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OCOEE RIVER
WHITEWATER RAFTING AGREEMENT

FINAL ENVIRONMENTAL ASSESSMENT
Polk County, Tennessee

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

Cooperating Agency:
U.S. Forest Service
Cherokee National Forest

May 2018

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Symbols, Acronyms, and Abbreviations

AADT	Annual Average Daily Traffic
ACS	American Community Survey
APE	Area of Potential Effects
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
I/O	Input/Out
IBI	Index of Biotic Integrity
in/yr	Inches Per Year
LOS	Level of Service
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OROA	Ocoee River Outfitters Association
Development Fund	Ocoee River Recreation and Economic Development Fund
RM	River Mile
ROD	Record of Decision
RUVD	Recreation Use Values Database
SHPO	State Historic Preservation Officer
SLDC	Southeast Local Development Corporation
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USCB	U.S. Census Bureau
USFS	U.S. Department of Agriculture Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

The Tennessee Valley Authority (TVA) is considering a new management agreement with the U.S. Department of Agriculture Forest Service (USFS) and the State of Tennessee (State) to establish partner responsibilities for recreational management along the Ocoee River in Polk County, Tennessee. The proposed agreement addresses water releases from Ocoee Dams 2 and 3 for a term of 15 years and a land action to improve recreation management. This Environmental Assessment (EA) has been prepared to evaluate environmental, economic, recreational and other impacts of the proposed agreements. The USFS is serving as a cooperating agency in this review.

1.1 Introduction and Background

The Ocoee River headwaters originate from the Toccoa River in northern Georgia. Once the Toccoa River crosses the state line from McCaysville, Georgia to Copperhill, Tennessee, the river is renamed as the Ocoee River and flows through Polk County, Tennessee. It is one of the most popular rivers in the eastern United States for whitewater rafting and kayaking (Figure 1-1). Two sections of the river, commonly known as the Upper Ocoee and the Middle Ocoee, are used for whitewater recreation (Figure 1-2). The Upper Ocoee is defined as the section from River Mile (RM) 29.2 just below Ocoee No. 3 Dam downstream to RM 24.2 at the Roger's Branch access site just above Ocoee No. 2 Dam. When generating power at the Ocoee No. 3 Powerhouse, the water in this section is diverted at No. 3 Dam into a tunnel to the Ocoee No. 3 Powerhouse located about 0.8 mile upstream of the No. 2 Dam (Figure 1-3). The Middle Ocoee is defined as the section from RM 24.1 at Ocoee No. 2 Dam downstream to the take-out at RM 19.6 below the Ocoee No. 2 Powerhouse. When generating power at the No. 2 Powerhouse, the water in this section is diverted at No. 2 Dam into an elevated flume to the No. 2 Powerhouse (Figure 1-4).

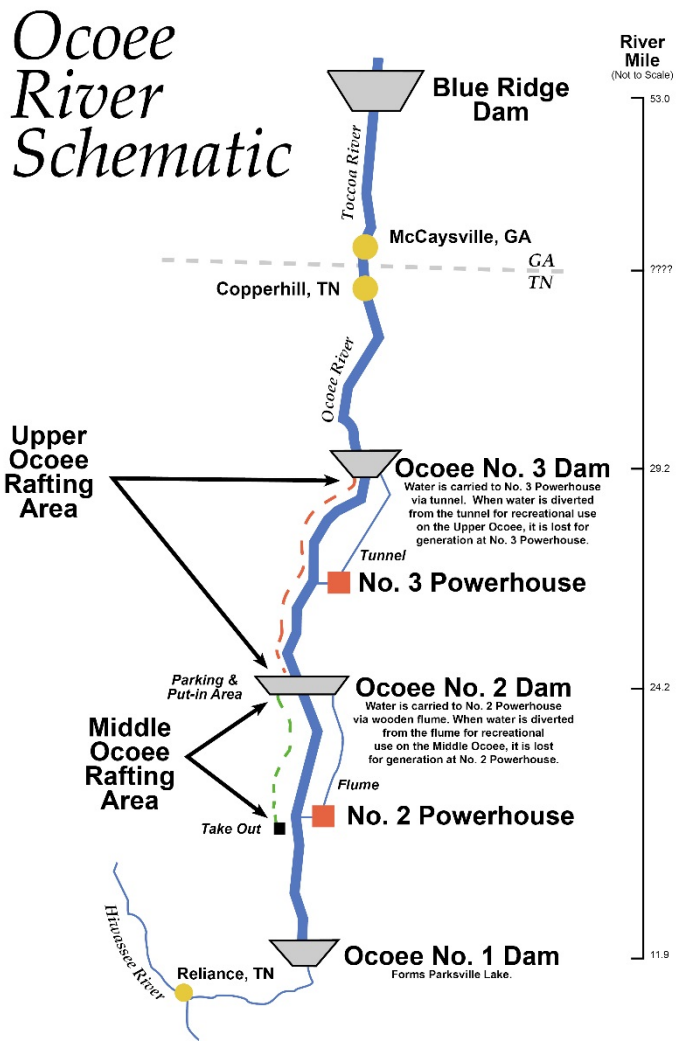

Figure 1-1. Overview of the Ocoee River (not to scale)

Whitewater recreation on both river sections is dependent on the release of water from TVA dams

into the river channel. Ordinarily, the water is diverted from the river channel to generate power, which leaves insufficient water flow in the river channel to support whitewater recreation.

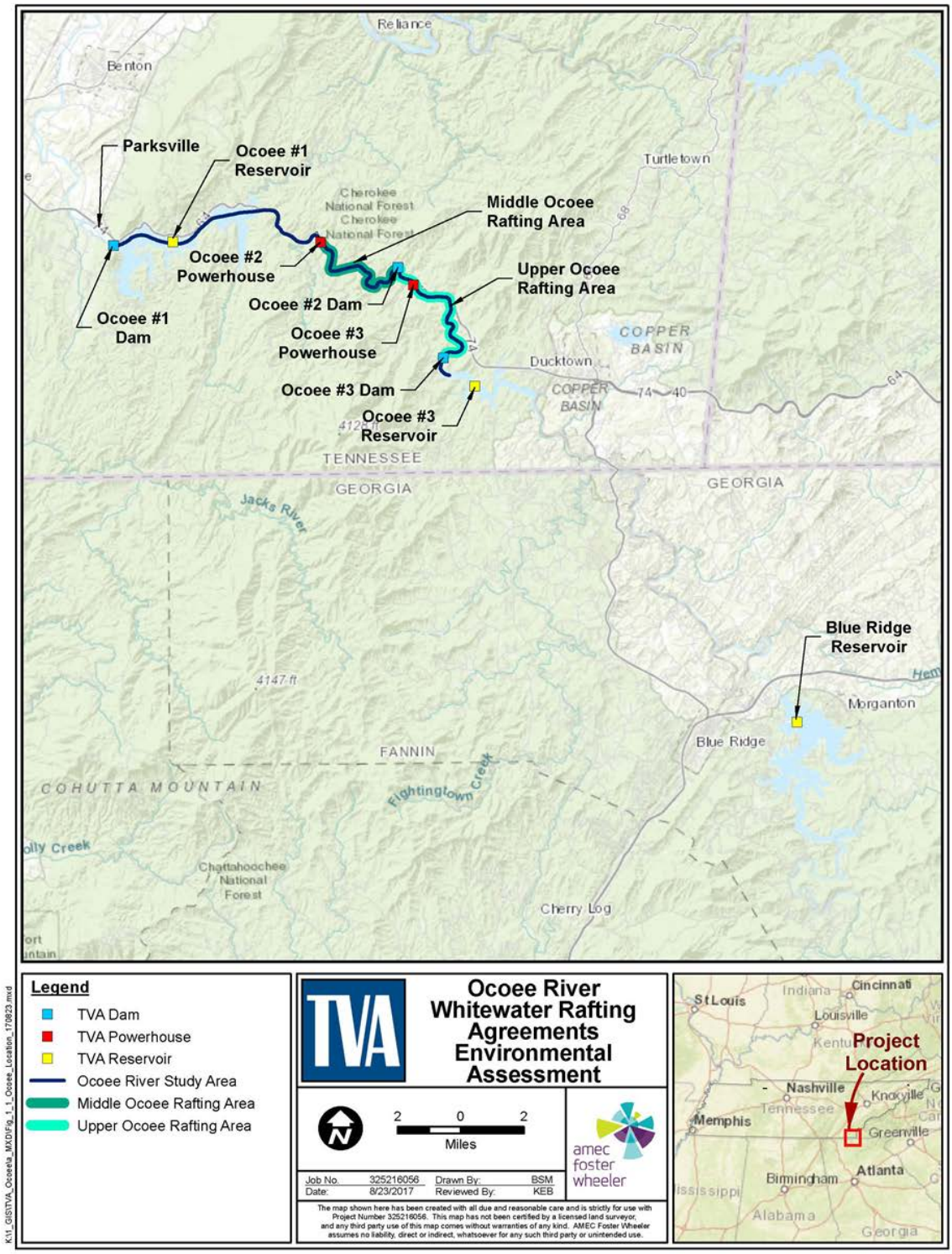

Figure 1-2. Project Location

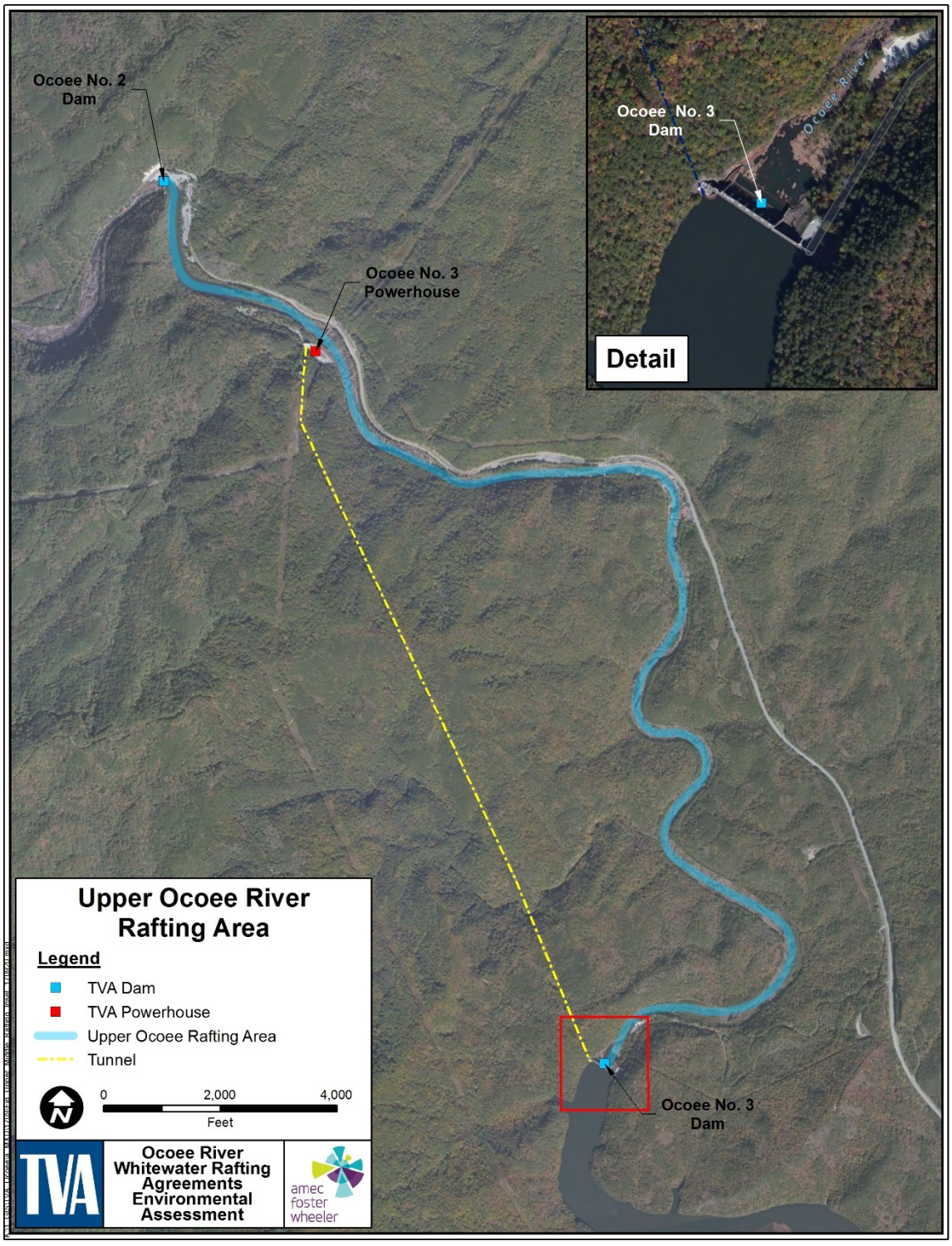

Figure 1-3. Upper Ocoee Rafting Area

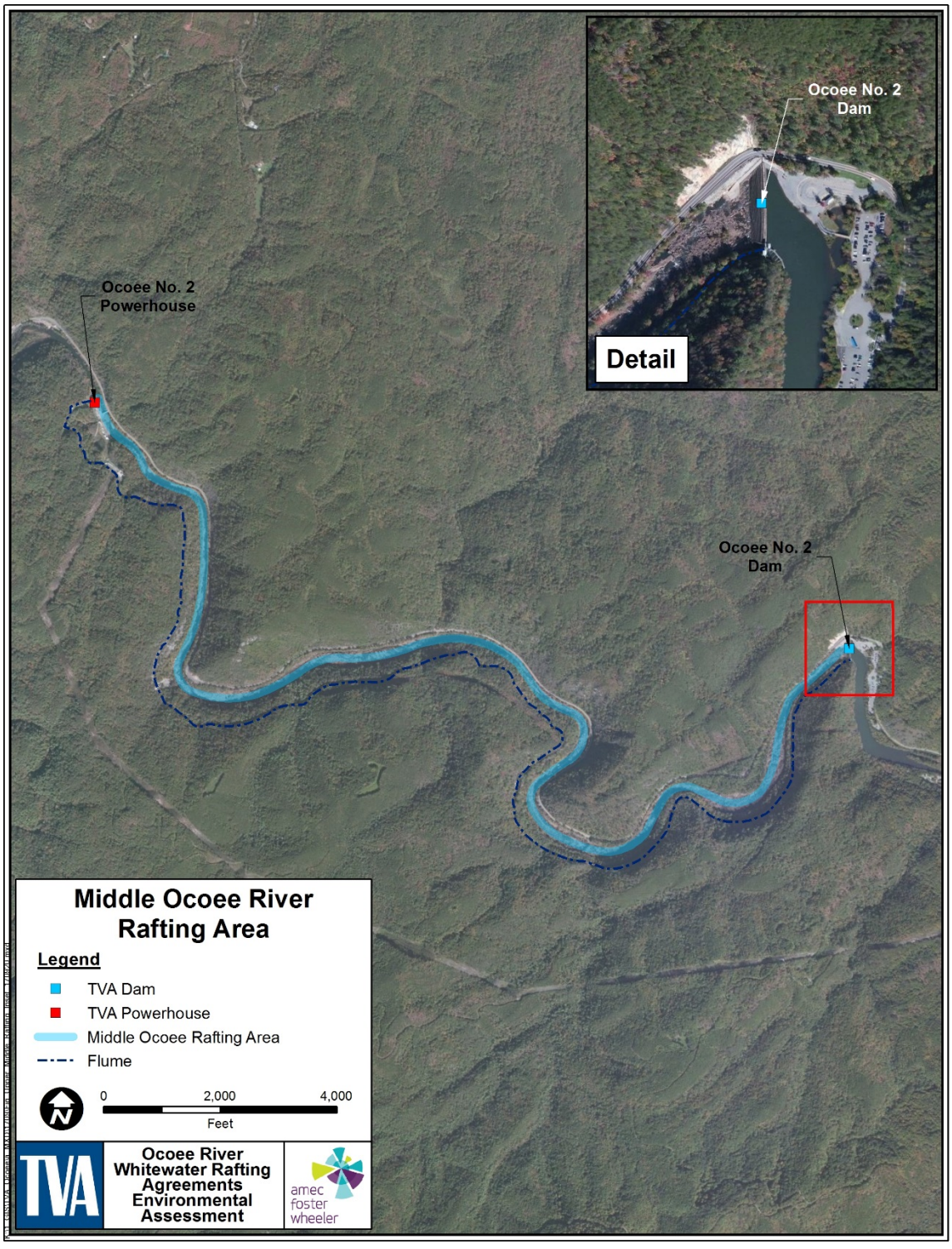

Figure 1-4. Middle Ocoee Rafting Area

Until 1976, the hydropower units at Ocoee No. 2 were regularly used to generate power. Consequently, the Middle Ocoee was rarely available for whitewater recreation, except during high flow periods in the river and during scheduled fall maintenance activities. In 1976, TVA ceased generating power at Ocoee No. 2 because of the deteriorated condition of the flume and No. 2 Dam, and whitewater recreational use of the river rapidly increased. In 1979, TVA decided to rehabilitate the Ocoee No. 2 Dam and flume to resume power production. TVA also indicated that it would provide recreational water releases, if TVA was reimbursed for the lost revenue. This led to protracted and sometimes controversial negotiations over how the river could be managed for power production and still accommodate white water recreation without burdening TVA consumers with the cost to replace the lost power generation with other energy sources.

The process established in 1983 to reimburse TVA for lost power costs from providing water releases on the Middle Ocoee ends on March 16, 2019.

In 1983, Congress passed Public Law No. 98-151 which appropriated $7.4 million for the purpose of providing recreation on the Middle Ocoee River. This money was for reimbursement to the TVA power program for replacement power generation resulting from recreational releases of water from Ocoee No. 2 Dam. TVA placed $1 million of this appropriation in a trust fund for the State of Tennessee for compensation for their assumed responsibility for the development, operation, and maintenance of recreation facilities at Ocoee No. 2 for a 35-year period. The entire $7.4 million appropriation is being reimbursed to the U.S. Treasury through fees collected for Ocoee River recreation activities. The $7.4 million threshold was reached during the 2017 recreation season, and the final payment of the 1984 appropriation was made to the U.S. Treasury in early 2018.

In light of the 1983 Congressional appropriation, TVA entered into a 35-year agreement with the State in March 1984 to provide scheduled recreational water releases from Ocoee No. 2 Dam for up to 116 days per year. The water release days would occur between late March and early November and include weekends and holidays. The agreement established a system under which TVA licensed commercial outfitters to provide rafting services. Outfitters submit user fees to TVA based on the number of customers served. TVA in turn submits these user fees to the U.S. Treasury as payment toward the 1983 Congressional appropriation. Under the terms of the agreement, TVA also granted the State a 35-year recreation easement over TVA lands at the Ocoee No. 2 Dam and below the Ocoee No. 2 Powerhouse for the operation and maintenance of whitewater recreation and associated facilities on the Middle Ocoee. TVA also constructed improved access facilities at the dam and powerhouse sites.

Agreements and easements established in 1984 between TVA and the State to set the number of recreational release days on the Middle Ocoee, establish licensing of commercial rafting outfitters by TVA, and other arrangements expire on December 31, 2018.

In 1988, the State, in cooperation with the USFS and TVA, issued the Ocoee River General Management Plan (Tennessee Department of Environment and Conservation [TDEC] 1988). This plan, and its associated Memorandum of Understanding between the three agencies, describes the responsibilities of each agency in the operation and maintenance of whitewater recreation and associated facilities on the Middle Ocoee. It also incorporates

rules issued by the TDEC (Chapter 0400-2-10) establishing requirements for conducting rafting services on the Ocoee River.

In 1997, the Cherokee National Forest (part of the USFS) issued a Final Environmental Impact Statement (EIS) (USFS 1997) on the development of recreational facilities in the Upper Ocoee River corridor, including the reuse of facilities developed for the whitewater competition during the 1996 Summer Olympic Games. This Final EIS addressed, among other things, commercial whitewater recreation on the Upper Ocoee River. Because this activity is dependent on TVA's releasing water from Ocoee No. 3 Dam into the river channel, TVA was a cooperating agency in the development of the Final EIS and issued a Record of Decision (ROD) on the proposed action (TVA 1997). TVA, like the USFS, decided to implement the alternative for the maximum level of land- and water-based recreation development, which approves scheduled water releases from Ocoee No. 3 Dam for up to 54 days per year for commercial and recreational use and up to 20 days per year for special events (a total of 74 days). These releases are dependent on TVA's being reimbursed for lost power generation revenues and are subject to the availability of water in Blue Ridge Reservoir upstream of Ocoee No. 3 Reservoir. The selected alternative also included expanding the facilities at Ocoee No. 2 Dam and constructing two rafting access areas on the Upper Ocoee below Ocoee No. 3 Dam. Facilities at these two access areas included separate launch areas for commercial and private boaters, a restroom and change house, and parking for buses and other large vehicles.

In 2006, TVA entered into an agreement with the Southeast Local Development Corporation (SLDC) for recreational water releases on the Upper Ocoee from Ocoee No. 3 Dam for 2006 through 2018. The agreement established a schedule for 34 release days. SLDC was also provided the option to purchase additional release days as requested by the outfitters, specifically up to 20 days for recreation and an additional 20 days for special events. Therefore, the SLDC agreement is consistent with the 1997 TVA and USFS ROD for management of the Upper Ocoee River, which set a maximum of 74 release days. SLDC was given the option to reimburse TVA for replacement power generation through lump sum or annual payments. SLDC chose to reimburse TVA in two lump sum payments totaling $1.6 million, shortly after the agreement was signed. In 2010, SLDC assigned its rights and obligations under the 2006 agreement to the Ocoee River Outfitters Association (OROA), a state-chartered non-profit organization of outfitters operating on the Ocoee River.

