderwood since operation commenced in 1930.
	Dates, purpose, and type of any recent operational changes	There have been no recent operational changes.

	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	There are no plans for any regulatory activities.
Dam or Diversion	Date of original construction and description and dates of subsequent dam or diversion structure modifications	The Calderwood Development was constructed between 1925 and 1930.
	Dam or diversion structure height including separately, the height of any flashboards, inflatable dams, etc.	Dam Height: 230 feet Flashboards: N/A
	Spillway elevation and hydraulic capacity	Spillway elevation: 1067.8 feet with 20-foot-high gates Hydraulic capacity: 375,000 cfs at 1102.8 ft (top of dam)
	Tailwater elevation (provide normal range if available)	937.8 feet to 1071.0 feet
	Length and type of all penstocks and water conveyance structures between the impoundment and powerhouse	A 2,050 ft. long tunnel carries water from the intake to the powerhouse. The upstream section of the tunnel is circular, 26.5 feet in diameter and approximately 220 feet long. It transitions into a horseshoe shape section that is 26 feet wide at the invert and has a 13 foot radius on the upper half-round section, giving the tunnel a maximum height of 24 feet.
	Dates and types of major infrastructure changes	2006: Trash gate modification to pass base flow
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	The purpose of the project is for power generation.
	Source water	Little Tennessee River
	Receiving water and location of discharge	Little Tennessee River at RM 42.2
Conduit	Date of conduit construction and primary purpose of conduit	1930 Purpose: to convey water to turbines for power production.
Impoundment and Watershed	Authorized maximum and minimum water surface elevations	Maximum: 1087.8 feet Minimum: 1081.8 feet
	Normal operating elevations and normal fluctuation range	Normal elevation: 1087.8 feet The Calderwood Development is operated with a normal daily drawdown of 1 to 2 feet. The maximum daily fluctuation is 5 to 6 feet. There is no seasonal drawdown.

	Gross storage volume and surface area at full pool	Gross Storage Volume: 41,000 acre-feet Surface Area: 570 acres
	Usable storage volume and surface area	Useable storage volume: 3,500 acre-feet Surface area: 570 acres
	Describe requirements related to impoundment inflow, outflow, up/down ramping and refill rate restrictions.	The Calderwood Development located on the Cheoah River and is operated in a "modified run-of-river" mode. In the modified run-of-river mode, inflow and outflow from the developments typically balance out on a daily basis.
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Fontana Dam, Tennessee Valley Authority, RM 60 Cheoah Development, Brookfield Smoky Mountain Hydropower LP, RM 51.2, FERC Project Number: P-2169 * No upstream dams provide downstream fish passage.
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Chilhowee Development, Brookfield Smoky Mountain Hydropower LP, RM 33.6, FERC Project Number: P-2169 Tellico Dam, Tennessee Valley Authority, RM 0. * No downstream dams provide upstream fish passage.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	The Tennessee Valley Authority manages releases from Fontana Dam to control the volume of water released on the Little Tennessee River.
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control.	The total area within the FERC Project Boundary is approximately 8,300 acres (5,800 acres of water and 2,500 acres of land).
Hydrologic Setting	Average annual flow at the dam, and period of record used	The approximate average annual flow at the Calderwood Development based on flow data collect from 2014 through 2019 at the development is 4,744 cfs.
	Average monthly flows and period of record used	The approximate average monthly flows at the Calderwood Development based on flow data collect from 2014 through 2019 at the development are as follows:

		January – 7,506 cfs February – 6,079 cfs March – 5,546 cfs April – 2,604 cfs May – 3,525 cfs June – 3,903 cfs July – 3,293 cfs August – 3,952 cfs September – 4,276 cfs October – 4,560 cfs November – 5,512 cfs December – 6,213 cfs
	Location and name of closest stream gauging stations above and below the facility	Upstream: USGS 03503000 Little Tennessee River at Needmore, NC Downstream: N/A
	Watershed area at the dam (in square miles). Identify if this value is prorated and provide the basis for proration.	1,856 square miles Daily mean flow data for the Calderwood Development was estimated, estimated by a linear proration of data, based on flow data collected at the Cheoah development and Santeetlah bypass reach by Brookfield.[1]
Designated Zones of Effect	Number of zones of effect	There are three zones of effect at the Calderwood Development (See Appendix A).
	Upstream and downstream locations by river miles	Zone 6: 43.6 to 51.0 Zone 7: 42.3 to 43.6 Zone 8: 42.2 to 42.3
	Type of waterbody (river, impoundment, by-passed reach, etc.)	Zone 6: Impoundment Zone 7: Bypass Reach Zone 8: Downstream
	Delimiting structures or features	Zone 6: From the head of Calderwood reservoir, downstream approximately 7.4 miles to the Calderwood dam. Zone 7: from the Calderwood dam, downstream along the bypassed reach approximately 1.3 miles.

[1] Ries, K.G. and Friesz, P.J. 2000. Methods for Estimating Low-Flow Statistics for Massachusetts Streams. Water Resources Investigations Report 00-4135. U.S. Department of Interior. U.S. Geological Survey.

		Zone 8: from the Calderwood powerhouse, downstream approximately 0.1 miles.
	Designated uses by state water quality agency	The Tennessee portion of the Calderwood reservoir is classified for domestic water supply, industrial water supply, fish and aquatic life, recreation, irrigation, livestock watering, wildlife, and trout stream. The NCDWR classifies the waters of the Little Tennessee River in vicinity of the Calderwood Development as Class C water with a Trout Waters Supplemental Classification. Link to NCDWR Classification Codes: https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications#DWRPrimaryClassification Link to TNCEC Classification Codes: https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html

Table I-4. Facility Description Information for the Chilhowee Development.

Item	*Information Requests*	*Response (and references to further details)*
Name of the Facility	Facility name (use FERC project name if possible)	Smoky Mountain Hydroelectric Project (FERC No. 2169) *Chilhowee Development*
Location	River name (USGS proper name)	Little Tennessee River
	Watershed name	Lower Little Tennessee HUC: 06010204
	Nearest town(s), county(ies), and state(s) to dam	Tallassee, Blount and Monroe Counties, Tennessee
	River mile of dam above next major river	33.6
	Geographic latitude of dam	35°32'41"N
	Geographic longitude of dam	84°03'01"W
Facility Owner	Application contact names	See Part V of LIHI certification application for more information
	Facility owner company and authorized owner representative name.	Brookfield Smoky Mountain Hydro, L.P. Ashley Thomas
	FERC licensee company name (if different from owner)	Same as above
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	FERC Project Number 2169 New license issued January 25, 2005 The Smoky Project Settlement Offer was filed with FERC on May 7, 2004. License expires on February 28, 2045
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	License for a Major Project
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	WQC Issue Date: April 29, 2004 Issuing Agency: Tennessee Department of Environment and Conservation Identification: NRS 03-055.
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories	Order Approving Settlement and Issuing New License and Tennessee WQC (January 25, 2005) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10382034

		Final Environmental Assessment for Hydropower License (September 10, 2004) https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127 Relicensing Settlement Agreement: https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198
Powerhouse	Date of initial operation (past or future for pre-operational applications)	1957
	Total installed capacity (MW)	52.2 MW
	Average annual generation (MWh) and period of record used	Actual annual generation is filed with FERC each year. The average generation from 2017 to 2019 is 1,646,207 MWh. Annual generation reported in the 2005 LIHI application was 1,445, 585 MWh from 1982 to 2001.
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.)	The Chilhowee Development located on the Little Tennessee River is operated in a "modified run-of-river" mode. In the modified run-of-river mode, inflow and outflow from the developments typically balance out on a daily basis.
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	Generating Units: 3 Type: Kaplan Units Description: Three identical generating units with a design capacity of 23,333 HP at design head of 56.5 feet and a speed of 128.6 rpm Maximum Capacity: 1752 cfs (each) Minimum Capacity: 4014 cfs (each)
	Trashrack clear spacing (inches), for each trashrack	One trashrack with a clear spacing of 6"
	Dates and types of major equipment upgrades	There have been no major equipment upgrades at the powerhouse. There have been no major repairs at Chilhowee since operation commenced in 1957.
	Dates, purpose, and type of any recent operational changes	There have been no recent operational changes.

	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	There are no plans for any regulatory activities.
Dam or Diversion	Date of original construction and description and dates of subsequent dam or diversion structure modifications	The Chilhowee Development was constructed between 1955 and 1957.
	Dam or diversion structure height including separately, the height of any flashboards, inflatable dams, etc.	Dam Height: 88.5 feet Flashboards: N/A
	Spillway elevation and hydraulic capacity	Spillway Elevation: 836.0 feet with 38-foot-high gates Hydraulic Capacity: 265,600 cfs at 883.0 (top of embankment section)
	Tailwater elevation (provide normal range if available)	808.0 feet to 813.0 feet
	Length and type of all penstocks and water conveyance structures between the impoundment and powerhouse	There are no penstocks, tunnels, surge chambers, flumes, canals, inverted siphons or pressure relief devices included in the project.
	Dates and types of major infrastructure changes	2008 – 2009: Left embankment repair 2017: Right embankment repair
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	The purpose of the project is for power generation.
	Source water	Little Tennessee River
	Receiving water and location of discharge	Little Tennessee River at RM 33.6
Conduit	Date of conduit construction and primary purpose of conduit	N/A
Impoundment and Watershed	Authorized maximum and minimum water surface elevations	Maximum: 874.0 feet Minimum: 869.0 feet
	Normal operating elevations and normal fluctuation range	Normal Pool: 874.0 feet The Chilhowee Reservoir is operated with a normal daily fluctuation of 1 to 2 feet and a maximum daily fluctuation of 3 to 4 feet to meet system demands. The maximum allowable drawdown is 5 feet.
	Gross storage volume and surface area at full pool	Gross storage volume: 49,000 acre-feet Surface Area: 1,734 acres
	Usable storage volume and surface area	Usable storage capacity: 6,805 acre-feet Surface area: 1,734 acres

	Describe requirements related to impoundment inflow, outflow, up/down ramping and refill rate restrictions.	The Chilhowee Reservoir is operated with a normal daily fluctuation of 1 to 2 feet and a maximum daily fluctuation of 3 to 4 feet to meet system demands. There is no seasonal drawdown at Chilhowee Reservoir due to its limited ability to store water. Except under emergency conditions or for maintenance, the maximum allowable drawdown of Chilhowee Reservoir is 5 feet below normal full pond elevation. The normal daily drawdown at Chilhowee Reservoir is approximately 2 feet.
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Fontana Dam, Tennessee Valley Authority, RM 60 Cheoah Development, Brookfield Smoky Mountain Hydropower LP, RM 51.2, FERC Project Number: P-2169 Calderwood Development, Brookfield Smoky Mountain Hydropower LP, RM 43.6, FERC Project Number: P-2169 * No upstream dams provide downstream fish passage.
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Tellico Dam, Tennessee Valley Authority, RM 0. * No downstream dams provide upstream fish passage.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	The Tennessee Valley Authority manages releases from Fontana Dam to control the volume of water released on the Little Tennessee River.
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control.	The total area within the FERC Project Boundary is approximately 8,300 acres (5,800 acres of water and 2,500 acres of land).
Hydrologic Setting	Average annual flow at the dam, and period of record used	The approximate average annual flow at the Chilhowee Development based on flow data collect from 2014 through 2019 at the development is 5,054 cfs.
	Average monthly flows and period of record used	The approximate average monthly flows at

		the Chilhowee Development based on flow data collect from 2014 through 2019 at the development are as follows: January – 7,995 cfs February – 6,475 cfs March – 5,907 cfs April – 2,774 cfs May – 3,755 cfs June – 4,157 cfs July – 3,507 cfs August – 4,209 cfs September – 4,555 cfs October – 4,871 cfs November – 5,871 cfs December – 6,618 cfs
	Location and name of closest stream gauging stations above and below the facility	Upstream: USGS 03503000 Little Tennessee River at Needmore, NC Downstream: N/A
	Watershed area at the dam (in square miles). Identify if this value is prorated and provide the basis for proration.	1,977 square miles Daily mean flow data for the Chilhowee Development was estimated, estimated by a linear proration of data, based on flow data collected at the Cheoah development and Santeetlah bypass reach by Brookfield.[2]
Designated Zones of Effect	Number of zones of effect	There are two zones of effect at the Chilhowee Development (See Appendix A).
	Upstream and downstream locations by river miles	Zone 9: 33.6 to 42.2 Zone 10: 33.0 to 33.6
	Type of waterbody (river, impoundment, by-passed reach, etc.)	Zone 9: Impoundment Zone 10: Downstream
	Delimiting structures or features	Zone 1=9: From the head of Chilhowee reservoir, downstream approximately 8.6 miles to the Chilhowee dam. Zone 10: from the Chilhowee powerhouse, downstream approximately 0.6 miles (Tellico reservoir).

[2] Ries, K.G. and Friesz, P.J. 2000. Methods for Estimating Low-Flow Statistics for Massachusetts Streams. Water Resources Investigations Report 00-4135. U.S. Department of Interior. U.S. Geological Survey.

	Designated uses by state water quality agency	The Chilhowee reservoir is classified for fish and aquatic life, recreation, irrigation, and livestock watering and wildlife. Link to TNCEC Classification Codes: https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html

PART II. STANDARD MATRICES

The Smoky Project has a total of ten zones of effect for this application. The Santeetlah Development has three zones of effect that are defined as: (1) Zone one, which extends from the head of Santeetlah Lake, downstream approximately 6.0 miles to the Santeetlah dam, (2) Zone two, which extends from the Santeetlah dam, downstream along the bypassed reach approximately 9.3 miles, and (3) Zone three, which is the discharge point into the Cheoah Reservoir.

The Cheoah Development has two zones of effect that are defined as: (1) Zone four, which extends from the head of the Cheoah impoundment, downstream approximately 9.0 miles to the Cheoah Dam (2) Zone five, which extends from the Cheoah dam, downstream approximately 0.1 miles.

The Calderwood Development has three zones of effect that are defined as: (1) Zone six, which extends from the head of the Calderwood impoundment, downstream approximately 7.4 miles to the Calderwood dam (2) Zone seven, which extends from the Calderwood dam, downstream along the bypassed reach approximately 1.3 miles, and (3) Zone eight, which extends from the Calderwood powerhouse approximately 0.1 miles to the Chilhowee impoundment.

The Chilhowee Development has two zones of effect that are defined as: (1) Zone nine, which extends from the head of the Chilhowee impoundment, downstream approximately 5.6 miles to the Chilhowee dam, (2) Zone ten, which extends from the Chilhowee dam, downstream approximately 0.6 miles.

The standards selected to satisfy the LIHI certification criteria in each of these zones are identified in the following tables.

Table II-1. LIHI Standards Selected for Zone of Effect No. 1 for the Santeetlah Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-2. LIHI Standards Selected for Zone of Effect No. 2 for the Santeetlah Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**		X			
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**		X			
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-3. LIHI Standards Selected for Zone of Effect No. 3 for the Santeetlah Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-4. LIHI Standards Selected for Zone of Effect No. 4 for the Cheoah Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-5. LIHI Standards Selected for Zone of Effect No. 5 for the Cheoah Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-6. LIHI Standards Selected for Zone of Effect No. 6 for the Calderwood Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-7. LIHI Standards Selected for Zone of Effect No. 7 for the Calderwood Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**		X			
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-8. LIHI Standards Selected for Zone of Effect No. 8 for the Calderwood Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-9. LIHI Standards Selected for Zone of Effect No. 9 for the Chilhowee Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

Table II-10. LIHI Standards Selected for Zone of Effect No. 10 for the Chilhowee Development

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**		X			
D	**Downstream Fish Passage**	X				
E	**Watershed and Shoreline Protection**		X			X
F	**Threatened and Endangered Species Protection**			X		
G	**Cultural and Historic Resources Protection**		X			
H	**Recreational Resources**		X			

PART III. SUPPORTING INFORMATION

This section contains information that explains and justifies the standards selected to pass the LIHI certification criteria (see Part II for selections).

SANTEETLAH DEVELOPMENT

Information Required to Support Ecological Flows Standards.

III.A.1 Ecological Flows: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 1 of the Smoky Project is the Santeetlah impoundment. All agency recommendations were incorporated into the May 7, 2004 Relicensing Settlement Agreement (RSA) and subsequent January 25, 2005 FERC license. The Santeetlah development operates with a maximum fluctuation of 4-5 feet from April 1 to November 1, and maximum 9.9 feet during the months of December 1 to March 1. Generally, the reservoir is filled in March and drawn down in November. Santeetlah is operated as a storage and release facility and is operated in coordination with the three downstream developments. The impoundment can fluctuate based on the releases and operations of the non-Project facility Fontana Dam on the Little Tennessee River. The Santeetlah impoundment fluctuations and releases were agreed upon in the RSA, and were implemented to provide protection and enhancement for a variety of other resources and uses, including aquatic species and habitat, water quality, and reservoir wetlands. Santeetlah Reservoir supports a warm-water fishery managed by the North Carolina Wildlife Resources Commission (NCWRC).

2004 RSA:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10149198

2005 FERC License:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10382034

In accordance with the RSA and Article 410 of the FERC license, the Licensee filed a Shoreline Management Plan (SMP) for the Project with FERC on October 1, 2004, which was approved by FERC on March 31, 2006. The SMP details the ecological and fluctuation monitoring efforts at Santeetlah, and was prepared in consultation North Carolina Department of Environment and Natural Resources - Division of Water Resources (NCDWR), North Carolina Department of Environmental Quality (NCDEQ), North Carolina Division of Water Quality (NCDWQ), North NCWRC, North Carolina Department of Natural and Cultural Resources (NCDNCR) State Historic Preservation Office, United States Forest Service (USFS), United States Fish and Wildlife Service (USFWS), Bureau of Indian Affairs (BIA), Great Smoky Mountain National Park (GSMNP), Eastern Band of Cherokee Indians (EBCI) Tribal Historic Preservation Office, United Keetoowah Bank of Cherokee Indians (UKB) Tribal Historic Preservation Office, Cherokee Nation, Cross Creek Property Owners Association, Friends of Lake Santeetlah, Town of Lake Santeetlah, Town of Robbinsville, Graham County, Sierra Club, American Rivers, Tennessee Clean Water Network, The Nature Conservancy (TNC), Tennessee Department of Environment and Conservation (TDEC), Tennessee Wildlife Resources Agency (TWRA), Tennessee Historic Commission (THC), and the Tennessee State Historic Preservation Office (TNSHPO).

In a letter dated June 9, 2005, the Office of the Secretary for the U.S. Department of Interior stated "We are pleased with the balance of shoreline uses afforded by the SMP and its shoreline classification and are encouraged that the primarily undeveloped characteristics of the Project developments will be retained for the benefit of fish and wildlife and their habitats as well as fish-and-wildlife-based recreation for the American public […] and believe that the SMP adequately protects, enhances, and mitigates the ongoing and future impacts of the Project."

June 2005 Department of Interior Support Letter:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10605715

In accordance with Article 410 of the Project License, on April 1, 2016, Brookfield filed the required ten-year update to the SMP in consultation with above agencies and stakeholders. The updates included adjusting the maximum drawdown of the impoundment from 10 feet to 9.9 feet. FERC approved the updated SMP on July 6, 2017, and stated in the Order that the updates were minor.

Updated SMP:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14187014

FERC Order Approving Updated SMP:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14630216

The Santeetlah Development is in compliance with resource agency conditions issued regarding flow conditions. The FERC license, RSA, and Section 401 Water Quality Certificate (WQC) include the requirements water level control recommended by the NCDWR. All of the requirements pertaining to flow conditions and impoundment levels have been implemented at the Santeetlah development. Brookfield maintains records of these conditions at the Project. In the event of a deviation from established minimum flows or impoundment levels, Brookfield files documentation with FERC detailing the reasons for the deviation.

III.A.2 Ecological Flows: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
A	2	Agency Recommendation (see Appendix A for definitions): • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to agency management goals and objectives for fish and wildlife. • Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations).

Zone 2 of the Smoky Project is the approximately 9.3 mile bypass reach from the Santeetlah dam to the confluence with the Little Tennessee River. All agency recommendations were incorporated into the May 7, 2004 RSA and subsequent FERC license. The RSA requires the release of aquatic base flows and occasional high flow releases from the Santeetlah development order to enhance, maintain, and protect fish and wildlife habitat and water quality in the Cheoah River downstream of the dam. Brookfield determines the aquatic base flow each month by calculating the average daily inflow (ADI) value for the three preceding months.

The aquatic base flow regime was determined from studies conducted and technical memorandums developed in 2002 during the last relicensing by the Resource Agency Group. According to the Environmental Assessment (EA), the Licensee also conducted an Instream Flow Incremental Methodology (IFIM) using flows of 2-3 cfs, 40 cfs, and a high flow of 103 cfs. The study indicated that providing a seasonally variable flow would better restore the natural hydrologic condition to the Cheoah River. The Cheoah River downstream of Santeetlah dam supports a cool-water fishery that is managed by the NCWRC primarily for smallmouth bass and rock bass. The existing

recreational fishery is dominated by smallmouth bass and rock bass, although occasional trout are found.

Additionally, in accordance with the North Carolina 401 WQC, Brookfield provides 19-20 days of scheduled recreational releases on the Cheoah River of 1000 cfs, as measured at Santeetlah Dam, based on repeating five year schedule. According to the EA, the recreational releases were designed and implemented to provide more diverse assemblage of fish and aquatic biota.

2004 Environmental Assessment:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127

2014 Revised North Carolina 401 WQC:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13652166

The FERC license incorporates the requirements of the North Carolina 401 WQC for minimum flows in the bypassed reach of Santeetlah dam. Article 405 of the FERC License required the Licensee to file, for Commission approval, a monitoring Pplan to monitor the minimum flows from the Santeetlah Development. The Licensee filed the Santeetlah Development Monitoring Plan on February 28, 2007. On April 4, 2007, FERC issued an Order Modifying and Approving Monitoring Plan under License Article 405.

2007 Santeetlah Development Monitoring Plan:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11280586

2007 Order Modifying and Approving Monitoring Plan:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11302684

As part of the Commission's acceptance of the Plan, the Licensee was required to provide a summary report of first year activities by April 1, 2008, a summary report of second year activities by April 1, 2009 and a Final Summary Report of the monitoring by July 1, 2009. On June 30, 2009 the Licensee filed the Final Summary Report, which was approved by FERC on September 11, 2009.

2009 Final Summary Report
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12061321

2009 FERC Approval of Final Summary Report:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12146422

Brookfield is in compliance with resource agency conditions issued regarding flow conditions. The FERC license, RSA, and Section 401 WQC include the requirements for flow releases recommended by state and federal agencies. All of the license and settlement requirements pertaining to flow conditions have been implemented in the Santeetlah bypass reach. Brookfield maintains records of these conditions at the Project. In the event of a deviation from established

minimum flows or impoundment levels, Brookfield files documentation with FERC detailing the reasons for the deviation.

III.A.3 Ecological Flows: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 3 of the Santeetlah development is the area of discharge from the Santeetlah powerhouse on the Cheoah Reservoir (Little Tennessee River). A flow was not recommended from the Santeetlah powerhouse given that it flows directly into the Cheoah Reservoir. The RSA and FERC License do not contain conditions to manage fish and wildlife in the tailrace; however the Cheoah Reservoir is managed by the NCWRC as a put-grow-and-take stocked trout fishery.

Information Required to Support Water Quality Standards.

III.B.1 Water Quality: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g.,

		a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

The Smoky Project is in compliance with all conditions issued pursuant to a Clean Water Act – Section 401 WQC. The Section 401 WQCs are conditioned on compliance with the terms of the RSA. The original 401 WQC for the Project was issued November 8, 2004 by the North Carolina Division of Water Quality (now known as NCDWR). The Tennessee Department of Environment and Conservation issued their 401 WQC for the Project on April 29, 2004; however, Tennessee's 401 WQC does not apply to the Santeetlah development. On-going water quality monitoring at the Project is not required as part of the WQC or FERC license.

Generally, any changes to the original WQC are necessitated by significant changes in or to the Project environment affecting the Conditions of the original WQC, which culminates in an amendment of the original WQC. On June 27, 2014, NCDENR issued a revised 401 WQC to allow for more flexibility in scheduling high flow events and create additional recreational opportunities. The newly revised 401 WQC does not affect any of the other environmental resources of the project. FERC issued an Order Incorporating the Revised 401 WQC on March 11, 2015.

2014 Revised North Carolina 401 WQC:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13652166

2015 FERC Order Incorporating the Revised 401 WQC:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13799520

Additionally, the Applicant contacted the North Carolina Division of Water Resources on February 20, 2020, regarding the current WQC status for the Project. By e-mail dated February 27, 2020, the North Carolina Division of Water Resources indicated that the current 401 WQC is still valid for the Smoky Project. The consultation documentation regarding the 401 WQC is included in Appendix C.

Per review of the 2018 Section 303(d) list for North Carolina, no impaired waters in the Project area or downstream reach are listed. A copy of the 2018 Section 303(d) list for North Carolina can be viewed at https://files.nc.gov/ncdeq/Water%20Quality/Planning/TMDL/303d/2018/2018-NC-303-d--List-Final.pdf.

The waters of the Santeetlah reservoir are designated as Class B. Waters protected for all Class B uses include swimming, skin diving, water skiing, and similar uses involving human body contact with water where such activities take place in an organized manner or on a frequent basis.

III.B.2 Water Quality: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

See response above for Zone 1.

Downstream from the Santeetlah development, the waters are designated as Class C. Waters of this class are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.

III.B.3 Water Quality: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

See response above for Zone 1.

The waters are designated as Class C. Waters of this class are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.

Information Required to Support Upstream Fish Passage Standards.

III.C.1 Upstream Fish Passage: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

There are no upstream fish passage barriers or migratory fish management issues in Zone 1 because it is an impoundment. In 2003, studies conducted during the last relicensing (summarized in the Final License Application) indicated that there were no known migrating fish in the Santeetlah Reservoir. The Santeetlah Reservoir is currently managed by the NCWRC as a warmwater fishery. Fish species that are actively managed include walleye, smallmouth bass, largemouth bass, white crappie, black crappie, bluegill, and redbreast sunfish. According to the FERC EA dated September 10, 2004, the Santeetlah "warmwater fish populations appear to be healthy and indicate a balanced, reproducing population."

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for this development. In the Section 18 Prescriptions issued on September 19, 2003, the Interior stated "the Santeetlah sub-system […] retained surprisingly high species richness." Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

2003 Final License Application:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10558837

2003 Department of Interior Section 18 Prescriptions:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.C.2 Upstream Fish Passage: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

In 2003, studies conducted during the last relicensing (summarized in the Final License Application) indicated that there are no known migrating fish in the Santeetlah bypass reach (Cheoah River). The Cheoah River supports a cool-water fishery that is managed by the NCWRC primarily for smallmouth bass and rock bass. The existing recreational fishery is dominated by smallmouth bass and rock bass, although occasional trout are found.