1.2 Current Release Schedules and Reimbursement for Lost Power Costs

1.2.1 Middle Ocoee River

Water is released from the Ocoee No. 2 Dam in accordance the agreement established in 1984. The average flow on water release days is at least 1,200 cubic feet per second (cfs).

TVA currently licenses 25 commercial outfitters to operate on the Middle Ocoee River. The State established a capacity limit of 4,250 boaters per day on the Middle Ocoee and a methodology for allocating this capacity among the outfitters in a regulation issued by TDEC and last revised in September 2010 (TDEC Rules Chapter 0400-02-10). When this limit is reached, the number of boaters is capped on the equivalent day of the next year.

The State collects an additional $0.50 per commercial rafter on the Middle Ocoee River for the reimbursement of its site maintenance expenses. Rafters floating both the Upper and

Middle Ocoee sections are charged $0.50 per day by the State, rather than $0.50 for each section. There are no restrictions on the number of non-commercial, private whitewater boats using the Ocoee River. As previously discussed, TVA received $7.4 million from the U.S. Congress in 1983 (Public Law 98-151) for replacement power generation resulting from water releases to the Middle Ocoee River to support whitewater recreation. At that time, Congress stipulated that the entire $7.4 million appropriation is to be reimbursed to the U.S. Treasury through user fees collected for Ocoee River recreation activities. The user fee collected by the outfitters to repay the congressional appropriation was initially $2 per customer and was intended to escalate over time as the industry was built. Under this original plan, the fee was projected to increase to $5 per customer by the end of the 35-year period in 2018. However, because the commercial use far exceeded expectations, the customer fee was reduced from $2 to $1 per customer in 1999 in order to minimize the user fee while still achieving the repayment of the $7.4 million before the end of 2018. The $7.4 million threshold was reached during the 2017 recreation season, and the final payment of the 1984 appropriation was made to the U.S. Treasury in early 2018. TVA now estimates that this appropriation only reimbursed TVA for replacement power generation from 1984 through 1992 or 1993. To fulfill the congressional directive, TVA has continued its obligation to release water through the full original 35-year term.

1.2.2 Upper Ocoee River

Water is released from Ocoee No. 3 Dam in accordance with the agreement established in 2006. The average flow on water release days is at least 1,600 cfs.

As noted above, under the 2006 agreement additional release days could be provided, and TVA would be reimbursed for replacement power generation. However, the total number of days cannot exceed 74 days in accordance with the 1997 USFS ROD. TVA was paid a total of $1.6 million in 2006 for water releases from Ocoee No. 3 for the 2006 to 2018 seasons. As part of the 2010 contract assignment from SLDC to OROA, OROA obtained a commercial bank loan to pay the remaining contract. OROA charges participating outfitters a fee schedule in order to collect enough to make the monthly bank loan payment. The formula used to determine the fee is based on the number of customers served and therefore varies slightly from year to year. The fee schedule is currently an annual base amount of $1,400 and an additional $4.70 per customer, which is estimated to total approximately $5 to $6 per rafter.

2006 Agreement for the Upper Ocoee River Water Releases

- TVA to release water from the Ocoee No. 3 Dam for up to 34 days per year.
- There are an additional 20 days available for purchase for rafting, and another 20 days at a lower flow rate available for purchase for special events.
- Releases would occur between early May and mid-September on weekend days.
- Average release rate would be at least 1,600 cfs for rafting and 1,400 cfs for special events.
- TVA reimbursed for replacement power generation through OROA from funds collected by outfitters.
- Agreement expires at the end of 2018.

The 25 commercial outfitters licensed to operate on the Middle Ocoee are also eligible to operate on the Upper Ocoee. There are no additional licensing requirements and no capacity limits for commercial operations on the Upper Ocoee. In addition to the fee schedule charged by the OROA, the State also collects $0.50 per rafter for reimbursement of its management expenses. A sizeable proportion of commercial customers raft both the Upper and Middle Ocoee sections for an all-day trip. Customers are also encouraged by outfitters to raft the upper section when the daily capacity limit on the middle section is being met. Rafters floating both the Upper and Middle

Ocoee sections are charged $0.50 per day by the State, rather than $0.50 for each section.

1.3 Purpose and Need

The process established in 1983 to reimburse TVA for lost power generation when water is diverted from hydropower generation to provide water releases for whitewater rafting on Middle Ocoee River ends on March 16, 2019. Existing agreements and easements established in 1984 between TVA and the State to set the number of recreational release days on the Middle Ocoee River, establish licensing of commercial rafting outfitters by TVA, and other arrangements also expire on December 31, 2018. A 2006 agreement relating to water releases on the Upper Ocoee River expires at the end of 2018 as well.

The purpose of the proposed action is to enter into new agreements to enable continued commercial rafting activities on the Ocoee River. TVA, the State and the USFS recognize the desirability of continuing commercial rafting activities on the Ocoee River beyond the expiration of the existing agreements that support these activities. TVA, in its mission of service, focuses on three key areas: energy, environment and economic development. This management agreement would demonstrate TVA's effort to balance those three objectives in the economic benefits brought to the Ocoee River region while continuing to promote the sustainable use of the river and the surrounding environment. However, TVA has a statutory duty and an obligation to its rate payers to produce power in a reliable and cost effective manner. This duty necessitates that TVA be reimbursed for the cost of replacement power when the water is used for recreational releases in the Upper and Middle Ocoee rather than for hydroelectric generation.

1.4 Decision to be Made

This EA has been prepared to inform TVA decision makers and the public about the environmental consequences of the proposed action. The decision TVA must make is whether or not to enter into new agreements to enable continued commercial rafting opportunities on the Ocoee River. TVA will use this EA to support the decision-making process and to determine whether an Environmental Impact Statement should be prepared or whether a Finding of No Significant Impact may be issued.

1.5 Related Environmental Reviews

The following environmental reviews have been prepared for actions related to operations at the Ocoee River:

Final Environmental Impact Statement – Rehabilitation of the Ocoee No. 2 Hydro Plant. Tennessee Valley Authority, Chattanooga, Tennessee (TVA 1979). The EIS evaluated the proposal to repair Ocoee No. 2 Hydroelectric project and allow recreation use of the river.

Final Environmental Impact Statement – 1996 Olympic Whitewater Slalom Venue Ocoee River, Polk County, Tennessee, Ocoee Ranger District, Cherokee National Forest (USFS 1994). The EIS evaluated four alternatives for holding the 1996 Olympic Whitewater Slalom Venue on the Upper Ocoee River. The preferred alternative was to develop the Olympic venue on the Upper Ocoee River and retain the competitive channel and facilities constructed to support the Olympic event. As a cooperating agency, TVA issued a ROD that supported the preferred alternative.

*Final Environmental Impact Statement – Upper Ocoee River Corridor Recreational Development, Polk County, Ocoee Ranger District, Cherokee National Forest (*USFS 1997*).* The EIS addressed the development of recreational facilities in the Upper Ocoee River

corridor, including the reuse of facilities developed for the whitewater competition during the 1996 Summer Olympic Games. TVA, like the USFS, decided to implement the alternative for the maximum level of land- and water-based recreation development, which approves scheduled water releases from Ocoee No. 3 Dam for up to 54 days per year for commercial and recreational use and up to 20 days per year for special events (a total of 74 days). Water releases for commercial and recreational use require flows of about 1,600 cfs. Water releases for special events require flows of about 1,400 cfs. The selected alternative also included expanding the facilities at Ocoee No. 2 Dam and constructing two put-ins on the Upper Ocoee below Ocoee No. 3 Dam. Facilities at these two put-ins included separate launch areas for commercial and private boaters, a restroom and change house, and parking for buses and other large vehicles. TVA's decision stipulated that TVA would be reimbursed for the increased cost of replacement power when providing these releases.

Draft Environmental Impact Statement and Draft Section 4(f) Evaluation, Appalachian Development Highway System Corridor K (Relocated US 64) from West of the Ocoee River to State Route 68 near Ducktown, Polk County, Tennessee (Federal Highway Administration 2003). This document, prepared by the Federal Highway Administration, evaluates the environmental impacts associated with proposed new location alternatives for US 64 between US 411 and the Ocoee No. 3 area. The proposed new location alternatives would involve construction of US 64 outside of the Ocoee Gorge corridor to the north of existing US 64. The length of the proposed new highway is 20 miles, and both new location alternatives include two Ocoee River crossings between Ocoee 3 Dam and Ocoee 3 Powerhouse.

Reservoir Operations Study Final Programmatic Environmental Impact Statement. Tennessee Valley Authority, Knoxville, Tennessee (TVA 2004). The Reservoir Operations Study evaluated policies for operating the TVA reservoir system and the associated environmental impacts of those policies. The study did not change recreation releases from Ocoee No. 2 Dam or Ocoee No. 3 Dam, citing to the two previous EISs (TVA 1979 and USFS 1997) that included decisions concerning recreation releases to the Ocoee River.

Final Environmental Impact Statement for the Revised Land and Resource Management Plan, Cherokee National Forest, Management Bulletin R8-MB 114B (USFS 2004a). The revised Land and Resource Management Plan provides program-level direction for management of the land and resources and sets management standards for the Cherokee National Forest. Monitoring is conducted every year to assess how well goals and objectives are being met, if standards are being properly implemented, and whether environmental effects are occurring as predicted. The plan was accompanied by the *Revised Land and Resource Management Plan Management Bulletin R8-MB 114B* (USFS 2004b). This document examines the environmental impacts associated implementation of the Revised Land and Resource Management Plan.

Ocoee 2 – Ocoee 3 Transmission Line Replacement Environmental Assessment. Tennessee Valley Authority, Knoxville, Tennessee (TVA 2006). The EA assesses alternatives for replacing a transmission line between the Ocoee No. 2 and Ocoee No. 3 Powerhouses that is mostly located in the Ocoee gorge and crosses Middle Ocoee River several times.

Ocoee and Hiwassee Rivers Corridor Management Plan, Cherokee National Forest (USFS 2008). This plan provides an inventory of existing highway and corridor conditions near the

Ocoee River; includes management strategies and guidelines for construction of features; and addresses visitor use trends.

Mountain Reservoirs Land Management Plan, Chatuge, Hiwassee, Blue Ridge, Nottely, Ocoees 1,2, and 3, Apalachia, and Fontana Reservoirs, Georgia, North Carolina and Tennessee (TVA 2009)*.* The plan evaluates impacts associated with implementation of a plan for managing a total of 6,220 acres of land on nine mountain reservoirs on tributaries to the Tennessee River. The document includes the land plan for the Ocoee No, 1, 2 and 3 reservoirs.

1.6 Scope of the Environmental Assessment and Summary of the Proposed Action

This EA evaluates the potential environmental, cultural, and socioeconomic impacts of implementation of management agreements with the USFS and the State to agreements to establish partner responsibilities for recreational management to allow the continuation of commercial whitewater rafting on the Ocoee River in Polk County, Tennessee. Under the proposed action, TVA would provide water releases from Ocoee Dams No. 2 and No. 3 for a term of 15 years beginning in 2019. The water release agreement may be renewed after this period; *for the sake of analysis, TVA assumes one renewal over an additional 15-year period.* Water releases would be based on a schedule framework similar to the water release agreements currently in place. TVA would also grant a recreation easement to the State. Additionally, the USFS would make land available to the State to complement the recreational use on the TVA easement areas.

The State would be responsible for a commercial-use permitting program and oversight of commercial rafting activities on the Ocoee River, both administered by Tennessee State Parks. The State's responsibilities would include all general operational and maintenance activities necessary to facilitate commercial whitewater operations both within the TVA easement area and on two tracts of National Forest System lands. The State would also be responsible for emergency first response, law enforcement, traffic management, and other appropriate tasks along the Ocoee River corridor. A detailed description of the proposed action and alternatives considered are provided in Chapter 2.

TVA prepared this EA to comply with the National Environmental Policy Act (NEPA) and regulations promulgated by the Council on Environmental Quality (CEQ) and TVA's procedures for implementing NEPA. TVA considered the possible environmental effects of the proposed action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made. TVA assesses the potential impacts on these resources in detail in this EA.

- Recreation
- Socioeconomics
- Environmental Justice
- Traffic and Transportation
- Surface Water
- Vegetation and Wildlife
- Aquatic Ecology
- Threatened and Endangered Species
- Wetlands
- Natural Areas and Parks
- Cultural Resources

TVA also considered potential effects related to floodplains, solid and hazardous waste, public health and safety, noise, visual impacts, land use, geology, prime farmland, and air

quality and climate change. As described below, these resources were considered but eliminated from detailed consideration:

- *Air Quality*. No construction activities are proposed and any changes in recreational use and shifts in hydropower generation that would occur because of the changes in water release schedules being considered would not result in any notable changes in emissions. Therefore, there would be no direct or indirect impact on regional air quality.

- *Climate Change*. No construction activities are proposed and the proposed changes in water release schedules would not have a significant change on the use of energy or fossil fuels. Therefore, no changes to climate or significant increases in greenhouse gases are anticipated.

- *Floodplains*. TVA adheres to the requirements of Executive Order (EO) 11988, Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. The entire project area is located within the 100-year floodplain of the Ocoee River. However, there would be no activities that would result in filling or other alteration of floodplains because of the proposed changes in the water release schedules. Therefore, no impacts to floodplains would occur as a result of any alternative under consideration.

- *Solid and Hazardous Waste.* No construction activities are proposed and the proposed changes in water release schedules would not generate hazardous or solid waste. Therefore, there would be no impact associated with solid or hazardous wastes.

- *Public Health and Safety*. No construction activities are proposed, and the proposed changes in water release schedules would not impact any issues associated with public health and safety. Additionally, none of the alternatives would alter or modify outfitter health and safety practices and requirements. There would be an improvement of seasonal recreation based congestion on State Route 64 under Alternative A, with marginal improvements to safety. However, there would be no change to the condition of the roadway. No impacts to public health and safety would occur under Alternatives B or C.

- *Noise*. The proposed changes in water release schedules under consideration would not result in additional equipment use or operational noise emissions that

would appreciably alter existing noise emissions. Therefore, no impacts from noise would occur with any project alternative.

- *Visual Impacts*. The proposed actions would not appreciably change the existing visual landscape, scenic integrity or scenic attractiveness of the project area. Views of the project area would not appreciably change under any of the water release schedules under consideration.

- *Land Use*. No development or change in current land use is proposed. Therefore, there would be no impact on land use with any project alternative.

- *Geology and groundwater*. The project area is located in a river valley and would not include any below ground disturbance that would impact geologic or groundwater resources.

- *Prime Farmland*. The project area lacks prime farmland resources. Therefore there would be no impact to prime farmland.

TVA's action would satisfy the requirements of EO 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13112 as amended by 13751 (Invasive Species) and applicable laws including the National Historic Preservation Act of 1966 (NHPA), Endangered Species Act of 1973 (ESA), and Clean Water Act (CWA).

1.7 Public and Agency Involvement

In developing the EA, TVA provided the public and interested stakeholders with opportunities to participate in the environmental review process. A summary of these outreach efforts is provided below.

1.7.1 The Scoping Process

TVA conducted a 30-day public scoping period from June 19, 2017, through July 19, 2017, to solicit comments on the alternatives and environmental resources to be considered in the EA. The scoping period was announced by a notice on the TVA website. TVA received 34 comment submissions (Appendix A). Of the submissions, 31 were from individual members of the public, one was from a representative of the Lake Blue Ridge Civic Association, and one was from American Whitewater, a national non-profit organization. TVA also received a response from the Eastern Band of the Cherokee Indians noting that the project would not have any adverse impact on known Cherokee resources and from the Muscogee (Creek) Nation stating that the tribe is unaware of any Muscogee cultural or sacred sites located within the immediate project area.

Most comments supported continuing the release of water to allow whitewater rafting citing economic and recreation benefits. Many commenters requested that TVA provide additional water release days and increase flow volumes. One commenter expressed concerns regarding existing traffic volumes and the effect on public safety. The Lake Blue Ridge Civic Association opposes the recreational release arrangement citing the impact to the water level in Blue Ridge Reservoir. These comments were considered in the formulation of alternatives and the identification of resources evaluated in this EA. For instance, in response to comments received during the scoping period, TVA added a third alternative to

this EA (Alternative C) because it would provide additional water release days and it represents the current water release framework.

1.7.2 Public Review of the Draft EA

On November 30, 2017, TVA published the Draft EA for public review and comment. The availability of the Draft EA was announced in *The Cleveland Daily Banner,* which serves the Polk County and Bradley County area (Cleveland Daily Banner) and the Draft EA was posted on TVA's Web site. TVA's agency involvement included notification of the availability of the Draft EA to local, state, and federal agencies and federally recognized tribes as part of the review. Chapter 5 provides a list of agencies, tribes, and organizations notified of the availability of the Draft EA. Comments were accepted from November 30, 2017, through January 5, 2018, via TVA's Web site, mail, and e-mail.

During the public comment period on the draft EA, TVA conducted a public meeting on December 11, 2017, at Cleveland State Community College in Cleveland, Tennessee. The meeting was attended by 38 members of the public. Eight people submitted written comments at the public meeting.

At the end of the comment period, TVA had received comment submissions on the Draft EA from 27 members of the public, organizations, and intergovernmental agencies. One comment was received from a state agency, nine from nongovernmental organizations, and the remainder were from private citizens and businesses. The comment submissions were carefully reviewed and summarized. TVA made revisions to the EA in response to the public comments. These comment summaries and TVA's responses to them as well as a description of how the Final EA was revised in response to comments as applicable are located in Appendix B.

Most of the comments received on the draft were related to the loss of five days in the water release schedule under Alternative B. Based on TVA consideration of input from the public during the review period of the Draft EA, TVA added provisions to both Alternative B and Alternative C that allow some flexibility in the water release calendar and address requests for additional water release days outside of the agreement with the State. These provisions are described in detail in Sections 2.2.2 and 2.2.3.

After further consideration of the public input and potential environmental impacts, TVA's preferred alternative is the modified Alternative C, which, as described below, implements the agreement with the State, provides flexibility in the recreational release schedule, and retains the five days of water releases in September.

1.8 Necessary Federal Permits or Licenses

There are no federal permits or licenses required for TVA to undertake this action. TVA is working with the State of Tennessee to ensure compliance with all applicable state requirements.

CHAPTER 2 – ALTERNATIVES

2.1 TVA Water Release Framework

TVA has developed a framework to develop water release schedules to meet the current agreements. The framework provides context for the alternatives presented in this chapter.

Consistent with the 1984 agreement described in Chapter 1, scheduled water releases on the Middle Ocoee occur on up to 116 days from the middle of March through the last Saturday in October. Each year, TVA develops a release schedule that provides weekend releases throughout this period and, in addition, three weekday releases each week between Memorial Day and Labor Day, and five weekday releases in late September. Minor adjustments are made annually in the dates of releases based on the dates on which the holidays and weekends occur; thus, because of how these dates fall on the calendar, the total number of water release days per year have varied slightly. The hours of releases per day also varies across the season, with more hours provided on weekends than weekdays. Between 6 and 10 hours of water releases are provided on water release days. Generally, six or seven hours of releases are provided on weekdays and during early and late season weekend days, and 8 to 10 hours of water releases are provided on weekends and holidays in the summer. The average flow during these releases would be at least 1,200 cfs. Figure 2-1 shows the release schedule for 2017 and serves as an example of how the release days and hours on the Middle Ocoee River are designated.

Currently, TVA releases from Ocoee No. 3 Dam in accordance with the agreement with the SLDC established in 2006, providing 34 annual release days between early May and mid-September for varying hours. Water releases from the Ocoee No. 3 Dam occur from early May through mid-September for varying hours. Releases only occur on weekend days during this period, and the number of hours of release per day varies between five and eight. The average flow on water release days is at least 1,600 cfs. Figure 2-2 shows the release schedule for 2017 and serves as an example of how the release days and hours on the Upper Ocoee River are designated.

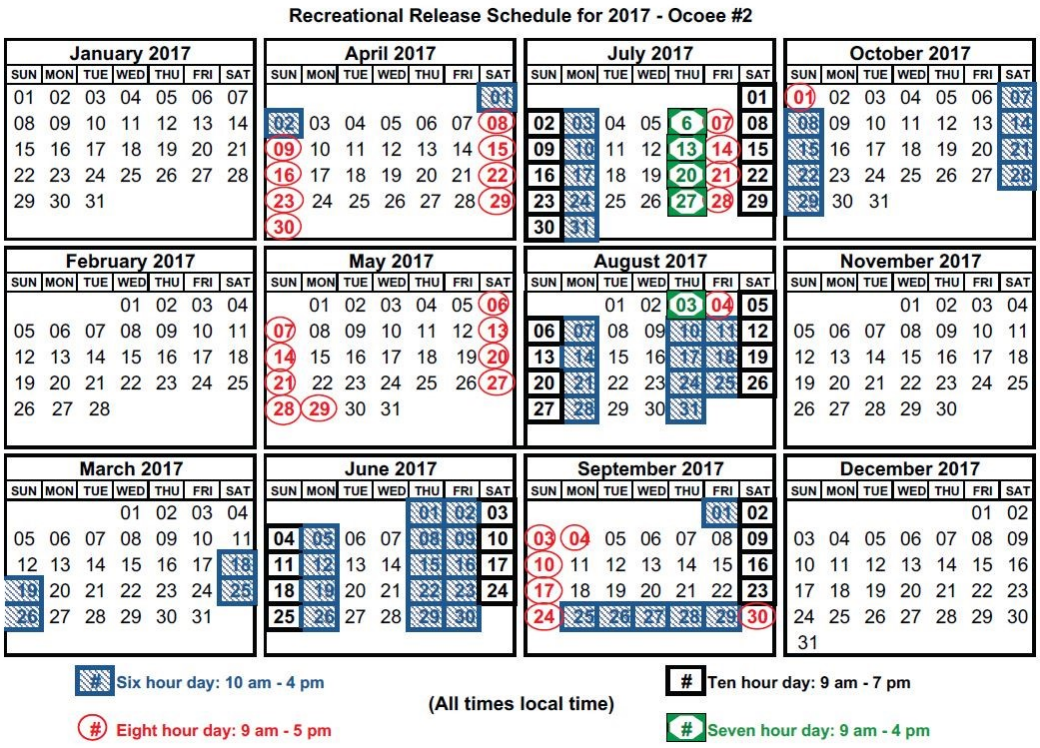

Figure 2-1. Scheduled Water Releases on the Middle Ocoee (2017)

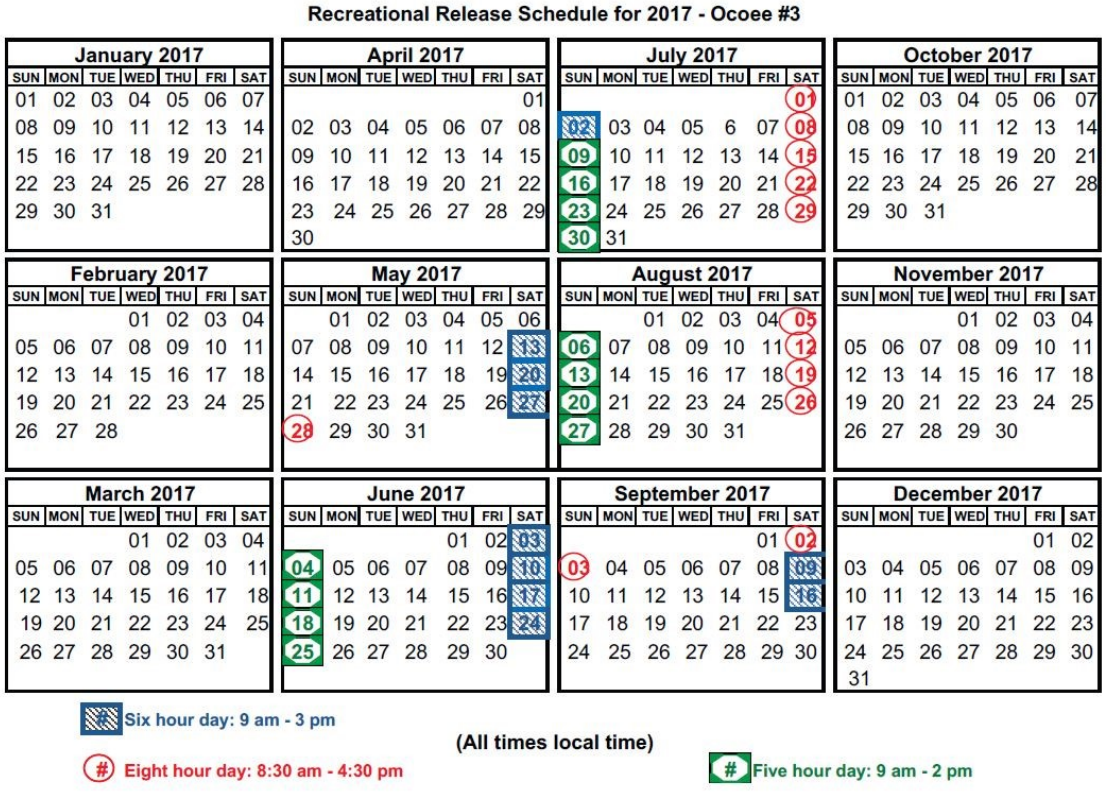

Figure 2-2. Scheduled Water Releases on the Upper Ocoee (2017)

2.2 Description of Alternatives

The scope of the potential alternatives is constrained by the need for TVA to be reimbursed for the replacement power generation that occurs when water is released into the Upper and Middle Ocoee River channels in order to fulfill its statutory mandate and duty to its ratepayers. In addition, TVA must also operate the Ocoee No. 2 flume at least two days over a seven day period during the summer to keep the wooden flume wet and minimize the leakage that would occur if the flume were to dry out. This constrains the number of days per week that TVA can release water into the Middle Ocoee instead of diverting it into the flume. Alternatives evaluated in this EA include:

- Alternative A – No Action
- Alternative B – Proposed Agreements
- Alternative C – Current Management Regime

2.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, the agreements and easements enabling commercial rafting on the Middle and Upper Ocoee River would expire at the end of 2018 and would not be replaced with new agreements. Thereafter, whitewater boating (rafting and kayaking) on the Middle and Upper Ocoee would only be possible during periods of naturally occurring high river flow and/or when TVA is not generating power at the Ocoee No. 2 and Ocoee No. 3 Powerhouses.

2.2.2 Alternative B – Proposed Agreements

2.2.2.1 Water Releases

As part of the proposed agreements, TVA would provide scheduled water releases for a term of 15 years on the Middle and Upper sections of the Ocoee River, below the Ocoee No. 2 and No. 3 Dams. The water releases would be provided on a schedule similar to that defined by the water release agreements currently in place. In this analysis, the water release agreement may be renewed after this period (in its analysis, TVA assumes one renewal over an additional 15-year period).

The proposed agreement includes the following terms:

- *Middle Ocoee River* – TVA would provide water releases from Ocoee No. 2 Dam based on the same framework for determining annual water release schedules that have been in place since 1984, with one minor difference: TVA would eliminate releases currently occurring on five weekdays in late September. Thus, over the 15-year period, TVA would provide between 106 and 112 release days annually. The number of release days would vary by year based on how weekend and holidays occur. The hours of releases per day would vary between 6 and 10 hours daily, consistent with current operations. The average rate of flow during these releases would be at least 1,200 cfs, which is also consistent with current operations.

  TVA would consider requests by the Ocoee River Recreation and Economic Development Fund (Development Fund) Board for limited changes to the standard water release schedule as described below.

- *Upper Ocoee River* – There would be no change from the current schedule of release to the Upper Ocoee River. TVA would continue to provide water releases from Ocoee No. 3 Dam for recreational use on 34 weekend days. The hours of

release per day would vary between five and eight hours. The average rate of flow during these releases would be at least 1,600 cfs. Consistent with TVA's management decision in the 1997 ROD (described above), which set a maximum of 74 release days, an additional 20 release days for recreational use and 20 release days for special events may be requested by the outfitters or others for special events, provided reimbursement for the replacement power is given.

Water release schedules would be consistent with the framework provided in Appendix C. TVA would receive $11.78 million from the State for the cost of replacement power arising from the water releases over the 15-year term. The proposed water release agreement would not apply fees or restrict access to private boaters.

Based on TVA consideration of input from the public during the review period of the Draft EA, TVA modified Alternative B to provide some flexibility in the water release calendar. TVA would accept and consider requests to change the standard water release schedule by trading water release days under certain circumstances. These requests must be made by the Development Fund Board to TVA by October 1 for changes to the scheduled rafting release days in the next calendar year. TVA would consider such proposals and seek concurrence from the State Park Manager.

The number of days traded would be unlimited within a seven-day period, assuming there is a 48-hour period for the wooden flume to have water flowing in it within a seven-day period. In addition, TVA would consider up to five days traded within the entire calendar year of the schedule, subject to water availability and power system needs, assuming there is a 48-hour period within the seven-day period for the wooden flume to have water flowing in it. One of the trade days could be used to create a six consecutive day rafting period during a seven-day period containing a major holiday (Memorial Day, Independence Day, or Labor Day).

2.2.2.2 Recreation Management

Under this alternative, TVA, USFS, and the State would enter into a Memorandum of Understanding under which the State would be responsible for the licensing, which is presently done by TVA, and continued oversight of commercial rafting activities on the Middle and Upper Ocoee. The State's responsibilities (as at present) would include emergency first response, law enforcement, traffic management, site maintenance, and enforcing commercial capacity limits. The State would be reimbursed from the Development Fund for the estimated $450,000 annual cost of its oversight and management. The Development Fund was established by the State, and will be administered by an independent board and funded through annual fees paid by the outfitters. Under the agreement, the State would also continue to manage TVA and USFS tracts of lands, which would require the following USFS and TVA land actions to be implemented:

- The USFS to make Tracts FS #1 and FS #2 available to the State (approximately 3.7 acres). These tracts are used for parking (FS #1) and restroom facilities (FS #2).
- TVA would grant a 30-year easement to the State to maintain three parcels of land (approximately 27.2 acres) utilized in commercial activities. No construction or improvements on these parcels are proposed at this time. These tracts are:
    - Parcel 1, an 8.3-acre area near the Ocoee No. 2 Powerhouse used by commercial outfitters as the takeout for boaters on the Middle Ocoee;

- Parcel 2, a 15.0-acre area at Ocoee No. 2 Dam used as the takeout for boaters on the Upper Ocoee River and as the launch area for boaters on the Middle Ocoee River; and
- Parcel 3, the 3.87-acre area immediately downstream of Ocoee No. 3 Dam used as the launch area for boaters on the Upper Ocoee River (this tract is currently licensed by TVA to the USFS under the terms of a 30-day revocable license).

The locations of these land actions are shown on Figure 2-3. Any future construction, improvements, or changes to operations occurring on these parcels would be subject to additional environmental review.

2.2.3 Alternative C – Current Management Regime

This alternative is substantially to the same as Alternative B, except under this alternative TVA would continue releasing water to the Middle Ocoee River for five weekdays in late September that are not scheduled under Alternative B.

TVA would enter into the agreements outlined above (Section 2.1) regarding Ocoee River water releases and recreation management and would release water for a five day period beginning on the last Monday of September each year. These water releases would not be included in the agreement. Alternative C is essentially the same as the current management regime, except that additional scheduling flexibility would be provided as described in Section 2.2.2.1.

2.2.4 Alternatives Considered but Eliminated from Further Discussion

In response to comments received during the scoping process, TVA considered requests to increase the number of recreational release days per year and to increase the velocity of flow during water release periods. The schedules for recreational water release considered in this EA provide recreational benefit while optimizing reservoir operations and power production, and as noted above, TVA would consider additional release days at the request of any entity. TVA also considered requests to increase the rate of flow released. Flow rates were set based on flow testing by commercial and private users. Increasing the minimum recreation flows would increase the value of the lost power and were not considered. In addition, the actual flow rates vary depending on the amount of water that must be released to meet the recreation commitment and any additional inflow that must be released. Therefore, higher flows are provided several times throughout the season, without any additional costs. In addition, an increase in flow rate could alter the existing habitat of the river as well as impact safety of recreational users. Based on these reasons, additional alternatives to address increases in the number of release days and an increase in flow were eliminated from further consideration.

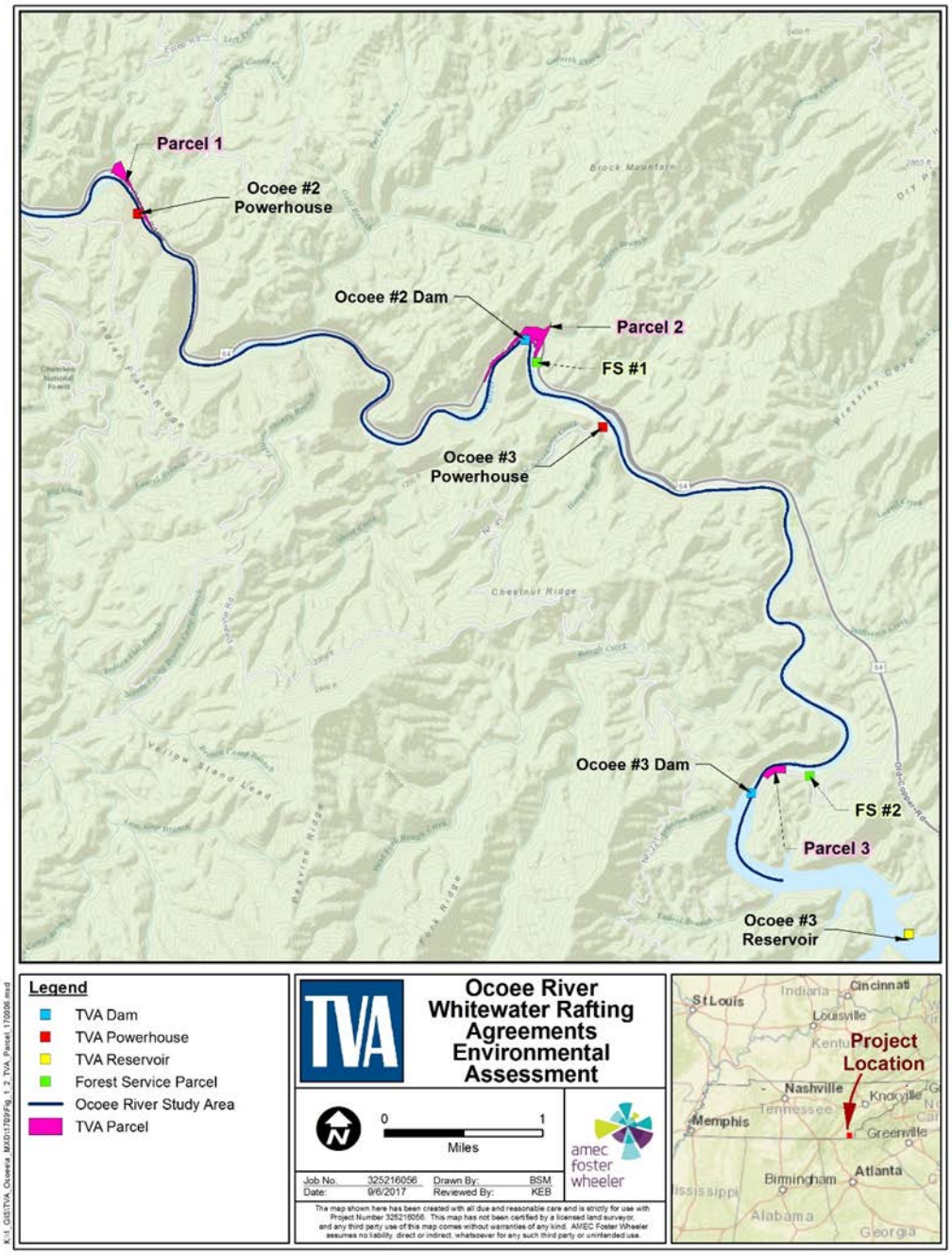

Figure 2-3. Parcels Considered for Management by the State Under the Proposed Action

2.3 Comparison of Alternatives

The environmental impacts of each of the alternatives under consideration are summarized in Table 2-1. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource in Chapter 3.

Table 2-1. Summary and Comparison of Alternatives by Resource Area

Resource Issue Area	Alternative A No Action	Alternative B Proposed Agreements	Alternative C Current Management Regime
Recreation and Economics	Significant impact to the local economy and recreators. Minor benefit to TVA consumers.	Minor impact to the local economy and recreators relative to baseline conditions (due to increased fees). Minor benefit to TVA consumers.	Minor impact to the local economy and recreators relative to baseline conditions (due to increased fees). Incrementally less than Alternative B. Minor impact to TVA consumers.
Demographics	No impact on residential population, Moderate impact on local transient population.	No impact relative to existing conditions.	No impact.
Environmental Justice	No impact.	No impact.	No impact.
Traffic and Transportation	No change in existing level of service, but notable improvement in seasonal recreator-based congestion.	No impact relative to existing conditions.	No impact.
Hydrology	Notable change in flow characteristics.	No impact relative to existing conditions.	No impact.
Water Quality	No impact.	No impact relative to existing conditions.	No impact.
Vegetation and Wildlife	Change in habitat could result in potentially significant impact to globally rare plant communities. Minor impact to wildlife.	No impact relative to existing conditions.	No impact.
Aquatic Ecology	Minor impact. Aquatic biota are adapted to variable flow.	No impact relative to existing conditions.	No impact.
Threatened and Endangered Species	Potential significant impact to federally listed Ruth's golden aster.	No adverse impact.	No adverse impact.
Wetlands	Change in plant composition; however, no impact to extent of wetlands.	No impact relative to existing conditions.	No impact.
Natural Areas and	Minor indirect impact to parks due to decrease	No impact relative to	No impact.

Resource Issue Area	Alternative A No Action	Alternative B Proposed Agreements	Alternative C Current Management Regime
Parks	in visitors. Moderate indirect impact to ecologically sensitive area due to change in habitat.	existing conditions.	
Cultural Resources	No impact.	No impact.	No impact.
Cumulative Effects	Cumulative effect related to increased use of alternate whitewater rafting rivers in the region. Impact would be minor and not detectable on a regional level.	No impact.	No impact.

2.4 TVA's Preferred Alternative

After further consideration of the public input and environmental impacts, TVA's preferred alternative is Alternative C. Under this alternative, TVA would enter into agreements that would allow the continued support of commercial rafting activities on the Ocoee River and TVA would retain the five days of water releases in late September each year. TVA would be compensated for the differential cost of power on all recreation days except fo five additional days scheduled in September. Although TVA would bear the fractional cost associated with the replacement power generation for these five release days, those minimal costs were determined to be outweighed by the economic benefits to the community that the release days provide.

2.5 Summary of Mitigation Measures

Mitigation measures are actions that could be taken to avoid, minimize, or reduce or compensate for adverse impacts to the environment. The EA evaluates the impacts related to the decision to enter into new agreements to enable continued commercial rafting opportunities on the Ocoee River. No activities that would have adverse impacts on the environment are proposed as part of the action evaluated in this EA; therefore, specific mitigation measures have not been identified.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Recreation and Economics

3.1.1 Affected Environment

3.1.1.1 Economic Impact of Recreation

Due to its location in the Cherokee National Forest, numerous recreational facilities are located within the vicinity of the Ocoee River. These include rafting, kayaking, camping, hunting, fishing, boating, hiking, biking and picnicking. However, the economic base of the project area is dominated by the rafting industry.

Recreational use on the Ocoee River is dominated by a developed industry of commercial rafting on both the Upper and Middle Ocoee River. As a premiere whitewater rafting location, the Ocoee River is one of the most popular rivers in the country and draws visitors from throughout the eastern U.S. Traditionally, the busiest recreational days on the Ocoee River occur on weekends during the summer months.

Two sections of the river, commonly known as the Upper Ocoee and the Middle Ocoee, are used for whitewater recreation (see Figure 1-1). The Upper Ocoee is defined as the reach from RM 29.2 just below Ocoee No. 3 Dam downstream to RM 24.2 at the Roger's Branch access site just above Ocoee No. 2 Dam. When generating power at the Ocoee No. 3 Powerhouse, the water in this section is diverted at No. 3 Dam into a tunnel to the Ocoee No. 3 Powerhouse located about 0.8 mile upstream of the No. 2 Dam (Figure 1-2). Most rafting trips on the Upper Ocoee River are about 5 miles long and begin at the put-in below Ocoee No. 3 Dam. A section of the Upper Ocoee River (about 1,500 feet) was modified to hold the world's first Olympic whitewater event on a natural river, the 1996 Olympic canoe and kayak slalom events. Since the Olympic competition, the Ocoee has been a premier whitewater venue for athletes from around the world who value the Class III–IV rapids in the Ocoee's Upper and Middle sections.

The Middle Ocoee is defined as the reach from RM 24.1 at Ocoee No. 2 Dam downstream to the take-out at RM 19.6 below the Ocoee No. 2 Powerhouse (Figure 1-3). When generating power at the No. 2 Powerhouse, the water in this section is diverted at No. 2 Dam into an elevated flume to the No. 2 Powerhouse. Rafting trips on the Middle Ocoee River are about 4.5-miles long and begin at the put-in below Ocoee No. 2 Dam. Many rafters float both the Upper and Middle Ocoee sections in one trip.

Commercial outfitters provide rafting and other paddling services on the Upper and Middle sections of the Ocoee River. Up to 25 companies may be registered with the State to provide rafting services on the Ocoee River. Whitewater recreation on both river sections is dependent on the release of water from TVA dams into the river channel. In addition to scheduled release days, non-commercial rafters also take trips on the river when there is sufficient rainfall to raise water levels without the diversion of flows from Ocoee.

3.1.1.2 Economic Setting

Trips to the Ocoee River benefit rafters, those who provide rafting services, and those who support the rafting industry directly or indirectly. Creating the water flow to support Ocoee River rafting trips requires restricting otherwise available power generation. This increases power generation costs. In addition, the numerous river users means some facilities need to

be provided, and necessitate maintenance of the area and the facilities. Economic analysts determined the most important effects related to the rafting industry that would result from the proposed action are those that would affect power generation, the southeastern rafting market, and local business and residents.

The release of water from the Ocoee dams to support recreation mean that less hydropower is generated. This leads to TVA to incur costs because it must replace the lower cost hydropower with other forms of generation that are more expensive. TVA uses a production cost model known as Planning and Risk, a Ventyx tool, to estimate the cost to provide replacement power. The model produces details about the projected usage of TVA's generating resources to meet forecasted demand over any desired time horizon (hourly, daily, weekly, monthly, or yearly) in the future. TVA's goal is to deploy the lowest cost resources to meet power demands before utilizing higher cost resources. The production cost model provides the marginal cost of power based on projected future supply and demand given current expectations of future system conditions. Hourly values from TVA's Planning and Risk model are used to calculate an average replacement cost of energy on a weekly basis.

The existing (baseline) economic characteristics of the southeastern rafting market and its effects on local businesses and residents were evaluated using linked simulation models. The rafting market approach begins with a travel cost based model of the demand for rafting in the southeast. The supply of Ocoee River rafting is developed based on costs and revenues of providing trips.

Inputs to the travel cost based model include changes to:

- *Cost* to outfitters to supply commercial rafting trips
- *Quality* of rafting at the Ocoee River and similar eastern U.S. rivers
- *Availability* of rafting at particular times

Outputs of the model include changes in:

- *Consumer surplus* which is an economic measure of the value that rafters derive from the rafting trips they take
- *Rafting trips* taken by type (single or multiple day)
- *Expenditures* by rafters taking single or multiple-day trips and expenditure type (e.g. restaurants, hotels)

Rafting use levels (including expenditures) under the Ocoee's existing conditions have economic impacts on local economies and employment. This evaluation uses input/out (I/O) analysis to estimate the economic impact of these use levels on local economies and employment.