According to the EA, fish population surveys were conducted in 1993, 1999, and 2001. Nineteen fish species were captured in the Cheoah River bypassed reach by the combined sampling efforts. The results of the 1993 and 1999 surveys indicated rock bass and smallmouth bass dominated the reach. Trout were occasionally captured in the bypassed reach and white suckers and rock bass dominated the Cheoah Development powerhouse tailrace area in the 2001 sampling.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for this development. In the Section 18 Prescriptions issued on September 19, 2003, the Interior stated "the Santeetlah sub-system […] retained surprisingly high species richness." Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

2003 Final License Application:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10558837

2003 Department of Interior Section 18 Prescriptions:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.C.3 Upstream Fish Passage: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

Zone 3 of the Smoky Project does not pose any barriers to upstream fish passage because the Santeetlah powerhouse discharges into the Cheaoh Reservoir. During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for this development. In the Section 18 Prescriptions issued on September 19, 2003, the Interior stated "the Santeetlah sub-system […] retained surprisingly high species richness." Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

Information Required to Support Downstream Fish Passage Standards.

III.D.1 Downstream Fish Passage: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

Zone 1 of the Smoky Project is the Santeetlah impoundment. In 2003, studies conducted during the last relicensing (submitted in the Final License Application) indicated that there are no known migrating fish in Zone 1, and the risk of entrainment was low at Santeetlah due to the size of the trashracks (2-2.75 inch) over the intake and the low numbers of clupeids and littoral zone species.

The Santeetlah Reservoir is currently managed by the NCWRC as a warmwater fishery. Fish species that are actively managed include walleye, smallmouth bass, largemouth bass, white crappie, black crappie, bluegill, and redbreast sunfish. According to the FERC Environmental Assessment dated September 10, 2004, the "warmwater fish populations appear to be healthy and indicate a balanced, reproducing population." Given that coldwater fisheries are downstream from the Santeetlah reservoir, downstream fish passage would not be encouraged.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for this development. In the Section 18 Prescriptions issued on September 19, 2003, the Interior stated "the Santeetlah sub-system…retained surprisingly high species richness." Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

2003 Final License Application:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10558838

2003 Department of Interior Section 18 Prescriptions:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.D.2 Downstream Fish Passage: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
D	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.

According to the EA, the Licensee conducted an Instream Flow Incremental Methodology (IFIM) using flows of 2-3 cfs, 40 cfs, and a high flow of 103 cfs. The study indicated that providing a

seasonally variable flow would better restore the natural hydrologic condition to the Cheoah River bypassed reach. The FERC license incorporates the requirements of the North Carolina 401 WQC for minimum flows in the bypassed reach of Santeetlah dam. Article 405 required the Licensee to file, for Commission approval, a Monitoring Plan to monitor the minimum flows from the Santeetlah Development.

On February 28, 2007, the Licensee filed a Monitoring Plan of the Santeetlan minimum flows for approval. The Monitoring Plan was developed in consultation with the NCDENR, USFWS, USFS, the NPS, and the NCWRC. The Monitoring Plan specifies that Brookfield determines the appropriate aquatic minimum flow each month based on average daily inflow, and releases are made from two Tainter gates. FERC approved the Monitoring Plan on April 4, 2007.

The Smoky Project is in compliance with resource agency conditions issued regarding flow conditions. Fish passage monitoring or effectiveness is not required in the license for the Santeetlah development. During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for this development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

2007 Monitoring Plan:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11280586

2007 FERC Order Approving Monitoring Plan:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11302684

III.D.3 Downstream Fish Passage: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain

Criterion	*Standard*	*Instructions*
		why the facility is or was not the cause of this.

There are no downstream fish passage barriers or migratory fish management issues in Zone 3 because it discharges directly into the Cheaoh Reservoir. During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for this development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

Information Required to Support Shoreline and Watershed Protection Standards.

III.E.1 Shoreline and Watershed Protection: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project.
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

The RSA included many commitments aimed at protecting the resources of the Little Tennessee River Basin including land protection, watershed protection trust funds, and a shoreline management plan.

In the RSA, the Licensee established the North Carolina Resource Management and Enhancement Fund (North Carolina Fund) to be used by the NCWRC, North Carolina Department of Environment and Natural Resources, U. S. Forest Service, Eastern Band of Cherokee Indians, and USFWS and Tallassee Fund to be used by the U. S. Forest Service, USFWS, Great Smoky Mountains National Park, Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, Eastern Band of Cherokee Indians and The Nature Conservancy of Tennessee for natural resource stewardship and Project mitigation activities.

The North Carolina Fund must be used within the scope of subject matter of the Fish and Wildlife Coordination Act, the Endangered Species Act, and Section 10 of the Federal Power Act including but not limited to 1) monitoring of biotic and abiotic parameters, 2) addition of large woody debris, and gravel and vegetation management in the Cheoah River below Santeetlah Dam, and 3) for other natural resource stewardship activities, including, but not limited to, a) threatened and endangered species recovery efforts, b) control of exotic species and environmental outreach and c) education directly related to those Cheoah River and Little Tennessee River basin resources affected by ongoing Project operations, in particular the Santeetlah and Cheoah developments, and the portion of the Calderwood Development in North Carolina. The Licensee deposited an initial payment of $100,000, and $25,000 each year after.

The Licensee also established the Tallassee Fund, which will be managed by the USFWS, USFS, Great Smoky Mountains National Park, Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, the Eastern Band of the Cherokee Indians, The Nature Conservancy of Tennessee, the National Parks Conservation Association, the Tennessee Clean Water Network, and American Rivers for 1) threatened and endangered species recovery efforts, 2) ecosystem enhancements and restoration, 3) management and control of exotic species, and 4) environmental outreach and education directly related to the Smoky Project, as well as other non-Project lands in Tennessee currently owned by the Licensee to mitigate the continuing environmental impacts associated with the Project's operations. The Licensee deposited an initial payment of $100,000, and an additional $100,000 each year after.

Brookfield submits an annual License Compliance Fund Board Implementation Report. The most recent annual fund report was filed with FERC on June 11, 2019, for the 2018 fund implementation year.

2018 License Compliance Fund Board Implementation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15267908

Additionally, in the RSA, the Licensee agreed to grant The Nature Conservancy options to acquire title to a significant portion of this non-Project acreage for reconveyance to a federal or state agency. The primary purpose of these conservation easements is to retain land and water areas predominantly in their natural, scenic, open or wooded condition or as suitable habitat for fish, plants or wildlife and preserve the historical, architectural, archaeological, or cultural aspects of the properties. The total number of acres to be protected through the conservation easements is approximately 11,000 acres. About 800 acres of the total are riparian (Project and non-Project) areas along the Project reservoirs, including Santeetlah.

The Licensee filed a Shoreline Management Plan (SMP) for the Project with FERC on October 1, 2004, which was approved by FERC on March 31, 2006. The SMP was prepared in consultation with North Carolina Department of Environment and Natural Resources, NCWRC, North Carolina State Historic Preservation Office, U.S. Forest Service, U.S. Fish and Wildlife Service, Bureau of

Indian Affairs, Great Smoky Mountains National Park, Eastern Band of Cherokee Indians, Cross Creek Property Owners Association, Friends of Lake Santeetlah, Town of Lake Santeetlah, Town of Robbinsville, Graham County, Sierra Club, American Rivers, Tennessee Clean Water Network, The Nature Conservancy, Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, Tennessee Historic Commission and Tennessee State Historic Preservation Office.

In a letter dated June 9, 2005, the Office of the Secretary for the U.S. Department of Interior stated "We are pleased with the balance of shoreline uses afforded by the SMP and its shoreline classification and are encouraged that the primarily undeveloped characteristics of the Project developments will be retained for the benefit of fish and wildlife and their habitats as well as fish-and-wildlife-based recreation for the American public […] and believe that the SMP adequately protects, enhances, and mitigates the ongoing and future impacts of the Project."

June 2005 Department of Interior Support Letter:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10605715

In accordance with Article 410 of the Project License, on April 1, 2016, Brookfield filed the required ten-year update to the SMP. The updates included adjusting the maximum drawdown from 10 feet to 9.9 feet, updating the recreation information, and updating the species considered rare, threatened, and endangered. FERC approved the updated SMP on July 6, 2017, and considered the updates minor.

2016 Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14187014

2017 FERC Order Approving Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14630216

III.E.2 Shoreline and Watershed Protection: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project.
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land

Criterion	*Standard*	*Instructions*
		protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

See response above for Zone 1.

III.E.3 Shoreline and Watershed Protection: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project. •
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline. •

See response above for Zone 1.

Information Required to Support Threatened and Endangered Species Standards.

III.F.1 Threatened and Endangered Species: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

Based on information received from the USFWS's North Carolina Field Office on February 12, 2020, regarding a request for information on rare, threatened or endangered (RTE) species, it appears that there are nine RTE species that have been known to be located at or near the Santeetlah

development. These species are the Carolina Northern Flying Squirrel (*Glaucomys sabrinus coloratus*), Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), Northern Long-eared Bat (*Myotis septentrionalis*), Bog Turtle (*Clemmys muhlenbergii*), Spotfin Chub (*Erimonax monachus*), Appalachian Elktoe (*Alasmidonta raveneliana*), Virginia Spiraea (*Spiraea virginiana*), and Rock Gnome Lichen (*Gymnoderma lineare*). There is one critical habitat in the area for the Appalachian Elktoe.

The USFWS filed a "Biological Assessment for the Tapoco Settlement Agreement" with FERC (this Assessment is appended to the RSA). This Assessment concluded that none of the activities described in the RSA (e.g., Project operations, recreational enhancements etc.) are anticipated to have adverse effects on the RTE species included in the Biological Opinion. In some cases, USFWS states in the Biological Assessment that the activities described in the RSA would have a beneficial effect.

2004 RSA and Biological Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

Article 407 of the FERC license required the Licensee to file an Endangered Species Management Plan (ESMP) to protect and enhance the federally-listed threatened or endangered species and their critical habitat associated with the Smoky Project. On August 30, 2007, the Licensee filed an ESMP with FERC. On March 4, 2008, FERC issued an Order Modifying and Approving the ESMP, but required the Licensee to revise and refile the ESMP. On September 4, 2008, the Licensee refiled the revised ESMP, which was approved by FERC on April 14, 2009. The approved plan requires the licensee file annual reports summarizing activities concerning endangered species conducted during the previous year.

2008 FERC Order Approving and Modifying ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11601515

2008 Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11794571

2009 FERC Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11989083

On December 19, 2017, Brookfield filed a Revised ESMP pursuant to the 2008 FERC Order requiring an update to the ESMP every five years. The Revised ESMP was developed in consultation with the USFWS, USFS, GSMNP, NCDEQ, NCWRC, and TNDEC. On April 30, 2018 FERC issued the Order Approving the Revised Species Management Plan. The approved plan requires the licensee file annual reports summarizing activities concerning endangered species conducted during the previous year. The most recent report was filed on March 29, 2019 for the 2018 implementation year.

2017 ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14780431

2018 Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14902071

2019 Annual ESMP Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15200639

The USFWS has published formal recovery plans for all RTE species listed above except for the northern long-eared bat. Generally, the goal of the recovery plans is to restore viable populations of each species to a significant portion of its historic range and remove each species from the federal endangered species list. The goal of the Smoky Project's ESMP is incorporate the recovery plans for RTE species to restore viable populations of the species and its habitat to such a degree that the species no longer qualifies for protection under the Endangered Species Act.

During preparation of this application, Brookfield also consulted with North Carolina Department of Natural and Cultural Resources (NCDNCR) Natural Heritage Program for an updated list of threatened and endangered species that may occur in the vicinity of the Santeetlah Development. By letter dated February 27, 2020, the NCDNCR indicated that the Eastern Hellbender, Junaluska Salamander, Tellico Salamander, Bald Eagle, Golden Banded-Skipper, Mottlled Duskywing, Baltimore Checkerpot, Flag-tailed Spinyleg, Appalachian Elktoe, Slippershell Mussel, Wavyrayed ,Lampmussel, Smoky Dace, Wounded Darter, Open Supercoil, A Liverwort, Rafinesque's Big-eared Bat, Little Brown Bat, Northern Long-eared Bat, Indiana Bat, Tricolored Bat, Eastern Spotted Skunk, and Copper Moss may occur in the vicinity of Santeetlah Development.

The record of RTE consultation is included in Appendix D.

III.F.2 Threatened and Endangered Species: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

See response above for Zone 1.

III.F.3 Threatened and Endangered Species: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*

F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

See response above for Zone 1.

Information Required to Support Cultural and Historic Resources Standards.

III.G.1 Cultural and Historic Resources: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

The historical resources for the Santeetlah development include the Santeetlah dam and ancillary buildings and structures, Santeetlah pipeline and tunnels, and the Santeetlah powerhouse. These structures were added to the National Register of Historic Places (NRHP) on April 2, 2004. On August 25, 2004, FERC executed a Programmatic Agreement (PA) for the Smoky Project. The PA, signed by FERC, the North Carolina State Historic Preservation Office (NCSHPO), the Tennessee State Historic Preservation Office (TNSHPO), the USFS, and the Licensee, was subsequently sent to the Advisory Council on Historic Preservation on September 9, 2004.

The PA outlines stipulations that must be followed by the Licensee during the term of its license. The PA specifically discusses management of historic properties, interim treatment of historic properties, and the development and implementation of a Historic Properties Management Plan (HPMP). Brookfield continues to implement the provisions of the Programmatic Agreement for the Project, in accordance with its terms.

As required by Article 409 of the FERC license and the PA, the Licensee filed the HPMP with FERC on February 28, 2006. The HPMP was developed in consultation with NCSHPO, TNSHPO, USFS, the Bureau of Indian Affairs, Eastern Band of Cherokee Indians Tribal Historic Preservation Office (EBCI THPO), and the Great Smoky Mountains National Park (GSMNP). On June 21, 2006, FERC issued an order approving the HPMP.

2004 Programmatic Agreement:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10240982

2006 HPMP:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10965083

2006 Order Approving HPMP:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11070060

On April 1, 2016 (supplemented on August 12, 2016), Brookfield filed for Commission approval, a revised HPMP in accordance with the required ten year reevaluation and update. On October 7, 2016, FERC issued an order modifying and approving the HPMP. Brookfield is required to file an annual report of all activities associated with the implementation of the HPMP with FERC, NCSHPO, TNSHPO, EBCI THPO, the Bureau of Indian Affairs, USFS, the GSMNP, and the United Keetowah Band of Cherokee Indians (UKB) and the Cherokee Nation of Oklahoma. The most recent annual report was filed on January 31, 2020 for the 2019 reporting year. The facilities in the Smoky Project are in compliance with all requirements regarding cultural resource protection, mitigation, or enhancement included in the FERC license, PA, and HPMP.

2016 Order Modifying and Approving Revised HPMP:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14372663

2019 HPMP Annual Report:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=15456636

III.G.2 Cultural and Historic Resources: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

See response above for Zone 1.

III.G.3 Cultural and Historic Resources: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

See response above for Zone 1.

Information Required to Support Recreational Resources Standards.

III.H.1 Recreational Resources: Santeetlah Development Zone 1

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

The Smoky Project developments are in compliance with recreational access, accommodation, and facilities' conditions in the FERC license. At the Santeetlah development, recreational facilities include boat access points and boat launches, campgrounds, and marinas. There are no FERC-approved facilities.

On January 25, 2005, FERC issued an order approving settlement and issuing a new license. The Licensee agreed, in the RSA, to add new public recreation facilities and upgrade existing facilities. As per Article 408 of the FERC license, the Licensee submitted a Recreation Plan to FERC on February 28, 2006. The Recreation Plan was developed in consultation with NCWRC, North Carolina Department of Environment and Natural Resources (NCDENR), Tennessee Department of Environment and Conservation (TDEC), Tennessee Wildlife Resources Agency (TWRA), United States Fish and Wildlife Service (USFWS), National Park Service (NPS), and USFS as appropriate. FERC approved the Recreation Plan by order on August 9, 2006.

As per the RSA and Recreation Plan, the Licensee must consult with the USFS, NCWRC, and TWRA annually to prioritize recreational enhancements to be implemented for the following year based on funding availability and other relevant considerations. The most recent annual meeting occurred on July 24, 2019 and the most recent Annual Recreation Report was filed February 03, 2020 for the 2019 year. According to the 2019 Annual Report, all the scheduled recreational enhancements associated with Santeetlah have been implemented.

2006 Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965081

2006 FERC Order Approving Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11107010

2019 Annual Recreation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15458959

III.H.2 Recreational Resources: Santeetlah Development Zone 2

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

See response above for Zone 1.

III.H.3 Recreational Resources: Santeetlah Development Zone 3

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

See response above for Zone 1.

CHEOAH DEVELOPMENT

Information Required to Support Ecological Flows Standards.

III.A.4 Ecological Flows: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 4 of the Smoky Project is the Cheoah impoundment. The Cheoah development is operated as daily cycle peaking facilities with the upstream non-Project Fontana Project serving as the primary flow control facility. During periods of high releases from Fontana, the Cheoah development operates 24 hours per day. As determined in the RSA, the maximum drawdown of the reservoir is 7 feet with no seasonal drawdown. High flows released from Fontana could cause water to be spilled over the Cheoah development due to its limited ability to store water. Cheoah Reservoir supports a cold-water fishery that is actively managed by the NCWRC.

2004 RSA:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

The Cheaoh development is in compliance with resource agency conditions issued regarding operating conditions. The FERC license, RSA, and Section 401 WQC include the requirements for fluctuations of the Cheoah impoundment recommended by state and federal environmental agencies. Brookfield remains in compliance with the established flow conditions and impoundment levels and maintains records of these conditions at the Project. In the event of a deviation from maximum drawdown levels, Brookfield files documentation with FERC detailing the reasons for the deviation.

III.A.5 Ecological Flows: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 5 of the Smoky Project is the downstream area of the Cheoah development. The Cheoah powerhouse is immediately downstream from the dam; therefore, there is no bypassed reach at this development. The RSA and FERC license do not require a minimum flow or base flow.

According to the EA and studies conducted during relicensing, the Cheoah tailrace indicated good water quality and a healthy aquatic environment; sixteen species of fish were captured in the Cheoah tailwaters area and several of these species prefer the cool, rocky habitat and swift currents. Since the existing aquatic communities persisted during the prior license term, the current operations were understood to adequately support and maintain existing aquatic communities.

2004 RSA:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

The Cheaoh development is in compliance with resource agency conditions issued regarding operating conditions. The FERC license, RSA, and Section 401 WQC include recommendations by state and federal environmental agencies. Brookfield remains in compliance with the established flow conditions and impoundment levels and maintains records of these conditions at the Project. In the event of a deviation from maximum drawdown levels, Brookfield files documentation with FERC detailing the reasons for the deviation.

Information Required to Support Water Quality Standards.

III.B.4 Water Quality: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

The Smoky Project is in compliance with all conditions issued pursuant to a Clean Water Act – Section 401 WQC. The Section 401 WQCs are conditioned on compliance with the terms of the RSA. The original 401 WQC for the Project was issued November 8, 2004 by the North Carolina Division of Water Quality (now known as NCDWR). The Tennessee Department of Environment and Conservation issued their 401 WQC for the Project on April 29, 2004; however, Tennessee's 401 WQC does not apply to the Cheoah development. On-going water quality monitoring at the Project is not required as part of the WQC or FERC license.

Generally, any changes to the original WQC are necessitated by significant changes in or to the Project environment affecting the Conditions of the original WQC, which culminates in an amendment of the original WQC. On June 27, 2014, NCDENR issued a revised 401 WQC to allow for more flexibility in scheduling high flow events and create additional recreational opportunities. The newly revised 401 WQC does not affect any operations at the Cheoah development. FERC issued an Order Incorporating the Revised 401 WQC on March 11, 2015.

2014 Revised North Carolina 401 WQC:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13652166

2015 FERC Order Incorporating the Revised 401 WQC:
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13799520

Additionally, the Applicant contacted the North Carolina Division of Water Resources on February 20, 2020, regarding the current WQC status for the Project. By e-mail dated February 27, 2020, the North Carolina Division of Water Resources indicated that the current 401 WQC is still valid

for the Smoky Project. The consultation documentation regarding the 401 WQC is included in Appendix C.

Per review of the 2018 Section 303(d) list for North Carolina, no impaired waters in the Project area or downstream reach are listed. A copy of the 2018 Section 303(d) list for North Carolina can be viewed at https://files.nc.gov/ncdeq/Water%20Quality/Planning/TMDL/303d/2018/2018-NC-303-d--List-Final.pdf.

The waters of the Cheoah reservoir are designated as Class C. Waters of this class are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.

III.B.5 Water Quality: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

See response above for Zone 4.

Information Required to Support Upstream Fish Passage Standards.

III.C.4 Upstream Fish Passage: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement.

		• Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

There are no upstream fish passage barriers or migratory fish management issues in Zone 4 because it is an impoundment. In 2003, studies conducted during the last relicensing (submitted in the Final License Application) indicated that there are no known migrating fish in the Cheoah Reservoir.

The NCWRC manages the reservoir as a put-grow-and-take stocked trout fishery, with brook trout, rainbow trout, and brown trout stocked in the reservoir on a regular basis. Catchable-size trout are usually stocked when they are nine to ten inches long. Creel surveys conducted by NCWRC indicate rainbow trout were the top species captured, followed by yellow perch, brook trout, and brown trout; 88 percent of all fish captured fish in the survey were trout, and 4 percent were yellow perch. Other fish species present in the reservoir include bluegill, walleye, smallmouth bass, rock bass, white sucker, and river chub. Fish populations appear to be healthy, especially the white suckers that showed a better growth rate than those normally found in this geographic region.

During the relicensing proceeding for the Smoky River Project, neither the Department of Commerce nor Interior prescribed fish passage facilities at the Cheoah development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license.

2003 Final License Application:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10558838

2003 Department of Interior Section 18 Prescriptions:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.C.5 Upstream Fish Passage: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

See response above for Zone 4.

Information Required to Support Downstream Fish Passage Standards.

III.D.4 Downstream Fish Passage: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

Zone 4 of the Smoky Project is the Cheoah impoundment. The NCWRC manages the reservoir as a put-grow-and-take stocked trout fishery, with brook trout, rainbow trout, and brown trout stocked in the reservoir on a regular basis. Catchable-size trout are usually stocked when they are nine to ten inches long. Creel surveys conducted by NCWRC indicate rainbow trout were the top species captured, followed by yellow perch, brook trout, and brown trout; 88 percent of all fish captured

fish in the survey were trout, and 4 percent were yellow perch. Other fish species present in the reservoir include bluegill, walleye, smallmouth bass, rock bass, white sucker, and river chub. Fish populations appear to be healthy, especially the white suckers that showed a better growth rate than those normally found in this geographic region.

During the relicensing proceeding for the Smoky River Project, neither the Department of Commerce nor Interior prescribed fish passage facilities at the Cheoah development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license.

2003 Final License Application:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10558838

2003 Department of Interior Section 18 Prescriptions:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.D.5 Downstream Fish Passage: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

There are no downstream fish passage barriers or migratory fish management issues in Zone 5 because it is the tailwater/downstream zone. During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed fish passage facilities for

this development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

Sixteen species of fish were captured in the Cheoah tailwaters area during the Licensee's 2001 sampling effort. The five most abundant species captured were white sucker, rock bass, warpaint shiner, mottled sculpin, and river chub. According to the EA, several of these species prefer the cool, rocky habitat and swift currents found at the project development tailraces. Fish species collected in the tailwaters area also included some stream species, such as black redhorse, which are likely strays from the mouth of the nearby Cheoah River. Trout captured were in good condition and showed good growth.

2003 Department of Interior Section 18 Prescriptions:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

Information Required to Support Shoreline and Watershed Protection Standards.

III.E.4 Shoreline and Watershed Protection: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project. •
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

The RSA included many commitments aimed at protecting the resources of the Little Tennessee River Basin including land protection, watershed protection trust funds, and a shoreline management plan.

In the RSA, the Licensee established the North Carolina Resource Management and Enhancement Fund (North Carolina Fund) to be used by the NCWRC, NCDNCR, USFS, UKB, and USFWS.

The Tallassee Fund is to be used by the USFS, USFWS, GSMNP, TDEC, TWRA, EBCI, the Nature Conservancy of Tennessee the National Parks Conservation Association, the Tennessee Clean Water Network, and American Rivers for natural resource stewardship and Project mitigation activities.

The North Carolina Fund must be used within the scope of subject matter of the Fish and Wildlife Coordination Act, the Endangered Species Act, and Section 10 of the Federal Power Act including but not limited to 1) monitoring of biotic and abiotic parameters, 2) for other natural resource stewardship activities, including, but not limited to, a) threatened and endangered species recovery efforts, b) control of exotic species and environmental outreach and c) education directly related to those Little Tennessee River basin resources affected by ongoing Project operations, in particular the Santeetlah and Cheoah developments, and the portion of the Calderwood Development in North Carolina. The Licensee deposited an initial payment of $100,000, and $25,000 each year after.

The Tallassee Fund, must be used for the following activities 1) threatened and endangered species recovery efforts, 2) ecosystem enhancements and restoration, 3) management and control of exotic species, and 4) environmental outreach and education directly related to the Smoky Project, as well as other non-Project lands in Tennessee currently owned by the Licensee to mitigate the continuing environmental impacts associated with the Project's operations. The Licensee deposited an initial payment of $100,000, and an additional $100,000 each year after.

Brookfield submits an annual License Compliance Fund Board Implementation Report. The most recent annual fund report was filed with FERC on June 11, 2019, for the 2018 fund implementation year.

2018 License Compliance Fund Board Implementation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15267908

Additionally, in the RSA, the Licensee agreed to grant The Nature Conservancy options to acquire title to a significant portion of this non-Project acreage for reconveyance to a federal or state agency. The primary purpose of these conservation easements is to retain land and water areas predominantly in their natural, scenic, open or wooded condition or as suitable habitat for fish, plants or wildlife and preserve the historical, architectural, archaeological, or cultural aspects of the properties. The total number of acres to be protected through the conservation easements is approximately 11,000 acres. About 800 acres of the total are riparian (Project and non-Project) areas along the Project reservoirs, including along the Cheoah reservoir.

The Licensee filed a SMP for the Project with FERC on October 1, 2004, which was approved by FERC on March 31, 2006. The SMP was prepared in consultation with NCDENR, NCWRC, NCSHPO, USFS, USFWS, BIA, GSMNP, EBCI, (CCPOA, Friends of Lake Santeetlah, Town of Lake Santeetlah, Town of Robbinsville, Graham County, Sierra Club, American Rivers, Tennessee Clean Water Network, The Nature Conservancy, TDEC, TWRC, and TNSHPO.

In a letter dated June 9, 2005, the Office of the Secretary for the U.S. Department of Interior stated "We are pleased with the balance of shoreline uses afforded by the SMP and its shoreline classification and are encouraged that the primarily undeveloped characteristics of the Project developments will be retained for the benefit of fish and wildlife and their habitats as well as fish-and-wildlife-based recreation for the American public…and believe that the SMP adequately protects, enhances, and mitigates the ongoing and future impacts of the Project."

June 2005 Department of Interior Support Letter:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10605715

In accordance with Article 410 of the Project License, on April 1, 2016, Brookfield filed the required ten-year update to the SMP. The updates did not impact the Cheoah development. FERC approved the updated SMP on July 6, 2017, and considered the updates minor.

Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14187014

FERC Order Approving Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14630216

III.E.5 Shoreline and Watershed Protection: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project. •
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

See response above for Zone 4.

Information Required to Support Threatened and Endangered Species Standards.

III.F.4 Threatened and Endangered Species: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

Based on information received from the USFWS's North Carolina Field Office on February 12, 2020, regarding a request for information on rare, threatened or endangered (RTE) species, it appears that there are twelve RTE species that have been known to be located at or near the Cheoah development. These species are the Carolina Northern Flying Squirrel (*Glaucomys sabrinus coloratus*), Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), Northern Long-eared Bat (*Myotis septentrionalis*), Bog Turtle (*Clemmys muhlenbergii*), Spotfin Chub (*Erimonax monachus*), Appalachian Elktoe (*Alasmidonta raveneliana*), Littlewing Pearlymussel (*Pegias fabula*), Noonday Snail (*Mesodon clarki Nantahala*), Spruce-fir Moss Spider (*Microhexura montivaga*), Virginia Spiraea (*Spiraea virginiana*), and Rock Gnome Lichen (*Gymnoderma lineare*). There is two critical habitats in the area for the Appalachian Elktoe and the Indiana Bat.

The USFWS filed a "Biological Assessment for the Tapoco Settlement Agreement" with FERC (this Assessment is appended to the RSA). This Assessment concluded that none of the activities described in the RSA (e.g., Project operations, recreational enhancements etc.) are anticipated to have adverse effects on RTE species. In some cases, USFWS states the activities described in the RSA would have a beneficial effect.

2004 RSA and Biological Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

Article 407 of the FERC license required the Licensee to file an ESMP to protect and enhance the federally-listed threatened or endangered species and their critical habitat associated with the Smoky Project. On August 30, 2007, the Licensee filed an ESMP with FERC. On March 4, 2008, FERC issued an Order Modifying and Approving the ESMP, but required the Licensee to revise and refile the ESMP. On September 4, 2008, the Licensee refiled the revised ESMP, which was approved by FERC on April 14, 2009. The approved plan requires the licensee file annual reports summarizing activities concerning endangered species conducted during the previous year.

2008 FERC Order Approving and Modifying ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11601515

2008 Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11794571

2009 FERC Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11989083

On December 19, 2017, Brookfield filed a Revised ESMP pursuant to the 2008 Order requiring an update to the ESMP every five years. On April 30, 2018 FERC issued the Order Approving the Revised Species Management Plan.

2017 ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14780431

Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14902071

The USFWS has published formal recovery plans for all RTE species listed above except for the northern long-eared bat. Generally, the goal of the recovery plans is to restore viable populations of each species to a significant portion of its historic range and remove each species from the federal endangered species list. Additionally, the goal of the Smoky Project's ESMP is to restore viable populations of the species and its habitat to such a degree that the species no longer qualifies for protection under the Endangered Species Act.

During preparation of this application, Brookfield also consulted with North Carolina Department of Natural and Cultural Resources (NCDNCR) Natural Heritage Program for an updated list of threatened and endangered species that may occur in the vicinity of the Santeetlah Development. By letter dated February 27, 2020, the NCDNCR indicated that the Eastern Hellbender, Junaluska Salamander, Tellico Salamander, Bald Eagle, Golden Banded-Skipper, Mottlled Duskywing, Baltimore Checkerpot, Flag-tailed Spinyleg, Appalachian Elktoe, Slippershell Mussel, Wavyrayed ,Lampmussel, Smoky Dace, Wounded Darter, Open Supercoil, A Liverwort, Rafinesque's Big-eared Bat, Little Brown Bat, Northern Long-eared Bat, Indiana Bat, Tricolored Bat, Eastern Spotted Skunk, and Copper Moss may occur in the vicinity of Santeetalh Development.

The record of RTE consultation is included in Appendix D.

III.F.5 Threatened and Endangered Species: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions

		for protection of listed species in the area.

See response above for Zone 4.

Information Required to Support Cultural and Historic Resources Standards.

III.G.4 Cultural and Historic Resources: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

The historical resources for the Cheoah development include the Cheoah Dam, Penstock Building, Powerhouse, and ancillary buildings and structures. These structures were added to the NRHP on April 2, 2004. On August 25, 2004, FERC executed a PA for the Smoky Project. The PA, signed by FERC, the NCSHPO, TNSHPO, the USFS, and the Licensee, was subsequently sent to the Advisory Council on Historic Preservation on September 9, 2004.

The PA outlines stipulations that must be followed by the Licensee during the term of its license. The PA specifically discusses management of historic properties, interim treatment of historic properties, and the development and implementation of a HPMP. Brookfield continues to implement the provisions of the PA, in accordance with its terms.

As required by Article 409 of the FERC license and the PA, the Licensee filed the HPMP with FERC on February 28, 2006. The HPMP was developed in consultation with NCSHPO, TNSHPO, USFS, the Bureau of Indian Affairs, EBCI THPO, and GSMNP. On June 21, 2006, FERC issued an order approving the HPMP.

2004 Programmatic Agreement:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10240982

2006 HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965083

2006 Order Approving HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11070060

On April 1, 2016 (supplemented on August 12, 2016), Brookfield filed for Commission approval, a revised HPMP in accordance with the required ten year reevaluation and update. On October 7, 2016, FERC issued an order modifying and approving the HPMP. Brookfield is required to file an annual report of all activities associated with the implementation of the HPMP with FERC,

NCSHPO, TNSHPO, EBCI THPO, the Bureau of Indian Affairs, USFS, the GSMNP, and the UKB and the Cherokee Nation of Oklahoma. The most recent annual report was filed on January 31, 2020 for the 2019 reporting year. The facilities in the Smoky Project are in compliance with all requirements regarding cultural resource protection, mitigation, or enhancement included in the FERC license, PA, and HPMP.

2016 Order Modifying and Approving Revised HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14372663

2019 HPMP Annual Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15456636

III.G.5 Cultural and Historic Resources: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

See response above for Zone 4.

Information Required to Support Recreational Resources Standards.

III.H.4 Recreational Resources: Cheoah Development Zone 4

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

The Smoky Project developments are in compliance with recreational access, accommodation, and facilities' conditions in the FERC license. At the Cheoah development, recreational facilities include canoe take-outs with portage trails, an ADA fishing pier, boat ramp, and loading dock. The licensee provides undeveloped lake access on the north side of the Cheoah Reservoir. There are no formal FERC-approved facilities.

On January 25, 2005, FERC issued an order approving settlement and issuing a new license. The Licensee agreed, in the Relicensing Settlement Agreement (RSA), to add new public recreation facilities and upgrade existing facilities. As per Article 408 of the FERC license, the Licensee

submitted a Recreation Plan to FERC on February 28, 2006. The Recreation Plan was developed in consultation with NCWRC, North Carolina Department of Environment and Natural Resources (NCDENR), Tennessee Department of Environment and Conservation (TDEC), Tennessee Wildlife Resources Agency (TWRA), United States Fish and Wildlife Service (USFWS), National Park Service (NPS), and USFS as appropriate. FERC approved the Recreation Plan by order on August 9, 2006.

As per the RSA and Recreation Plan, the Licensee must consult with the USFS, NCWRC, and TWRA annually to prioritize recreational enhancements to be implemented for the following year based on funding availability and other relevant considerations. The most recent annual meeting occurred on July 24, 2019 and the most recent Annual Recreation Report was filed February 03, 2020 for the 2019 year. According to the 2019 Annual Recreation Report, all the scheduled recreational enhancements associated with Cheoah have been implemented.

2006 Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965081

2006 FERC Order Approving Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11107010

2019 Annual Recreation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15458959

III.H.5 Recreational Resources: Cheoah Development Zone 5

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

See response above for Zone 4.

CALDERWOOD DEVELOPMENT

Information Required to Support Ecological Flows Standards.

III.A.6 Ecological Flows: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 6 of the Smoky Project is the Calderwood impoundment. The Calderwood Development is operated as a daily cycle peaking facility with the upstream non-Project Fontana Project serving as the primary flow control facility. During periods of high releases from Fontana, the Calderwood Development operates 24 hours per day. As determined in the RSA, the maximum drawdown of the reservoir is 6 feet with no seasonal drawdown. According to the EA, the normal daily fluctuation is 1 to 2 feet and the development has a limited ability to store water. Calderwood Reservoir supports a cold-water fishery managed jointly by the NCWRC and the Tennessee Wildlife Resources Agency (TWRA). The NCWRC stocks the reservoir with catchable sized rainbow trout. Although it does not have a formal management plan, TWRA also manages Calderwood Reservoir as a stocked trout fishery and has continued regular stockings.

2004 RSA:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

The Calderwood Development is in compliance with resource agency conditions issued regarding operating conditions. The FERC license, RSA, and Section 401 WQC include the requirements

for fluctuations of the Calderwood impoundment recommended by state and federal environmental agencies.

Brookfield remains in compliance with the established flow conditions and impoundment levels and maintains records of these conditions at the Project. In the event of a deviation from maximum drawdown levels, Brookfield files documentation with FERC detailing the reasons.

III.A.7 Ecological Flows: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
A	2	Agency Recommendation (see Appendix A for definitions): • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to agency management goals and objectives for fish and wildlife. • Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations).

Zone 7 of the Smoky Project is the bypassed reach downstream of the Calderwood dam. The Smoky Project is in compliance with resource agency conditions issued regarding flow conditions. The RSA and FERC license require Brookfield to release a minimum bypass flow according to the repeated 10-year schedule provided in the RSA (an average range of 32.5 cfs to 41.5 cfs). According to the RSA, the minimum flow regime was implemented in order to reduce thermal impacts on stream biota.

The RSA requires Brookfield to record the flow data electronically using the control system at Calderwood Dam and make the flow data available on the internet: https://safewaters.com/facility/4.

2004 RSA:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

III.A.8 Ecological Flows: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the

Criterion	*Standard*	*Instructions*
		facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 8 of the Smoky Project is the tailrace area downstream of the Calderwood powerhouse and does not include a bypassed reach. The Smoky Project is in compliance with resource agency conditions issued regarding flow conditions. The FERC license, RSA, and 401 WQC do not require base flows from the Calderwood powerhouse. According to the EA, the maximum discharge from the Calderwood powerhouse is similar to the upstream non-Project (Fontana Project) and therefore the discharges were already compatible with the existing aquatic communities. Since the existing aquatic communities persisted during the prior license term, the base flows were understood to adequately support and maintain existing aquatic communities.

All of the license and settlement requirements pertaining to flow conditions and impoundment levels have been implemented at the Smoky Project. Brookfield remains in compliance with the established flow conditions and maintains records of these conditions at the Project. In the event of a deviation from established minimum flows or impoundment levels, Brookfield files documentation with FERC detailing the reasons for the deviation.

Information Required to Support Water Quality Standards.

III.B.6 Water Quality: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more

		than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

The Smoky Project is in compliance with all conditions issued pursuant to a Clean Water Act – Section 401 WQC. The Section 401 WQCs are conditioned on compliance with the terms of the RSA. The original 401 WQC for the development was issued by the Tennessee Department of Environment and Conservation on April 29, 2004. On November 8, 2004 the North Carolina Division of Water Quality (now known as NCDWR) issued their 401 WQC; however, this does not apply to the Calderwood development. On-going water quality monitoring at the Project is not required as part of the WQC or FERC license.

Generally, any changes to the original WQC are necessitated by significant changes in or to the Project environment affecting the Conditions of the original WQC, which culminates in an amendment of the original WQC. This situation has not occurred for the TNDEC Section 401 WQC, and the original WQC, issued on April 29, 2004 is still in effect. The TNDEC WQC is appended to the FERC License.

2005 FERC License and 2004 TN WQC:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10382034

Per review of the draft 2020 Section 303(d) list for Tennessee, the Little Tennessee River is listed as an impaired waterway A copy of the draft 2020 Section 303(d) list for Tennessee can be viewed at https://www.tn.gov/content/dam/tn/environment/water/water-public-notices/ppo_water_2019-11-15-dwr-2020-list-impaired-waters-draft.xlsx, on the Little Tennessee River tab.

To alleviate impacts of the diversion of water from the Little Tennessee River below Calderwood Dam, on March 1, 2005 APGI began releasing minimum instream flows in the Calderwood Bypass reach of the Little Tennessee River according to the repeating 10-year schedule. In its 401 WQC, the state of Tennessee certified that the operation of the Project, in conformance with approved plans and specifications, will not violate applicable water quality standards.

The waters of the Calderwood reservoir are designated as Class C. Waters of this class are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner. The Tennessee portion of the Calderwood reservoir is classified for domestic water supply, industrial

water supply, fish and aquatic life, recreation, irrigation, livestock watering, wildlife, and trout stream.

III.B.7 Water Quality: Calderwood Edwards Development Zone 7

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

See response above for Zone 6.

III.B.8 Water Quality: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

See response above for Zone 6.

Information Required to Support Upstream Fish Passage Standards.

III.C.6 Upstream Fish Passage: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

There are no upstream fish passage barriers or migratory fish management issues in Zone 6 because it is an impoundment. In 2003, studies conducted during the last relicensing (submitted in the Final License Application) indicated that there are no known migrating fish in the Calderwood Reservoir.

The Calderwood Reservoir is currently managed jointly by the NCWRC and the TWRA as a put-grow-and-take stocked trout fishery, with brook trout, rainbow trout, and brown trout stocked in the reservoir on a regular basis. Most of the trout stocked by NCWRC have been fingerlings (2 to 4 inches long). However recently, NCWRC has been stocking only rainbow trout fingerlings every other year, and ceased stocking brown and brook trout in the reservoir in 1994. TWRA, also, has made regular stockings of catchable-sized (9 to 10 inches) rainbow trout over the past ten years.

Fish sampling in 2000 and 2001 of the Calderwood Reservoir produced many species of fish, including white sucker, rock bass, warpaint shiner, mottled sculpin, river chub, northern hogsucker, redbreast sunfish, largemouth bass, central stoneroller, whitetail shiner, spotfin shiner, northern striped shiner, warpaint shiner, yellow bullhead, Tennessee snubnose darter, and rainbow trout. According to the EA, the historic and current fish assemblage in the Calderwood bypassed reach consisted primarily of species that inhabit medium-to-large warmwater or coolwater streams. There is no indication of migratory fish in vicinity of the Calderwood development. In 2003, the Licensee supported NCWRC and TWRA's trout stocking effort by constructing a fish delivery chute upstream of the Calderwood Dam to facilitate trout stocking into the Calderwood Reservoir.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor Interior prescribed fish passage facilities at the Calderwood development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license.

2003 Final License Application:

https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10558838

2003 Department of Interior Section 18 Prescriptions:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.C.7 Upstream Fish Passage: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

See response above for Zone 6.

III.C.8 Upstream Fish Passage: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

See response above for Zone 6.

Information Required to Support Downstream Fish Passage Standards.

III.D.6 Downstream Fish Passage: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream

		fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

Zone 6 of the Smoky Project is the Calderwood impoundment. In 2003, studies conducted during the last relicensing (submitted in the Final License Application) indicated that there are no known migrating fish in the Calderwood Reservoir.

The Calderwood Reservoir is currently managed jointly by the NCWRC and the TWRA as a put-grow-and-take stocked trout fishery, with brook trout, rainbow trout, and brown trout stocked in the reservoir on a regular basis. Most of the trout stocked by NCWRC have been fingerlings (2 to 4 inches long). However recently, NCWRC has been stocking only rainbow trout fingerlings every other year, and ceased stocking brown and brook trout in the reservoir in 1994. TWRA, also, has made regular stockings of catchable-sized (9 to 10 inches) rainbow trout over the past ten years.

In 2003, the Licensee supported NCWRC and TWRA's trout stocking effort by constructing a fish delivery chute upstream of the Calderwood Dam to facilitate trout stocking into the Calderwood Reservoir.

Fish sampling in 2000 and 2001 of the Calderwood Reservoir produced many species of fish, including white sucker, rock bass, warpaint shiner, mottled sculpin, river chub, northern hogsucker, redbreast sunfish, largemouth bass, central stoneroller, whitetail shiner, spotfin shiner, northern striped shiner, warpaint shiner, yellow bullhead, Tennessee snubnose darter, and rainbow trout. According to the EA, the historic and current fish assemblage in the Calderwood bypassed reach consisted primarily of species that inhabit medium-to-large warmwater or coolwater streams. There is no indication of migratory fish in vicinity of the Calderwood development.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor Interior prescribed fish passage facilities at the Calderwood development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license.

2003 Final License Application:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10558838

2003 Department of Interior Section 18 Prescriptions:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=9781039

2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.D.7 Downstream Fish Passage: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor Interior prescribed fish passage facilities at the Calderwood development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license. Fish sampling in 2000 and 2001 of the Calderwood Reservoir produced many species of fish, including white sucker, rock bass, warpaint shiner, mottled sculpin, river chub, northern hogsucker, redbreast sunfish, largemouth bass, central stoneroller, whitetail shiner, spotfin shiner, northern striped shiner, warpaint shiner, yellow bullhead, Tennessee snubnose darter, and rainbow trout. According to the EA, the historic and current fish assemblage in the Calderwood bypassed reach consisted primarily of species that inhabit medium-to-large warmwater or coolwater streams. There is no indication of migratory fish in vicinity of the Calderwood development.

2003 Final License Application:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10558838

2003 Department of Interior Section 18 Prescriptions:
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2004 Environmental Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10242127

III.D.8 Downstream Fish Passage: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

There are no downstream fish passage barriers or migratory fish management issues in Zone 8 because it is the tailwater/downstream zone. During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor the Interior prescribed anadromous or catadromous fish passage facilities at the Calderwood development. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future. Fish sampling in 2000 and 2001 of the Calderwood Reservoir produced many species of fish, including white sucker, rock bass, warpaint shiner, mottled sculpin, river chub, northern hogsucker, redbreast sunfish, largemouth bass, central stoneroller, whitetail shiner, spotfin shiner, northern striped shiner, warpaint shiner, yellow bullhead, Tennessee snubnose darter, and rainbow trout. According to the EA, the historic and current fish assemblage in the Calderwood bypassed reach consisted primarily of species that inhabit medium-to-large warmwater or coolwater streams. There is no indication of migratory fish in vicinity of the Calderwood development.

Information Required to Support Shoreline and Watershed Protection Standards.

III.E.6 Shoreline and Watershed Protection: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project. •
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

The RSA included many commitments aimed at protecting the resources of the Little Tennessee River Basin including land protection, watershed protection trust funds, and a shoreline management plan.

In the RSA, the Licensee established the North Carolina Resource Management and Enhancement Fund (North Carolina Fund) to be used by the NCWRC, NCDNCR, USFS, UKB, and USFWS. The Tallassee Fund is to be used by the USFS, USFWS, GSMNP, TDEC, TWRA, EBCI, the Nature Conservancy of Tennessee the National Parks Conservation Association, the Tennessee Clean Water Network, and American Rivers for natural resource stewardship and Project mitigation activities.

The North Carolina Fund must be used within the scope of subject matter of the Fish and Wildlife Coordination Act, the Endangered Species Act, and Section 10 of the Federal Power Act including but not limited to 1) monitoring of biotic and abiotic parameters, 2) for other natural resource stewardship activities, including, but not limited to, a) threatened and endangered species recovery efforts, b) control of exotic species and environmental outreach and c) education directly related to those Cheoah River and Little Tennessee River basin resources affected by ongoing Project operations, in particular the portion of the Calderwood Development in North Carolina. The Licensee deposited an initial payment of $100,000, and $25,000 each year after.

The Licensee also established the Tallassee Fund, which is used for 1) threatened and endangered species recovery efforts, 2) ecosystem enhancements and restoration, 3) management and control of exotic species, and 4) environmental outreach and education directly related to the Smoky

Project, as well as other non-Project lands in Tennessee currently owned by the Licensee to mitigate the continuing environmental impacts associated with the Project's operations. The Licensee deposited an initial payment of $100,000, and an additional $100,000 each year after.

Brookfield submits an annual License Compliance Fund Board Implementation Report. The most recent annual fund report was filed with FERC on June 11, 2019, for the 2018 fund implementation year.

2018 License Compliance Fund Board Implementation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15267908

Additionally, in the RSA, the Licensee agreed to grant The Nature Conservancy options to acquire title to a significant portion of this non-Project acreage for reconveyance to a federal or state agency. The primary purpose of these conservation easements is to retain land and water areas predominantly in their natural, scenic, open or wooded condition or as suitable habitat for fish, plants or wildlife and preserve the historical, architectural, archaeological, or cultural aspects of the properties. The total number of acres to be protected through the conservation easements is approximately 11,000 acres. About 800 acres of the total are riparian (Project and non-Project) areas along the Project reservoirs, including along the Calderwood reservoir.

The SMP was prepared in consultation with The Licensee filed a SMP for the Project with FERC on October 1, 2004, which was approved by FERC on March 31, 2006. The SMP was prepared in consultation with NCDENR, NCWRC, NCSHPO, USFS, USFWS, BIA, GSMNP, EBCI, (CCPOA, Friends of Lake Santeetlah, Town of Lake Santeetlah, Town of Robbinsville, Graham County, Sierra Club, American Rivers, Tennessee Clean Water Network, The Nature Conservancy, TDEC, TWRC, TNSHPO.

In a letter dated June 9, 2005, the Office of the Secretary for the U.S. Department of Interior stated "We are pleased with the balance of shoreline uses afforded by the SMP and its shoreline classification and are encouraged that the primarily undeveloped characteristics of the Project developments will be retained for the benefit of fish and wildlife and their habitats as well as fish-and-wildlife-based recreation for the American public…and believe that the SMP adequately protects, enhances, and mitigates the ongoing and future impacts of the Project."

June 2005 Department of Interior Support Letter:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10605715

In accordance with Article 410 of the Project License, on April 1, 2016, Brookfield filed the required ten-year update to the SMP. The updates did not affect the Calderwood development. FERC approved the updated SMP on July 6, 2017, and considered the updates minor.

Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14187014

FERC Order Approving Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14630216

III.E.7 Shoreline and Watershed Protection: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project. •
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

See response above for Zone 6.

III.E.8 Shoreline and Watershed Protection: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • The facility is in compliance with all government agency recommendations in a license or certificate, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the project. •
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

See response above for Zone 6.

Information Required to Support Threatened and Endangered Species Standards.

III.F.6 Threatened and Endangered Species: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

Based on information received from the USFWS's North Carolina Field Office and the Tennessee Field Office on February 12, 2020, regarding a request for information on rare, threatened or endangered (RTE) species, it appears that there are seventeen RTE species that have been known to be located at or near the Calderwood development. These species are the Carolina Northern Flying Squirrel (*Glaucomys sabrinus coloratus*), Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), Northern Long-eared Bat (*Myotis septentrionalis*), Bog Turtle (*Clemmys muhlenbergii*), Duskytail Darter (*Etheostoma percnurum*), Spotfin Chub (*Erimonax monachus*), Cumberland Bean (pearlymussel) (*Villosa trabalis*), Anthony's Riversnail (*Athearnia anthonyi*), Appalachian Elktoe (*Alasmidonta raveneliana*), Littlewing Pearlymussel (*Pegias fabula*), Noonday Snail (*Mesodon clarki Nantahala*), Spreading Avens (*Geum radiatum*), Virginia Spiraea (*Spiraea virginiana*), Spruce-fir Moss Spider (*Microhexura montivaga*), Rock Gnome Lichen (*Gymnoderma lineare*), and White Fringeless Orchid (*Platanthera integrilabia*). There are two critical habitats in the area for the Indiana Bat and Appalachian Elktoe.

The USFWS filed a "Biological Assessment for the Tapoco Settlement Agreement" with FERC (this Assessment is appended to the RSA). This Assessment concluded that none of the activities described in the RSA (e.g., Project operations, recreational enhancements etc.) are anticipated to have adverse effects on RTE species. In some cases, USFWS states the activities described in the RSA would have a beneficial effect.

2004 RSA and Biological Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

Article 407 of the FERC license required the Licensee to file an ESMP to protect and enhance the federally-listed threatened or endangered species and their critical habitat associated with the Smoky Project. On August 30, 2007, the Licensee filed an ESMP with FERC. On March 4, 2008, FERC issued an Order Modifying and Approving the ESMP, but required the Licensee to revise and refile the ESMP. On September 4, 2008, the Licensee refiled the revised ESMP, which was approved by FERC on April 14, 2009. The approved plan requires the licensee file annual reports summarizing activities concerning endangered species conducted during the previous year.

2008 FERC Order Approving and Modifying ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11601515

2008 Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11794571

2009 FERC Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11989083

On December 19, 2017, Brookfield filed a Revised ESMP pursuant to the 2008 Order requiring an update to the ESMP every five years. On April 30, 2018 FERC issued the Order Approving the Revised Species Management Plan.

2017 ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14780431

Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14902071

The USFWS has published formal recovery plans for all RTE species listed above except for the northern long-eared bat. Generally, the goal of the recovery plans is to restore viable populations of each species to a significant portion of its historic range and remove each species from the federal endangered species list. Additionally, the goal of the Smoky Project's ESMP is to restore viable populations of the species and its habitat to such a degree that the species no longer qualifies for protection under the Endangered Species Act.

The record of RTE consultation is included in Appendix D.

III.F.7 Threatened and Endangered Species: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

See response above for Zone 6.

III.F.8 Threatened and Endangered Species: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action:

		• If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

See response above for Zone 6.

Information Required to Support Cultural and Historic Resources Standards.

III.G.6 Cultural and Historic Resources: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

The historical resources for the Calderwood development include the Calderwood Dam, Penstock, Tunnel, Powerhouse, Calderwood Service Building, School, Theater, and ancillary buildings and structures. These structures were added to the NRHP on August 21, 1989 and July 3, 1990.

On August 25, 2004, FERC executed a PA for the Smoky Project. The PA, signed by FERC, the NCSHPO, TNSHPO, the USFS, and the Licensee, was subsequently sent to the Advisory Council on Historic Preservation on September 9, 2004.

The PA outlines stipulations that must be followed by the Licensee during the term of its license. The PA specifically discusses management of historic properties, interim treatment of historic properties, and the development and implementation of a HPMP. Brookfield continues to implement the provisions of the Programmatic Agreement for the Project, in accordance with its terms.

As required by Article 409 of the FERC license and the PA, the Licensee filed the HPMP with FERC on February 28, 2006. The HPMP was developed in consultation with NCSHPO, TNSHPO, USFS, the Bureau of Indian Affairs, EBCI THPO, and GSMNP. On June 21, 2006, FERC issued an order approving the HPMP.

2004 Programmatic Agreement:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10240982

2006 HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965083

2006 Order Approving HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11070060

On April 1, 2016 (supplemented on August 12, 2016), Brookfield filed for Commission approval, a revised HPMP in accordance with the required ten year reevaluation and update. On October 7, 2016, FERC issued an order modifying and approving the HPMP. Brookfield is required to file an annual report of all activities associated with the implementation of the HPMP with FERC, NCSHPO, TNSHPO, EBCI THPO, the Bureau of Indian Affairs, USFS, the GSMNP, and the UKB and the Cherokee Nation of Oklahoma. The most recent annual report was filed on January 31, 2020 for the 2019 reporting year. The facilities in the Smoky Project are in compliance with all requirements regarding cultural resource protection, mitigation, or enhancement included in the FERC license, PA, and HPMP.