The I/O models characterize changes in demand for one industry in terms of their effect on all industries within a local economic area. Inputs to the I/O model are the:

- *Direct expenditures* which represent the initial, baseline expenditures across each industry.

The outputs of this analysis are direct baseline employment, indirect and induced expenditures, employment, and tax payments in the local economy, which are defined as Polk County and Bradley County, Tennessee. Although a small number of employees would pay taxes outside Polk and Bradley counties, the results of the model are not meaningfully impacted by these actions. The outputs of the analysis include:

- *Direct employment* that occurs as the rafting and directly related industries experience a reduction in revenues that is equal to rafter reduction in expenditures.
- *Indirect revenues and employment* as a result of inter-industry transactions as supplying industries adjust to demands from the directly affected industries.
- *Induced revenues and employment* that reflect local spending that result from income changes in the directly and indirectly affected industry sectors.

IMPLAN© is the I/O modeling package which was employed to conduct this analysis.

3.1.1.3 Economic Benefits and Impacts of Rafting

Economic impacts associated with the Ocoee River water releases are evaluated in detail in Appendix D and summarized below.

Economic benefits accrue to rafters as consumer surplus which is the amount rafters would be willing to pay above and beyond costs, that is, the value the rafters feel the experience is worth.[1] Economic benefits cannot be observed directly but can be identified using travel cost modeling techniques. The economic benefits of rafting have been identified in several studies. Rosenberger (2016) compiled the Recreation Use Values Database (RUVD) for North America. The RUVD includes economic valuation studies estimating the consumer surplus (value above costs) use value of recreation activities (per person per day) in the U.S. and Canada from 1958 to 2015. Rosenberger adjusted the 3,192 estimates of diverse recreational activities in the RUVD to 2016 U.S. dollars. Rosenberger estimated a mean consumer surplus use value of $117.39 per single-day trip for non-motorized boating, including whitewater rafting.

English and Bowker (1996) estimated per trip consumer surplus for a zonal travel-cost model for outfitted rafting on the Chattooga River along Georgia's border with South Carolina. The authors collected data from a random sample of households who used commercial outfitter services on the Chattooga River. English and Bowker's estimates of consumer surplus use value per rafting trip ranged from $31.66 to $70.46 (2016 U.S. dollars).

English, Bowker, and Donovan (1996) studied per trip consumer surplus use value associated with guided whitewater rafting on the Chattooga River (Georgia and South Carolina) and the Nantahala River in rural western North Carolina. The authors estimated household recreation demand based on an individual travel-cost model. Their findings show average per trip consumer surplus estimates between $89 and $286 (1996 U.S. dollars). The estimates vary based on modeling assumptions regarding the opportunity cost of time and river quality.

[1] For example if a hypothetical rafter is willing to pay a total (including travel costs and fees) of $150 for a rafting trip but the actual cost of the trip is $75, the rafter received $75 in consumer surplus.

Economic impacts are different from benefits in that they measure exchange rather than value. Economic impacts from rafting occur as rafters spend money in local economies. The most recent evaluation of the local economics of Ocoee River rafting was conducted by Dr. Steve Morse. This study was requested by the OROA with support from the America Outdoors Association (Morse 2013a, 2013b). During 2012, the Ocoee River became "the most visited whitewater river" in the U.S. with 229,542 visitors (Beauchamp 2013). Morse and other researchers from the University of Tennessee studied the 2012 economic impacts of visitor spending by Ocoee River rafters. Morse's team conducted visitor spending surveys at the Ocoee River from June 8 to September 20, 2012. The researchers asked rafters how much they spent in the local area while rafting the Ocoee River. The survey data "represented the spending patterns of 3,118 rafters visiting the Ocoee River in 2012" (Morse 2013a, 2013b).

The alternatives being evaluated imply changes to Ocoee River rafting availability and costs. Existing information from economic studies including the Morse study, a recent edition of IMPLAN, and recent rafting counts were employed to develop an integrated local economic impact and supply and demand based representation of eastern U.S. rafting.

Demand for Ocoee River rafting is influenced both by the population of potential rafters and the quality, cost, and location of other premiere rafting sites.[2] The Morse study effort included a survey of Ocoee River rafters that requested information about their rafting trip. The results of the survey indicate that Ocoee River rafters come from all over the United States but are primarily from the Eastern United States. Based on this, potential Ocoee River rafters were specified as coming from the center of the 474 counties within 350 miles of the Ocoee.

To find the substitute rafting sites needed to complete the demand model, information was considered from American Whitewater (2017a, 2017b), Eddlemon (2014a, 2014b), print and online media articles, the USFS (2017b, 2017c, 2017d, 2017e), Web sites for Ocoee River outfitters, the National Park Service, National Geographic (2017), Riverfacts.com, Hawks Nest Hydroelectric Project (Hawks Nest Hydro, LLC 2015), and others. These sources identified whitewater rafting sites in Tennessee, Alabama, Georgia, Kentucky, North Carolina, Virginia, and West Virginia as viable substitutes. From the initial list of more than 100 alternate rafting sites, a group was selected as the most likely sites that Ocoee rafters would choose if whitewater rafting trips to the Ocoee were unavailable. These include other well-known rafting rivers such as the Gauley, Nolichucky, Chattooga, and Nantahala.

Distances and travel costs from the centers of these counties to the Ocoee River and other premiere eastern U.S. rafting destinations were calculated using truck routing software (PCMiler) and standard AAA per-mile travel costs. The quality of the Ocoee River and alternative premier rafting sites was specified using the site quality metrics of Hynes, Hanley, and Garvey (2007). Although a related econometric model was developed for whitewater opportunities in Ireland, no similar studies of preferences in the U.S. are available. The relevant site quality metrics are whitewater quality, parking quality, crowding, water pollution, scenic quality and water level predictability.

[2] Rafting on the Ocoee River may also compete with theme parks such as Six Flags Over Georgia. Although it was not feasible to include dissimilar competitors in the model.

The alternate whitewater rafting sites identified were studied and assigned ratings in each category identified above (whitewater quality, parking, crowding, water pollution, scenic quality, and predictability of water level). Table 3-1 lists the sources of information used for rating each alternate whitewater site in these six categories.

Table 3-1. Sources of Information for Rating Whitewater Rafting Sites

Category	Source of Information
Whitewater quality	American Whitewater (2017a, 2017b), Eddlemon (2014a, 2014b), print and online media articles. Based on published information, the Ocoee River receives the highest rating on the scale (5) because of its whitewater class and people's enjoyment of Ocoee whitewater trips.
Parking quality	Published reports, aerial views from Google Earth.
Crowding	Published reports. A rating of "5" means that a site is not crowded with whitewater rafters.
Water quality	Published water quality reports from TDEC and other states' environmental agencies.
Scenic rating	Published reports, including Eddlemon (2014a, 2014b).
Predictability of water level	American Whitewater (2017a, 2017b), Eddlemon (2014a, 2014b), published reports (including gauge readings).

This information (population, travel costs, site characteristics) was combined in a commercial rafting site-choice demand model, used to characterize the "demand" for eastern U.S. rafting. This model provides the baseline value of rafting and the behaviors of rafters on the Ocoee River. These Ocoee River rafting trips are "supplied" by companies providing guided rafting trips on a per-person fee basis. The supply curve or "supply" for Ocoee River guided rafting trips represents the amount of trips each rafting company is willing and able to provide at a given price.

There is not a readily available source that includes the detailed cost information needed to compose the supply curve for Ocoee rafting. Evaluation of IMPLAN data indicates that approximately 91 percent of revenues in the rafting category for a particular zip code could be accounted for by Ocoee rafting companies. Costs for these companies include employee compensation (24 percent of the total revenue), facility (6 percent of the total revenue) and others (20 percent of the total revenue) with the remainder going to a large number of small categories.

Supply conditions were characterized by developing a representation of per-trip costs with total average trip costs ranging from $45 to $55. Capacity is specified to be rafting trips provided by each company as indicated by the outfitter data. Average cost is specified to be lower for larger companies. This comes from lower average facility and labor costs. Ordering these from lowest cost to highest cost results in a market marginal cost curve – the "supply" of rafting.

To complete the characterization of the baseline rafting market the representation of supply is integrated with the demand model by specifying that the average price of rafting is $50. The market model is then calibrated to replicate the 184,518 guided rafting trips to the Ocoee River. This is consistent with guided rafting trips for the most recent year with available information (2016).

Expenditure and trip data on the Ocoee River from Morse (2013) indicates that 59 percent of visits to the Ocoee River are day visits. The remaining 41 percent include overnight stays within 60 miles of the Ocoee River. Of the overnight visits, hotel stays account for 40 percent of overnight trips, rented cabins or homes for 30 percent, friends' or relatives' homes for 21 percent, and campgrounds for 9 percent. When combined, day trips account for 59 percent of total annual trips, overnight trips spent with friends and family account for 8 percent of annual trips, overnight trips spent at a hotel are 17 percent of total annual trips, overnight trips spent at a rented cabin or house are 13 percent of total annual trips, and overnight trips spent at a campground are 4 percent of total annual trips to the Ocoee River.

Table 3-2 presents the breakdown of average spending by Ocoee River whitewater rafters in 2012 (Morse 2013). Rafting trip and fees are the highest expenditure. This is because both day and overnight visitors spend money in these categories.

Table 3-2. Breakdown of Average Spending Per Person

Expenditure Category	Per Person Spending (2017 dollars)
Rafting Trip and Fees	$41.30
Lodging	$29.37
Food and Beverage	$23.33
Transportation	$16.34
Retail, souvenirs, etc.	$9.95
Total	**$120.29**

Source: Morse 2013b

For this analysis, these expenditure rates are further broken down by trip type and average per-day expenditures. Table 3-3 presents the expenditure breakdown by trip type. For example, day visitors spend about $90 per visitor. Because these visitors come from nearby, this $90 does not include lodging expenditures.

Overnight visitors spend between $118 and $219 per visit per person. Overnight visitors who stay with friends and family do not spend money on lodging. When these specifications are made, overnight visitors who stay with friends and family spend an average of $124.49. Overnight visitors who stay in hotels, rent cabins or houses, and stay at private or public campgrounds have lodging costs. Visitors who stay at hotels or motels spend about $219 per trip, followed by visitors who stay in rented cabins or homes at approximately $197, and lastly, visitors who stay in private or public campgrounds, with an average spending per trip of approximately $118.

Day visitors and overnight visitors who stay with friends and relatives spend the most on costs associated with the rafting trip, followed by food and beverage, transportation, and souvenirs/retail. Overnight visitors who stay at hotels spend the most on the rafting trip relative to the other expenditure categories. Overnight visitors who stay in rented cabins or homes spend the most on lodging. Visitors who stay in private or public campgrounds spend the most on the rafting trip.

Table 3-3. Expenditures by Sector and Trip Type (2017 Dollars)

		Overnight Visitors			
Expenditure Category	**Day Visitors**	**Relatives or Friends**	**Hotel or Motel**	**Rented Cabin or House**	**Private or Public Campground**
Rafting Trip and Fees	$47.43	$57.06	$70.67	$63.80	$44.24
Lodging	—	—	$50.35	$68.52	$12.34
Food & Beverage	$17.99	$29.07	$42.73	$31.07	$25.57
Transportation	$14.58	$27.75	$32.67	$20.63	$23.85
Retail, Souvenirs, etc.	$9.73	$10.61	$22.35	$13.06	$11.62
Average Spending Per Visitor	**$89.73**	**$124.49**	**$218.77**	**$197.09**	**$117.61**

Source: Morse 2013

Each expenditure category in Table 3-3 comprises a variety of sectors. Rafting trips and fees include recreation fees, parking fees, and outfitter fees (e.g., Ocoee River Outfitters). Lodging includes hotels, rental cabins and homes and private or public campgrounds. The food and beverage category includes full-service restaurants, limited-service restaurants, and all other food and drinking places (e.g., mobile food concession stands). Transportation includes expenditures at gas stations and car rentals. Souvenir/retail expenditures are spent at souvenir shops, health and personal care stores (e.g., pharmacies) and general merchandise stores (e.g., Walmart).

Per-trip expenditures by category from Table 3-3 were used to identify per-trip direct, indirect and induced economic impacts under the baseline condition. Table 3-4 presents the economic impacts associated with baseline conditions based on expenditures from the 2012 Morse study, trips and inter-market relationships in IMPLAN from 2016. Total Industrial Output refers to the dollar value of goods and services produced. Value-added impacts are employee compensation, proprietor and property type income, and tax on production and imports. Indirect Business Tax includes excise taxes, property and sales tax paid by businesses, fees, fines, licenses, and permits. Labor Income is the sum of employee compensation and proprietor income.

Table 3-4. Baseline Annual Economic Impacts from Commercial Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$18,413,162	$3,578,289	$4,056,327	$26,047,778
Total Value Added	$9,777,943	$1,762,641	$2,402,532	$13,943,116
Indirect Business Tax	$1,946,492	$148,233	$250,578	$2,345,303
Labor Income	$5,830,918	$1,163,662	$1,565,430	$8,533,010
Employment	320.4	32.0	32.5	384.9

The estimated level of direct expenditures by rafters in baseline conditions is approximately $22.67 million. Retail expenditures are specified to be gross retail sales (i.e., purchaser prices) as opposed to gross retail margin (i.e., producer prices). IMPLAN applies the appropriate margin to the gross retail sales; therefore, the output results only reflect the margined value. All non-transportation expenditures are modeled to occur in the local market which is defined for this analysis as Polk and Bradley counties. Only half of the transportation expenditures are specified for these counties to account for origin or in route gas purchases. After these adjustments are made, the estimated level of direct expenditures in baseline conditions is approximately $18.41 million. This expenditure level is responsible for about $9.78 million in value-added economic effects of which $1.95 million are indirect business taxes and $5.83 million in labor income in Polk and Bradley counties. The total federal, state, and local indirect business taxes do not include personal income tax or social security taxes.

The indirect output (i.e., amount of inter-industry transactions from supplying industries) is $3.58 million. This output is associated with 32 jobs resulting in a total of $1.16 million in labor income. The induced effects (i.e., amount of local spending that result from income in the directly and indirectly affected industry sectors) are estimated to be $4.06 million in industrial output. This output is associated with almost 33 jobs, resulting in a total of $1.57 million in labor income. In total, under the baseline conditions, the expenditures by rafters of the Ocoee River results in approximately $26.05 million in industrial output, $13.94 million in value-added impacts, $2.35 million in indirect business taxes, and almost 385 jobs resulting in a total of $8.53 million in labor income.

3.1.2 Environmental Consequences

The most economically important features of the alternatives are the changes in the availability/reliability of Ocoee River flow and changes in the direct cost of Ocoee River rafting. Changes to availability and reliability of rafting occur as planned releases are eliminated under Alternative A or curtailed under Alternative B. Changes to the direct cost of Ocoee River rafting occur for both Alternatives B and C as per-rafter fees increase by approximately $5 to account for facility maintenance costs that were previously provided by the State.

These effects are evaluated by first adjusting the rafting supply and demand conditions to reflect the proposed changes in water release schedules and cost. Changes in availability and reliability are identified by developing models that are calibrated to produce the trip numbers associated with the changes. Implications for consumer surplus are developed as output from the model. Changes in cost are evaluated by changing the cost structure of rafting outfitters and observing the model-produced changes in trip numbers and consumer surplus.

Implications for expenditures are derived based on the number and type (overnight or not) of rafting trips for each alternative. Expenditures by sector for each alternative are an input to the local economic impact model. These direct expenditures are used to identify the total local economic impact (direct, indirect, induced) effect on expenditures and employment. Changes in economic benefits and economic impacts could potentially apply to commercially guided and self-guided recreational rafters. For this assessment, changes to economic impacts from self-guided rafters were not evaluated because many of these trips are expected to be local. This means that trip changes by these rafters would not lead to important changes in expenditures and therefore they would not lead to economic impacts. Changes to economic benefits are evaluated for all rafters.

3.1.2.1 Alternative A – No Action

3.1.2.1.1 Rafting-Related Economic Impacts

Under the No Action Alternative there is no agreement on water releases for recreation purposes. TVA would operate the Ocoee dams as it does its other assets – as part of an overall system to manage water for flood control, hydroelectric power generation, recreation, water supply, water quality, aquatic habitat, and other uses. Without predictable flow, all self-guided and commercially guided rafting on previous release days is expected to be unsustainable.

Based on 2016 rafter counts[3] this would result in the loss of approximately 200,000 annual rafting trips: 181,438 commercially-guided trips and 18,598 recreational trips. The economic model used for this analysis estimates that the present value of the losses in economic benefits (consumer surplus) associated with these lost rafting trips over a 15-year time period is approximately $289 million ($19.3 million in annual losses).

This is the lost value to those 200,000 recreators who would have preferred to take rafting trips on the Ocoee River, but because the river would no longer support rafting, they either have to go to another location that is farther away, of lower quality, or both. The economic value measure reflects how much more they would prefer to take their trips to the Ocoee River than to the other distant and/or lower quality rafting sites.

Private rafting and kayaking would still exist under this alternative when conditions are favorable during periods of rain/high flow that would produce excess non-turbine flow. Private rafting and kayaking is expected to be driven by local, opportunistic recreators. This is not expected to result in a trip differential related to experience or desirability. Accordingly, there is no change to these rafters' well-being or expenditures.

In addition to losses in economic value resulting from lost trips under the No Action Alternative, there would also be economic impacts resulting from the lost trips. The analysis uses IMPLAN to assess the economic impacts resulting from the lost trips. To use the IMPLAN model, per-trip expenditures by category from Table 3-3 were used to identify per-trip indirect and induced economic impacts. Table 3-5 presents the economic impacts associated with implementation of Alternative A. Under Alternative A, all economic impacts associated with baseline conditions are lost because managed water releases for recreation purposes would be eliminated.

Table 3-5. Alternative A – Estimated Annual Economic Losses from Whitewater Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$18,413,162	$3,578,289	$4,056,327	$26,047,778
Total Value Added	$9,777,943	$1,762,641	$2,402,532	$13,943,116
Indirect Business Tax	$1,946,492	$148,233	$250,578	$2,345,303
Labor Income	$5,830,918	$1,163,662	$1,565,430	$8,533,010
Employment	320.4	32.0	32.5	384.9

[3] TVA acknowledges that rafter count data is limited as counts may not include access points that are preferred by some private boaters.

3.1.2.1.2 Cost of Power

Under the No Action Alternative, water previously released in support of rafting would be made available as needed by TVA to generate power at the No. 2 and No. 3 Powerhouses. As such, the higher cost of generation of replacement power under the baseline condition would not be passed on to TVA consumers under the No Action Alternative.

3.1.2.2 Alternative B – Proposed Agreements

3.1.2.2.1 Rafting-Related Economic Impacts

Under the proposed action, TVA would operate the dams similarly to current operations but with a slight reduction in release days. This change is expected to have a minimal impact to private rafting as the information available regarding private rafting is not quantifiable given the slight reduction in release days. Overall, fees required to be paid for commercial rafting operations would increase. There is currently a facility maintenance fee of $0.50 per rafter for all sections of the river, a U.S. Treasury repayment fee of $1 per rafter for lost power generation on the middle section, and an OROA fee for the upper section associated with lost power generation equating to approximately $5 per rafter. Under this proposal, there would be no fee associated with lost power generation and the new fee associated with maintenance is expected to be about 10 percent of current per-rafter revenue of $45 to $55 per-trip and would be used to support the State's operation, maintenance and administrative costs which are estimated to be $450,000 in 2019.

This increase in maintenance fees shifts some ongoing cost from taxpayers to some mixture of operators and customers. To evaluate the implications of the rafting cost increase, the supply demand framework described above was applied. Because the cost increase would apply evenly to all rafting companies, a per-trip price increase equivalent to the cost increase was added to the supply curve (described above). The resulting simulation indicates that adding $5 per trip to the overall costs experienced by rafters results in an annual reduction of 8,050 trips, which represents a 4.4 percent reduction in trips annually. In addition, the five days in September where rafting is eliminated accounts for approximately 400 trips, for a total impact of a loss of 8,445 trips (4.7percent of total trips).

The present value of the loss in economic benefits (consumer surplus) to recreators associated with 8,445 lost trips over a 15-year time period is approximately $12.2 million (approximately $813,000 in annual losses). These are losses to recreators who would have preferred to take rafting trips to the Ocoee River, but the increased costs of Ocoee River trips or the lack of availability during those five days causes them to either go to another location that is of lower quality or to not raft at all. The economic value measure reflects how much more they would prefer to take their trips to the Ocoee River rather than to other lower quality rafting sites or to not raft at all.

In addition to losses in economic value to recreators resulting from lost trips under Alternative B, there would also be impacts to the economy resulting from the lost trips. The analysis uses IMPLAN to assess the economic impacts resulting from the lost trips. To use the IMPLAN model, per-trip expenditures by category from Table 3-3 were used to identify per-trip indirect and induced economic impacts.

Table 3-6 presents the economic impacts associated with implementation of Alternative B.

Table 3-6. Alternative B – Estimated Annual Economic Losses from Whitewater Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$857,055	$166,554	$188,805	$1,212,414
Total Value Added	$455,122	$82,043	$111,828	$648,993
Indirect Business Tax	$90,601	$6,900	$11,663	$109,164
Labor Income	$270,148	$54,164	$72,864	$397,176
Employment	14.9	1.5	1.5	17.9

The estimated level of direct expenditures by the 8,445 rafters in Alternative B is approximately $1.06 million. After adjustments are made to retail and transportation expenditures, the estimated level of direct expenditures that will be lost under Alternative B is approximately $857,000. This expenditure level is responsible for about $455,000 in value-added impacts of which $91,000 are indirect business taxes and 15 employees making $270,000 in labor income in Polk and Bradley counties. The total federal, state, and local indirect business taxes do not include personal income tax or social security taxes.