2016 Order Modifying and Approving Revised HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14372663

2019 HPMP Annual Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15456636

III.G.7 Cultural and Historic Resources: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

See response above for Zone 6.

III.G.8 Cultural and Historic Resources: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

See response above for Zone 6.

Information Required to Support Recreational Resources Standards.

III.H.6 Recreational Resources: Calderwood Development Zone 6

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

The Smoky Project developments are in compliance with recreational access, accommodation, and facilities' conditions in the FERC license. At the Calderwood development include campsites and a canoe put-in and take-out. There are no FERC-approved facilities.

On January 25, 2005, FERC issued an order approving settlement and issuing a new license. The Licensee agreed, in the Relicensing Settlement Agreement (RSA), to add new public recreation facilities and upgrade existing facilities. As per Article 408 of the FERC license, the Licensee submitted a Recreation Plan to FERC on February 28, 2006. The Recreation Plan was developed in consultation with NCWRC, North Carolina Department of Environment and Natural Resources (NCDENR), Tennessee Department of Environment and Conservation (TDEC), Tennessee Wildlife Resources Agency (TWRA), United States Fish and Wildlife Service (USFWS), National Park Service (NPS), and USFS as appropriate. FERC approved the Recreation Plan by order on August 9, 2006.

As per the RSA and Recreation Plan, the Licensee must consult with the USFS, NCWRC, and TWRA annually to prioritize recreational enhancements to be implemented for the following year based on funding availability and other relevant considerations. The most recent annual meeting occurred on July 24, 2019 and the most recent Annual Recreation Report was filed February 03, 2020 for the 2019 year. According to the 2019 Annual Report, all the scheduled recreational enhancements associated with Calderwood have been implemented.

2006 Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965081

2006 FERC Order Approving Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11107010

2019 Annual Recreation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15458959

III.H.7 Recreational Resources: Calderwood Development Zone 7

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

See response above for Zone 6.

III.H.8 Recreational Resources: Calderwood Development Zone 8

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

See response above for Zone 6.

CHILHOWEE DEVELOPMENT

Information Required to Support Ecological Flows Standards.

III.A.9 Ecological Flows: Chilhowee Development Zone 9

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 9 of the Smoky Project is the Chilhowee impoundment. In accordance with the RSA, the Licensee operates Chilhowee Reservoir with no seasonal drawdown and maximum drawdowns of 5 feet from normal full pool elevation of 874.0 feet USGS datum. The Chilhowee Reservoir is operated with daily pondage, a normal fluctuation range of 1 to 2 feet with a minimum outflow. There is no seasonal drawdown of the Chilhowee Reservoir due to its limited usable storage.

2004 RSA:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

The Chilhowee reservoir extends upstream to the Calderwood Powerhouse and represents a thermal transition area in the Little Tennessee River Basin. Cold-water releases from Fontana Dam are transported through Cheoah and Calderwood Reservoirs and cool the upper portion of Chilhowee Reservoir. The upper portion of the reservoir supports a cold- to cool-water fishery. Since the reservoir is relatively shallow, reservoir waters warm as they move down the reservoir. Therefore, the lower portion supports more of a cool-water fishery. Chilhowee Reservoir is actively managed by TWRA. Although there is no formal management plan for the reservoir, TWRA intends to continue to manage the upper portion of Chilhowee Reservoir as a stocked trout fishery annually stocking rainbow trout.

Brookfield remains in compliance with the established flow conditions and impoundment levels and maintains records of these conditions at the Project. In the event of a deviation from established minimum flows or impoundment levels, Brookfield files documentation with FERC detailing the reasons for the deviation.

III.A.10 Ecological Flows: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

Zone 10 of the Smoky Project is the bypassed reach downstream of the Chilhowee dam. The Smoky River Project is in compliance with resource agency conditions issued regarding flow conditions. At the request of the downstream facility owner, the Chilhowee Development is operated from May 1 to October 31 with a minimum daily average outflow of 1,000 cubic feet per second (cfs) into the Chilhowee tailrace. This minimum flow was not a requirement in the RSA, FERC License, or WQC, and was implemented for operation of the downstream hydropower facility. For the remainder of the year, no minimum flow is required downstream of Chilhowee.

Information Required to Support Water Quality Standards.

III.B.9 Water Quality: Chilhowee Development Zone 9

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation.

		• Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

The Smoky Project is in compliance with all conditions issued pursuant to a Clean Water Act – Section 401 WQC. The Section 401 WQCs are conditioned on compliance with the terms of the RSA. The original 401 WQC for the development was issued by the Tennessee Department of Environment and Conservation on April 29, 2004. On November 8, 2004 the North Carolina Division of Water Quality (now known as NCDWR) issued their 401 WQC; however, this does not apply to the Chilhowee Development. On-going water quality monitoring at the Project is not required as part of the WQC or FERC license.

Generally, any changes to the original WQC are necessitated by significant changes in or to the Project environment affecting the Conditions of the original WQC, which culminates in an amendment of the original WQC. This situation has not occurred for the TNDEC Section 401 WQC, and the original WQC, issued on April 29, 2004 is still in effect. The TNDEC WQC is appended to the FERC License.

2005 FERC License and 2004 TN WQC:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10382034

Per review of the draft 2020 Section 303(d) list for Tennessee, the Little Tennessee River is listed as an impaired waterway. A copy of the draft 2020 Section 303(d) list for Tennessee can be viewed at https://www.tn.gov/content/dam/tn/environment/water/water-public-notices/ppo_water_2019-11-15-dwr-2020-list-impaired-waters-draft.xlsx.

In its 401 WQC, the state of Tennessee certified that the operation of the Project, in conformance with approved plans and specifications, will not violate applicable water quality standards. The Chilhowee reservoir is classified for fish and aquatic life, recreation, irrigation, livestock watering and wildlife.

III.B.10 Water Quality: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the

		page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

See response above for Zone 9.

Information Required to Support Upstream Fish Passage Standards.

III.C.9 Upstream Fish Passage: Chilhowee Development Zone 9

Criterion	***Standard***	***Instructions***
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

Zone 9 of the Smoky Project does not represent a barrier to upstream passage because it is an impoundment. The Chilhowee Reservoir extends upstream to the Calderwood Powerhouse and represents a thermal transition area in the Little Tennessee River Basin. Cold-water releases from Fontana Dam are transported through Cheoah and Calderwood Reservoirs and cool the upper portion of Chilhowee Reservoir. Therefore, the upper portion of the reservoir supports a cold- to cool-water fishery. Since the reservoir is relatively shallow, reservoir waters warm as they move down the reservoir. Therefore, the lower portion supports more of a cool-water fishery. Chilhowee Reservoir is actively managed by TWRA. Although there is no formal management plan for the reservoir, TWRA intends to continue to manage the upper portion of Chilhowee Reservoir as a stocked trout fishery by annually stocking rainbow trout.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor Interior prescribed fish passage facilities at the Chilhowee Reservoir. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in

the future, which is provided in the FERC license.

III.C.10 Upstream Fish Passage: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
C	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.

Under the RSA, the Licensee agreed with the USFWS Section 18 Prescription to reintroduce native fish species to waters above the Chilhowee Dam. Interior also requested reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license.

In accordance with Article 401, and developed in consultation with USFWS, the Licensee filed a Fish Passage Translocation Plan (Translocation Plan) on August 31, 2005. By order dated August 22, 2006, FERC modified and approved the Translocation Plan, which requires the Licensee to provide the USFWS annual funding for the trapping and relocation of certain numbers of target fish species (spotfin chub, yellowfin madtom, smoky madtom, and duskytail darter). The Translocation Plan requires the Licensee to meet annually each winter with the USFWS to discuss the specific numbers of each fish species to be passed, the timing and method of translocation, and the disbursement of funds. The Licensee must file an annual report on the Translocation Plan; the most recent annual report was filed on January 17, 2020 for the 2018 implementation year.

2005 Translocation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10888555

2006 FERC Order Approving and Modifying Translocation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11116997

2018 Annual Translocation Plan Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15445189

Article 403 of the FERC License required the Licensee to file a Chilhowee Development Tailwater Fish Monitoring Plan (Tailwater Fish Plan) to evaluate the presence and status of important potamodromous and diadromous fishes (specifically lake sturgeon, black buffalo, smallmouth buffalo, river redhorse, seuger, and American eels) in the vicinity of the lower end of the

Chilhowee Dam tailwaters and the upper end of the downstream non-Project Tellico Reservoir. On August 31, 2005 the Licensee filed the Tailwater Fish Plan, which was accepted by FERC on July 20, 2006.

2005 Tailwater Fish Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10888555

2006 Order Approving Tailwater Fish Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11089415

According to the approved Tailwater Fish Plan, the Licensee must file monitoring reports following fisheries sampling activities in 2009, 2014, and 2024 at the Chilhowee tailwaters to evaluate the presence and status of important migrating fish. The most recent report for the 2014 sampling year was filed by the Licensee on June 2, 2015, and acknowledged by FERC on September 8, 2015. The 2014 monitoring report states that of the important potamodromous and diadromous fishes specified by Article 403, black buffalo, river redhorse, sauger, and smallmouth buffalo were found in the tailwaters of Chilhowee.

2015 Tailwater Fish Monitoring Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=13894103

2015 FERC Acknowledgement of Tailwater Fish Monitoring Report
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=13980751

Information Required to Support Downstream Fish Passage Standards.

III.D.9 Downstream Fish Passage: Chilhowee Development Zone 9

Criterion	*Standard*	*Instructions*
D	1	**Not Applicable / De Minimis Effect:** • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

The Chilhowee Reservoir extends upstream to the Calderwood Powerhouse and represents a thermal transition area in the Little Tennessee River Basin. Cold-water releases from Fontana Dam are transported through Cheoah and Calderwood Reservoirs and cool the upper portion of Chilhowee Reservoir. Therefore, the upper portion of the reservoir supports a cold- to cool-water fishery. Since the reservoir is relatively shallow, reservoir waters warm as they move down the reservoir. Therefore, the lower portion supports more of a cool-water fishery. Chilhowee Reservoir is actively managed by TWRA. Although there is no formal management plan for the reservoir, TWRA intends to continue to manage the upper portion of Chilhowee Reservoir as a stocked trout fishery by annually stocking rainbow trout.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor Interior prescribed downstream fish passage facilities at the Chilhowee Reservoir. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future, which is provided in the FERC license.

III.D.10 Downstream Fish Passage: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
D	1	**Not Applicable / De Minimis Effect:** • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

Zone 10 of the Smoky Project is the portion of the Cheoah River downstream of the Chilhowee dam. The Smoky River Project is in compliance with resource agency conditions issued regarding flow conditions. At the request of the downstream facility owner, the Chilhowee Development is operated from May 1 to October 31 with a minimum daily average outflow of 1,000 cubic feet per second (cfs) into the Chilhowee tailrace. For the remainder of the year, no minimum flow is required downstream of Chilhowee.

In 1974, nineteen fish species were collected during this study and the top eight species included sculpins (mottled and banded), bluegill, northern hog sucker, brown trout, rainbow trout, brook silversides, chestnut lamprey, and river chub. The fish species assemblage is similar to that reported for the Cheoah and Calderwood tailwaters and is dominated by coldwater species.

During the relicensing proceeding for the Smoky Project, neither the Department of Commerce nor Interior prescribed anadromous or catadromous fish passage facilities for this zone. Interior did, however, request reservation of its authority to prescribe upstream and downstream fish passage devices in the future.

Information Required to Support Shoreline and Watershed Protection Standards.

III.E.9 Shoreline and Watershed Protection: Chilhowee Development Zone 9

Criterion	***Standard***	***Instructions***
E	2	Agency Recommendation: • Provide copies or links to any agency recommendations or management plans that are in effect related to protection, mitigation, or enhancement of shoreline surrounding the facility (e.g., Shoreline Management Plans). • Provide documentation that indicates the facility is in full compliance with any agency recommendations or management plans that are in effect.
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

The RSA included many commitments aimed at protecting the resources of the Little Tennessee River Basin including land protection, watershed protection trust funds, and a shoreline management plan.

In the RSA, the Licensee established the North Carolina Resource Management and Enhancement Fund (North Carolina Fund) to be used by the NCWRC, NCDNCR, USFS, UKB, and USFWS. The Tallassee Fund is to be used by the USFS, USFWS, GSMNP, TDEC, TWRA, EBCI, the Nature Conservancy of Tennessee the National Parks Conservation Association, the Tennessee Clean Water Network, and American Rivers for natural resource stewardship and Project mitigation activities.

The North Carolina Fund must be used within the scope of subject matter of the Fish and Wildlife Coordination Act, the Endangered Species Act, and Section 10 of the Federal Power Act including but not limited to 1) monitoring of biotic and abiotic parameters, 2) for other natural resource stewardship activities, including, but not limited to, a) threatened and endangered species recovery efforts, b) control of exotic species and environmental outreach and c) education directly related to those Cheoah River and Little Tennessee River basin resources affected by ongoing Project operations, in particular the portion of the Calderwood Development in North Carolina. The Licensee deposited an initial payment of $100,000, and $25,000 each year after.

The Licensee also established the Tallassee Fund, which is used for 1) threatened and endangered species recovery efforts, 2) ecosystem enhancements and restoration, 3) management and control of exotic species, and 4) environmental outreach and education directly related to the Smoky Project, as well as other non-Project lands in Tennessee currently owned by the Licensee to mitigate the continuing environmental impacts associated with the Project's operations. The Licensee deposited an initial payment of $100,000, and an additional $100,000 each year after.

Brookfield submits an annual License Compliance Fund Board Implementation Report. The most recent annual fund report was filed with FERC on June 11, 2019, for the 2018 fund implementation year.

2018 License Compliance Fund Board Implementation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15267908

Additionally, in the RSA, the Licensee agreed to grant The Nature Conservancy options to acquire title to a significant portion of this non-Project acreage for reconveyance to a federal or state agency. The primary purpose of these conservation easements is to retain land and water areas predominantly in their natural, scenic, open or wooded condition or as suitable habitat for fish, plants or wildlife and preserve the historical, architectural, archaeological, or cultural aspects of the properties. The total number of acres to be protected through the conservation easements is approximately 11,000 acres. About 800 acres of the total are riparian (Project and non-Project) areas along the Project reservoirs, including along the Chilhowee reservoir.

The SMP was prepared in consultation with The Licensee filed a SMP for the Project with FERC on October 1, 2004, which was approved by FERC on March 31, 2006. The SMP was prepared in consultation with NCDENR, NCWRC, NCSHPO, USFS, USFWS, BIA, GSMNP, EBCI, (CCPOA, Friends of Lake Santeetlah, Town of Lake Santeetlah, Town of Robbinsville, Graham County, Sierra Club, American Rivers, Tennessee Clean Water Network, The Nature Conservancy, TDEC, TWRC, TNSHPO.

In a letter dated June 9, 2005, the Office of the Secretary for the U.S. Department of Interior stated "We are pleased with the balance of shoreline uses afforded by the SMP and its shoreline classification and are encouraged that the primarily undeveloped characteristics of the Project developments will be retained for the benefit of fish and wildlife and their habitats as well as fish-

and-wildlife-based recreation for the American public…and believe that the SMP adequately protects, enhances, and mitigates the ongoing and future impacts of the Project."

June 2005 Department of Interior Support Letter:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10605715

In accordance with Article 410 of the Project License, on April 1, 2016, Brookfield filed the required ten-year update to the SMP. The updates did not affect the Calderwood development. FERC approved the updated SMP on July 6, 2017, and considered the updates minor.

Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14187014

FERC Order Approving Updated SMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14630216

III.E.10 Shoreline and Watershed Protection: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
E	2	Agency Recommendation: • Provide copies or links to any agency recommendations or management plans that are in effect related to protection, mitigation, or enhancement of shoreline surrounding the facility (e.g., Shoreline Management Plans). • Provide documentation that indicates the facility is in full compliance with any agency recommendations or management plans that are in effect.
E	PLUS	Bonus Activities: • Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors • In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.

See response above for Zone 9.

Information Required to Support Threatened and Endangered Species Standards.

III.F.9 Threatened and Endangered Species: Chilhowee Development Zone 9

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in

		compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents.\ • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

Based on information received from the USFWS's North Carolina Field Office and the Tennessee Field Office on February 12, 2020, regarding a request for information on rare, threatened or endangered (RTE) species, it appears that there are seventeen RTE species that have been known to be located at or near the Chilhowee Development. These species are the Carolina Northern Flying Squirrel (*Glaucomys sabrinus coloratus*), Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), Northern Long-eared Bat (*Myotis septentrionalis*), Duskytail Darter (*Etheostoma percnurum*), Spotfin Chub (*Erimonax monachus*), Cumberland Bean (pearlymussel) (*Villosa trabalis*), Anthony's Riversnail (*Athearnia anthonyi*), Spreading Avens (*Geum radiatum*), Virginia Spiraea (*Spiraea virginiana*), and White Fringeless Orchid (*Platanthera integrilabia*). There is one critical habitats in the area for the Indiana Bat.

The USFWS filed a "Biological Assessment for the Tapoco Settlement Agreement" with FERC (this Assessment is appended to the RSA). This Assessment concluded that none of the activities described in the RSA (e.g., Project operations, recreational enhancements etc.) are anticipated to have adverse effects on the RTE species included in the Biological Opinion. In some cases, USFWS states in the Biological Assessment that the activities described in the RSA would have a beneficial effect.

2004 RSA and Biological Assessment:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10149198

Article 407 of the FERC license required the Licensee to file an Endangered Species Management Plan (ESMP) to protect and enhance the federally-listed threatened or endangered species and their critical habitat associated with the Smoky Project. On August 30, 2007, the Licensee filed an ESMP with FERC. On March 4, 2008, FERC issued an Order Modifying and Approving the ESMP, but required the Licensee to revise and refile the ESMP. On September 4, 2008, the Licensee refiled the revised ESMP, which was approved by FERC on April 14, 2009. The approved plan requires the licensee file annual reports summarizing activities concerning endangered species conducted during the previous year.

2008 FERC Order Approving and Modifying ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11601515

2008 Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11794571

2009 FERC Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11989083

On December 19, 2017, Brookfield filed a Revised ESMP pursuant to the 2008 FERC Order requiring an update to the ESMP every five years. The Revised ESMP was developed in consultation with the USFWS, USFS, GSMNP, NCDEQ, NCWRC, and TNDEC. On April 30, 2018 FERC issued the Order Approving the Revised Species Management Plan. The approved plan requires the licensee file annual reports summarizing activities concerning endangered species conducted during the previous year. The most recent report was filed on March 29, 2019 for the 2018 implementation year.

2017 ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14780431

2018 Order Approving Revised ESMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14902071

2019 Annual ESMP Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15200639

The USFWS has published formal recovery plans for all RTE species listed above except for the northern long-eared bat. Generally, the goal of the recovery plans is to restore viable populations of each species to a significant portion of its historic range and remove each species from the federal endangered species list. Additionally, the goal of the Smoky Project's ESMP is incorporate the recovery plans for RTE species to restore viable populations of the species and its habitat to such a degree that the species no longer qualifies for protection under the Endangered Species Act.

The record of RTE consultation is included in Appendix D.

III.F.10 Threatened and Endangered Species: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
F	3	Recovery Plan and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents.\ • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

See response above for Zone 9.

Information Required to Support Cultural and Historic Resources Standards.

III.G.9 Cultural and Historic Resources: Chilhowee Development Zone 9

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

The historical resources for the Chilhowee Development include the Chilhowee dam and powerhouse. These structures were added to the NRHP on May 7, 2004.

On August 25, 2004, FERC executed a PA for the Smoky Project. The PA, signed by FERC, the NCSHPO, TNSHPO, the USFS, and the Licensee, was subsequently sent to the Advisory Council on Historic Preservation on September 9, 2004.

The PA outlines stipulations that must be followed by the Licensee during the term of its license. The PA specifically discusses management of historic properties, interim treatment of historic properties, and the development and implementation of a HPMP. Brookfield continues to implement the provisions of the Programmatic Agreement for the Project, in accordance with its terms.

As required by Article 409 of the FERC license and the PA, the Licensee filed the HPMP with FERC on February 28, 2006. The HPMP was developed in consultation with NCSHPO, TNSHPO, USFS, the Bureau of Indian Affairs, EBCI THPO, and GSMNP. On June 21, 2006, FERC issued an order approving the HPMP.

2004 Programmatic Agreement:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10240982

2006 HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965083

2006 Order Approving HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11070060

On April 1, 2016 (supplemented on August 12, 2016), Brookfield filed for Commission approval, a revised HPMP in accordance with the required ten year reevaluation and update. On October 7, 2016, FERC issued an order modifying and approving the HPMP. Brookfield is required to file an annual report of all activities associated with the implementation of the HPMP with FERC, NCSHPO, TNSHPO, EBCI THPO, the Bureau of Indian Affairs, USFS, the GSMNP, and the UKB and the Cherokee Nation of Oklahoma. The most recent annual report was filed on January

31, 2020 for the 2019 reporting year. The facilities in the Smoky Project are in compliance with all requirements regarding cultural resource protection, mitigation, or enhancement included in the FERC license, PA, and HPMP.

2016 Order Modifying and Approving Revised HPMP:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14372663

2019 HPMP Annual Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15456636

III.G.10 Cultural and Historic Resources: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

See response above for Zone 9.

Information Required to Support Recreational Resources Standards.

III.H.9 Recreational Resources: Chilhowee Development Zone 9

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

The Smoky Project developments are in compliance with recreational access, accommodation, and facilities' conditions in the FERC license. At the Chilhowee Development, recreational facilities include canoe portage and fishing piers. There are no FERC-approved facilities.

On January 25, 2005, FERC issued an order approving settlement and issuing a new license. The Licensee agreed, in the Relicensing Settlement Agreement (RSA), to add new public recreation facilities and upgrade existing facilities. As per Article 408 of the FERC license, the Licensee submitted a Recreation Plan to FERC on February 28, 2006. The Recreation Plan was developed in consultation with NCWRC, North Carolina Department of Environment and Natural Resources (NCDENR), Tennessee Department of Environment and Conservation (TDEC), Tennessee Wildlife Resources Agency (TWRA), United States Fish and Wildlife Service (USFWS), National

Park Service (NPS), and USFS as appropriate. FERC approved the Recreation Plan by order on August 9, 2006.

As per the RSA and Recreation Plan, the Licensee must consult with the USFS, NCWRC, and TWRA annually to prioritize recreational enhancements to be implemented for the following year based on funding availability and other relevant considerations. The most recent annual meeting occurred on July 24, 2019 and the most recent Annual Recreation Report was filed February 03, 2020 for the 2019 year. According to the 2019 Annual Report, all the scheduled recreational enhancements associated with Chilhowee have been implemented.

2006 Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10965081

2006 FERC Order Approving Recreation Plan:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=11107010

2019 Annual Recreation Report:
https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=15458959

III.H.10 Recreational Resources: Chilhowee Development Zone 10

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

See response above for Zone 9.

PART IV. SWORN STATEMENT AND WAIVER

As an Authorized Representative of Brookfield Renewable, the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's certification program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The Undersigned further acknowledges that if LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified®.

The Undersigned further agrees to hold the Low Impact Hydropower Institute, the Governing Board and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's certification program.

Company Name: Brookfield Renewable

Authorized Representative

Name: Ashley Thomas

Title: Compliance Manager

Authorized Signature: Ashley Thomas

Date: 3/19/2020

PART V. CONTACTS

Table V-1. Complete contact information for Brookfield Renewable.

Project Owner:	
Name and Title	
Company	Brookfield Smoky Mountain Hydropower, LLC., a subsidiary of Brookfield Renewable
Phone	
Email Address	
Mailing Address	314 Growdon Blvd Tallassee, TN 37878
Project Operator (if different from Owner):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Consulting Firm / Agent for LIHI Program (if different from above):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	Ashley Thomas, Compliance Manager
Company	Brookfield Renewable
Phone	(304) 442-5120
Email Address	Ashley.Thomas@brookfieldrenewable.com
Mailing Address	326 3rd Avenue, Suite 201 Montgomery, West Virginia, 25136
Party responsible for accounts payable:	
Name and Title	Sandeep Mascarenhas, Senior Analyst, Capacity & Ancillary Services Management
Company	Brookfield Renewable
Phone	(819) 561-2722 ext. 6743
Email Address	AP@brookfieldrenewable.com
Mailing Address	41 Victoria, Gatineau, QC J8X 2A1

Table V-2. Complete contact information for current and relevant state, federal, provincial, and tribal resource agency contacts.

Agency Contact (Check area of responsibility: Flows_X_, Water Quality _X_, Fish/Wildlife Resources _X_, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	North Carolina Department of Environmental Quality
Name and Title	Chonticha McDaniel, 401 Stormwater Engineer
Phone	(919) 707-3634
Email address	chonticha.mcdaniel@ncdenr.gov
Mailing Address	1617 Mail Service Center, Raleigh, North Carolina, 27699-1617

Agency Contact (Check area of responsibility: Flows__, Water Quality X__, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Tennessee Division of Water Resources
Name and Title	Jimmy Smith, Natural Resources Unit Manager
Phone	(615) 532-0191
Email address	Jimmy.R.Smith@tn.gov
Mailing Address	312 Rosa Park Avenue Nashville, TN 37243

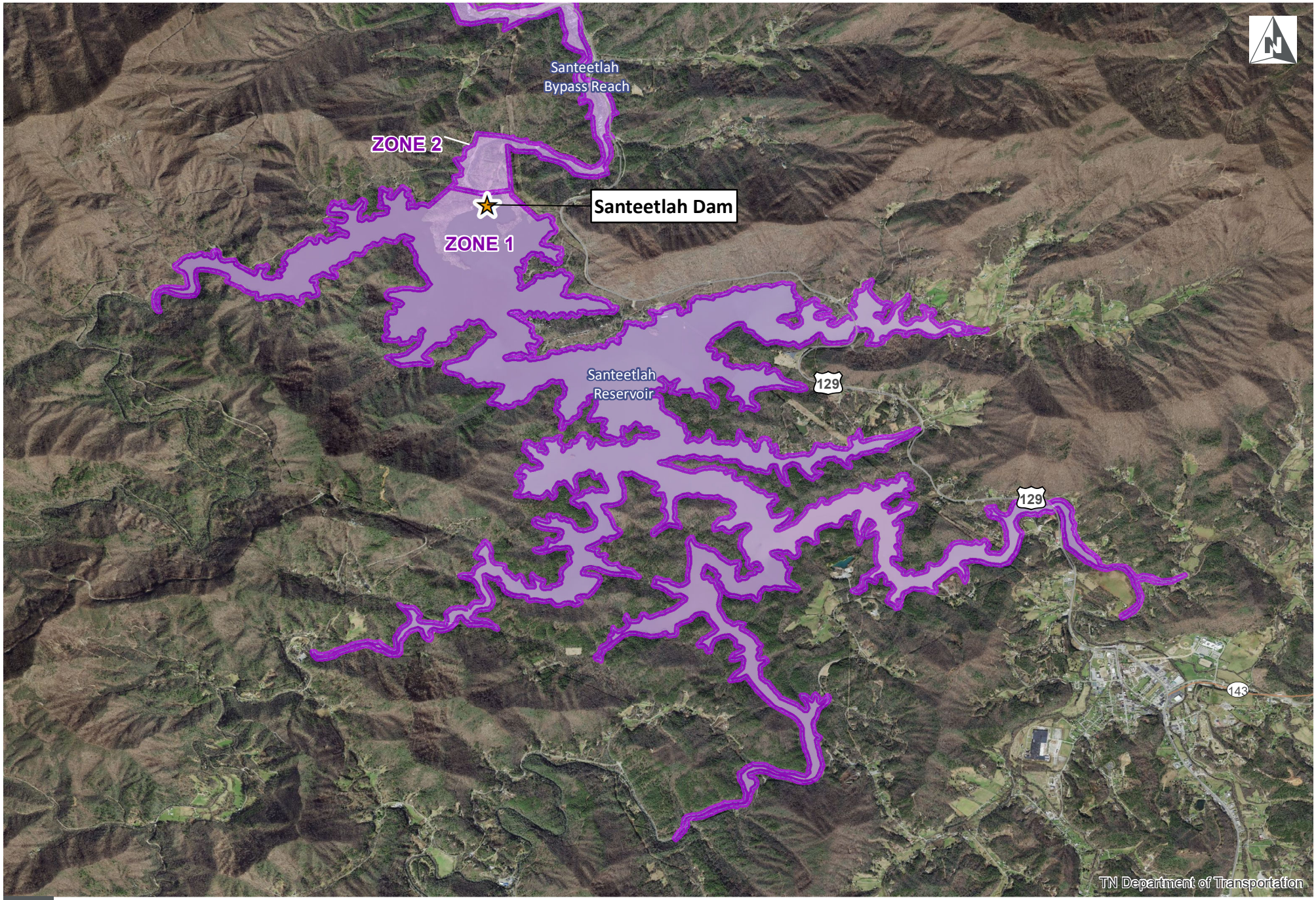
Agency Contact (Check area of responsibility: Flows_X_, Water Quality _X_, Fish/Wildlife Resources _X_, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	U.S. Fish and Wildlife Service
Name and Title	Bryan Tomkins
Phone	(828) 258-3939 ext. 42240
Email address	bryan_tompkins@fws.gov
Mailing Address	160 Zillicoa Street Asheville, NC 28801

Agency Contact (Check area of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources _X_, Recreation __):	
Agency Name	North Carolina Department of Natural and Cultural Resources
Name and Title	Renee Gledhill-Earley
Phone	(919)807-6579
Email address	Renee.gledhill-earley@ncdcr.gov
Mailing Address	4617 Mail Service Center Raleigh, NC 27699-4617

Agency Contact (Check area of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources _X_, Recreation __):	
Agency Name	Tennessee State Historic Preservation Office
Name and Title	E. Patrick McIntyre, Jr. Executive Director and State Historic Preservation Officer
Phone	(615)770-1092
Email address	Patrick.McIntyre@tn.gov
Mailing Address	2941 Lebanon Road Nashville, TN 37243-0442

APPENDIX A

SMOKY PROJECT ZONES OF EFFECT

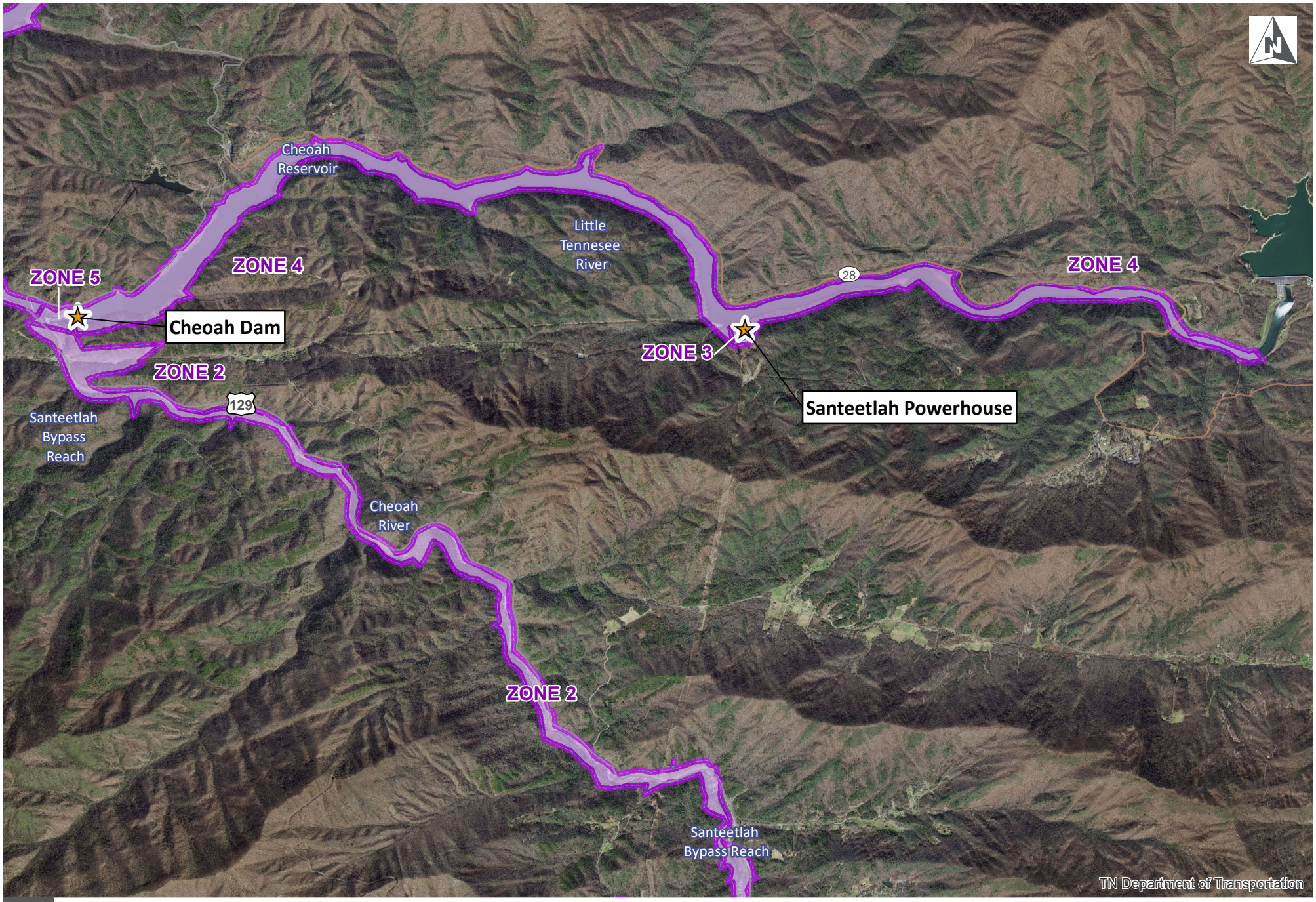


HDR Brookfield

ZONES OF EFFECT

SMOKY MOUNTAIN HYDROELECTRIC PROJECT

FIGURE 1

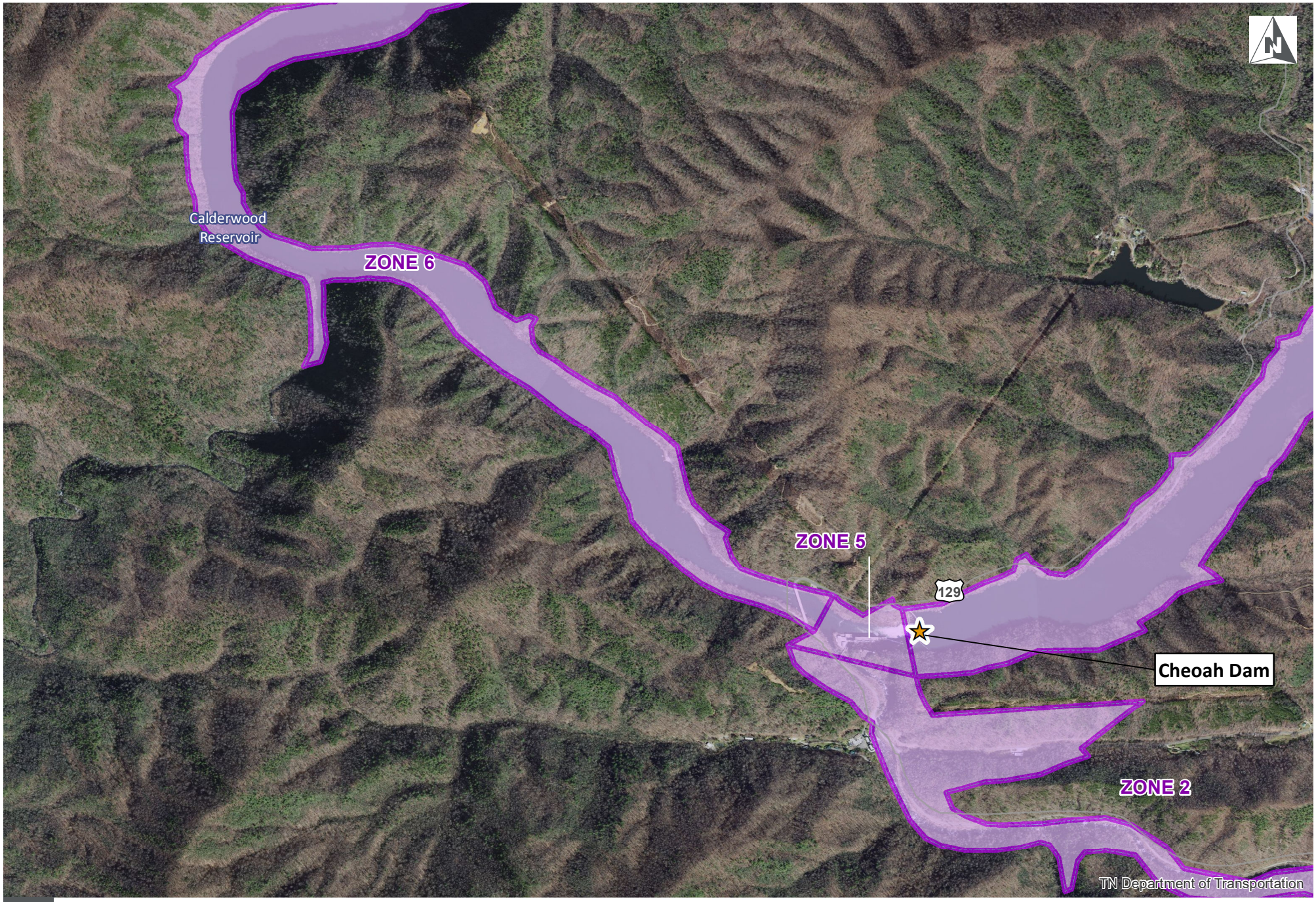


Brookfield

ZONES OF EFFECT

SMOKY MOUNTAIN HYDROELECTRIC PROJECT

FIGURE 1

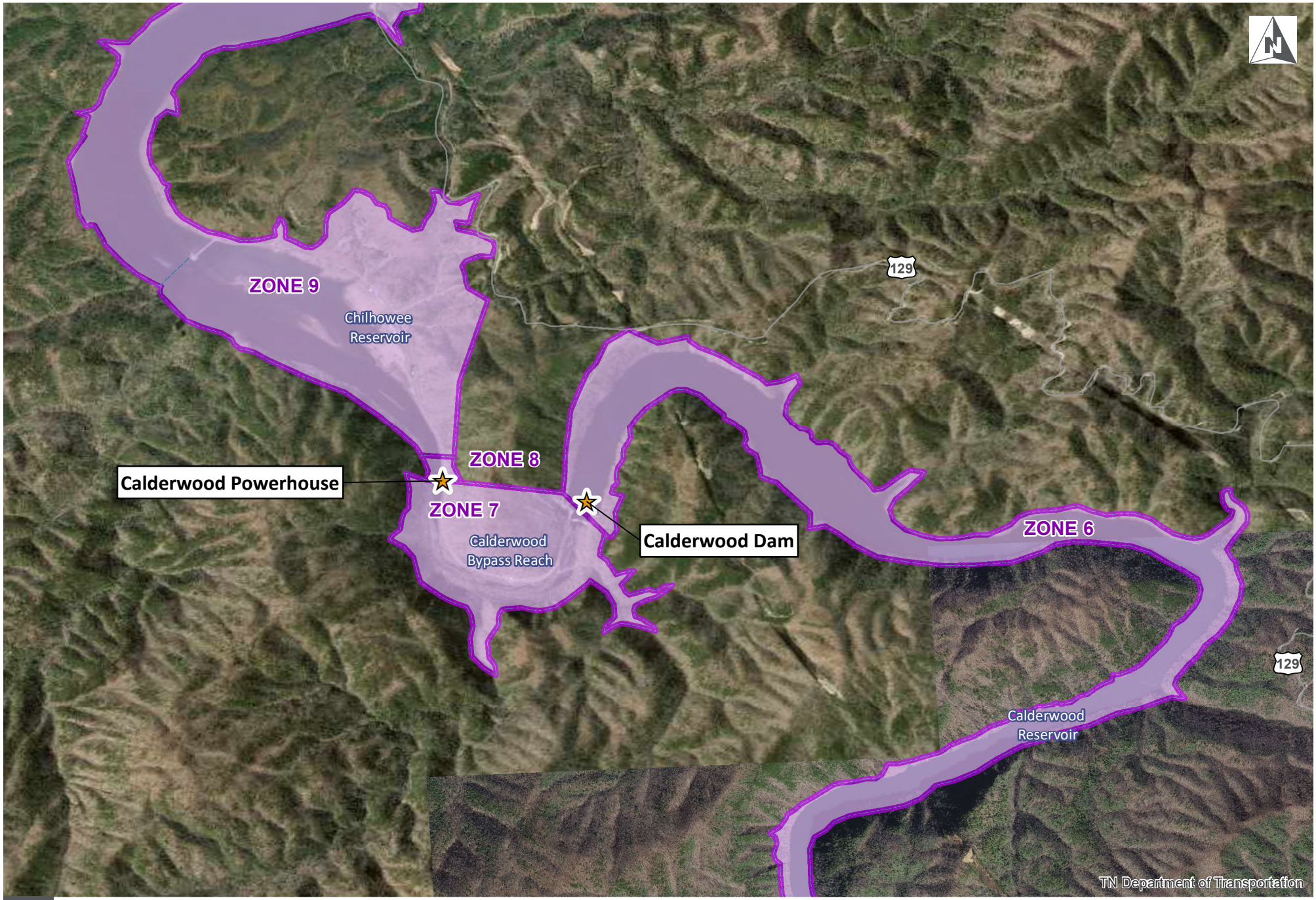


Brookfield

ZONES OF EFFECT

SMOKY MOUNTAIN HYDROELECTRIC PROJECT

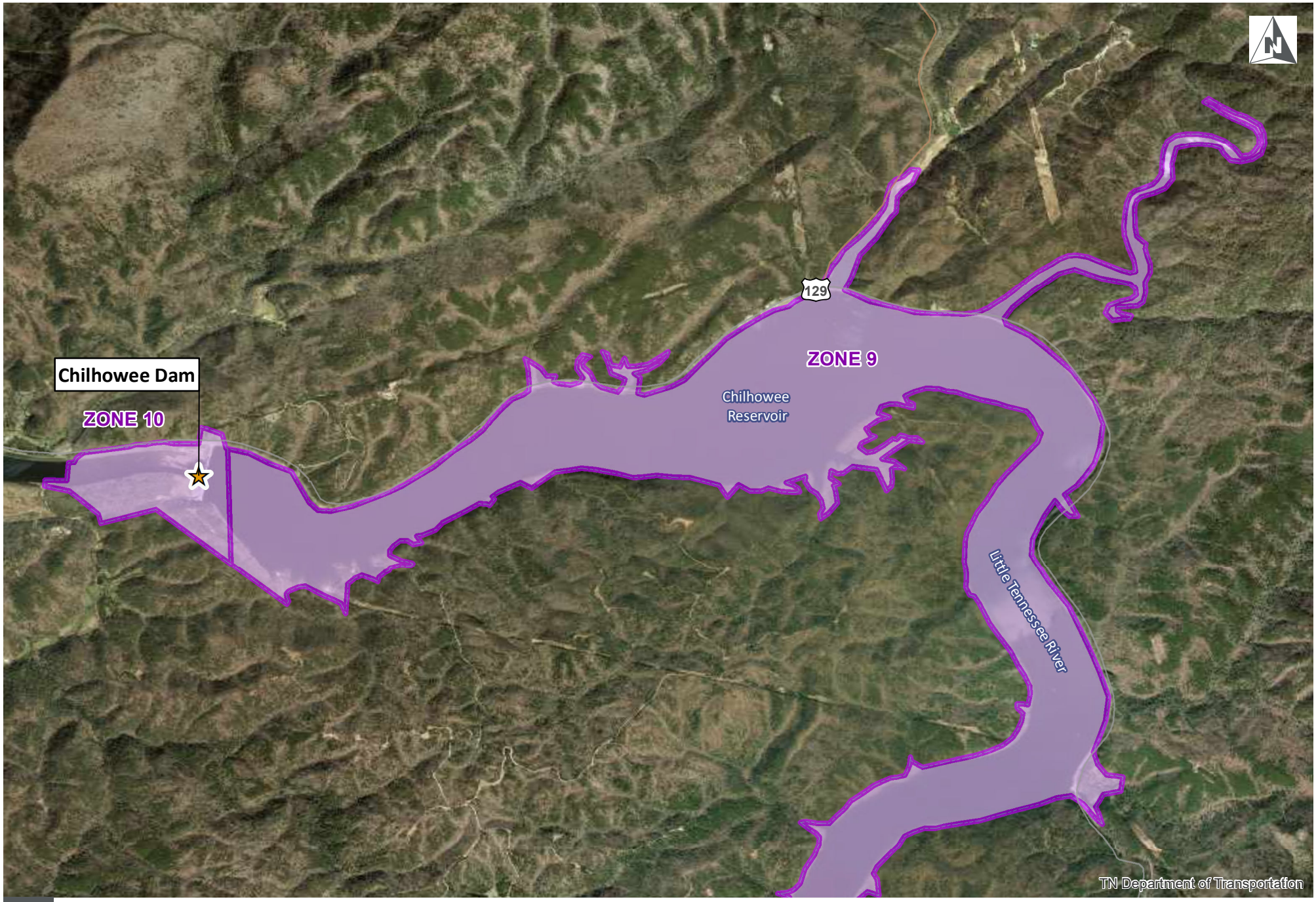
FIGURE 1



ZONES OF EFFECT

SMOKY MOUNTAIN HYDROELECTRIC PROJECT

FIGURE 1



Brookfield

ZONES OF EFFECT

SMOKY MOUNTAIN HYDROELECTRIC PROJECT

FIGURE 1

PATH: C:\USERS\KAUSTIN\DESKTOP\SMOKY\MAP_SMOKYLIHI_20200227.MXD - USER: KAUSTIN - DATE: 2/28/2020

(REPORT NAME)

APPENDIX B

PHOTOS OF KEY PROJECT FEATURES

APPENDIX B – PHOTOGRAPHS OF KEY PROJECT FEATURES

Santeetah Dam

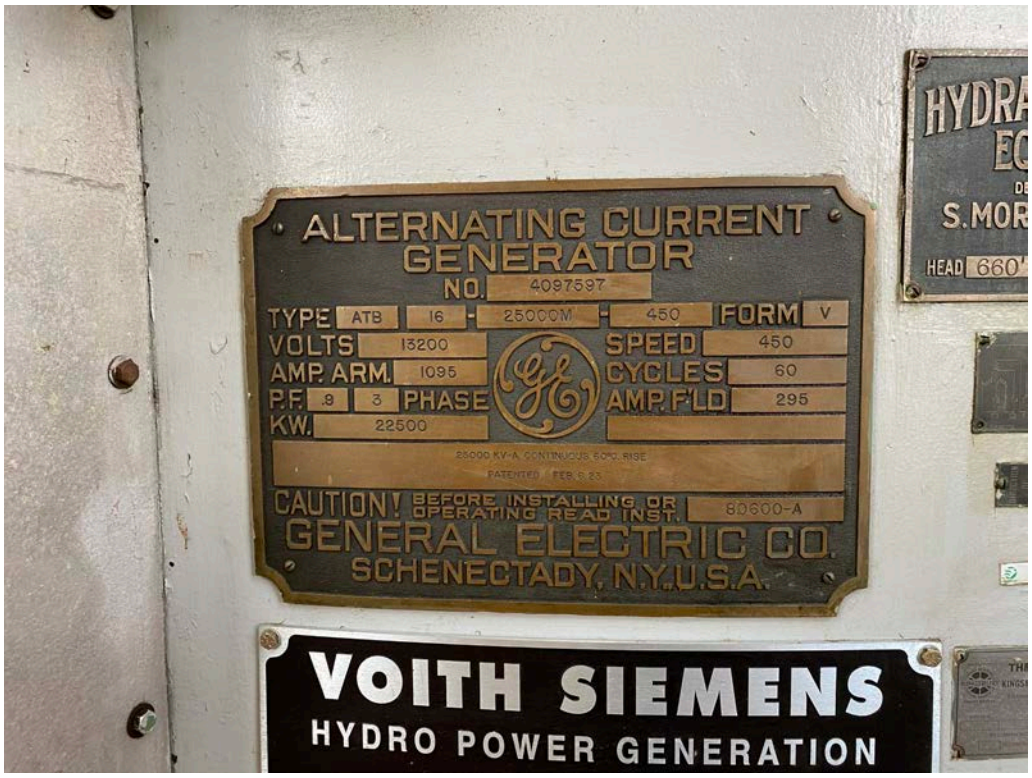
Santeetlah Right Thrust Block and Spillway