The indirect losses (i.e., changes in inter-industry transactions as supplying industries respond to decreased demand from the directly affected industries) is $167,000 in output. This output is associated with approximately two jobs receiving a total of $54,000 in labor income. The induced losses (i.e., changes in local spending that result from income changes in the directly and indirectly affected industry sectors) are estimated to be $189,000 in industrial output. This output is associated with approximately two jobs, receiving a total of $73,000 in labor income. In total, the expenditures by rafters of the Ocoee River results in approximately $1.21 million in lost industrial output, $649,000 in lost value-added impacts, $109,000 in lost indirect business taxes, and almost 18 lost jobs receiving a total of $397,000 in labor income.

Private rafting during the five days in September was measured at 710 trips in 2016. Economic impacts and benefits from releases would depend on the nature of these trips. If these are primarily local rafters, economic impacts from tourism are minimal and consumer surplus impacts are mitigated by within-season trip reallocation.

If the September week trips are tourists taking multi-day regional rafting trips for all five days, this would result in approximately $30,511 in expenditures in the local economy. This would result in $16,050 in value-added impacts, $2,706 in indirect business taxes, and $9,821 in labor income. The annual economic benefits to rafters (consumer surplus) associated with these rafting trips is $68,515. This benefit would be reduced proportionately with the number of days provided.

3.1.2.2.2 Cost of Power

In conjunction with Alternative B, TVA would continue to release water from Ocoee No. 3 and No. 2 dams to support commercial rafting. Consequently, TVA would reduce the amount of hydropower generation and would have to shift loads to other generation facilities at a higher production cost. However, in accordance with renewed agreements for continued whitewater recreation below these two dams, TVA would be compensated for the differential cost of power. As such, TVA consumers would not bear the marginal cost associated with reduced hydropower generation under this alternative.

3.1.2.3 Alternative C – Current Management Regime

3.1.2.3.1 Rafting-Related Economic Impacts

Under this alternative, TVA would continue to release water from Ocoee No. 3 and No. 2 dams to support commercial rafting similar to the baseline condition. The existing fee of $0.50 per rafter charged to commercial rafting operations would be increased as described under Alternative B.

As described under Alternative B, this increase from existing costs would fall on some mixture of operators and customers and result in an annual reduction of 8,050 trips, which represents a 4.4 percent reduction in trips annually. There would be no change in the current release schedule and therefore no additional loss in rafting trips.

The present value of the loss in economic benefit (consumer surplus) to recreators associated with these lost rafting trips over a 15-year time period is approximately $11.6 million (approximately $775,000 in annual losses).

Table 3-7 presents the impacts to the economy associated with Alternative C.

Table 3-7. Alternative C – Estimated Annual Economic Losses from Whitewater Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$818,944	$159,148	$180,409	$1,158,501
Total Value Added	$434,884	$78,395	$106,855	$620,134
Indirect Business Tax	$86,572	$6,593	$11,145	$104,310
Labor Income	$258,135	$51,755	$69,624	$379,514
Employment	14.2	1.4	1.4	17.0

The estimated level of direct expenditures by the 8,050 rafters in Alternative C is approximately $1.01 million. After adjustments are made to retail and transportation expenditures, the estimated level of direct expenditures that will be lost under Alternative C is approximately $819,000. This expenditure level is responsible for about $435,000 in value-added impacts of which $87,000 are indirect business taxes and 14 employees making $258,000 in labor income in Polk and Bradley counties. The total federal, state, and local indirect business taxes do not include personal income tax or social security taxes.

The indirect losses (i.e., changes in inter-industry transactions as supplying industries respond to increased demands from the directly affected industries) is $159,000 in output. This output is associated with over one job receiving a total of $52,000 in labor income. The induced losses (i.e., changes in local spending that result from income changes in the directly and indirectly affected industry sectors) are estimated to be $180,000 in industrial output. This output is associated with over one job, receiving a total of $70,000 in labor income. In total, the expenditures by rafters of the Ocoee River results in close to $1.16 million in lost industrial output, $620,000 in lost value-added impacts, $104,000 in lost indirect business taxes, and almost 17 lost jobs receiving a total of $380,000 in labor income.

3.1.2.3.2 Cost of Power

In conjunction with Alternative C, TVA would continue to release water from Ocoee No. 3 and No. 2 dams to support commercial rafting. Consequently, TVA would reduce the amount of hydropower generation and would have to shift loads to other generation facilities at a higher production cost. In accordance with renewed agreements for water supply, TVA would be compensated for the differential cost of power for the recreational days associated with the agreement. However, no compensation would be provided for the five additional release days scheduled in September. As such, TVA consumers would not bear the marginal cost associated with reduced hydropower generation under this alternative for most of the recreational season, but would bear the fractional cost associated with the replacement power generation during the five days in September.

To estimate the annual power costs associated with these five days in September, TVA developed average replacement cost estimates using a production cost model known as Planning and Risk, a Ventyx tool. The model produces details about the projected usage of TVA's generating resources to meet forecasted demand over any desired time horizon (hourly, daily, weekly, monthly, or yearly) in the future. The production cost model provides the marginal cost of power based on projected future supply and demand given current expectations of future system conditions. Inputs to this model are alternative release schedules. Outputs are the average replacement cost of energy on a weekly basis.

Using this model, September costs are estimated to range between $711.59 and $516.42 per hour. To calculate weekly costs, the midpoint of this range ($614) was multiplied by 30 hours (five days with a six-hour release schedule) to estimate $18,420 in annual power costs for the five days in September.

3.1.2.4 Summary of Environmental Consequences

Recreational rafting on the Ocoee River has an impact on the local economy, individual rafters and TVA consumers. Economic impacts from rafting occur as rafters spend money in local economies. Rafters receive benefits when the amount they are willing to pay for commercial rafting on the Ocoee River exceeds actual cost, as well as from TVA's consumers' absorption of costs for replacement power.

Total impacts to the economy (annual losses), impacts to the recreator and impacts to the TVA consumer are summarized in Table 3-8 for each of the proposed alternatives.

Table 3-8. Summary of Environmental Consequences

	Alternative A	Alternative B	Alternative C
Lost Rafting Trips	200,000	8,445	8,050
Total Annual Losses			
Total Industrial Output	$26,047,778	$1,212,414	$1,158,501
Total Value Added	$13,943,116	$648,993	$620,134
Indirect Business Tax	$2,345,303	$109,164	$104,310
Labor Income	$8,533,010	$397,176	$379,514
Employment	384.9	17.9	17.0
Impact to Recreator			
Total Loss of Economic Benefit (15 years)	$289 million	$12.2 million	$11.6 million
Annual Loss of Economic Benefit	$19.3 million	$813,000	$775,000
Impact to TVA Consumer			
Cost of Replacement Power	No cost	No cost	Cost associated with five release days in September (estimated to be $18,420)

Under Alternative A, the loss of approximately 200,000 rafting trips would result in approximately $26.05 million in lost expenditures in the local economy. This would result in a $13.94 million in lost value-added impacts, $2.35 million in lost indirect business taxes, and almost 385 lost jobs receiving a total of $8.53 million in labor income. In addition the losses in economic benefits to rafters (consumer surplus) associated with these lost rafting trips over a 15-year time period is approximately $289 million ($19.3 million in annual losses). The estimated impact to the local economy and to rafters would be significant.

However, there would be a minor beneficial impact under the No Action Alternative as the cost of generation of replacement power under the baseline condition would not be passed on to TVA consumers.

The estimated level of expenditures in the local economy that would be lost due to the loss of 8,445 rafting trips (4.7 percent of total trips) as a result of the fee increase and loss of five recreational release days in September under Alternative B is approximately $1.2 million. This expenditure level is responsible for about $650,000 in value-added impacts of which $109,000 are indirect business taxes and 18 employees making $397,000 in labor income. The impact to individual rafters over a 15-year time period is approximately $12.2 million (approximately $813,000 in annual losses). This would be a minor impact relative to the No Action Alternative (Alternative A).

Under Alternative B, TVA would be compensated for the cost of replacement power which would have a minor beneficial impact on TVA consumers.

The estimated level of expenditures in the local economy that would be lost due to the loss of 8,050 rafting trips (4.4 percent of total trips) as a result of the fee increase under Alternative C is approximately $1.1 million. This expenditure level is responsible for about $620,000 in value-added impacts of which $104,000 are indirect business taxes and 17 employees making $379,000 in labor income. The impact to individual rafters over a 15-year time period is approximately $11.6 million (approximately $775,000 in annual losses). This would be a minor impact relative to the No Action Alternative, although incrementally less than Alternative B.

Under Alternative C, impacts would be similar to Alternative B. TVA would be compensated for the differential cost of power for all recreational days extending through October, except for the five additional release days scheduled in September. As such, TVA consumers would bear the fractional cost, approximately $18,420 anually, associated with the replacement power generation during this period. Therefore, there would be minor impact to TVA consumers relative to Alternatives A and B.

3.2 Demographics and Environmental Justice

3.2.1 Affected Environment

Demographic characteristics are assessed using 2010 Census and 2011-2015 American Community Survey (ACS) 5-year estimates provided by the U.S. Census Bureau (USCB 2017a and 2017b). Employment and housing data are provided by the 2011-2015 ACS. Data was used from a spatial extent and scale that provides the most accurate and up-to-date pictures of demographic characteristic in the vicinity of the proposed actions. Polk County and Bradley County represent the geographic scale for the analysis of demographic impacts as these counties provide an appropriate context for analysis of the local demographic conditions in the vicinity of the project area. Additionally, the State is included as an appropriate secondary geographic area of reference.

3.2.1.1 Demographics and Housing

Demographic characteristics of the study area (population, race, and age) are summarized in Table 3-9. Figure 3-1 illustrates the locations of the various geographies referenced in the analysis. There are approximately 16,687 people living within Polk County. This represents only 0.3 percent of the population of Tennessee (6,499,615 people). Polk County is rural with a population density of 38.4 people per square mile. The largest city in Polk County, Benton, has a population of 1,897 people. Ducktown and Copperhill, the largest cities near the project area, have populations of 475 and 254 people, respectively. These cities are rural in nature. Bradley County has a population density of 310.4 people per square mile, which is much higher than that of Polk County and the State (157.6 people per square mile). Approximately 42 percent of the population of Bradley County resides in the city of Cleveland. While Bradley County has experienced a population increase (3.1 percent) since 2010, Polk County has experienced a slight population decrease (0.8 percent) (USCB 2017a and 2017b).

Table 3-9. Demographic Characteristics

	Bradley County	Polk County	State of Tennessee
Population[2]			
Population, 2015 estimate	102,062	16,687	6,499,615
Population, 2010[1]	98,963	16,825	6,346,105
Percent Change 2010-2015	3.1%	-0.8%	2.4%
Persons under 18 years, 2015	22.5%	21.1%	23.0%
Persons 65 years and over, 2015	15.4%	18.9%	14.6%
Racial Characteristics[2]			
White alone, 2015 (a)	91.7%	96.7%	77.8%
Black or African American, 2015 (a)	4.6%	0.3%	16.8%
American Indian and Alaska Native, 2015 (a)	0.1%	0.4%	0.3%
Asian, 2015 (a)	1.0%	0.1%	1.6%
Native Hawaiian and Other Pacific Islander, 2015 (a)	0.0%	0.0%	0.1%
Some Other Race, 2015 (a)	0.6%	0.7%	1.5%
Two or More Races, 2015	1.9%	1.8%	2.0%
Hispanic or Latino, 2015 (b)	5.4%	1.7%	4.9%
Income[2]			
Persons below poverty level, 2011-2015	19.6%	18.9%	17.6%
Per Capita Income, 2011-2015	$23,336	$21,404	$25,227
Housing Units[2]			
Total Housing Units	41,395	7,991	2,812,133
Occupied Housing Units	37,947	6,653	2,496,552
Vacant Housing Units	3,448	1,338	60,788

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

Sources: [1]USCB 2017a; [2]USCB 2017b

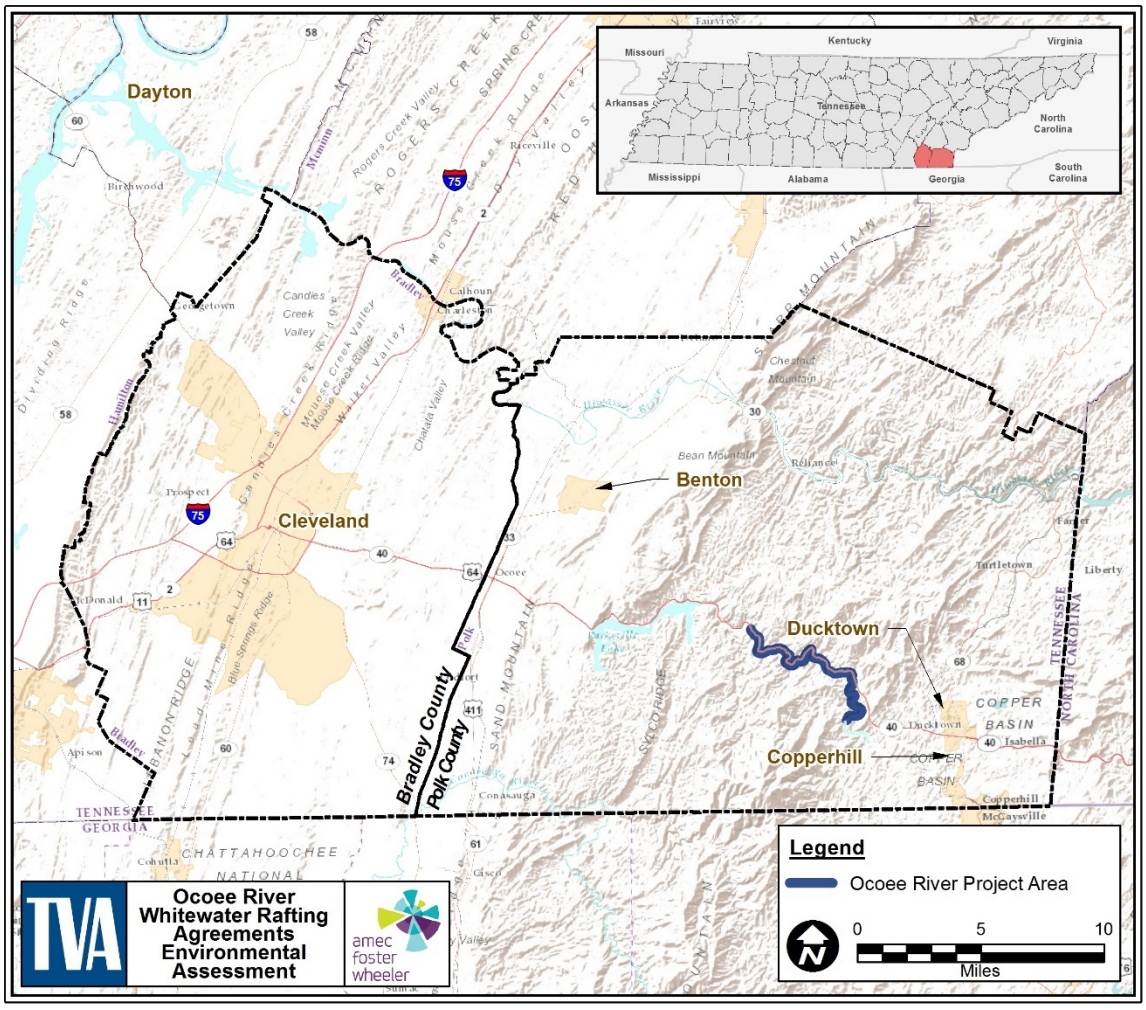

Figure 3-1. Study Area Geographies for Demographic Analysis

Numbers of persons younger than 18 within Polk County (21.1 percent) are similar to what is found in both Bradley County (22.5 percent) and throughout Tennessee (23.0 percent). More persons 65 years old and greater are found within Polk County (18.9 percent) than in Bradley County (15.4 percent) and the State (14.6 percent). Overall, Polk County contains about the same percentage of children as Bradley County and the State, but slightly more people 65 years old and greater (USCB 2017b).

As shown in Table 3-9, the populations within Polk and Bradley counties are predominantly white (96.7 percent and 91.7 percent, respectively), with all minority groups accounting for 3.3 and 8.3 percent of the population, respectively. Compared to the State of Tennessee, in which 22.2 percent of the population is a minority, these counties are less racially diverse (USCB 2017b).

The per capita income in Polk County ($21,404) is less than in both Bradley County ($23,336) and Tennessee ($25,227). Poverty rates within Polk County (18.9 percent) are similar to both Bradley County (19.6 percent) and state-wide (17.6 percent) (USCB 2017d).

Transient populations in the area increase during the summer rafting season and are generally greatest during the month of July, when in 2016, a total of 86,167 users visited the Middle section of the Ocoee River and 15,611 users visited the Upper section (Tennessee State Parks 2016a). In addition, as noted in Section 3.1, up to 25 commercial outfitters may provide guided rafting trips during the summer rafting season. Employees of outfitters and recreators living in the area utilizing the existing housing stock would increase demand on local public services, primarily police and fire protection during this time. According to the 2010 census, approximately 36 percent of vacant housing units in Polk County and 7.6 percent of the vacant housing units in Bradley County are reported to be held for seasonal, recreational, or occasional use. As is evident from these numbers, the majority of the local transient population would reside in Polk County.

3.2.1.2 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations. EO 12898 mandates some federal/executive agencies to consider EJ as part of the NEPA. EJ has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (U.S. Environmental Protection Agency 2016) and ensures that minority and low income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities.

The CEQ defines minority as any race and ethnicity, as classified by the USCB as: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (CEQ 1997). Low income populations are based on annual-statistical poverty thresholds also defined by the USCB.

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

Low-income populations are those with incomes that are less than the poverty level, which varies by the size of family and number of related children under 18 years (CEQ 1997). The 2015 USCB Poverty Thresholds states the poverty threshold as an annual household income of $24,257 for a family of four (USCB 2017c). For an individual, an annual income of $12,082 is the poverty threshold. A low-income population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total number of households.
- The ratio of low income population significantly exceeds (i.e., greater than or equal to 20 percent) the appropriate geographic area of analysis.

For this assessment, two geographic areas of analysis (i.e., county and state) were used to determine potential EJ populations. Polk and Bradley counties are defined as the potentially affected community. Demographic data for these counties was compared to state-wide data.

Total minority populations (i.e., all non-white racial groups and Hispanic or Latino, combined) comprise 27.1 percent of the population of Tennessee. Minorities make up 13.7 percent of the population of Bradley County and 5.0 percent of the population of Polk County (USCB 2017b). The poverty rate in Tennessee is 17.6 percent. Bradley County has a poverty rate of 19.6 percent, and Polk County has a poverty rate of 18.9 percent.

The study area does not meet the specified criteria as EJ minority populations or low income populations (see Table 3-1). Therefore, no further analysis regarding Environmental Justice is required.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, water release agreements would expire at the end of 2018 and whitewater recreation on the middle and Upper Ocoee would only be possible during periods of naturally occurring high river flow and when TVA is not generating power at the Ocoee No. 2 and No. 3 Powerhouses. This would result in a moderate change in the transient population as the number of recreators would decrease substantially during the current rafting period (early May through mid-September). However, the transient population influx is variable and intermittent and there would be no change to the resident population. Therefore the demand for public services would not be appreciably affected. Consequently, impacts to local demographics would be minor.

3.2.2.2 Alternative B – Proposed Agreements

Under this alternative, five days of water releases to the Middle Ocoee in late September would be eliminated. In addition, there would be no construction or improvements to the parcels of land affected by the proposed action. No changes to resident or transient populations or demand for public services are anticipated and this alternative is substantially similar to the current management practice. Therefore, there would be no changes to local demographics relative to the baseline condition.

3.2.2.3 Alternative C – Current Management Regime

Under Alternative C, TVA would continue the current management practice, and there would be no construction or improvements on affected parcels of land. Therefore, there would be no changes to resident or transient populations or demand for public service relative to the baseline condition.

3.3 Traffic and Transportation

3.3.1 Affected Environment

U.S. Highway 64 (US 64), also designated as State Route (SR) 40 and US 74, is the primary east west route in the region and serves through, local and recreational traffic and is the main route used to access the Upper and Middle Ocoee River (Figure 3-2). Accordingly, traffic on US 64 is composed of a mix of cars, heavy and light duty trucks, as well as buses transporting commercial rafters and kayakers, recreational vehicles, and cars pulling recreational trailers. Within the study area, the majority of the road is two lanes with a speed limit of 45 miles per hour. From SR 30 east to the Ocoee Whitewater Center,

approximately 9.5 miles, US 64 primarily has two 12-foot lanes with narrow shoulders (2 feet or less) and is striped for no passing. The exception to this is a 1.1-mile section near Forest Service Road 45 (at the Ocoee No. 3 Powerhouse) where US 64 is four lanes wide. From the Ocoee Whitewater Center east to No. 3 Dam Road, approximately 1.5 miles, the geometry of US 64 improves somewhat and has 4- to 8-foot shoulders and allows for frequent passing.

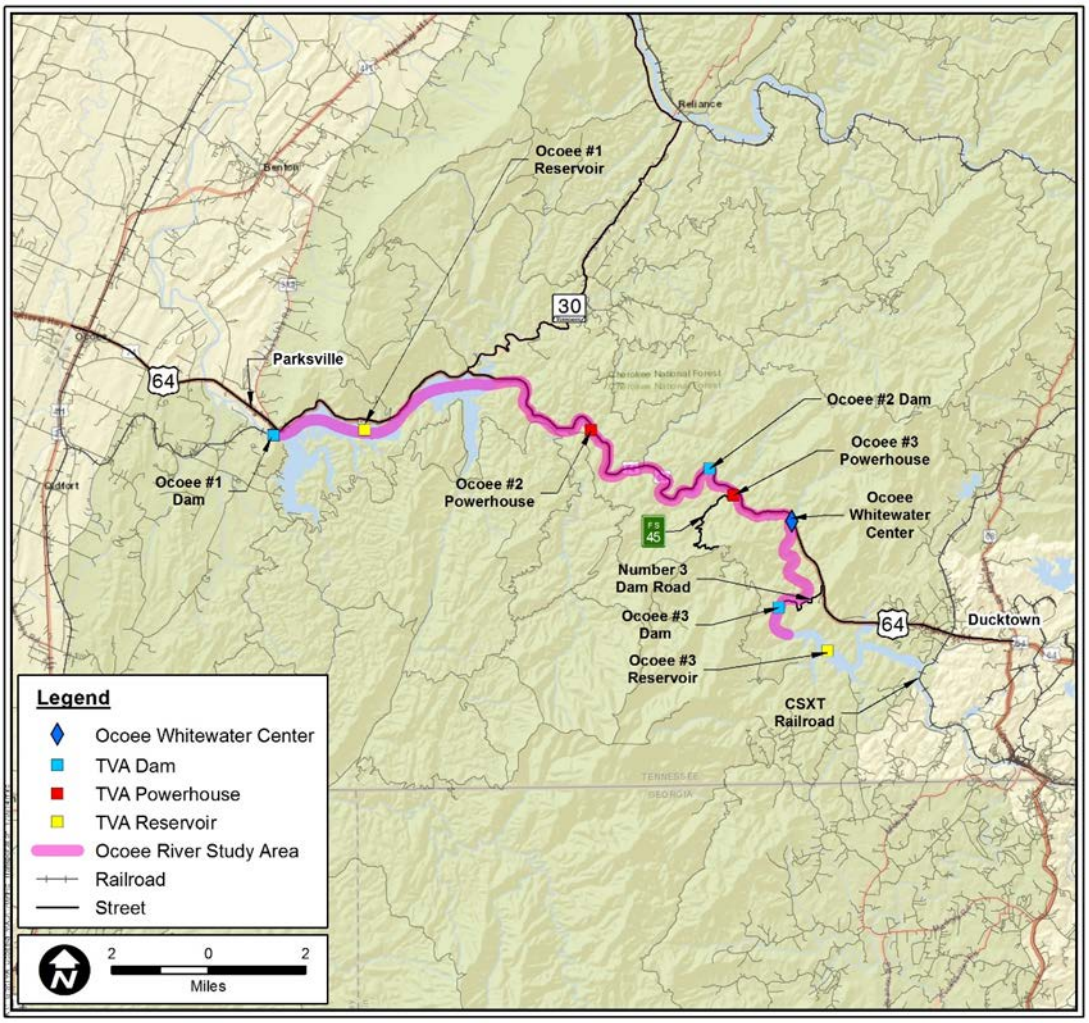

Figure 3-2. Transportation Features in the Vicinity of the Upper and Middle Ocoee River

Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS is described accordingly:

- LOS A: describes free flow traffic conditions;
- LOS B: free flow conditions although presence of other vehicles begins to be noticeable;
- LOS C: increases in traffic density become noticeable but remain tolerable to the motorist;
- LOS D: borders on unstable traffic flow; the ability to maneuver becomes restricted; delays are experienced;
- LOS E: traffic operations are at capacity; travel speeds are reduced, ability to maneuver is not possible; travel delays are expected; and
- LOS F: designates traffic flow breakdown where the traffic demand exceeds the capacity of the roadway; traffic can be at a standstill.

The 2013 Annual Average Daily Traffic (AADT) volumes on US 64 in the vicinity of the Upper and Middle Ocoee River reported from the Tennessee Department of Transportation (TDOT) are provided in Table 3-10. LOS was determined based on annual traffic data and roadway conditions. The existing LOS on US 64 in the study area vary. Between SR 30 and the Ocoee Whitewater Center, US 64 has an LOS E. The primary reason for this relatively poor LOS is due to the geometry of the road (narrow to no shoulders, no passing, rolling terrain). East of the Ocoee Whitewater Center to No. 3 Dam Road, US 64 has an LOS C. The level of service is improved through this section because passing is allowed on this stretch of US 64, and there are wider shoulders.

Table 3-10. Average Daily Traffic Volume (2013) and LOS on Roadways in the Vicinity of the Upper and Middle Ocoee River

Roadway	Existing Annual Average Daily Vehicle Use (AADT)	Number of Lanes	Estimated LOS
US 64 just east of intersection with SR 30 to the Ocoee Whitewater Center	3,434	2	E
US 64 just east of CXST RR near Ducktown	5,383	2	C

Source: TDOT 2013.

The traffic data presented in Table 3-10 represents an annual average daily vehicle count on US 64. It should be noted that this traffic data does not reflect periodic increases in traffic, particularly during the summer months, when the area experiences a rise in recreational use on the river. Traffic is generally heaviest during the month of July, when in 2016, a total of 86,167 users visited the Middle section of the Ocoee River and 15,611 users visited the upper section (Tennessee State Parks 2016a). The greatest single day usage on the Middle Ocoee was 6,638 users, and the greatest single day usage on the Upper Ocoee was 2,571 users during this period.

Assuming one person per vehicle, the daily traffic on US 64 in the vicinity of the Ocoee River would be 6,638 vehicles per day at peak times of the year when TVA releases water for recreational purposes. Realistically, there would likely be several multiple-occupant vehicles and busses would hold multiple rafters; however, as detailed traffic counts are not available, for conservative purposes, one person per vehicle is assumed. The estimated LOS on US 64 during the summer peak remained at LOS E. However, during the recreational rafting season, increased congestion and a general deterioration in level of service is expected to result from higher traffic volumes and ingress/egress associated from recreators.

Availability of parking facilities within the US 64 corridor are limited due to the mountainous terrain. Parking is available at the Middle and Upper Ocoee River access points. However, when these lots fill, recreators park on the north side of US 64 on the side of the road. This is a potentially dangerous condition, as recreational users have to cross US 64 to access the river.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action Alternative

Under Alternative A, whitewater recreation would only be available on the Middle and Upper Ocoee River during periods of naturally occurring high river flow and when TVA is not generating power at the Ocoee No. 2 and Ocoee No. 3 Powerhouses. Consequently, it would be expected that recreational use on the Ocoee River would decline, which would result in a corresponding reduction in the amount of recreational-related traffic on US 64. In addition, as the number of recreational users decrease, the need to park along the roadway shoulders would be minimized. Therefore, under Alternative A, there would be a beneficial impact to transportation and pedestrian safety as a result of the decrease in recreational use of the Ocoee River.

US 64 is the primary east-west route used by both local residents and through traffic throughout the year. Since the relatively poor LOS along US 64 in the study area is attributed to both the AADT and geometry of the road (narrow to no shoulders, no passing, rolling terrain), the beneficial impacts on transportation along US 64 as a result of the reduction in recreational-related traffic would be considered minor and would not improve the LOS ranking on US 64 in the study area, but would result in a notable improvement in seasonal recreator-based congestion.

Traffic in the region could also be indirectly impacted as recreators would utilize alternate rafting rivers in the region such as the Gauly, Nolichucky, Chatooga, and Nantahala. However, traffic would be dispersed and would only result in an incremental change to traffic and transportation conditions on the roadways which provide access to these facilities. Therefore, the indirect impact would be minor.

3.3.2.2 Alternative B – Proposed Agreements

As part of the proposed agreements, TVA would provide scheduled water releases on the Middle and Upper Ocoee River. The water releases would be provided based on a schedule similar to the water release agreements currently in place. However, TVA would eliminate releases to the Middle Ocoee River currently occurring on five weekdays in late September.

As stated in Section 3.3.1, the 2013 AADT volume on US 64 between SR 30 and the Ocoee Whitewater Center was 3,434 vehicles per day, which results in an LOS E. The

primary reason for this relatively poor level of service is due to the geometry of the road (narrow to no shoulders, no passing, rolling terrain). However, as noted above, during the summer peak river usage times, the traffic on US 64 can increase to as high as 6,638 vehicles per day. The LOS estimated using the traffic volumes during summer peak river usage time remained at LOS E between SR 30 and the Ocoee Whitewater Center. Additionally, under this alternative there would be no change in seasonal recreator-based congestion on US 64. Eliminating five release dates to the Middle Ocoee River in late September would have no effect on the peak summer usage time when US 64 would remain at an LOS E.

Traffic in the region could be indirectly impacted as recreators would utilize alternate rafting rivers described above when rafting is not available on the Ocoee River. However as traffic would be dispersed and would only result in an incremental change to traffic and transportation conditions during a relatively short period this impact would be negligible.

Therefore, implementation of Alternative B would result in an incremental change in traffic and transportation conditions limited to September only, but there would be no impact to LOS.

3.3.2.3 Alternative C – Current Management Regime

This alternative is substantially similar to Alternative B, except under this alternative, TVA would release water to the Middle Ocoee for five additional weekdays in late September. This alternative is the current management practice.

Under Alternative C, there would be no change to current conditions. Therefore, there would be no direct or indirect incremental effect on transportation.

3.4 Surface Water Resources

3.4.1 Hydrology

3.4.1.1 Affected Environment

A total of 1,988 acres of surface water features are identified on National Wetlands Inventory (NWI) Maps of the project area (Table 3-11).

Table 3-11. Surface Water Features

	Ocoee River	USFWS and TVA Parcels	5-mile Region
NWI Open Water Feature			
Lacustrine	1,988.0		411.9
Riverine	251.1	2.7	1,433.5
Ponded			51.2
Total	**2,239.1**	**2.7**	**2,125.1**

Source: USFWS 2017b

As described by Cowardin et al. (1979), the lacustrine system includes wetlands and deep water habitat situated in a topographic depression or dammed river channel that lacks trees, shrubs, or persistent emergent vegetation. Within the project area, this includes the Ocoee No. 1 Reservoir below the Ocoee No. 2 Powerhouse. Within the lacustrine wetlands, a majority (90 percent) are classified as limnetic, which includes all deep-water habitats

(greater than 2.5 meters deep). The other lacustrine areas are considered littoral and extend from the shoreward boundary to the limnetic limit. While there may be some emergent vegetation consisting of floating or submersed aquatic plants, it is less than 30 percent cover.

Riverine wetlands are characterized as being contained within a channel and having moving water. This includes the section of the project area between the Ocoee No. 3 Dam and the Ocoee No. 2 Powerhouse. This stretch of the river is classified as having a rocky substrate characterized by stones, boulders, and bedrock. A small amount (2.7 acres) of riverine wetlands are also mapped within the parcels that USFWS and TVA would transfer management responsibilities to the State. These parcels are currently developed and no additional development is planned at this time.

3.4.1.1.1 Reservoir Operation System

The Ocoee No. 2 and No. 3 dams are included within the overall TVA Tennessee River system operation plan. This operation plan is complex and includes 49 dams and reservoirs that provide a multipurpose system to manage water for flood control, hydroelectric power generation, navigation, recreation, water supply, water quality, aquatic habitat, and other uses. Because the system is managed to achieve multiple purposes, there are inherent competing demands and trade-offs that require balancing with respect to water flows and reservoir levels. TVA has established an overall reservoir operations plan based on many years of experience and, most recently, use of a complex computer program to assist in evaluating plans with various options that emphasize different objectives. The operating plan provides the framework for meeting defined minimum requirements (e.g., flows) related to one or more objectives while also defining ranges that allow for real-time operation-related decisions. The plan has been updated and revised periodically, including the most recent overall plan revision in 2004. The plan development and approval is documented in the Reservoir Operations Study – Final Programmatic EIS (TVA 2004).

The Ocoee River, known as the Toccoa River until it crosses the Georgia-Tennessee state line, originates in the mountains of north Georgia. TVA controls the river and maintains the Blue Ridge Reservoir upstream in Georgia as well as the Ocoee No. 2 and No. 3 dams and reservoir complexes. Downstream from the Tennessee state line, the river is impounded to form the Ocoee No. 3 Reservoir. When generating power at the Ocoee No. 3 Powerhouse, the water in the Upper Ocoee River is diverted at No. 3 Dam into a tunnel to the Ocoee No. 3 Powerhouse located about 0.8 mile upstream of the No. 2 Dam. When generating power at the No. 2 Powerhouse, the water in the Middle Ocoee River (the reach between Ocoee No. 2 Dam and Ocoee No. 3 Dam) is diverted at the No. 2 Dam into an elevated flume to the No. 2 Powerhouse. The Ocoee No. 1 Dam is located about 8 miles below the Ocoee No. 2 Powerhouse. This dam impounds the Ocoee No. 1 Reservoir (also known as Parksville Lake).

The Reservoir Operations Study was developed to address operations for 35 of the 49 dams in the TVA system. The dams not included are smaller, single-purpose dams, or structures lacking operational facilities. For the 35 structures addressed, general guidance describing, for example, seasonal reservoir target water levels with maximum and minimum levels and targeted minimum flows is provided. The Reservoir Operations Study establishes “balancing guides” for reservoir water levels that are used to meet downstream objectives (e.g., streamflow) while balancing the releases and levels in the upstream reservoirs. Flow at Chickamauga Dam is used as an index to assess the adequacy of streamflow in the TVA system (Table 3-12). If additional flow within the system is needed, releases can be made

from 10 upstream reservoirs, including Blue Ridge which releases water that flows down the Ocoee River past the Ocoee No. 2 Dam and Ocoee No. 3 Dam.

Based on operational needs, TVA will release enough water to meet the average minimum flows at Chickamauga Dam.

Water may also be released from reservoirs during summer months after significant storm events to ensure adequate flood storage capacity.

Table 3-12. Chickamauga Dam System Flow Requirements (June through Labor Day)

Flow Threshold Characteristic	Weekly Average Minimum Flow at Chickamauga Dam (cfs)	
	June 1 - July 31	**Aug. 1 - Labor Day**
If the volume of water stored in tributary reservoirs is **below** the Minimum Operations Guide	13,000 cfs	25,000 cfs
If the volume of water stored in tributary reservoirs is **above** the Minimum Operations Guide	Increases from 14,000 cfs the first week of June to 25,000 cfs the last week in July	29,000 cfs

Source: TVA 2017

There is little storage available at Ocoee No. 2 and Ocoee No. 3 headwater pools for use in regulating flow to meet timing and rate of flow needs. By the early 1990s more than 80 percent of the original reservoir storage capacity at Ocoee No. 3 had been lost to sedimentation (USFS 1997), and Ocoee No. 2 had only a small storage capacity in its original condition. These structures are operated as run-of-river structures. Blue Ridge Reservoir is the only regulating reservoir upstream of Ocoee No. 2 and Ocoee No. 3. The uncontrolled drainage area at Ocoee No. 3 is approximately 290 square mi compared to runoff from approximately 233 square miles that is regulated by Blue Ridge. On a long-term average basis more flow through Ocoee No. 2 and Ocoee No. 3 is uncontrolled. However, the storage in Blue Ridge with more steady release can sustain flows through Ocoee No. 2 and Ocoee No. 3 during dry weather periods when uncontrolled runoff is low.

Blue Ridge Reservoir is a 3,300-acre multipurpose reservoir that was constructed during 1925 to 1930. The reservoir provides 68,500 acre-feet of flood storage capacity. The drainage area to Blue Ridge Reservoir is approximately 233 square miles. The basic operating schedule for Blue Ridge Reservoir is presented in Figure 3-3.

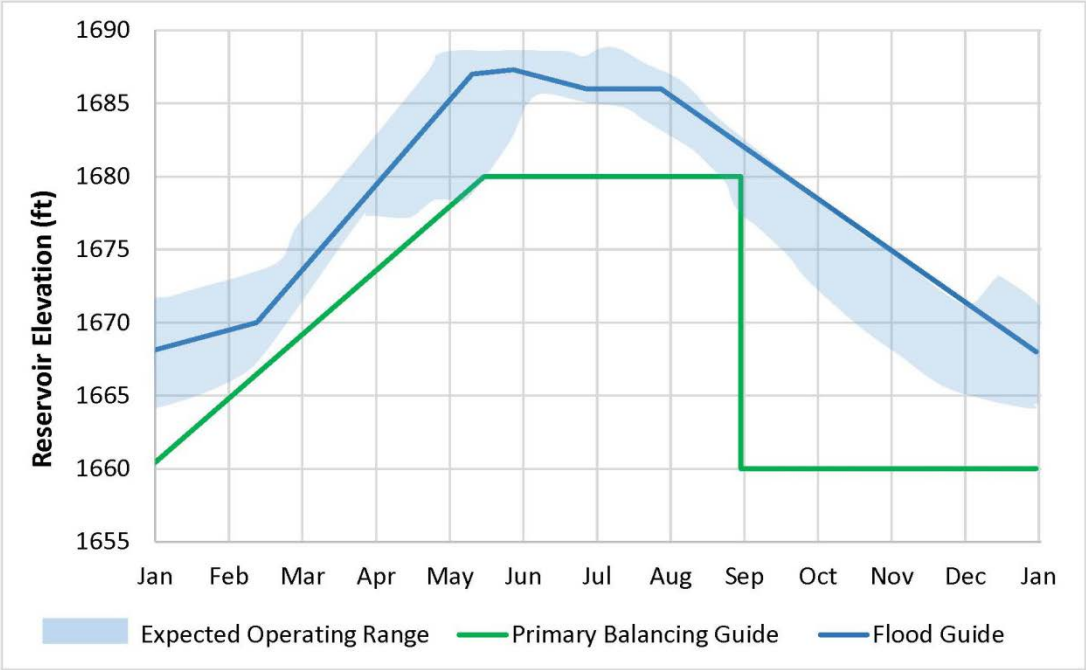

Figure 3-3. TVA Blue Ridge Reservoir Operating Schedule

Blue Ridge Reservoir releases of water occur to produce electric power at the Blue Ridge Powerhouse, but also depend on requirements of flow at Chickamauga Dam as well as storage levels in nine other reservoirs (Chatuge, Cherokee, Douglas, Fontana, Nottely, Hiwassee, Norris, South Holston, and Watauga). Releases from Blue Ridge Reservoir are also used to supplement water flow in accordance with managed water releases from Ocoee No. 3 and No. 2. There is a small storage volume at Ocoee No. 3 that allows some re-regulation of water released from Blue Ridge Reservoir. There is minimal storage at Ocoee No. 2 such that releases from Ocoee No. 3 and Ocoee No. 2 are closely scheduled. TVA uses the combination of extensive staff experience operating the system, computer simulation, and real-time information to make daily decisions regarding flows and water levels throughout the system, while maintaining flows and levels within the defined target ranges.

3.4.1.1.2 Ocoee River Flow Characteristics

3.4.1.1.2.1 General Stream Flow Characteristics

The average annual runoff at the U.S. Geological Survey (USGS) Station located downstream from the Blue Ridge Dam from 1899 through 1974 was 623 cfs (36.3 inches per year [in/yr]). The average runoff prior to completion of construction of the Blue Ridge Dam in 1930 was 715 cfs (41.7 in/yr). An evaporative loss of 34 in/yr (National Weather Service 1982) from the reservoir surface is equivalent to approximately 9,350 acre-feet/ year, or approximately 0.75 in/yr over the watershed, which contributes to a long-term lower runoff since 1930. The larger portion of the difference appears to be related to one or more of other factors such as lower precipitation and water withdrawals. The minimum mean daily stream flow prior to dam construction was 115 cfs (0.49 cfs/square mile). Selected streamflow statistics by month and annually are presented on Figure 3-4.

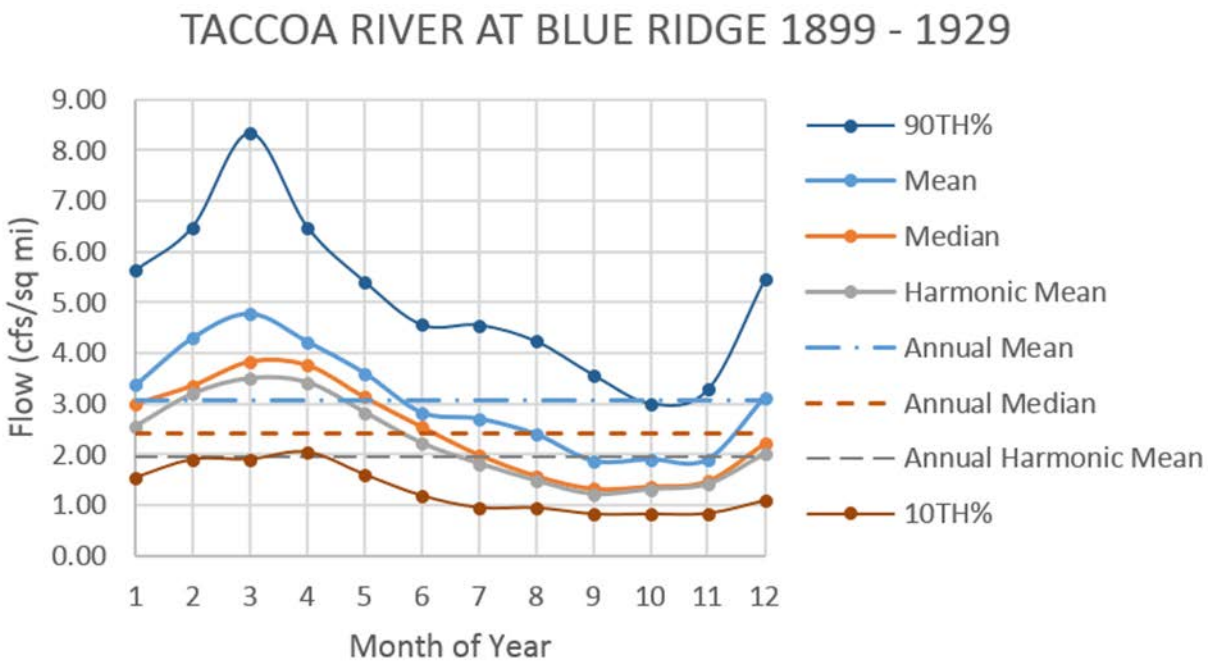

Figure 3-4. Monthly and Annual Natural Flow Statistics Toccoa River at Blue Ridge Reservoir (Downstream of Blue Ridge Dam, USGS Station 03559000)

Several long-term streamflow monitoring locations are available in the vicinity of Ocoee No. 2 and No. 3 Dams. These locations are listed in Table 3-13. The USGS data indicate a trend of decreasing streamflow per unit drainage area with increasing drainage area. The statistics from TVA flow data are relatively consistent with USGS data in the vicinity of Ocoee No. 2 and No. 3. It is expected that the large scale revegetation of exposed and unvegetated mined landscapes noted by TDEC (2014) are factors that have contributed to the observed reduced runoff rate.