Santeetlah Right Thrust Block and Spillway

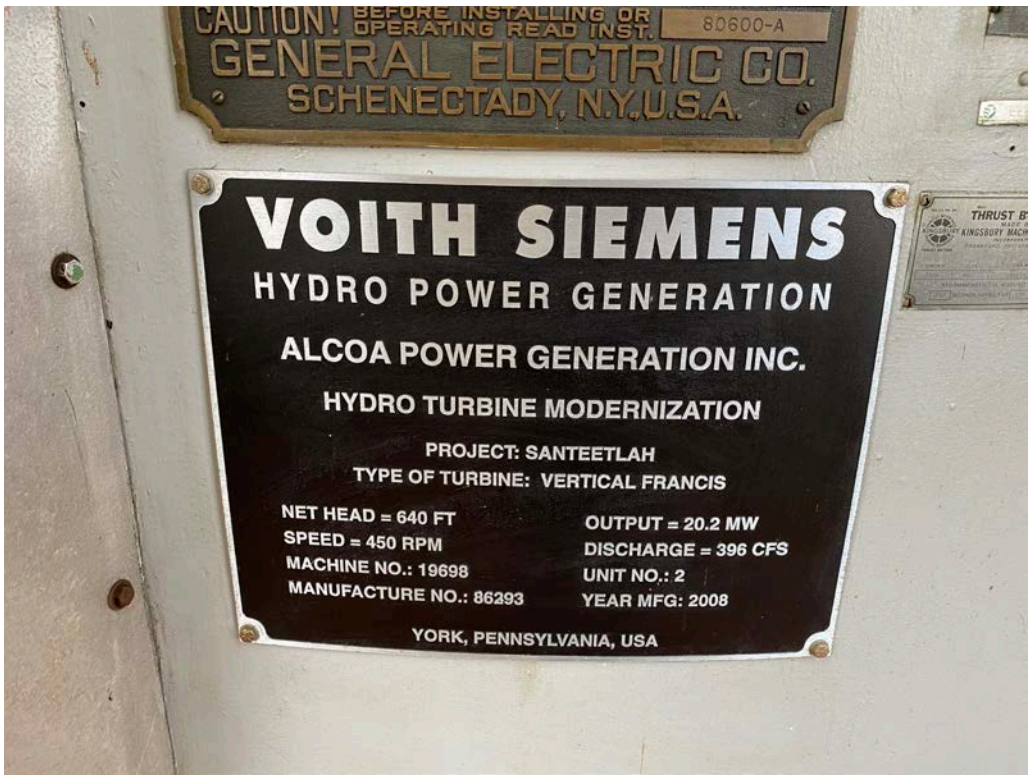
Santeetlah Surge Tank and Powerhouse

Santeetlah Plunge Pool and Bypass Reach

Santeetlah Tainter Gates



Santeetlah Alternating Current Generator Nameplate

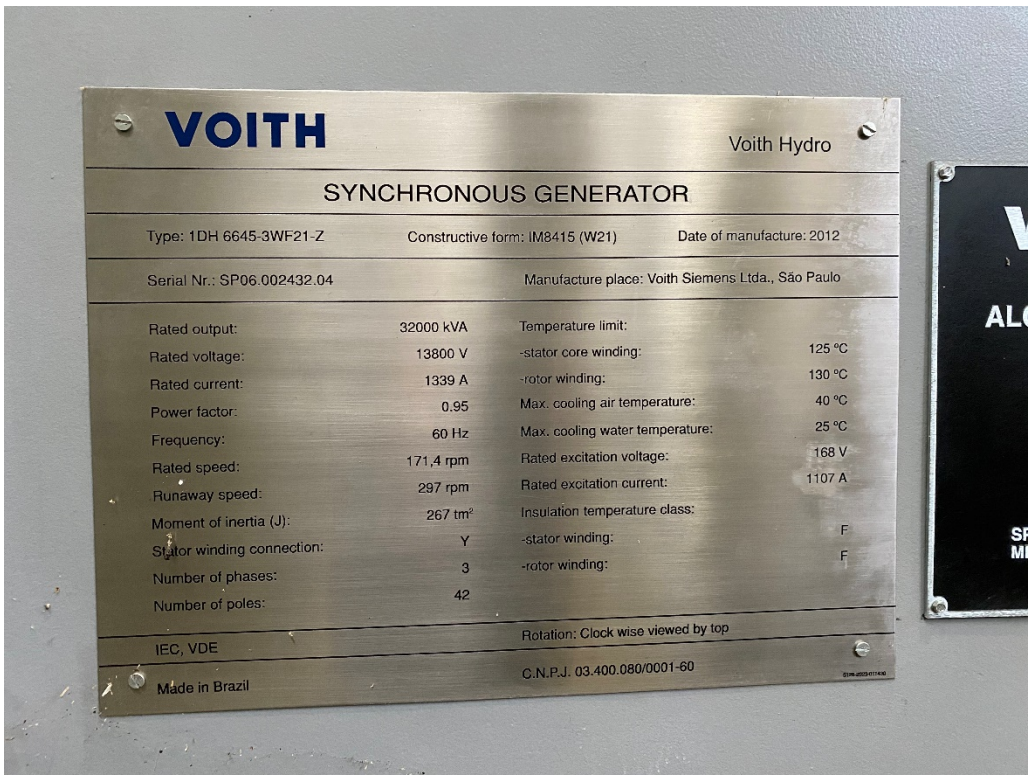


Santeetlah Turbine Nameplate

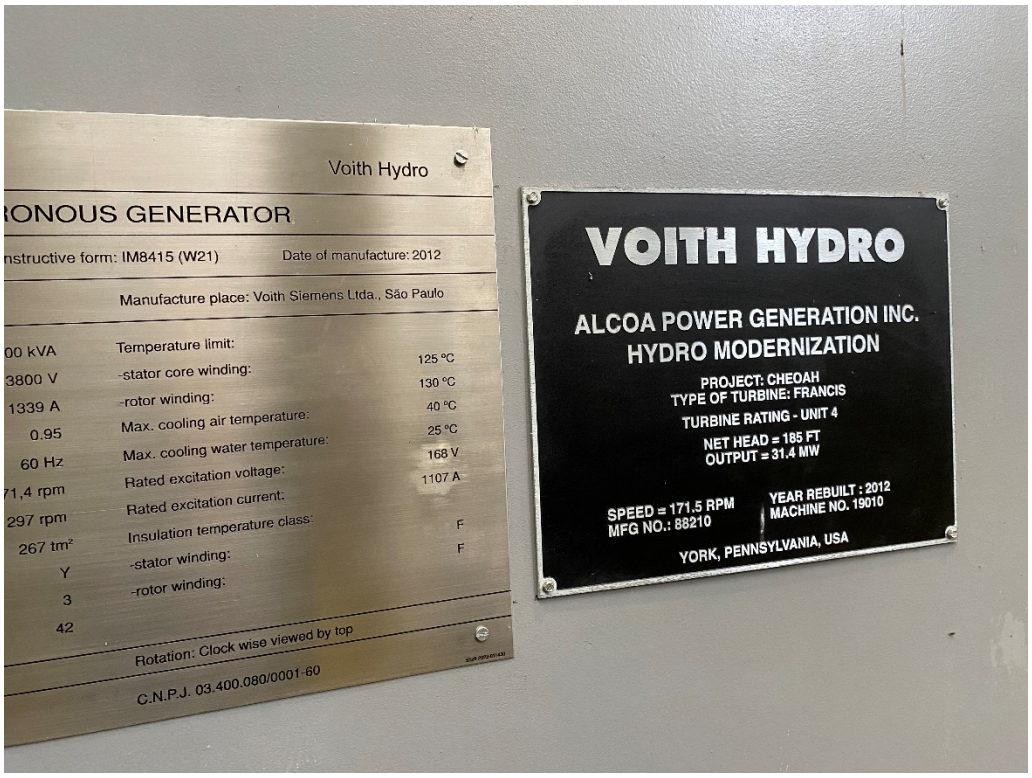
Cheoah Dam and Powerhouse

Cheoah Powerhouse and Downstream

Cheoah Impoundment



Cheoah Generator Nameplate



Cheoah Turbine Nameplate


Calderwood Dam

Calderwood Dam

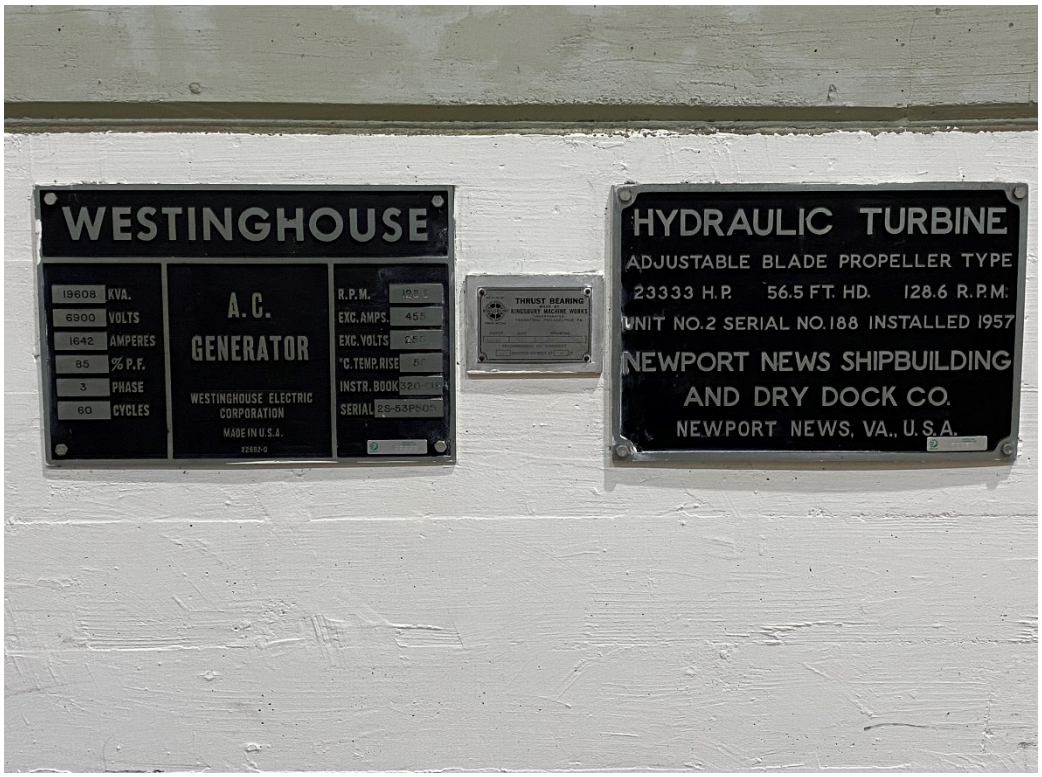
Calderwood Bypass Reach

Calderwood Unit No. 3

Calderwood Unit No. 2

Chilhowee Dam

Chilhowee Impoundment



Chilhowee Turbine and Generator Nameplates

APPENDIX C

401 WATER QUALITY CERTIFICATION CONSULTATION

Brookfield

Brookfield Renewable
314 Growdon Blvd.
Tallassee, TN 37878

Phone: 865-306-3069

February 20, 2020

Mr. Paul Wojoski
North Carolina Division of Water Resources
617 Mail Service Center
Raleigh, NC 27699

Subject: **Smoky Mountain Hydroelectric Project (FERC No.2169)**
Low Impact Hydropower Institute Certification
Water Quality Certificate Verification

Dear Mr. Wojoski

Brookfield Smoky Mountain Hydropower, LLC (BSMH) is applying for Low Impact Hydropower Institute (LIHI) certification for the Smoky Mountain Hydroelectric Project (FERC No. 2169). The Smoky Mountain Hydroelectric Project includes the Chilhowee and Calderwood developments, located on the Little Tennessee River in Blount and Monroe Counties, Tennessee, and the Santeetlah and Cheoah developments, located on the Cheoah and Little Tennessee rivers in Graham and Swain Counties, North Carolina.

As part of this LIHI application process, BSMH is requesting confirmation from the North Carolina Division of Water Resources stating that the 401 Water Quality Certificate issued for the operation of Santeetlah and Cheoah developments on June 27, 2014 is still valid. Please provide this confirmation by reply to this letter via letter or email.

BSMH would appreciate a response within 30 days of the date of this letter. Thank you in advance for your assistance, and if you have any questions, please do not hesitate to contact me at (865) 306-3069 or by email at Ashley.Thomas@brookfieldrenewable.com.

Sincerely,

Ashley Thomas
Compliance Manager
Brookfield Renewable

From: Mcdaniel, Chonticha
To: Thomas, Ashley
Subject: Smoky Mountain Hydro Project (DWR# 2003-0191v3)
Date: Thursday, February 27, 2020 11:23:08 AM
Attachments: image002.png

Hi Ashley,

The 401 Individual Certification #3447 for the subject project is still valid and has the same expiration as the FERC License (#2169) which is good until 2045. Please feel free to let me know if you have additional questions regarding this matter. Thank you!

Chonticha McDaniel
401 Stormwater Engineer
401 & Buffer Permitting Branch
Division of Water Resources
Department of Environmental Quality

919-707-3634 office
chonticha.mcdaniel@ncdenr.gov

Mailing Address - 1617 Mail Service Center, Raleigh, North Carolina, 27699-1617
Street Address - 512 N. Salisbury St. (Floor 9th), Raleigh, North Carolina, 27604

Nothing Compares

Brookfield

Brookfield Renewable
314 Growdon Blvd.
Tallassee, TN 37878

Phone: 865-306-3069

February 20, 2020

Mr. Jimmy Smith
Tennessee Division of Water Resources
William R. Snodgrass Tennessee Tower
312 Rosa Park Avenue
Nashville, TN 37243

Subject: **Smoky Mountain Hydroelectric Project (FERC No.2169)**
Low Impact Hydropower Institute Certification
Water Quality Certificate Verification

Dear Mr. Jimmy Smith:

Brookfield Smoky Mountain Hydropower, LLC (BSMH) is applying for the Low Impact Hydropower Institute (LIHI) certification for the Smoky Mountain Hydroelectric Project (FERC No. 2169). The Smoky Mountain Hydroelectric Project includes the Chilhowee and Calderwood developments, located on the Little Tennessee River in Blount and Monroe Counties, Tennessee, and the Santeetlah and Cheoah developments, located on the Cheoah and Little Tennessee rivers in Graham and Swain Counties, North Carolina.

As part of the LIHI application process, BSMH is requesting confirmation from the Tennessee Department of Environment and Conservation stating that the 401 Water Quality Certificate issued for the operation of Santeetlah and Cheoah developments on February 11, 2004 (revised April 29, 2004) is still valid. Please provide this confirmation by reply to this letter via letter or email.

BSMH would appreciate a response within 30 days of the date of this letter. Thank you in advance for your assistance, and if you have any questions, please do not hesitate to contact me at (865) 306-3069 or by email at Ashley.Thomas@brookfieldrenewable.com

Sincerely,

Ashley Thomas
Compliance Manager
Brookfield Renewable

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Water Resources
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

March 17, 2020

Ashley Thomas
Compliance Manager
Brookfield Renewable
314 Growden Blvd.
Tallassee, TN 37878

Subject: Smoky Mountain Hydroelectric Project (FERC No.2169)
Low Impact Hydropower Institute Certification
Water Quality Certificate Verification

Dear Mr. Thomas:

Brookfield Smoky Mountain Hydropower, LLC (BSMH) is applying for the Low Impact Hydropower Institute (LIHI) certification for the Smoky Mountain Hydroelectric Project (FERC No. 2169). The Smoky Mountain Hydroelectric Project includes the Chilhowee and Calderwood developments, located on the Little Tennessee River in Blount and Monroe Counties, Tennessee, and the Santeetlah and Cheoah developments, located on the Cheoah and Little Tennessee rivers in Graham and Swain Counties, North Carolina.

In a Section 401 Water Quality Certification issued April 29, 2004, the Tennessee Department of Environment and Conservation (TDEC), Division of Water Resources, certified that the operation of the Smoky Mountain Hydroelectric Project, in conformance with approved plans and specifications, will not violate applicable water quality standards. We believe that the Smoky Mountain Hydroelectric Project is appropriately protective of water quality in the bypass reach below Calderwood Dam.

Sincerely,

Robert Baker

Robert Baker
Natural Resources Unit
615-532-0710
robert.d.baker@tn.gov

APPENDIX D

RARE, THREATENED AND ENDANGERED SPECIES CONSULTATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
Phone: (828) 258-3939 Fax: (828) 258-5330
http://www.fws.gov/nc-es/es/countyfr.html

In Reply Refer To: February 12, 2020
Consultation Code: 04EN1000-2020-SLI-0327
Event Code: 04EN1000-2020-E-00780
Project Name: Santeetlah Reservoir

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. Although not required by section 7, many agencies request species lists to start the informal consultation process and begin their fulfillment of the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This list, along with other helpful resources, is also available on the U.S. Fish and Wildlife Service (Service) Asheville Field Office's (AFO) website: https://www.fws.gov/raleigh/species/cntylist/nc_counties.html. The AFO website list includes “species of concern” species that could potentially be placed on the federal list of threatened and endangered species in the future. Also available are:

Design and Construction Recommendations
https://www.fws.gov/asheville/htmls/project_review/Recommendations.html

Optimal Survey Times for Federally Listed Plants
https://www.fws.gov/nc-es/plant/plant_survey.html

Northern long-eared bat Guidance
https://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html

Predictive Habitat Model for Aquatic Species
https://www.fws.gov/asheville/htmls/Maxent/Maxent.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could require modifications of these lists. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of the species lists should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website or the AFO website (the AFO website dates each county list with the day of the most recent update/change) at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list or by going to the AFO website.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a Biological Evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12 and on our office's website at https://www.fws.gov/asheville/htmls/project_review/assessment_guidance.html.

If a Federal agency (or their non-federal representative) determines, based on the Biological Assessment or Biological Evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

Though the bald eagle is no longer protected under the Endangered Species Act, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require additional consultation (see https://www.fws.gov/southeast/our-services/permits/eagles/). Wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds (including bald and golden eagles) and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm;

http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

Project Summary

Consultation Code: 04EN1000-2020-SLI-0327

Event Code: 04EN1000-2020-E-00780

Project Name: Santeetlah Reservoir

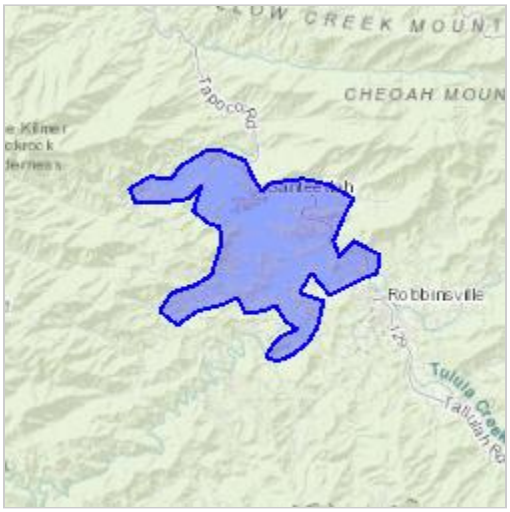
Project Type: DAM

Project Description: Brookfield Smoky Mountain Hydropower is presently working with the Low Impact Hydropower Institute (LIHI) to certify the Smoky Mountain (FERC No. 2169) as a low impact project. In preparing the application for LIHI certification, Brookfield must update or confirm consultation with resource agencies with respect to the presence of threatened or endangered species within the vicinity of the hydroelectric development. Per the request from LIHI, Brookfield respectfully requests information on the presence of threatened or endangered species within the vicinity of the above-listed projects.

As a matter of background, the license from the Federal Energy Regulatory Commission (FERC) was issued for this Project on January 25, 2005. Project operations and environmental protection measures at this Project have been largely determined by a comprehensive Offer of Settlement. The licensing processes for this Project included consultation with resource agencies regarding threatened and endangered species.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.344526478660185N83.8530087987439W



Counties: Graham, NC

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2657	Endangered
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Clemmys muhlenbergii* Population: U.S.A. (GA, NC, SC, TN, VA) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Similarity of Appearance (Threatened)

Fishes

NAME	STATUS
Spotfin Chub *Erimonax monachus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1521	Threatened

Clams

NAME	STATUS
Appalachian Elktoe *Alasmidonta raveneliana* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5039	Endangered

Flowering Plants

NAME	STATUS
Virginia Spiraea *Spiraea virginiana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1728	Threatened

Lichens

NAME	STATUS
Rock Gnome Lichen *Gymnoderma lineare* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3933	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Appalachian Elktoe *Alasmidonta raveneliana* https://ecos.fws.gov/ecp/species/5039#crithab	Final

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10

NAME	BREEDING SEASON
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31
Yellow-bellied Sapsucker *sphyrapicus varius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8792	Breeds May 10 to Jul 15

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for

that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

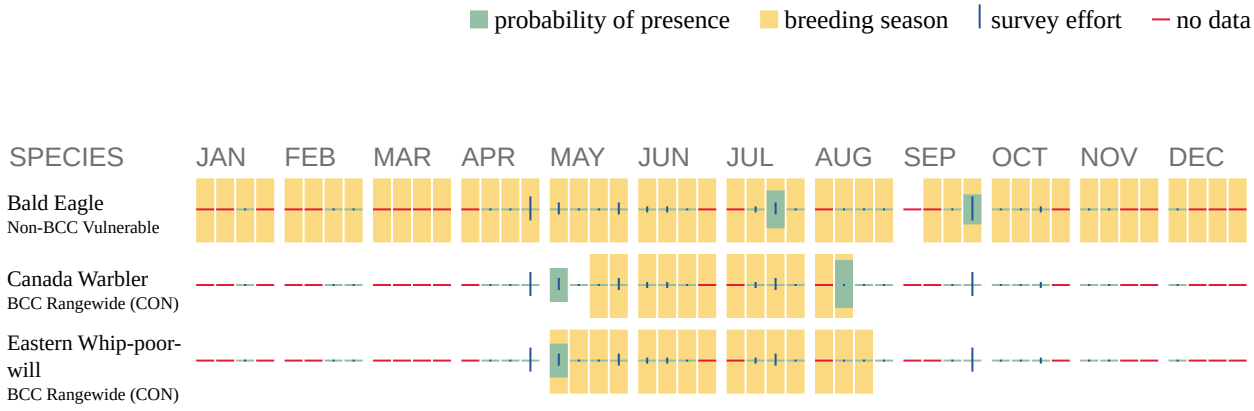
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

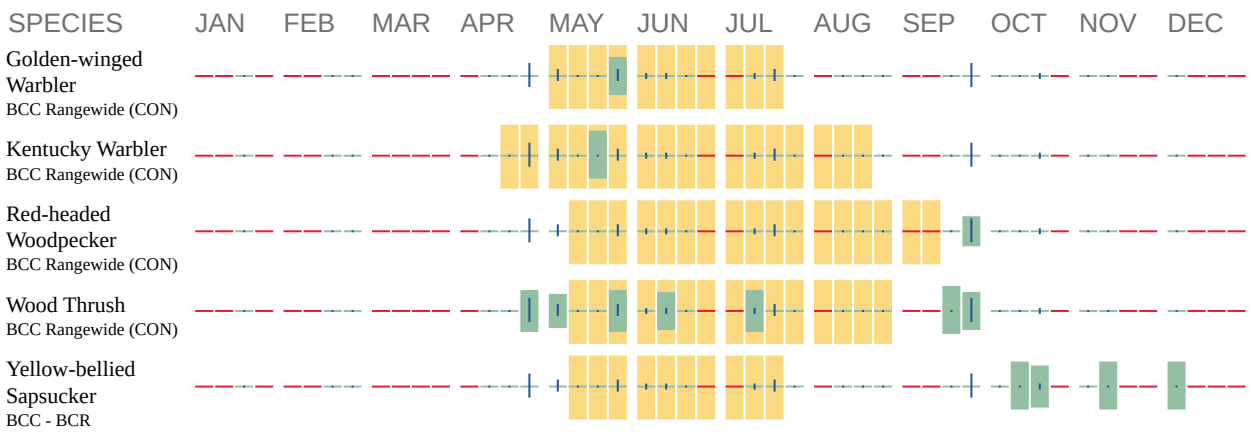
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as

warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can

implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1Ah

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1A
- PSS1Fh

FRESHWATER POND

- PUBHh

LAKE

- L1UBHh

RIVERINE

- R3UB1H
- R3UBH
- R4SBC
- R5UBH

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
Phone: (828) 258-3939 Fax: (828) 258-5330
http://www.fws.gov/nc-es/es/countyfr.html

In Reply Refer To: February 12, 2020
Consultation Code: 04EN1000-2020-SLI-0328
Event Code: 04EN1000-2020-E-00782
Project Name: Cheoah Development 2

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. Although not required by section 7, many agencies request species lists to start the informal consultation process and begin their fulfillment of the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This list, along with other helpful resources, is also available on the U.S. Fish and Wildlife Service (Service) Asheville Field Office's (AFO) website: https://www.fws.gov/raleigh/species/cntylist/nc_counties.html. The AFO website list includes “species of concern” species that could potentially be placed on the federal list of threatened and endangered species in the future. Also available are:

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New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could require modifications of these lists. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of the species lists should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website or the AFO website (the AFO website dates each county list with the day of the most recent update/change) at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list or by going to the AFO website.

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Though the bald eagle is no longer protected under the Endangered Species Act, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require additional consultation (see https://www.fws.gov/southeast/our-services/permits/eagles/). Wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds (including bald and golden eagles) and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm;

http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

Project Summary

Consultation Code: 04EN1000-2020-SLI-0328

Event Code: 04EN1000-2020-E-00782

Project Name: Cheoah Development 2

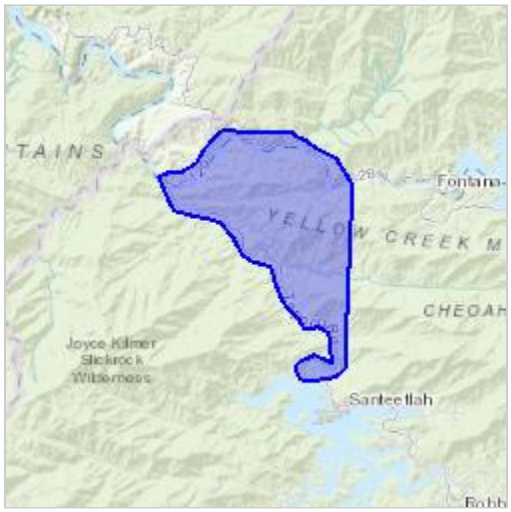
Project Type: DAM

Project Description: Brookfield Smoky Mountain Hydropower is presently working with the Low Impact Hydropower Institute (LIHI) to certify the Smoky Mountain (FERC No. 2169) as a low impact project. In preparing the application for LIHI certification, Brookfield must update or confirm consultation with resource agencies with respect to the presence of threatened or endangered species within the vicinity of the hydroelectric development. Per the request from LIHI, Brookfield respectfully requests information on the presence of threatened or endangered species within the vicinity of the above-listed projects.

As a matter of background, the license from the Federal Energy Regulatory Commission (FERC) was issued for this Project on January 25, 2005. Project operations and environmental protection measures at this Project have been largely determined by a comprehensive Offer of Settlement. The licensing processes for this Project included consultation with resource agencies regarding threatened and endangered species.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.42268627895221N83.88172194359322W



Counties: Graham, NC | Swain, NC

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2657	Endangered
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Clemmys muhlenbergii* Population: U.S.A. (GA, NC, SC, TN, VA) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Similarity of Appearance (Threatened)

Fishes

NAME	STATUS
Spotfin Chub *Erimonax monachus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1521	Threatened

Clams

NAME	STATUS
Appalachian Elktoe *Alasmidonta raveneliana* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5039	Endangered
Littlewing Pearlymussel *Pegias fabula* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2572	Endangered

Snails

NAME	STATUS
Noonday Snail *Mesodon clarki nantahala* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/322	Threatened

Arachnids

NAME	STATUS
Spruce-fir Moss Spider *Microhexura montivaga* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4801	Endangered

Flowering Plants

NAME	STATUS
Virginia Spiraea *Spiraea virginiana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1728	Threatened

Lichens

NAME	STATUS
Rock Gnome Lichen *Gymnoderma lineare* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3933	Endangered

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Appalachian Elktoe *Alasmidonta raveneliana* https://ecos.fws.gov/ecp/species/5039#crithab	Final
Indiana Bat *Myotis sodalis* https://ecos.fws.gov/ecp/species/5949#crithab	Final

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10

NAME	BREEDING SEASON
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 27 to Jul 20
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31
Yellow-bellied Sapsucker *sphyrapicus varius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8792	Breeds May 10 to Jul 15

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

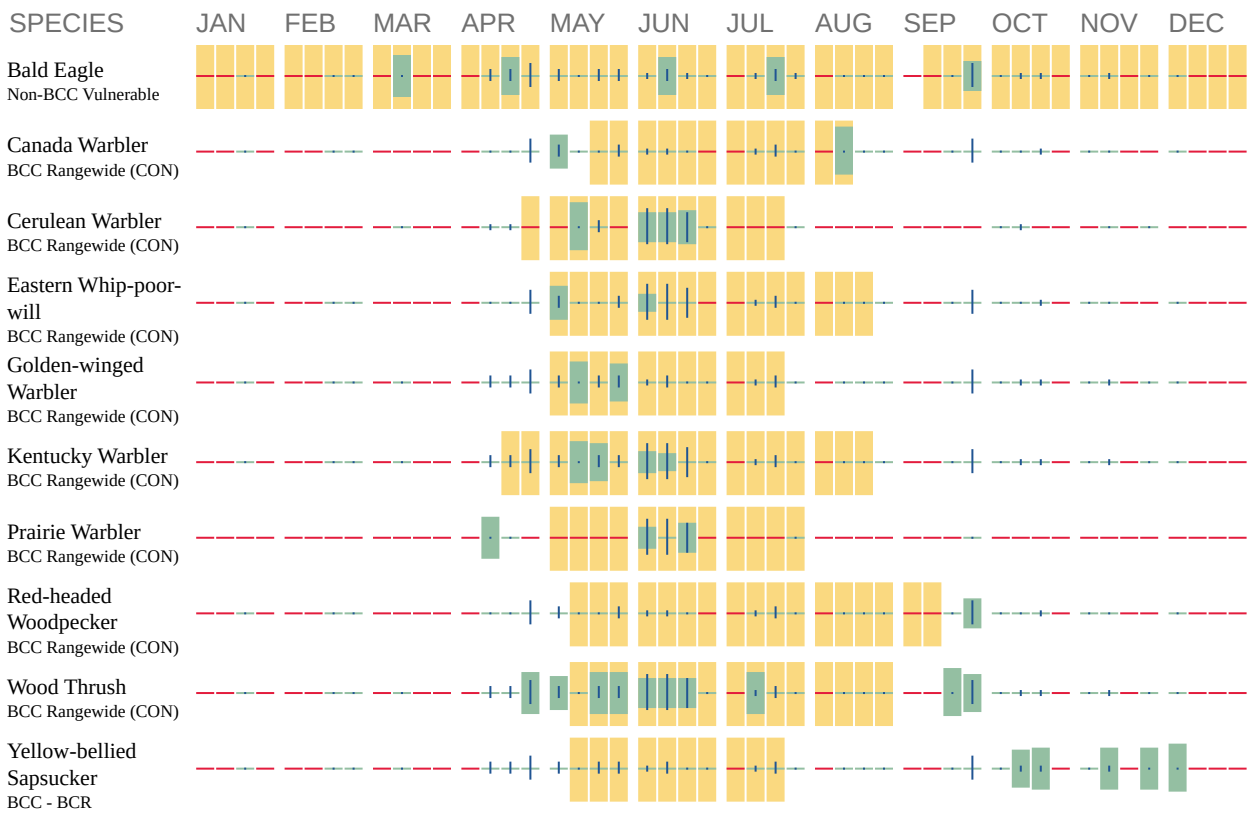
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or

permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In

contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1A

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1A
- PSS1A

FRESHWATER POND

- PUBHh
- PUBHx

LAKE

- L1UBHh

RIVERINE

- R3RBH
- R3UB1H
- R4SB3C
- R4SBC
- R5UBH
- R3UB1F
- R3UBH

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
Phone: (828) 258-3939 Fax: (828) 258-5330
http://www.fws.gov/nc-es/es/countyfr.html

In Reply Refer To:
Consultation Code: 04EN1000-2020-SLI-0324
Event Code: 04EN1000-2020-E-00774
Project Name: Calderwood Reservoir

February 11, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. Although not required by section 7, many agencies request species lists to start the informal consultation process and begin their fulfillment of the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This list, along with other helpful resources, is also available on the U.S. Fish and Wildlife Service (Service) Asheville Field Office's (AFO) website: https://www.fws.gov/raleigh/species/cntylist/nc_counties.html. The AFO website list includes “species of concern” species that could potentially be placed on the federal list of threatened and endangered species in the future. Also available are:

Design and Construction Recommendations
https://www.fws.gov/asheville/htmls/project_review/Recommendations.html

Optimal Survey Times for Federally Listed Plants
https://www.fws.gov/nc-es/plant/plant_survey.html

Northern long-eared bat Guidance
https://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html

Predictive Habitat Model for Aquatic Species
https://www.fws.gov/asheville/htmls/Maxent/Maxent.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could require modifications of these lists. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of the species lists should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website or the AFO website (the AFO website dates each county list with the day of the most recent update/change) at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list or by going to the AFO website.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a Biological Evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12 and on our office's website at https://www.fws.gov/asheville/htmls/project_review/assessment_guidance.html.

If a Federal agency (or their non-federal representative) determines, based on the Biological Assessment or Biological Evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

Though the bald eagle is no longer protected under the Endangered Species Act, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require additional consultation (see https://www.fws.gov/southeast/our-services/permits/eagles/). Wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds (including bald and golden eagles) and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm;

http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

Project Summary

Consultation Code: 04EN1000-2020-SLI-0324

Event Code: 04EN1000-2020-E-00774

Project Name: Calderwood Reservoir

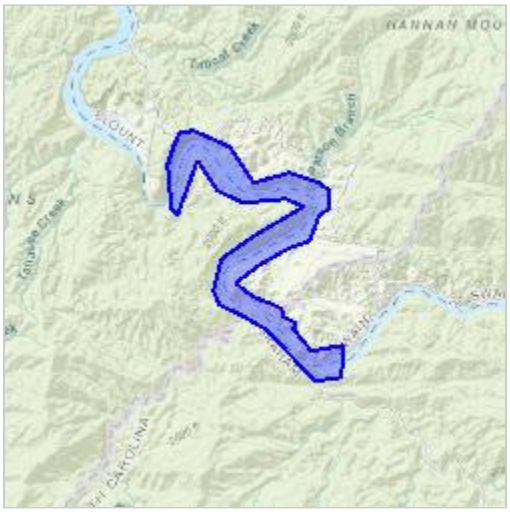
Project Type: DAM

Project Description: Brookfield Smoky Mountain Hydropower is presently working with the Low Impact Hydropower Institute (LIHI) to certify the Smoky Mountain (FERC No. 2169) as a low impact project. In preparing the application for LIHI certification, Brookfield must update or confirm consultation with resource agencies with respect to the presence of threatened or endangered species within the vicinity of the hydroelectric development. Per the request from LIHI, Brookfield respectfully requests information on the presence of threatened or endangered species within the vicinity of the above-listed projects.

As a matter of background, the license from the Federal Energy Regulatory Commission (FERC) was issued for this Project on January 25, 2005. Project operations and environmental protection measures at this Project have been largely determined by a comprehensive Offer of Settlement. The licensing processes for this Project included consultation with resource agencies regarding threatened and endangered species.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.474505380464834N83.95806371228866W



Counties: Graham, NC | Swain, NC | Blount, TN | Monroe, TN

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2657	Endangered
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Clemmys muhlenbergii* Population: U.S.A. (GA, NC, SC, TN, VA) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Similarity of Appearance (Threatened)

Fishes

NAME	STATUS
Spotfin Chub *Erimonax monachus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1521	Threatened

Clams

NAME	STATUS
Appalachian Elktoe *Alasmidonta raveneliana* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5039	Endangered
Littlewing Pearlymussel *Pegias fabula* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2572	Endangered

Snails

NAME	STATUS
Noonday Snail *Mesodon clarki nantahala* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/322	Threatened

Arachnids

NAME	STATUS
Spruce-fir Moss Spider *Microhexura montivaga* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4801	Endangered

Flowering Plants

NAME	STATUS
Virginia Spiraea *Spiraea virginiana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1728	Threatened

Lichens

NAME	STATUS
Rock Gnome Lichen *Gymnoderma lineare* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3933	Endangered

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Appalachian Elktoe *Alasmidonta raveneliana* https://ecos.fws.gov/ecp/species/5039#crithab	Final
Indiana Bat *Myotis sodalis* https://ecos.fws.gov/ecp/species/5949#crithab	Final

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

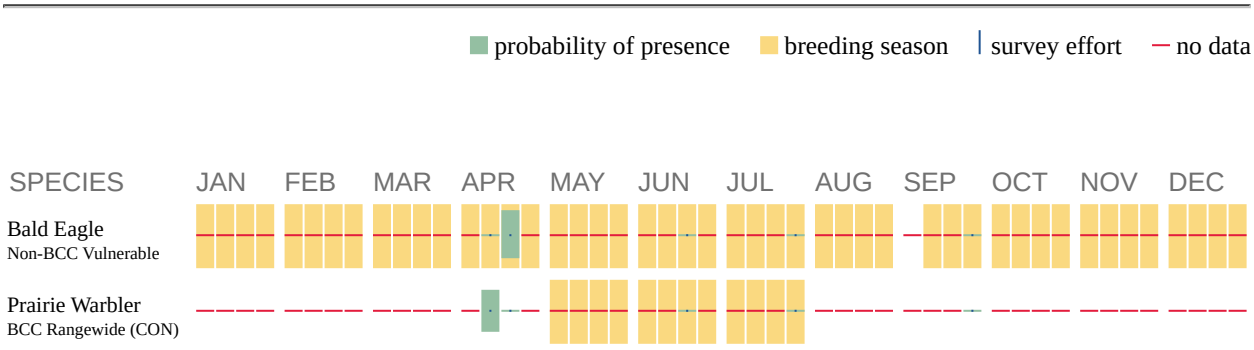
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To:
Consultation Code: 04ET1000-2020-SLI-0660
Event Code: 04ET1000-2020-E-00926
Project Name: Calderwood Reservoir

February 11, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

Project Summary

Consultation Code: 04ET1000-2020-SLI-0660

Event Code: 04ET1000-2020-E-00926

Project Name: Calderwood Reservoir

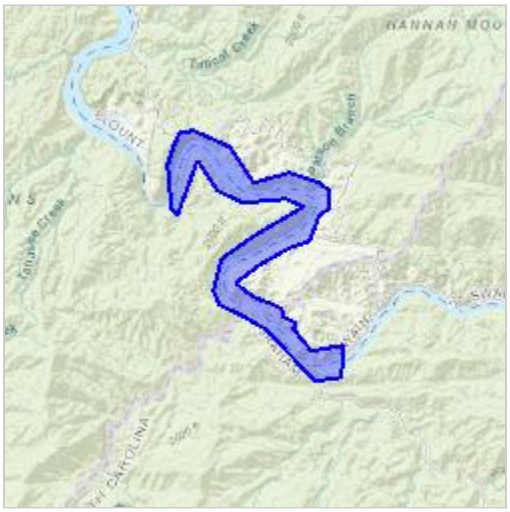
Project Type: DAM

Project Description: Brookfield Smoky Mountain Hydropower is presently working with the Low Impact Hydropower Institute (LIHI) to certify the Smoky Mountain (FERC No. 2169) as a low impact project. In preparing the application for LIHI certification, Brookfield must update or confirm consultation with resource agencies with respect to the presence of threatened or endangered species within the vicinity of the hydroelectric development. Per the request from LIHI, Brookfield respectfully requests information on the presence of threatened or endangered species within the vicinity of the above-listed projects.

As a matter of background, the license from the Federal Energy Regulatory Commission (FERC) was issued for this Project on January 25, 2005. Project operations and environmental protection measures at this Project have been largely determined by a comprehensive Offer of Settlement. The licensing processes for this Project included consultation with resource agencies regarding threatened and endangered species.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.474505380464834N83.95806371228866W



Counties: Graham, NC | Swain, NC | Blount, TN | Monroe, TN

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2657	Endangered
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Duskytail Darter *Etheostoma percnurum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/891	Endangered
Spotfin Chub *Erimonax monachus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1521	Threatened

Clams

NAME	STATUS
Cumberland Bean (pearlymussel) *Villosa trabalis* Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6061	Endangered

Snails

NAME	STATUS
Anthony's Riversnail *Athearnia anthonyi* Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4827	Endangered
Anthony's Riversnail *Athearnia anthonyi* Population: U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1)) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4827	Experimental Population, Non-Essential

Flowering Plants

NAME	STATUS
Spreading Avens *Geum radiatum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6854	Endangered
Virginia Spiraea *Spiraea virginiana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1728	Threatened
White Fringeless Orchid *Platanthera integrilabia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1889	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Indiana Bat *Myotis sodalis* https://ecos.fws.gov/ecp/species/5949#crithab	Final

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

LAKE

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- R3UB1H

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To: February 11, 2020
Consultation Code: 04ET1000-2020-SLI-0657
Event Code: 04ET1000-2020-E-00920
Project Name: Chilhowee Development

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

Project Summary

Consultation Code: 04ET1000-2020-SLI-0657

Event Code: 04ET1000-2020-E-00920

Project Name: Chilhowee Development

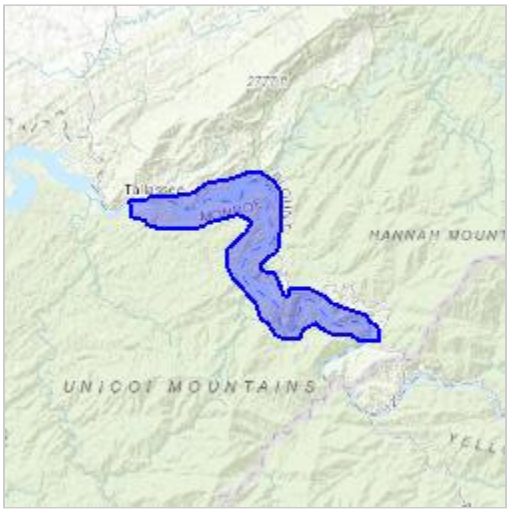
Project Type: DAM

Project Description: Brookfield Smoky Mountain Hydropower is presently working with the Low Impact Hydropower Institute (LIHI) to certify the Smoky Mountain (FERC No. 2169) as a low impact project. In preparing the application for LIHI certification, Brookfield must update or confirm consultation with resource agencies with respect to the presence of threatened or endangered species within the vicinity of the hydroelectric development. Per the request from LIHI, Brookfield respectfully requests information on the presence of threatened or endangered species within the vicinity of the above-listed projects.

As a matter of background, the license from the Federal Energy Regulatory Commission (FERC) was issued for this Project on January 25, 2005. Project operations and environmental protection measures at this Project have been largely determined by a comprehensive Offer of Settlement. The licensing processes for this Project included consultation with resource agencies regarding threatened and endangered species.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.52090084944984N84.00676104141832W



Counties: Blount, TN | Monroe, TN

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2657	Endangered
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Duskytail Darter *Etheostoma percnurum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/891	Endangered
Spotfin Chub *Erimonax monachus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1521	Threatened

Clams

NAME	STATUS
Cumberland Bean (pearlymussel) *Villosa trabalis* Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6061	Endangered

Snails

NAME	STATUS
Anthony's Riversnail *Athearnia anthonyi* Population: U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1)) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4827	Experimental Population, Non-Essential
Anthony's Riversnail *Athearnia anthonyi* Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4827	Endangered

Flowering Plants

NAME	STATUS
Spreading Avens *Geum radiatum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6854	Endangered
Virginia Spiraea *Spiraea virginiana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1728	Threatened
White Fringeless Orchid *Platanthera integrilabia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1889	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Indiana Bat *Myotis sodalis* https://ecos.fws.gov/ecp/species/5949#crithab	Final

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

Roy Cooper, **Governor**
Susi Hamilton, **Secretary**
Walter Clark, **Director, Land and Water Stewardship**

NCNHDE-11492

February 27, 2020

Johanna Velasquez
HDR Inc
440 S. Church Street
Charlotte, NC 28202
RE: Smoky_LIHI_Recertification; 10217273

Dear Johanna Velasquez:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Smoky_LIHI_Recertification
Project No. 10217273
February 27, 2020
NCNHDE-11492

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	21828	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2018-10-29	AB	3-Medium	---	Special Concern	G3T2	S3
Amphibian	16733	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2018-10-13	AB	3-Medium	---	Special Concern	G3T2	S3
Amphibian	27561	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2004-08-17	E	3-Medium	---	Special Concern	G3T2	S3
Amphibian	7903	Eurycea junaluska	Junaluska Salamander	2018-05-17	BC	3-Medium	---	Threatened	G2G3	S1
Amphibian	13753	Eurycea junaluska	Junaluska Salamander	2014-07-11	A?	3-Medium	---	Threatened	G2G3	S1
Amphibian	35480	Plethodon aureolus	Tellico Salamander	2012-03-28	E	3-Medium	---	Significantly Rare	G2G3	S2
Bird	25178	Haliaeetus leucocephalus	Bald Eagle	2015-02	E	3-Medium	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	31328	Haliaeetus leucocephalus	Bald Eagle	2015-03	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Butterfly	24853	Autochton cellus	Golden Banded-Skipper	2007-05-15	E	3-Medium	---	Significantly Rare	G4	S2
Butterfly	20005	Autochton cellus	Golden Banded-Skipper	1999-04-28	H?	3-Medium	---	Significantly Rare	G4	S2
Butterfly	28792	Erynnis martialis	Mottled Duskywing	2010-05-06	E	3-Medium	---	Significantly Rare	G3	S2
Butterfly	20261	Euphydryas phaeton	Baltimore Checkerspot	2004-05-20	B?	3-Medium	---	Significantly Rare	G5	S2
Dragonfly or Damselfly	33679	Dromogomphus spoliatus	Flag-tailed Spinyleg	2014-06-23	E	3-Medium	---	Significantly Rare	G4G5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Bivalve	21097	Alasmidonta raveneliana	Appalachian Elktoe	2018-11-26	CDr	3-Medium	Endangered	Endangered	G1	S1
Freshwater Bivalve	39254	Alasmidonta viridis	Slippershell Mussel	2018-11-26	E	3-Medium	---	Endangered	G4G5	S1
Freshwater Bivalve	28599	Lampsilis fasciola	Wavyrayed Lampmussel	2018-11-26	Er	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	39262	Villosa iris	Rainbow	2018-11-26	E	3-Medium	---	Threatened	G5	S2
Freshwater Fish	27470	Clinostomus sp. 1	Smoky Dace	2016-06-01	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27471	Clinostomus sp. 1	Smoky Dace	1997-07-23	H?	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27472	Clinostomus sp. 1	Smoky Dace	1997-07-15	H?	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	31089	Etheostoma vulneratum	Wounded Darter	2018-08-07	Er	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	17127	Paravitrea umbilicaris	Open Supercoil	1946-Pre	H	3-Medium	---	Special Concern	G3?	S2
Liverwort	21805	Plagiochila echinata	A Liverwort	1998	E	3-Medium	---	Significantly Rare Limited	G2	S1
Liverwort	22021	Plagiochila sullivantii var. sullivantii	A Liverwort	1991-09-08	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	21844	Plagiochila sullivantii var. sullivantii	A Liverwort	1998	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Mammal	11389	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2000-10-11	H?	3-Medium	---	Threatened	G3G4T3	S2
Mammal	1602	Myotis leibii	Eastern Small-footed Bat	2000-10-11	H?	3-Medium	---	Special Concern	G4	S2
Mammal	34760	Myotis lucifugus	Little Brown Bat	2012-08-12	E	2-High	---	Significantly Rare	G3	S2
Mammal	35191	Myotis lucifugus	Little Brown Bat	2000-07-14	H?	2-High	---	Significantly Rare	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	36044	Myotis lucifugus	Little Brown Bat	2006-07-25	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	34790	Myotis septentrionalis	Northern Long-eared Bat	2012-08-15	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	32835	Myotis septentrionalis	Northern Long-eared Bat	2010-07-11	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	35255	Myotis septentrionalis	Northern Long-eared Bat	2000	H?	2-High	Threatened	Threatened	G1G2	S2
Mammal	28682	Myotis sodalis	Indiana Bat	2005-06-07	E	3-Medium	Endangered	Endangered	G2	S1S2
Mammal	34795	Perimyotis subflavus	Tricolored Bat	2012-08-15	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	32956	Spilogale putorius	Eastern Spotted Skunk	2018-03-30	E	3-Medium	---	Game Animal	G4	S3
Moss	22013	Scopelophila ligulata	Copper Moss	1991-03-08	E	3-Medium	---	Significantly Rare Other	G5?	S1
Natural Community	39504	Acidic Cove Forest (Silverbell Subtype)	---	1997	A	2-High	---	---	G2	S1
Natural Community	31440	Acidic Cove Forest (Typic Subtype)	---	2011-08-18	BC	3-Medium	---	---	G5	S4
Natural Community	31654	Acidic Cove Forest (Typic Subtype)	---	2011-06-08	C	2-High	---	---	G5	S4
Natural Community	31652	Acidic Cove Forest (Typic Subtype)	---	2011-10-05	C	3-Medium	---	---	G5	S4
Natural Community	31871	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-09-04	C	3-Medium	---	---	G5	S5
Natural Community	31102	Chestnut Oak Forest (Dry Heath Subtype)	---	2011-05-25	AB	3-Medium	---	---	G5	S5
Natural Community	31873	Chestnut Oak Forest (Herb Subtype)	---	2011-10-05	B	3-Medium	---	---	G4G5	S4
Natural Community	31453	Low Elevation Rocky Summit (Acidic Subtype)	---	2011-10-14	B	2-High	---	---	G3?	S2
Natural Community	31454	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-10-14	B	2-High	---	---	G2G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31465	Montane Alluvial Forest (Large River Subtype)	---	2011-03-29	C	2-High	---	---	G2?	S1
Natural Community	31932	Montane Cliff (Acidic Herb Subtype)	---	2011-10-05	B	2-High	---	---	G3G4	S3
Natural Community	31946	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-06-11	A	2-High	---	---	G3	S3
Natural Community	31069	Pine--Oak/Heath (Typic Subtype)	---	2011-05-25	C	3-Medium	---	---	G3	S3
Natural Community	32049	Rich Cove Forest (Boulderfield Subtype)	---	2012-03-29	A	3-Medium	---	---	G3	S2
Natural Community	31471	Rich Cove Forest (Boulderfield Subtype)	---	2011-03-29	B	2-High	---	---	G3	S2
Natural Community	31992	Rich Cove Forest (Montane Rich Subtype)	---	2012-09-04	B	3-Medium	---	---	G3G4	S3
Natural Community	31103	Rich Cove Forest (Montane Rich Subtype)	---	2011-05-25	BC	3-Medium	---	---	G3G4	S3
Natural Community	32019	Rich Cove Forest (Montane Rich Subtype)	---	2011-10-05	B	3-Medium	---	---	G3G4	S3
Natural Community	31483	Rocky Bar and Shore (Alder-Yellowroot Subtype)	---	2011-08-18	B	2-High	---	---	G3G4	S3
Natural Community	32023	Spray Cliff	---	2011-10-05	B	2-High	---	---	G2	S2
Natural Community	31479	White Pine Forest	---	2011-03-29	B	3-Medium	---	---	G2G3	S2
Vascular Plant	30144	Adlumia fungosa	Climbing Fumitory	2011-10-11	C	2-High	---	Special Concern Vulnerable	G4	S2
Vascular Plant	29135	Adlumia fungosa	Climbing Fumitory	2012-08	E	2-High	---	Special Concern Vulnerable	G4	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	1978	Carex purpurifera	Purple Sedge	1994-09	B	3-Medium	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	29193	Carex purpurifera	Purple Sedge	2012-08	A	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	21804	Dicentra eximia	Bleeding Heart	1998	E	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29199	Dicentra eximia	Bleeding Heart	2012-08	E	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	5101	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	C	3-Medium	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	12578	Didymoglossum petersii	Dwarf Filmy-fern	1978-03-19	H	3-Medium	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21845	Didymoglossum petersii	Dwarf Filmy-fern	1998-11-19	B	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	27231	Didymoglossum petersii	Dwarf Filmy-fern	1999-10-20	AB	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21827	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	E	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21826	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	E	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	30165	Echinacea purpurea	Purple Coneflower	2011-08-24	B	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	30163	Erigenia bulbosa	Harbinger-of-spring	2011-04	E	2-High	---	Significantly Rare Peripheral	G5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	31708	Platanthera peramoena	Purple Fringeless Orchid	2012-09-04	D	2-High	---	Threatened	G5	S2
Vascular Plant	30178	Platanthera peramoena	Purple Fringeless Orchid	2011-08-18	D	2-High	---	Threatened	G5	S2
Vascular Plant	31715	Smilax hugeri	Huger's Carrion-flower	2012-09-04	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	14324	Spiraea virginiana	Virginia Spiraea	2018-06-13	BC	2-High	Threatened	Threatened	G2	S2
Vascular Plant	30371	Spiraea virginiana	Virginia Spiraea	2011-05-09	D	2-High	Threatened	Threatened	G2	S2
Vascular Plant	25737	Spiraea virginiana	Virginia Spiraea	2007-06-01	F	2-High	Threatened	Threatened	G2	S2
Vascular Plant	3765	Spiraea virginiana	Virginia Spiraea	2018-06-13	C	2-High	Threatened	Threatened	G2	S2
Vascular Plant	16185	Spiraea virginiana	Virginia Spiraea	2003	C	2-High	Threatened	Threatened	G2	S2
Vascular Plant	30336	Stewartia ovata	Mountain Camellia	2013-06-18	BC	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30337	Stewartia ovata	Mountain Camellia	2011-05-25	B	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30339	Stewartia ovata	Mountain Camellia	2011-10-05	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	35801	Stewartia ovata	Mountain Camellia	2013-07-23	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	34845	Stewartia ovata	Mountain Camellia	2013-05-24	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	27233	Vandenboschia boschiana	Appalachian Filmy-fern	1995	E	3-Medium	---	Endangered	G4	S1
Vascular Plant	30345	Vandenboschia boschiana	Appalachian Filmy-fern	2011-10-11	B	2-High	---	Endangered	G4	S1

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
LTN/Cheoah River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Great Smoky Mountains National Park	R1 (Exceptional)	C1 (Exceptional)

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Yellow Creek Wetlands and Slopes	R1 (Exceptional)	C3 (High)
LTN/Santeetlah Creek Aquatic Habitat	R1 (Exceptional)	C4 (Moderate)
LTN/Snowbird Creek Aquatic Habitat	R3 (High)	C4 (Moderate)
Cheoah Mountains	R1 (Exceptional)	C1 (Exceptional)
Farley Branch	R3 (High)	C4 (Moderate)
Tapoco/Calderwood Lake Slopes	R2 (Very High)	C3 (High)
Round Mountain Cove	R2 (Very High)	C3 (High)
Rocky Point Ferry Branch/Little Tennessee Slopes	R3 (High)	C4 (Moderate)
Cheoah River Floodplain	R2 (Very High)	C1 (Exceptional)
Joyce Kilmer Wilderness Area	R1 (Exceptional)	C1 (Exceptional)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Great Smoky Mountains National Park	US National Park Service	Federal
Great Smoky Mountains Registered Heritage Area	US National Park Service	Federal
Nantahala National Forest - Cheoah Ranger District	US Forest Service	Federal
Nantahala National Forest - Joyce Kilmer Wilderness	US Forest Service	Federal
Joyce Kilmer Wilderness Registered Heritage Area	US Forest Service	Federal
Mainspring Conservation Trust Easement	Land Trust for the Little Tennessee	Private

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on February 27, 2020; source: NCNHP, Q1 Jan 2020. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	21828	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2018-10-29	AB	3-Medium	---	Special Concern	G3T2	S3
Amphibian	16733	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2018-10-13	AB	3-Medium	---	Special Concern	G3T2	S3
Amphibian	27561	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2004-08-17	E	3-Medium	---	Special Concern	G3T2	S3
Amphibian	7903	Eurycea junaluska	Junaluska Salamander	2018-05-17	BC	3-Medium	---	Threatened	G2G3	S1
Amphibian	13753	Eurycea junaluska	Junaluska Salamander	2014-07-11	A?	3-Medium	---	Threatened	G2G3	S1
Amphibian	14289	Eurycea junaluska	Junaluska Salamander	1992-08-29	H?	3-Medium	---	Threatened	G2G3	S1
Amphibian	35480	Plethodon aureolus	Tellico Salamander	2012-03-28	E	3-Medium	---	Significantly Rare	G2G3	S2
Bird	25178	Haliaeetus leucocephalus	Bald Eagle	2015-02	E	3-Medium	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	31328	Haliaeetus leucocephalus	Bald Eagle	2015-03	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	37807	Loxia curvirostra	Red Crossbill	2014-09-27	E	2-High	---	Special Concern	G5	S2
Bird	15334	Setophaga cerulea	Cerulean Warbler	1982-06	H	3-Medium	---	Special Concern	G4	S2B
Bird	3244	Setophaga cerulea	Cerulean Warbler	2009-05	A	3-Medium	---	Special Concern	G4	S2B
Bird	34180	Vermivora chrysoptera	Golden-winged Warbler	2017-05-17	E	2-High	---	Special Concern	G4	S2S3B