The periods when flow records are available for TVA include both a relatively extreme prolonged drought period in 2007 and 2008 and a wet, flood condition in 2013. Historically, there have been no problems during those periods in meeting the release requirements for recreational rafting and kayaking. Review of TVA flow records confirm that during the months of July and August in 2007 and 2008 selected for review, the minimum recreational flows and durations appear to have generally been met.

Table 3-13. Long-Term Streamflow Stations in Vicinity of Ocoee No. 2 and No. 3 Dams

USGS Station No.	Name	Drainage Area (sq mi)	Period of Record Available
03564500	Ocoee River at Parksville, Tennessee	595	1911 - 1994
03563000	Ocoee River at EMF, Tennessee	524	1913 - 1998
NA	TVA Ocoee River at Ocoee No. 2 Dam	512	1992 - 2017
NA	TVA Ocoee River at Ocoee No. 3 Dam	493	1984 - 2017
03561500	Ocoee River at McHarg, Tennessee	447	1917 - 1942
03559500	Ocoee River at Copperhill, Tennessee	352	1903 - 1970
NA	TVA Toccoa River near Blue Ridge, Georgia	233	1984 - 2017
03559000	Toccoa River near Blue Ridge, Georgia	233	1899 - 1974
03560000	Fightingtown Creek at McCaysville, Georgia	70.9	1943 – 1971

Sources: USGS 2017; TVA 2017

3.4.1.1.2.2 Local Stream Flow Characteristics

Local stream flow characteristics of the Upper Ocoee and Middle Ocoee are highly influenced by operation of Blue Ridge Dam and Ocoee No. 2 and No. 3 dams in conjunction with the need for hydropower and support for rafting.

The Ocoee No. 3 Dam is 110 feet high and diverts water through a tunnel to the No. 3 Powerhouse located nearly 2 miles downstream (see Figure 1-2). The reach between Ocoee No. 3 Dam and Powerhouse is referred to as the Upper Ocoee Rafting Area. The dam produces a head of approximately 300 feet and a power generation capacity of 29 megawatts for a single turbine unit. The hydropower unit at Ocoee No. 3 operates at a flow of approximately 1,000 to 1,500 cfs. As such, during the spring and summer seasons, flow within this reach of the channel immediately downstream of Ocoee No. 3 Dam is variable and fluctuates. Based on TVA flow data from 1984 to 2017, the hourly flow has ranged from zero (which has occurred 87 percent of the time during March through October) to more than 14,000 cfs (Figure 3-5).

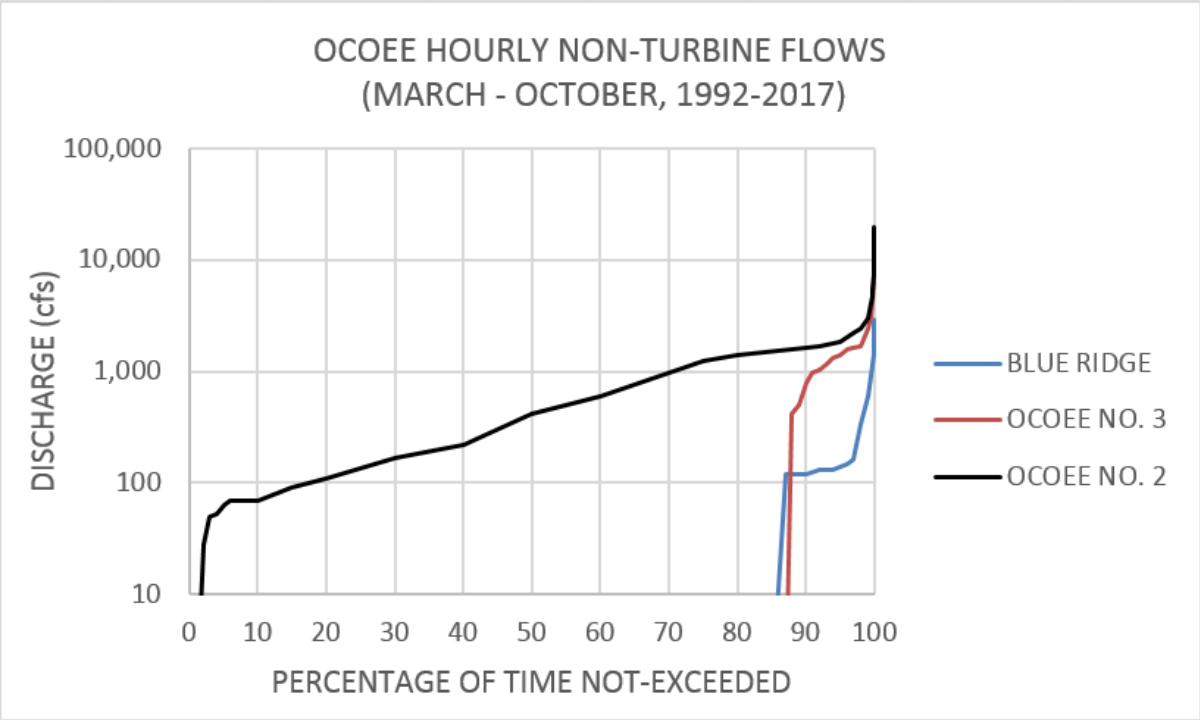

Figure 3-5. Hourly Flow Duration Graph for Non-Turbine Discharge at Blue Ridge, Ocoee No. 3, and Ocoee No. 2 Dams

Observable changes in streamflow statistics have occurred at Ocoee No. 3 over the period flow record. During the period from 2006 through 2016 with the Upper Ocoee River water release schedule in place and since the Olympics were held and the Reservoir Operations Study (TVA 2004) completed, non-turbine discharges through the Upper Ocoee River reach have been different than indicated by the statistics for the time period from 1984 through 1994. Hourly flow data for 2006 – 2016 show a distinct increase in the fraction of the time that releases at a rate of approximately 1600 cfs were made for the months of June through September compared to hourly data from the 1984 – 1994 period. Releases of approximately 1600 cfs have occurred an average of approximately 6% of the time during these months compared to slightly lower releases of approximately 1200 to 1300 cfs that were released during periods of approximately 1.0 to 2.5% of the time during the 1984 – 1994 period (see for example, Figure 3-6).

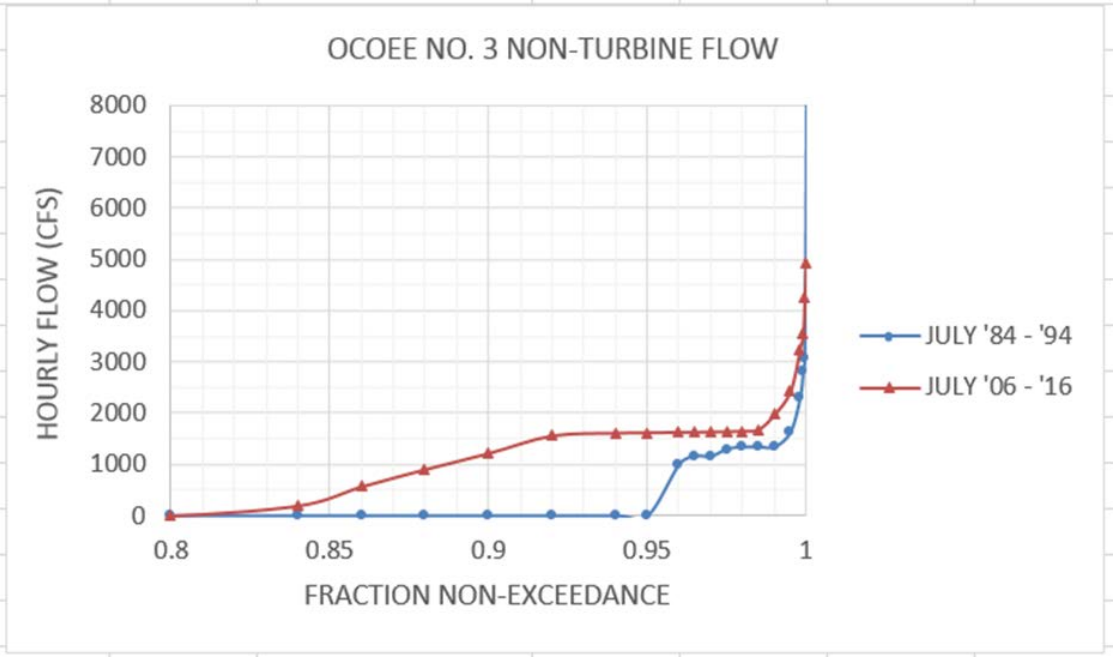

Figure 3-6. Comparison of Hourly Non-Turbine Flow Duration at Ocoee No. 3 for Period 2006 – 2016 with Period 1984 – 1994

Typical hourly flows at Blue Ridge Dam, Ocoee No. 3 and No. 2 are illustrated in Figures 3-7A, 3-7B, and 3-7C, respectively. These hydrographs illustrate flows and water levels on a randomly selected weekend (Saturday and Sunday, August 18 and 19, 2007) during a typical low-normal flow period characterized by scheduled recreational releases. "Non-turbine" flows are flows through the river channel, including recreational releases. As is evident in Figure 3-7B and Figure 3-7C, hydropower generation at Ocoee No. 2 and 3 Dam is truncated by the managed release of water to support rafting within this reach of the river. During periods of higher, normal flows, releases would be higher (up to capacity for hydropower generation) and/or for longer durations as appropriate based on the operations plan for the system. Additionally, as indicated in Figure 3-5, approximately 88 percent of the time during March through October over the past 30 years has been characterized as having no flow through the Ocoee No. 3 tailwater reach.

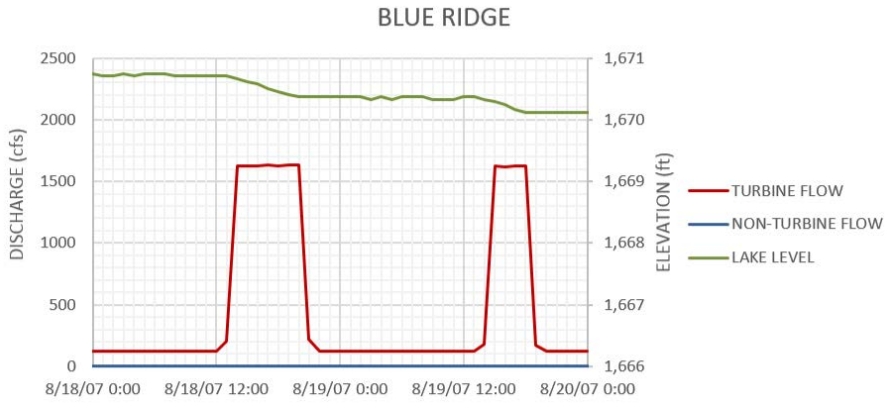

Figure 3-7A

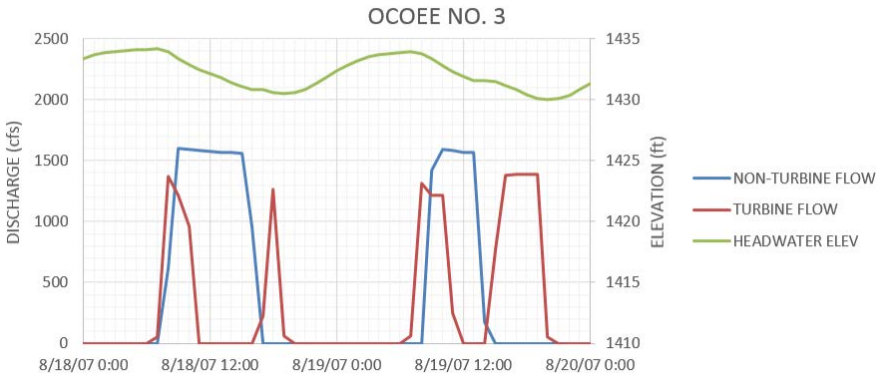

Figure 3-7B

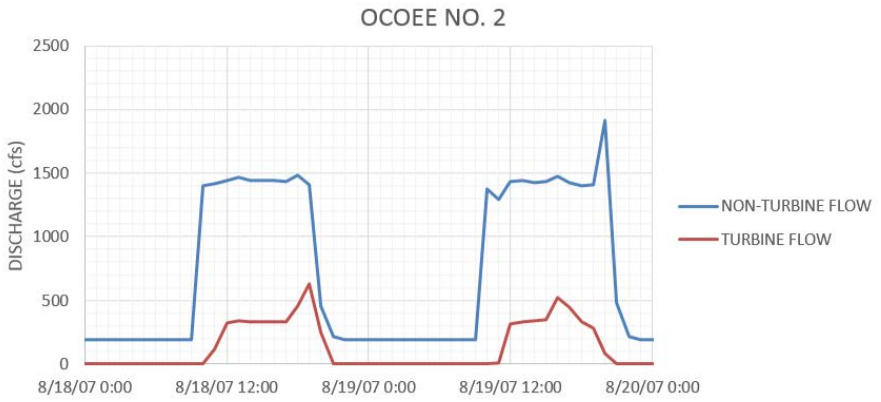

Figure 3-7C

Figure 3-7. Flow Hydrographs at Blue Ridge, Ocoee No. 3 and Ocoee No. 2 August 18-19, 2007

The Ocoee No. 2 Dam is 30 feet high and allows diversion of water via a flume to the Ocoee No. 2 Powerhouse approximately 5 miles downstream (see Figure 1-3). The reach between Ocoee No. 2 Dam and Powerhouse is referred to as the Middle Ocoee Rafting Area. The dam creates a useable head of approximately 250 feet for two turbines with a 23 megawatt capacity generating plant. The hydropower units operate at a flow of approximately 800 to 1,100 cfs with both units operating. As such, during the spring and summer seasons, flow within the 4.5-mile reach of the channel immediately downstream of Ocoee No. 2 Dam is variable and fluctuates. Based on TVA flow data from 1992 to 2017, the hourly flow has ranged from zero (which has occurred 1 percent of the time during March through October) to more than 19,000 cfs (Figure 3-5). The median flow is 420 cfs and the flow defined to support rafting (1,200 cfs) has been exceeded approximately 25 percent of the time.

The recreational release schedules for Ocoee No. 2 and No. 3, combined with target recreational release flow rates of 1,200 cfs and 1,600 cfs (respectively), represent approximately 43,430 cfs-days and 14,400 cfs-days, respectively, of flow volume. These flow volumes would generate approximately 15.4 and 6.1 gigawatt-hours, respectively, of electrical power annually if entirely diverted to power generation.

During the months from March through October, over the period from 2006 through 2017 approximately 84 percent of the total river flow at Ocoee No. 3 Dam was diverted for power generation leaving 16 percent of the flow in the channel. At the Ocoee No. 2 Dam, the March through October volume diverted from the Middle Ocoee channel for power generation during the period from 1992 through 2017 was 43 percent of the total annual flow volume.

Drawdown of Blue Ridge Reservoir storage augments natural runoff during low flow periods in accordance with the operating schedule (Figure 3-7A). The importance of Blue Ridge storage and releases for flood storage recovery and power generation, as well as for rafting, can be assessed by evaluating Upper Ocoee River natural flow without Blue Ridge. Based on approximately 29 years of daily streamflow from Fightingtown Creek from 1943 through 1971, scaled upward to a drainage area of 550 square mile by the ratio of drainage areas, the mean daily flow at Ocoee No. 2 and Ocoee No. 3 would be sufficient to meet the flow needs for rafting with high reliability during March through July; during August flow augmentation to provide 1600 cfs is needed approximately 15 percent of the days and during September and October the estimated natural flows would be sufficient for 1600 cfs on approximately 55 percent of the days. During dry weather, low flow days Blue Ridge releases augment flows through Ocoee No. 3 to sustain power generation and 1600 cfs for 8-hour release periods for rafting. On average approximately half of the flow volume through the Middle and Upper Ocoee River passes through Blue Ridge Reservoir. The release from Blue Ridge Reservoir is primarily dictated by the demand for flow to generate power, for flood storage recovery, and to meet minimum flow requirements for water quality, amongst other downstream needs. The flow to support power generation and rafting are similar in rate and timing based on the need for peaking power during the daytime hours, the flow required for the installed turbines, and the schedules established for rafting. This is illustrated by the hourly hydrographs for the Blue Ridge, Ocoee No. 3 and Ocoee No. 2 locations for a randomly selected weekend low flow period of August 18 and 19, 2007 (see Figure 3-7).

3.4.1.2 Environmental Consequences

3.4.1.2.1 Alternative A – No Action Alternative

Under this alternative, agreements and easements enabling commercial rafting on the Ocoee River would expire and would not be replaced with new agreements. From a total system perspective (i.e., extending from upstream of Ocoee Dam No. 3 to the river below Ocoee No. 2 Powerhouse) flow characteristics within the Ocoee River would be altered but not dramatically.

However, within the reaches immediately below Ocoee No. 3 and No. 2 dams, the scheduled and managed releases that are characteristic of the baseline condition would be replaced with an operating plan that is driven by need for hydropower generation and precipitation-based runoff (i.e., excess non-turbine flow). Consequently, flow characteristics of the approximately 5-mile reach of the Upper Ocoee and 4.5-mile reach of the Middle Ocoee would be dramatically altered during the rafting season. When power is needed from these hydropower units, water would be diverted at both Ocoee No. 2 and No. 3 dams

except for the volume associated with high flows exceeding the maximum turbine flow. Flow within the channel below these dams would, therefore, be reduced to only that volume associated with excess non-turbine flow (i.e., that which is released to the river immediately below the dam). Approximately half of the Upper and Middle Ocoee River flow is released from Blue Ridge Reservoir; if the recreational releases were entirely transferred to power generation, the storage and water level in Blue Ridge Reservoir would be unaffected.

During the last 25 to 30 years, high volume flows exceeding maximum power generation flow or recreational release rates, requiring discharge in the channel, occurred up to approximately 8 percent of the time during March through October. The actual distribution of flows for power generation versus excess non-turbine flow would be determined with consideration of the multiple objectives of the system, including aquatic habitat and water quality benefits of maintaining non-turbine flows (or discharging an equivalent volume at a more steady rate of flow) as well as the potential to generate additional electrical power.

Therefore, under the No Action Alternative, the flow characteristics of the river within the Upper and Middle Ocoee River would be markedly altered during the recreational season as water associated with hydropower generation would bypass these areas. Consequently, annual flow volumes within these reaches would be reduced by approximately 14,400 cfs-days (28,600 acre-feet) and 43,350 cfs-days (86,000 acre-feet) for the Upper and Middle Ocoee (respectively) under conditions in which the hydropower units are operating. These reductions are approximately 34 percent (Upper Ocoee) and 25 percent (Middle Ocoee) of the channel flow volumes during March through October over the past 30 years.

3.4.1.2.2 Alternative B – Proposed Agreements

Under Alternative B, the annual required recreational release volume would be decreased only during the month of September at Ocoee No. 2 Dam relative to the existing condition. Overall, this alternative would represent an approximate 3.5 percent reduction in the annual recreational release volume at Ocoee No. 2 Dam. Assuming that releases at Blue Ridge and at Ocoee No. 3 Dam are not influenced by demand for recreational release at Ocoee No. 2 Dam, there would be no appreciable change at Ocoee No. 3 Dam compared to the existing condition. Under the agreement, river outfitters may request some variation in the water releases, which may alter the days on which releases would occur. Additional releases may be approved as well. See Section 2.2.1.

3.4.1.2.3 Alternative C – Current Management Regime

For Alternative C, the annual required recreational release volume would essentially be unchanged from the existing condition. There would be no change at either Ocoee No. 2 Dam or Ocoee No. 3 Dam compared to the existing condition. Some variation in the scheduling framework may occur under the agreement because the agreement allows some flexibility, as described in Section 2.2.1.

3.4.2 Water Quality

3.4.2.1 Affected Environment

Under the CWA, the Middle and Upper Ocoee River has designated uses of Industrial Water Supply, Fish and Aquatic Life, Livestock Watering and Wildlife, Recreation, and Irrigation. Additionally, from the Ocoee No. 3 Powerhouse near mile 25.1 to Rock Creek near mile 26.5, the river is designated as a Trout Stream (TDEC 2013). TDEC's proposed 2016 final 303(d) list (TDEC 2017) identifies four water body segments that constitute the Ocoee River reach within the study area that have been identified as "Category 5" water

bodies, indicating that one or more uses are impaired. Causes of impairment identified are copper, iron, and zinc concentrations and siltation associated with historic mining activities in the watershed. The water bodies are also identified as being impaired by "flow alteration," Category 4c, which involves no pollutant. The Ocoee River from Ocoee No. 2 Dam to the Ocoee No. 3 Dam (which constitutes the Upper Ocoee River) is also identified as impacted by flow alteration.