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	117	Vermivora cyanoptera	Blue-winged Warbler	1964-07-11	H	4-Low	---	Significantly Rare	G5	S2B
Butterfly	9836	Autochton cellus	Golden Banded-Skipper	2003-06	E	4-Low	---	Significantly Rare	G4	S2
Butterfly	15130	Autochton cellus	Golden Banded-Skipper	2000-Pre	H?	4-Low	---	Significantly Rare	G4	S2
Butterfly	28791	Autochton cellus	Golden Banded-Skipper	2010-05-05	E	3-Medium	---	Significantly Rare	G4	S2
Butterfly	24853	Autochton cellus	Golden Banded-Skipper	2007-05-15	E	3-Medium	---	Significantly Rare	G4	S2
Butterfly	21057	Autochton cellus	Golden Banded-Skipper	2004-07-06	BC	3-Medium	---	Significantly Rare	G4	S2
Butterfly	10966	Autochton cellus	Golden Banded-Skipper	1996-04-27	H?	3-Medium	---	Significantly Rare	G4	S2
Butterfly	20005	Autochton cellus	Golden Banded-Skipper	1999-04-28	H?	3-Medium	---	Significantly Rare	G4	S2
Butterfly	13975	Celastrina nigra	Dusky Azure	1996-04-28	H?	3-Medium	---	Significantly Rare	G4	S2
Butterfly	28792	Erynnis martialis	Mottled Duskywing	2010-05-06	E	3-Medium	---	Significantly Rare	G3	S2
Butterfly	20261	Euphydryas phaeton	Baltimore Checkerspot	2004-05-20	B?	3-Medium	---	Significantly Rare	G5	S2
Butterfly	11944	Polygonia faunus	Green Comma	1996-04-25	H?	3-Medium	---	Significantly Rare	G5	S1S2
Butterfly	1106	Polygonia faunus	Green Comma	1996-04-27	H?	3-Medium	---	Significantly Rare	G5	S1S2
Dragonfly or Damselfly	33679	Dromogomphus spoliatus	Flag-tailed Spinyleg	2014-06-23	E	3-Medium	---	Significantly Rare	G4G5	S1
Dragonfly or Damselfly	33785	Stylurus scudderi	Zebra Clubtail	2004-Pre	H?	5-Very Low	---	Significantly Rare	G5	S2?
Freshwater Bivalve	21097	Alasmidonta raveneliana	Appalachian Elktoe	2018-11-26	CDr	3-Medium	Endangered	Endangered	G1	S1
Freshwater Bivalve	15440	Alasmidonta raveneliana	Appalachian Elktoe	1981-Pre	X?	2-High	Endangered	Endangered	G1	S1
Freshwater Bivalve	39254	Alasmidonta viridis	Slippershell Mussel	2018-11-26	E	3-Medium	---	Endangered	G4G5	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Freshwater Bivalve	28599	Lampsilis fasciola	Wavyrayed Lampmussel	2018-11-26	Er	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	39262	Villosa iris	Rainbow	2018-11-26	E	3-Medium	---	Threatened	G5	S2
Freshwater Fish	27470	Clinostomus sp. 1	Smoky Dace	2016-06-01	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27471	Clinostomus sp. 1	Smoky Dace	1997-07-23	H?	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27472	Clinostomus sp. 1	Smoky Dace	1997-07-15	H?	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	31089	Etheostoma vulneratum	Wounded Darter	2018-08-07	Er	3-Medium	---	Special Concern	G3	S2
Freshwater Fish	34820	Moxostoma sp. 2	Sicklefin Redhorse	2008-10-08	E	3-Medium	---	Threatened	G1G2	S2
Freshwater or Terrestrial Gastropod	37648	Discus nigrimontanus	Black Mountain Disc	2005-10-23	E	2-High	---	Significantly Rare	G4	S2S3
Freshwater or Terrestrial Gastropod	35926	Glyphyalinia junaluskana	Dark Glyph	2006-03-15	E	2-High	---	Special Concern	G2G3	S2
Freshwater or Terrestrial Gastropod	17127	Paravitrea umbilicaris	Open Supercoil	1946-Pre	H	3-Medium	---	Special Concern	G3?	S2
Freshwater or Terrestrial Gastropod	35935	Paravitrea umbilicaris	Open Supercoil	2006-03-15	E	2-High	---	Special Concern	G3?	S2
Liverwort	21805	Plagiochila echinata	A Liverwort	1998	E	3-Medium	---	Significantly Rare Limited	G2	S1
Liverwort	22021	Plagiochila sullivantii var. sullivantii	A Liverwort	1991-09-08	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	21844	Plagiochila sullivantii var. sullivantii	A Liverwort	1998	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	29261	Plagiochila virginica var. caroliniana	A Liverwort	2012-08	E	2-High	---	Significantly Rare Throughout	G3T2	S1

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Liverwort	8374	Porella wataugensis	A Liverwort	1990-Pre	H	4-Low	---	Significantly Rare Limited	G1G2Q	S1
Mammal	250	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2000-07-14	H?	3-Medium	---	Threatened	G3G4T3	S2
Mammal	11389	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2000-10-11	H?	3-Medium	---	Threatened	G3G4T3	S2
Mammal	1602	Myotis leibii	Eastern Small-footed Bat	2000-10-11	H?	3-Medium	---	Special Concern	G4	S2
Mammal	27987	Myotis leibii	Eastern Small-footed Bat	2008-06-02	E	2-High	---	Special Concern	G4	S2
Mammal	34024	Myotis leibii	Eastern Small-footed Bat	2006-07-25	E	2-High	---	Special Concern	G4	S2
Mammal	36484	Myotis lucifugus	Little Brown Bat	2000-07-16	H?	3-Medium	---	Significantly Rare	G3	S2
Mammal	36032	Myotis lucifugus	Little Brown Bat	2011-07-27	E	2-High	---	Significantly Rare	G3	S2
Mammal	36040	Myotis lucifugus	Little Brown Bat	2007-06-22	E	2-High	---	Significantly Rare	G3	S2
Mammal	36035	Myotis lucifugus	Little Brown Bat	2007-06-22	E	2-High	---	Significantly Rare	G3	S2
Mammal	34760	Myotis lucifugus	Little Brown Bat	2012-08-12	E	2-High	---	Significantly Rare	G3	S2
Mammal	34756	Myotis lucifugus	Little Brown Bat	2012-08-15	E	2-High	---	Significantly Rare	G3	S2
Mammal	35191	Myotis lucifugus	Little Brown Bat	2000-07-14	H?	2-High	---	Significantly Rare	G3	S2
Mammal	34769	Myotis lucifugus	Little Brown Bat	2012-08-13	E	2-High	---	Significantly Rare	G3	S2
Mammal	35179	Myotis lucifugus	Little Brown Bat	2003-08-07	E	2-High	---	Significantly Rare	G3	S2
Mammal	36044	Myotis lucifugus	Little Brown Bat	2006-07-25	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	36675	Myotis lucifugus	Little Brown Bat	2006-07-25	E	2-High	---	Significantly Rare	G3	S2
Mammal	34758	Myotis lucifugus	Little Brown Bat	2012-08-11	E	2-High	---	Significantly Rare	G3	S2

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Mammal	34170	Myotis septentrionalis	Northern Long-eared Bat	2000-07-17	H?	3-Medium	Threatened	Threatened	G1G2	S2
Mammal	32148	Myotis septentrionalis	Northern Long-eared Bat	2000-07-14	H?	2-High	Threatened	Threatened	G1G2	S2
Mammal	34169	Myotis septentrionalis	Northern Long-eared Bat	2000-06-09	H?	3-Medium	Threatened	Threatened	G1G2	S2
Mammal	34790	Myotis septentrionalis	Northern Long-eared Bat	2012-08-15	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	34208	Myotis septentrionalis	Northern Long-eared Bat	2008-06-03	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	34211	Myotis septentrionalis	Northern Long-eared Bat	2011-07-27	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	32790	Myotis septentrionalis	Northern Long-eared Bat	2006-07-25	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	34215	Myotis septentrionalis	Northern Long-eared Bat	2007-06-22	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	32835	Myotis septentrionalis	Northern Long-eared Bat	2010-07-11	E	2-High	Threatened	Threatened	G1G2	S2
Mammal	35255	Myotis septentrionalis	Northern Long-eared Bat	2000	H?	2-High	Threatened	Threatened	G1G2	S2
Mammal	28682	Myotis sodalis	Indiana Bat	2005-06-07	E	3-Medium	Endangered	Endangered	G2	S1S2
Mammal	32451	Myotis sodalis	Indiana Bat	2011-10-08	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	36157	Perimyotis subflavus	Tricolored Bat	2008-06-02	E	4-Low	---	Significantly Rare	G2G3	S3
Mammal	34795	Perimyotis subflavus	Tricolored Bat	2012-08-15	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36156	Perimyotis subflavus	Tricolored Bat	2006-07-25	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	35250	Perimyotis subflavus	Tricolored Bat	2003-08-07	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36805	Perimyotis subflavus	Tricolored Bat	2006-07-25	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	32956	Spilogale putorius	Eastern Spotted Skunk	2018-03-30	E	3-Medium	---	Game Animal	G4	S3
Moss	21831	Plagiomnium carolinianum	Carolina Star-moss	1998-05-20	E	2-High	---	Significantly Rare Limited	G3	S2

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Moss	23432	Plagiomnium ellipticum	Marsh Magnificent Moss	1987-10-03	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	22013	Scopelophila ligulata	Copper Moss	1991-03-08	E	3-Medium	---	Significantly Rare Other	G5?	S1
Natural Community	39504	Acidic Cove Forest (Silverbell Subtype)	---	1997	A	2-High	---	---	G2	S1
Natural Community	31442	Acidic Cove Forest (Typic Subtype)	---	2010-08-16	AB	4-Low	---	---	G5	S4
Natural Community	31440	Acidic Cove Forest (Typic Subtype)	---	2011-08-18	BC	3-Medium	---	---	G5	S4
Natural Community	31654	Acidic Cove Forest (Typic Subtype)	---	2011-06-08	C	2-High	---	---	G5	S4
Natural Community	31652	Acidic Cove Forest (Typic Subtype)	---	2011-10-05	C	3-Medium	---	---	G5	S4
Natural Community	13246	Canada Hemlock Forest (Typic Subtype)	---	2010	A	4-Low	---	---	G3G4	S1S2
Natural Community	7322	Chestnut Oak Forest (Dry Heath Subtype)	---	2018-08-03	A	4-Low	---	---	G5	S5
Natural Community	31871	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-09-04	C	3-Medium	---	---	G5	S5
Natural Community	31102	Chestnut Oak Forest (Dry Heath Subtype)	---	2011-05-25	AB	3-Medium	---	---	G5	S5
Natural Community	31443	Chestnut Oak Forest (Herb Subtype)	---	2010-05-25	B	4-Low	---	---	G4G5	S4
Natural Community	31874	Chestnut Oak Forest (Herb Subtype)	---	2011-08-15	B	4-Low	---	---	G4G5	S4
Natural Community	30896	Chestnut Oak Forest (Herb Subtype)	---	2010-04-29	BC	3-Medium	---	---	G4G5	S4
Natural Community	31873	Chestnut Oak Forest (Herb Subtype)	---	2011-10-05	B	3-Medium	---	---	G4G5	S4
Natural Community	30910	Low Elevation Basic Glade (Montane Subtype)	---	2012-05-23	A	4-Low	---	---	G2	S2

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Natural Community	31897	Low Elevation Basic Glade (Montane Subtype)	---	2012-06-19	C	2-High	---	---	G2	S2
Natural Community	31453	Low Elevation Rocky Summit (Acidic Subtype)	---	2011-10-14	B	2-High	---	---	G3?	S2
Natural Community	31915	Low Elevation Seep (Montane Subtype)	---	2011-06-11	B	2-High	---	---	G2G3	S2S3
Natural Community	31480	Low Elevation Seep (Montane Subtype)	---	2011-08-18	B	2-High	---	---	G2G3	S2S3
Natural Community	31914	Low Elevation Seep (Montane Subtype)	---	2012-06-19	C	2-High	---	---	G2G3	S2S3
Natural Community	31454	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-10-14	B	2-High	---	---	G2G3	S2
Natural Community	31917	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-04-11	C	2-High	---	---	G2G3	S2
Natural Community	31465	Montane Alluvial Forest (Large River Subtype)	---	2011-03-29	C	2-High	---	---	G2?	S1
Natural Community	31926	Montane Alluvial Forest (Small River Subtype)	---	2010-08-16	C	3-Medium	---	---	G3	S1
Natural Community	31931	Montane Cliff (Acidic Herb Subtype)	---	2011-08-15	B	3-Medium	---	---	G3G4	S3
Natural Community	31932	Montane Cliff (Acidic Herb Subtype)	---	2011-10-05	B	2-High	---	---	G3G4	S3
Natural Community	31927	Montane Cliff (Mafic Subtype)	---	2012-06-19	AB	2-High	---	---	G3	S3
Natural Community	32044	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-08	A	4-Low	---	---	G4G5	S4S5
Natural Community	38638	Montane Oak--Hickory Forest (Acidic Subtype)	---	2018-08-24	B	3-Medium	---	---	G4G5	S4S5

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Natural Community	38688	Montane Oak--Hickory Forest (Acidic Subtype)	---	2018-08-23	A	2-High	---	---	G4G5	S4S5
Natural Community	30929	Montane Oak--Hickory Forest (Acidic Subtype)	---	2011-05-10	BC	2-High	---	---	G4G5	S4S5
Natural Community	31461	Montane Oak--Hickory Forest (Acidic Subtype)	---	2011-08-18	B	4-Low	---	---	G4G5	S4S5
Natural Community	30935	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-05-10	B	3-Medium	---	---	G3	S3
Natural Community	31949	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-06-19	AB	4-Low	---	---	G3	S3
Natural Community	31063	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-05-25	AB	4-Low	---	---	G3	S3
Natural Community	31946	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-06-11	A	2-High	---	---	G3	S3
Natural Community	31965	Piedmont/Mountain Canebrake	---	2012-09-04	CD	2-High	---	---	G2?	S1
Natural Community	31069	Pine--Oak/Heath (Typic Subtype)	---	2011-05-25	C	3-Medium	---	---	G3	S3
Natural Community	31970	Rich Cove Forest (Boulderfield Subtype)	---	2011-06-11	A	4-Low	---	---	G3	S2
Natural Community	32049	Rich Cove Forest (Boulderfield Subtype)	---	2012-03-29	A	3-Medium	---	---	G3	S2
Natural Community	31472	Rich Cove Forest (Boulderfield Subtype)	---	2018-08-24	A	2-High	---	---	G3	S2
Natural Community	31471	Rich Cove Forest (Boulderfield Subtype)	---	2011-03-29	B	2-High	---	---	G3	S2
Natural Community	31971	Rich Cove Forest (Boulderfield Subtype)	---	2012-06-19	A	2-High	---	---	G3	S2
Natural Community	31969	Rich Cove Forest (Boulderfield Subtype)	---	2011-08-15	C	2-High	---	---	G3	S2
Natural Community	8707	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	A	4-Low	---	---	G4	S4

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Natural Community	31974	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-08-15	BC	3-Medium	---	---	G4	S4
Natural Community	5510	Rich Cove Forest (Montane Intermediate Subtype)	---	2018-08-24	B	3-Medium	---	---	G4	S4
Natural Community	32020	Rich Cove Forest (Montane Rich Subtype)	---	2012-09-20	AB	3-Medium	---	---	G3G4	S3
Natural Community	31992	Rich Cove Forest (Montane Rich Subtype)	---	2012-09-04	B	3-Medium	---	---	G3G4	S3
Natural Community	38636	Rich Cove Forest (Montane Rich Subtype)	---	2018-08-24	B	3-Medium	---	---	G3G4	S3
Natural Community	31103	Rich Cove Forest (Montane Rich Subtype)	---	2011-05-25	BC	3-Medium	---	---	G3G4	S3
Natural Community	32019	Rich Cove Forest (Montane Rich Subtype)	---	2011-10-05	B	3-Medium	---	---	G3G4	S3
Natural Community	31475	Rich Cove Forest (Red Oak Subtype)	---	2018-08-24	A	2-High	---	---	G3	S2?
Natural Community	32005	Rich Montane Seep	---	2011-08-15	AB	2-High	---	---	G3	S3
Natural Community	31483	Rocky Bar and Shore (Alder-Yellowroot Subtype)	---	2011-08-18	B	2-High	---	---	G3G4	S3
Natural Community	32023	Spray Cliff	---	2011-10-05	B	2-High	---	---	G2	S2
Natural Community	32032	Swamp Forest--Bog Complex (Typic Subtype)	---	2012-09-04	C	3-Medium	---	---	G2	S2
Natural Community	11874	White Pine Forest	---	1991-08-13	A	4-Low	---	---	G2G3	S2

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Natural Community	31479	White Pine Forest	---	2011-03-29	B	3-Medium	---	---	G2G3	S2
Reptile	18186	Pituophis melanoleucus melanoleucus	Northern Pinesnake	1959-08-19	H	4-Low	---	Threatened	G4T4	S2
Reptile	23777	Plestiodon anthracinus	Coal Skink	1967-07-30	H	3-Medium	---	Significantly Rare	G5	S2
Sawfly, Wasp, Bee, or Ant	37118	Bombus affinis	Rusty-patched Bumble Bee	1976-06-09	H	4-Low	Endangered	Significantly Rare	G2	S1
Vascular Plant	30144	Adlumia fungosa	Climbing Fumitory	2011-10-11	C	2-High	---	Special Concern Vulnerable	G4	S2
Vascular Plant	29135	Adlumia fungosa	Climbing Fumitory	2012-08	E	2-High	---	Special Concern Vulnerable	G4	S2
Vascular Plant	31646	Calamagrostis porteri ssp. porteri	Porter's Reed Grass	2012-09-20	E	2-High	---	Significantly Rare Peripheral	G4T4	S2
Vascular Plant	1978	Carex purpurifera	Purple Sedge	1994-09	B	3-Medium	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	29193	Carex purpurifera	Purple Sedge	2012-08	A	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	36495	Celastrus scandens	American Bittersweet	2012-05-23 or before	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	31686	Celastrus scandens	American Bittersweet	2012-09-20	B	2-High	---	Endangered	G5	S2?
Vascular Plant	7667	Cystopteris tennesseensis	Tennessee Bladder-fern	1956-08-19	H	4-Low	---	Endangered	G5	S1
Vascular Plant	21804	Dicentra eximia	Bleeding Heart	1998	E	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29199	Dicentra eximia	Bleeding Heart	2012-08	E	2-High	---	Significantly Rare Peripheral	G4	S3

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Vascular Plant	30164	Dicentra eximia	Bleeding Heart	2011-03-29	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	5101	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	C	3-Medium	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	12578	Didymoglossum petersii	Dwarf Filmy-fern	1978-03-19	H	3-Medium	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21845	Didymoglossum petersii	Dwarf Filmy-fern	1998-11-19	B	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	27231	Didymoglossum petersii	Dwarf Filmy-fern	1999-10-20	AB	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21827	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	E	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	30346	Didymoglossum petersii	Dwarf Filmy-fern	2011-08-11	C	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21830	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	E	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	21826	Didymoglossum petersii	Dwarf Filmy-fern	1998-06-17	E	2-High	---	Significantly Rare Throughout	G4G5	S2
Vascular Plant	30165	Echinacea purpurea	Purple Coneflower	2011-08-24	B	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	30163	Erigenia bulbosa	Harbinger-of-spring	2011-04	E	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	34001	Erigenia bulbosa	Harbinger-of-spring	2013-04-24	B	2-High	---	Significantly Rare Peripheral	G5	S1

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Vascular Plant	30172	Frasera caroliniensis	Columbo	2011-08-24	B	2-High	---	Significantly Rare Peripheral	G5	S2S3
Vascular Plant	31701	Hydrastis canadensis	Goldenseal	2012-09-20	BC	2-High	---	Significantly Rare Other	G3G4	S3
Vascular Plant	31708	Platanthera peramoena	Purple Fringeless Orchid	2012-09-04	D	2-High	---	Threatened	G5	S2
Vascular Plant	30178	Platanthera peramoena	Purple Fringeless Orchid	2011-08-18	D	2-High	---	Threatened	G5	S2
Vascular Plant	8027	Rhododendron cumberlandense	Cumberland Azalea	1961-06	H	4-Low	---	Significantly Rare Peripheral	G4?	S1
Vascular Plant	29267	Rudbeckia triloba var. beadlei	Chauncey's Coneflower	2011-09-08	A	2-High	---	Significantly Rare Throughout	G5TNR	S1
Vascular Plant	30275	Scutellaria saxatilis	Rock Skullcap	2011-06-08	CD	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	31713	Silene ovata	Mountain Catchfly	2012-09-20	AB	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	29303	Smilax hugeri	Huger's Carrion-flower	1995	E	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	31715	Smilax hugeri	Huger's Carrion-flower	2012-09-04	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29311	Solidago simulans	Granite Dome Goldenrod	2011-09-08	A	3-Medium	---	Significantly Rare Limited	G2	S2
Vascular Plant	30304	Solidago simulans	Granite Dome Goldenrod	2012-05-23	BC	2-High	---	Significantly Rare Limited	G2	S2
Vascular Plant	31716	Solidago simulans	Granite Dome Goldenrod	2012-06-19	BC	2-High	---	Significantly Rare Limited	G2	S2
Vascular Plant	14324	Spiraea virginiana	Virginia Spiraea	2018-06-13	BC	2-High	Threatened	Threatened	G2	S2
Vascular Plant	30371	Spiraea virginiana	Virginia Spiraea	2011-05-09	D	2-High	Threatened	Threatened	G2	S2
Vascular Plant	25737	Spiraea virginiana	Virginia Spiraea	2007-06-01	F	2-High	Threatened	Threatened	G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	3765	Spiraea virginiana	Virginia Spiraea	2018-06-13	C	2-High	Threatened	Threatened	G2	S2
Vascular Plant	16185	Spiraea virginiana	Virginia Spiraea	2003	C	2-High	Threatened	Threatened	G2	S2
Vascular Plant	29317	Stewartia ovata	Mountain Camellia	2010-08-25	A	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30336	Stewartia ovata	Mountain Camellia	2013-06-18	BC	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29316	Stewartia ovata	Mountain Camellia	2012-03-28	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30337	Stewartia ovata	Mountain Camellia	2011-05-25	B	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30339	Stewartia ovata	Mountain Camellia	2011-10-05	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	35801	Stewartia ovata	Mountain Camellia	2013-07-23	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	34845	Stewartia ovata	Mountain Camellia	2013-05-24	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	27233	Vandenboschia boschiana	Appalachian Filmy-fern	1995	E	3-Medium	---	Endangered	G4	S1
Vascular Plant	30345	Vandenboschia boschiana	Appalachian Filmy-fern	2011-10-11	B	2-High	---	Endangered	G4	S1

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
LTN/Cheoah River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Great Smoky Mountains National Park	R1 (Exceptional)	C1 (Exceptional)
Yellow Creek Wetlands and Slopes	R1 (Exceptional)	C3 (High)
LTN/Santeetlah Creek Aquatic Habitat	R1 (Exceptional)	C4 (Moderate)
LTN/Snowbird Creek Aquatic Habitat	R3 (High)	C4 (Moderate)
Cheoah Mountains	R1 (Exceptional)	C1 (Exceptional)

Natural Areas Documented Within a One-mile Radius of the Project Area

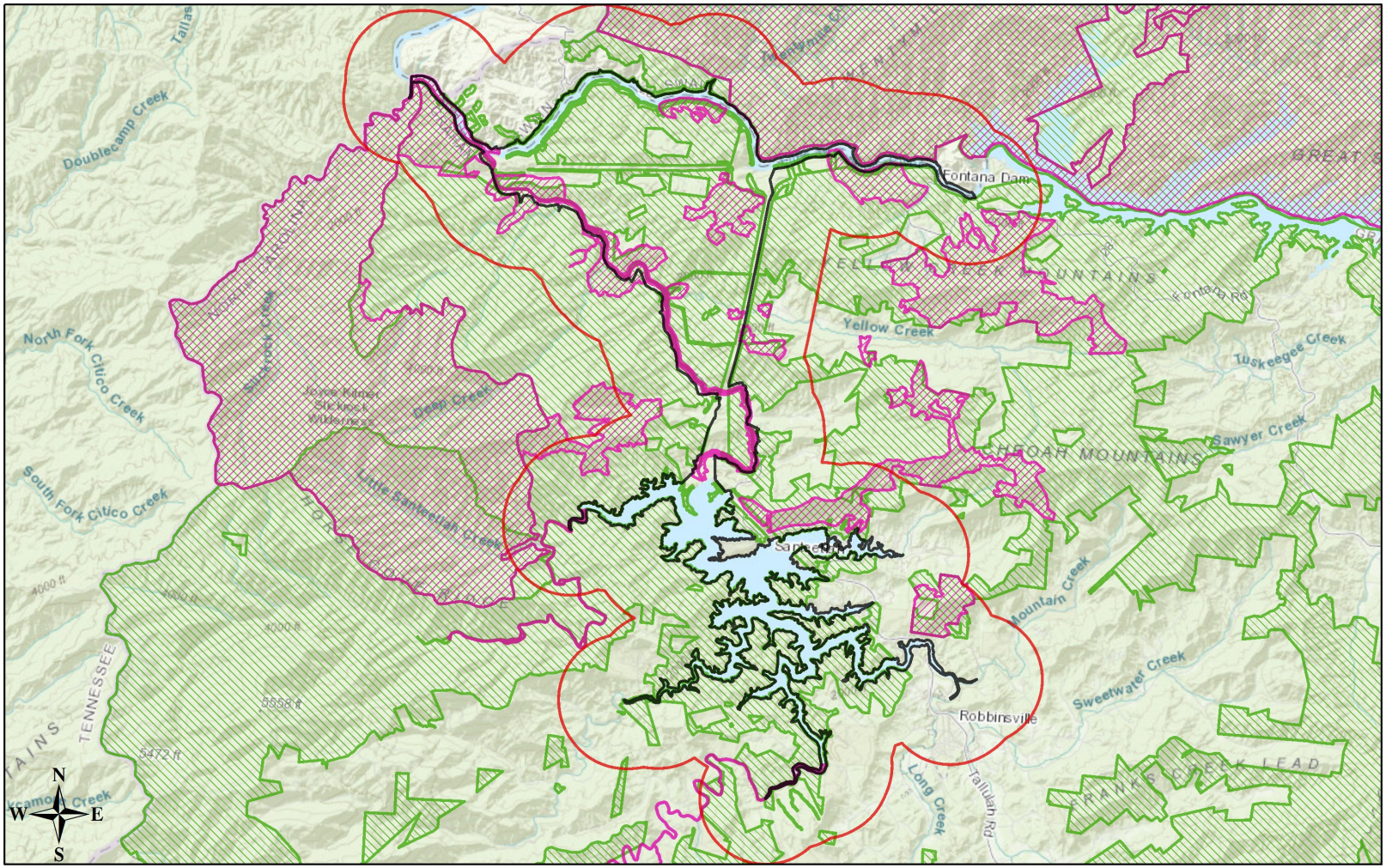
Site Name	Representational Rating	Collective Rating
Farley Branch	R3 (High)	C4 (Moderate)
Tapoco/Calderwood Lake Slopes	R2 (Very High)	C3 (High)
Sammy Basin	R2 (Very High)	C2 (Very High)
Round Mountain Cove	R2 (Very High)	C3 (High)
Rocky Point Ferry Branch/Little Tennessee Slopes	R3 (High)	C4 (Moderate)
Rock Creek Knob	R5 (General)	C4 (Moderate)
High Top/Bee Cove Slopes	R2 (Very High)	C3 (High)
Cheoah River Floodplain	R2 (Very High)	C1 (Exceptional)
Joyce Kilmer Wilderness Area	R1 (Exceptional)	C1 (Exceptional)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Great Smoky Mountains National Park	US National Park Service	Federal
Great Smoky Mountains Registered Heritage Area	US National Park Service	Federal
Nantahala National Forest - Cheoah Ranger District	US Forest Service	Federal
Nantahala National Forest - Joyce Kilmer Wilderness	US Forest Service	Federal
Joyce Kilmer Wilderness Registered Heritage Area	US Forest Service	Federal
Mainspring Conservation Trust Easement	Land Trust for the Little Tennessee	Private
Nantahala National Forest - Joyce Kilmer Memorial Forest	US Forest Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
NC Clean Water Management Trust Fund Funded Project	NC DNCR, Clean Water Management Trust Fund	State

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on February 27, 2020; source: NCNHP, Q1 Jan 2020. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-11492: Smoky_LIHI_Recertification



February 27, 2020

- Project Boundary
- Buffered Project Boundary
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

1:133,205

0 1 2 4 mi

0 1.75 3.5 7 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community