Approximately half of the drainage to Ocoee No. 2 and No. 3 dams passes through Blue Ridge Reservoir. The Blue Ridge Reservoir has been identified by TVA for their Reservoir Health Rating system as having relatively good water quality and it is identified as supporting its intended uses by the Environmental Protection Division of the Georgia Department of Natural Resources (2017). There are some concerns regarding Blue Ridge Reservoir sediments and habitat, which are rated as "fair" by the TVA reservoir health rating system, but those concerns are not significant issues related to the quality of water discharged from the reservoir. The concerns are identified as low levels of arsenic and polychlorinated biphenyl in sediment.

Much of the watershed upstream of Ocoee No. 3 and Ocoee No. 2 that had been mined and contributed to the reduced water quality of the Ocoee River has now been reforested. Revegetation of these landscapes along with extensive restoration activities has resulted in substantially improved water quality (TDEC 2014).

Segments of the Upper and Middle Ocoee River located immediately downstream of each dam have a rock streambed and are not characterized by extensive areas of sedimentation. Additionally, pooled areas where sediment accumulation is expected to occur are limited within the Upper and Middle reaches of the river to areas immediately upstream of the Ocoee No. 3 Dam. There is no record that indicates there is a significant volume of sediment accumulated upstream of the Ocoee No. 2 Dam.

On-going releases for rafting are not identified as contributing to any impairment of the river.

3.4.2.2 Environmental Consequences

3.4.2.2.1 Alternative A – No Action Alternative

Implementation of Alternative A would potentially lead to reduced non-turbine flows as a result of ending recreational releases, with the recreational release volume re-directed to power generation. TVA would consider aquatic habitat and water quality in adjusting to the absence of those recreational release requirements. However, reduced non-turbine releases would result in fewer days of flow and/or less flow volume through the Ocoee No. 2 and Ocoee No. 3 reaches bypassed by the diversions for power generation as described in Section 3.4.1.2.1. The Ocoee No. 3 tailwater currently has an 80 percent reduction in streamflow volume over the long-term compared to total river flow volume, and a further reduction might be expected to produce impacts to aquatic habitat. The impacts would likely be dependent upon how the non-turbine flows were released. A more steady release of a flow volume over a longer period of time compared to the higher, but shorter duration, recreational release might produce some habitat benefit. A similar effect may be expected within the Ocoee No. 2 tailwater, although currently nearly half of the total flow within the tailwater occurs as non-turbine flow through the channel. The rates of flow associated with diversion for power generation versus recreational releases are mostly too low to be of significance relative to sediment scouring and suspension of potentially

contaminated sediment. Periodic high flows can be at least six times larger than the power generation or recreational release rates occur in the Middle and Upper Ocoee River.

Differences in thermal effects to flow passing through the flume (turbine flow) as compared to that passing through the exposed rock channel (non-turbine flow) may result in some temperature differences in the river water entering the Ocoee No.1/Parksville reservoir and downstream areas under this alternative. Generally, non-turbine flow of the Middle Ocoee that are carried over the Ocoee No. 2 spillway fall into a shallow, rocky riverbed that allows the sun to heat the water up before it enters Ocoee No. 1/Parksville reservoir. Releases that travel down the flume instead of the river bed enter the river at the Ocoee No. 2 Powerhouse are generally cooler because the flume protects the water inside it from the sun. However, because water temperature within the Ocoee are more prominently influenced by numerous other factors, including weather, precipitation, time of year and time of day, this change is expected to be minor and of little consequence to water quality.

In summary, water quality is not expected to be significantly impacted by the No Action Alternative because there are no other activities proposed that may result in the impairment of water quality (i.e., ground disturbance, water or wastewater use and release, etc.). However, aquatic habitat has the potential to be reduced to a minor extent under this alternative. This effect would be particularly evident within the Ocoee No. 3 tailwater where non-turbine flows would be more limited.

3.4.2.2.2 Alternative B – Proposed Agreements

Under this alternative, only minor changes in water releases would occur in September. Differences in thermal effects to water passing through the flume as compared to the exposed rock channel may produce minor differences in the temperature of the river water entering the Ocoee No. 1/Parksville reservoir and river downstream as described above. However, because these changes are limited to only five days of managed releases, and because there are no other activities proposed that may result in the impairment of water quality (i.e., ground disturbance, water or wastewater use and release, etc.) no impacts to water quality from this alternative are expected relative to the baseline condition.

3.4.2.2.3 Alternative C – Current Management Regime

Under this alternative, there would be no change to the current release schedule. The minor difference in water temperature associated with the water passing through the flume as compared to the exposed rock channel would be essentially the same as Alternative B. There would be no other activities proposed that may result in the impairment of water quality (i.e., ground disturbance, water or wastewater use and release, etc.); therefore, no impacts to water quality from this alternative are expected.

3.5 Vegetation and Wildlife

3.5.1 Affected Environment

3.5.1.1 Vegetation

The Ocoee River project area is located within the Southern Metasedimentary Mountains, a sub-ecoregion of the Blue Ridge Mountains (66) Level IV ecoregion, which on the whole, is dominated by deciduous, evergreen, and mixed evergreen-deciduous forest (Griffith et al. 1998). This region is characterized by steep, dissected, biologically-diverse mountains. The Appalachian oak forests and at higher elevations, the northern hardwood forests include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech. Areas that have been disturbed over the years include the spruce-

fir forests, found generally above 5,500 feet, and the Copper Basin, located in the southeast corner of Tennessee. The spruce-fir forests have been reduced over the past 35 years from an invasive insect species and the Copper Basin was the site of copper mining and smelting for approximately 137 years that terminated activity in 1987 (Griffith et al. 1998).

The vegetation within a 5-mile radius surrounding the project area was evaluated using land use/land cover information obtained from the National Land Cover Database (Homer et al. 2015). Land cover in the 5-mile vicinity is primarily deciduous forest (63,205 acres), evergreen forest (19,819 acres), mixed forest (8,298 acres), hay/pasture (4,727 acres), and open water.

In-channel habitats on the Ocoee River are dominated by herbaceous species, because periodic releases from Ocoee Dams No. 2 and No.3 preclude trees from establishing downstream. These herbaceous habitats are inherently restricted, because they are only found in association with larger river systems with appropriate bedrock geology. Two globally rare herbaceous plant habitats, the Hiwassee/Ocoee River Boulder Riverscour Wet Meadow and the Hiwassee/Ocoee Bedrock Riverscour Wet Meadow, occur on the small section of the Ocoee River included within the scope of the proposed whitewater rafting agreement (NatureServe 2017). These habitats contain a unique assemblage of plants, including the federally listed plant species, Ruth's golden aster (*Pityopsis ruthii*), and are only found along the Hiwassee and Ocoee rivers in Polk County, Tennessee (TVA 2017). Drier sections of the in-channel habitat support species such as narrowleaf silkgrass, poison ivy, rice button aster, smallhead blazing star, splitbeard bluestem, slenderleaf false foxglove, tall coreopsis, and stunted Virginia pine. Wetter herbaceous habitats include species like chairmaker's bulrush, nodding lady's tresses, southern lobelia, swamp sunflower, as well as shrubs like hazel alder.

TVA parcels and USFS tracts FS #1 and FS #2 proposed to be managed by the State have been developed and are currently used for commercial and personal recreation. Naturalized vegetation does occur along the periphery of these sites, but substantial portions of each parcel are built up and contain facilities like parking lots, boat launches and restrooms. The fragmented riparian vegetation contains tree species like red maple, river birch, and sycamore. No rare plant communities occur on these TVA and USFS tracts.

Invasive plant species always pose a threat to native vegetation when there is disturbance surrounding an area. EO 13112 as amended by EO 13751 (Invasive Species) defines an invasive species as any species that is not native to that ecosystem and whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive plant species are common in previously disturbed areas, such as areas near dams, roads, and reservoirs. These species have the potential to affect the native plant communities adversely because of their ability to spread rapidly and displace native vegetation. Common species that threaten the integrity of native ecosystems in the Cherokee National Forest include tree of heaven, small carpetgrass, autumn olive, sericea lespedeza, kudzu, Chinese privet, Japanese honeysuckle, multiflora rose, and Nepal grass. However, in general, invasive plant species are not well established within in-channel habitats on the Middle and Upper Ocoee River.

3.5.1.2 Wildlife

As described in Section 3.5.1.1 (Vegetation), the immediate project area consists mostly of open water habitat especially in the Ocoee No. 1 Reservoir (Parksville Lake) with

naturalized vegetation and fragmented riparian forests occurring in the TVA parcels and USFS tracts. These habitats would likely support wildlife species that prefer open water habitat and can readily adapt to disturbed or altered habitats. In the area surrounding the Ocoee River, the southern Cherokee National Forest dominates the land cover and there are smaller areas of hay/pasture and some developed land to the east and west. Since the forest consists of large areas of contiguous and undisturbed habitat, the habitat supports many wildlife species commonly found throughout mixed forested landscapes.

Open water habitats in the Ocoee No.1 Reservoir would support wildlife communities characterized by waterfowl (ducks, geese), wading birds, shorebirds, raptors (hawks, bald eagle), various mammal species (beaver, otter), and herpetofauna (snakes, frogs, toads, turtles, and salamanders). These species would be more common around the Ocoee No. 1 Reservoir where there is a large open water habitat in comparison to the stretch of the Ocoee River used for whitewater rafting since the open water habitat is smaller and there is not a consistent water flow.

Naturalized vegetation and fragmented riparian forests found within the USFS tracts FS #1 and FS #2 may provide a limited amount of nesting habitat for migratory bird species as well as common mammal, amphibian, and reptile species. The majority of the USFS tracts are paved or otherwise developed. Therefore, most of the wildlife habitat for these species is limited to the edges of the tracts. The TVA parcels discussed in the proposed easement to the State are much less developed and are mostly comprised of natural vegetation also found in the adjacent surrounding area.

In the surrounding area, the mixed deciduous and evergreen forests provide contiguous forested habitat for many wildlife species commonly found throughout the Cherokee National Forest. These habitats would support wildlife communities characterized by songbirds (warblers, wren), cavity nesters (woodpeckers, owls), game birds (wild turkey, grouse), raptors (hawks), mammal species (raccoon, squirrel, white-tailed deer, fox, coyote, black bear), and herpetofauna (snakes, frogs, toads, turtles, and salamanders).

Several migratory bird species of concern are listed in the region surrounding the Ocoee River project area. These include the black-billed cuckoo, bobolink, Canada warbler, cerulean warbler, eastern whip-poor-will, Kentucky warbler, prairie warbler, red crossbill, red-headed woodpecker, rusty blackbird, wood thrush, and yellow-bellied sapsucker (U.S. Fish and Wildlife Service [USFWS] 2017b). The moist habitats present around the Ocoee #1 Reservoir and Ocoee River would likely provide suitable habitat for the rusty blackbird and red-headed woodpecker, and the mixed forested habitat in the surrounding area would likely provide suitable habitat for all the bird species of concern except the rusty blackbird and bobolink.

No wading bird colonies or other aggregations of migratory birds have been documented within 3 miles of the project area. In addition, no caves have been documented within the Ocoee River project area and none are known to occur within 3 miles of the project area.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action Alternative

3.5.2.1.1 Vegetation

Under the No Action Alternative, higher volume water releases into the Middle and Upper Ocoee would only occur when TVA is not generating power or during periods of naturally

occurring high river flow. Therefore, there would be a substantial decrease in the frequency of large flow water releases under this alternative. With the decrease in frequency of water releases, there is potential for woody vegetation to encroach on herbaceous habitats that currently dominant the in-channel habitat of the Ocoee River, including the rare plant communities. Encroachment of woody vegetation into formerly open habitats has been documented at many locations, including downstream of the Apalachia Dam on the Hiwassee River (Moore et al. 2016). Sections of the Hiwassee River downstream of Apalachia Dam experiences altered flows because water is carried to the powerhouse via penstock for electricity production, thereby by-passing the Hiwassee River between RM 54 and RM 66. Flows in this reach vary between minimal base flows (25 cfs) and periodic higher flows for flood storage recovery and during fall drawdowns of Apalachia and Hiwassee Reservoirs. In this cut-off reach, aerial photos taken around the time of dam closure show that riparian area of the Hiwassee River was much more open than today. Presumably, this shift resulted in a substantial reduction of the globally rare Hiwassee/Ocoee River Boulder Riverscour Wet Meadow and the Hiwassee/Ocoee Bedrock Riverscour Wet Meadow habitats. Implementation of the No Action Alternative would likely have a similar effect on the herbaceous vegetation currently found in the Middle and Upper Ocoee. Given the rarity of the habitats found along the Middle and Upper Ocoee, implementation of the No Action Alternative would produce negative impacts to the rare plant communities present there and those impacts may be significant.

The No Action Alternative would not affect plant communities on the TVA parcels and USFS tracts that would be made available to the State. In addition, those small, fragmented habitats are currently developed for recreation and possess little if any conservation value.

3.5.2.1.2 Wildlife

With Alternative A, there is potential for minor shifts in wildlife use and species composition in accordance with the anticipated changes in the associated plant communities from herbaceous dominated habitat to more woody plant dominated habitats. However, most of the common wildlife present in this area utilize a variety of habitat types and would likely continue to utilize the area as it transitions from herbaceous to woody habitats. Species that prefer herbaceous habitats may relocate to utilize other habitats in the surrounding area. Therefore, the impact would be minor.

3.5.2.2 Alternative B – Proposed Agreements

3.5.2.2.1 Vegetation

Under Alternative B, the elimination of water releases from Ocoee No. 2 dam during five weekdays in late September would have no discernible effect on surrounding vegetation communities in the project area since this alternative only differs slightly from current water release operations agreements. The globally rare Hiwassee/Ocoee River Boulder Riverscour Wet Meadow and the Hiwassee/Ocoee Bedrock Riverscour Wet Meadow communities would not be appreciably impacted by the minor change in water releases. In addition, there would be no construction or improvements to the TVA parcels and USFS tracts affected by the proposed change in management, and therefore, there would be no impacts to the surrounding vegetation communities.

3.5.2.2.2 Wildlife

There would be no effect on wildlife communities associated with Alternative B since this alternative only differs slightly from current water release operations and no construction or improvements would occur on the TVA parcels and USFS tracts.

3.5.2.3 Alternative C – Current Management Regime

3.5.2.3.1 Vegetation

Unlike Alternative B, Alternative C would continue the current schedule of water releases to support recreational rafting, including five weekdays in late September, and therefore, would have no effect on vegetation or globally rare plant communities. In addition, as with Alternative B, there would be no construction or improvements to the TVA parcels and USFS tracts affected by the proposed change in management, and therefore, there would be no impacts to the surrounding vegetation communities.

3.5.2.3.2 Wildlife

There would be no effect on wildlife communities associated with Alternative C since this alternative does not differ from current water release operations and no construction or improvements would occur on the TVA parcels and USFS tracts.

3.6 Aquatic Ecology

3.6.1 Affected Environment

The primary aquatic resource within the project area includes the Ocoee River, more specifically the sections referred to as the Upper and Middle Ocoee and its tributaries. Power generation, rainfall events, and flood control releases from the upstream Blue Ridge Reservoir are factors that affect flow and the availability of aquatic habitat on the Upper and Middle Ocoee, along with scheduled releases in these sections of the river. As described in Subsection 3.4.1, an overall reservoir operations plan is used to manage water levels within various reservoirs in the Tennessee River system. Flow at Chickamauga Dam is used as an index to assess the adequacy of streamflow in the Tennessee River system, and releases from upstream reservoirs, including the Blue Ridge Reservoir are used to augment water levels as needed (TVA 2004). Aquatic habitats above Ocoee No. 3 Dam and Ocoee No. 2 Dam are deeper, pooled areas; whereas aquatic habitats within the reaches immediately downstream of each dam are typically more shallow riverine habitats with varying degrees of riffles, rapids and exposed rock.

During the rafting season, managed releases from Ocoee No. 3 and No. 2 dams result in short-duration, high-flow “pulses” of flow within the reaches immediately downstream of each dam. Such flows result in intermittently flooded areas (particularly in the areas between each dam and powerhouse) and provide for a localized expansion of aquatic habitat availability as high flows inundate low-flow border areas of the channel. Water duration within these areas is, however, temporary as pulses of water released for rafting typically recede in a matter of hours.

TVA has monitored fish and benthic macroinvertebrate communities at several locations within the Ocoee River over many years. As part of the monitoring for fish and benthic macroinvertebrates, a calculated Index of Biotic Integrity (IBI) is used as an assessment of environmental quality at each stream site through application of ecologically based metrics of fish and benthic invertebrate community data from the site. Two monitoring sites that are within the Middle and Upper Ocoee River are at RM 19.6 and 27.1, respectively. Invertebrates and fish were collected at these sites to establish IBI scores. TVA notes, however, that these locations are not within reaches of the river that are dewatered during power generation.

Based on TVA collection records, fish sampling conducted at RM 19.6 for the Middle Ocoee River from 1995 to 2016 resulted in the collection of 7,615 fish represented by 37 species.

Species representing 3 percent or more of the total catch included redbreasted sunfish (18 percent), mottled sculpin (15 percent), yellow perch (13 percent), brook silverside (12 percent), warpaint shiner (10 percent), bluegill (7 percent), banded sculpin (6 percent), redline darter (6 percent), spotted bass (4 percent), and central stoneroller (3 percent). Fish IBI scores maintained a range of “fair” to “fair/good” rating with a steady improvement since 1995.

Fish sampling conducted at RM 27.1 for the Upper Ocoee River from 2009 to 2016 resulted in the collection of 8,128 fish represented by 21 species. Species representing 3 percent or more of the total catch included central stoneroller (66 percent), warpaint shiner (17 percent), redbreasted sunfish (6 percent), and northern hogsucker (5 percent). Fish IBI scores maintained a range of “poor” to “poor/fair” rating with a slight improvement since 2009. Additionally, a short reach of the Upper Ocoee River from the Ocoee No. 3 Powerhouse near RM 25.1 to Rock Creek near RM 26.5 is designated as a Trout Stream (TDEC 2013). From the 8,128 fish collected near RM 27.1 for the Upper Ocoee River from 2009 to 2016, rainbow trout represented only 0.02 percent of the total catch.

Species composition for the benthic macroinvertebrate sampling was similar for the Middle and Upper Ocoee sites. Numerically dominant taxa groups included Coleoptera (beetles), Ephemeroptera (mayflies), Diptera (true flies), Oligochaeta (worms), and Trichoptera (caddisflies). Benthic IBI scores for the Middle Ocoee River (RM 19.6) from 2002 to 2014 have remained in the “fair” range. The only exception was in 2002 when the benthic community received a “poor” rating. Benthic IBI scores for the Upper Ocoee River (RM 27.1) from 2009-2013 have been in the “poor” or “poor/fair” range except for 2013, when the benthic community received a “fair” rating.

There are also several small tributaries within both the Middle and Upper Ocoee drainage areas. These tributaries are smaller in nature and primarily only provide flow to the Ocoee River during and preceding rainfall events. Tributaries of the Ocoee River within the Upper Ocoee reach include:

- Rough Creek
- Williams Creek
- Laurel Creek
- Rock Creek
- Horse Bone Branch
- Little Gassaway Creek
- Gassaway Creek
- Rodgers Branch

Tributaries of the Ocoee River within the Middle Ocoee reach include:

- Short Creek
- Goforth Creek
- Tolliver Shanty Branch
- Left Prong Caney Creek

Due to the proximity and connection of the Ocoee River tributaries within the Middle Ocoee and Upper Ocoee, benthic macroinvertebrate species composition and abundances are expected to be similar to that described above for the Ocoee River. Fish species

composition is also expected to be similar to that described above for the Ocoee River and is expected to favor the smaller fishes found in the Ocoee River, such as juvenile sunfishes, shiners, minnows, and silversides since these tributaries are much smaller in size relative to the Ocoee River. Invertebrate community within the tributaries is expected to be similar to that described for the Ocoee River, dominated by beetles, mayflies, true flies, worms, and caddisflies

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would only release water from the Ocoee No. 3 and No. 2 Dams into the river channel when not generating power at the Ocoee No. 3 and Ocoee No. 2 Powerhouses and during periods of naturally occurring high river flow (those due to moderate/heavy rainfall). From a total system perspective (i.e., extending from upstream of Ocoee No. 3 Dam to the reach below Ocoee No. 2 Powerhouse) flow characteristics within the Ocoee River would be altered due to less frequent water releases. However, within the reaches immediately below Ocoee No. 3 and No. 2 Dams the scheduled and managed releases that are characteristic of the baseline condition would be replaced with a discharge regime that is driven by need for hydropower generation and precipitation-based runoff (i.e., excess non-turbine flow). Consequently, flow characteristics of the 5-mile reach of the Upper Ocoee River and the 4.5-mile reach of the Middle Ocoee River would be altered during the rafting season. When power is needed from these hydropower units, water would be diverted at both Ocoee No. 3 and No. 2 Dams except for the excess flows exceeding the maximum turbine flow. Flow within the channel below these dams would therefore, be reduced to only that volume associated with excess non-turbine flow (i.e., that which is released to the river immediately below the dam).

The elimination of managed releases during the rafting season under this alternative is expected to reduce the cross-sectional area within the channel below each dam that is wetted under high flows and available intermittently to aquatic organisms. Because high flows would be less frequent under this alternative, some species that are less tolerant of the frequent high flows associated with managed releases may be expected to become somewhat more common in the reach below each dam. Benthic fish species such as those described in Section 3.6.1 (sculpins, darters, stonerollers, northern hogsucker) are naturally more tolerant of higher flows and may be expected to be relatively unaffected by this alternative. However, in spite of the elimination of scheduled recreational releases, the river and its flow characteristics remain a managed system that is influenced by hydropower generation. The associated aquatic biota within the reaches below each dam would still be subject to some variability associated with seasonal variations in non-turbine flow. Therefore, while some compositional changes in the reach below each dam may occur, they are expected to be minor. Additionally, species that are more typical of reduced flow environments of the pool areas upstream of each dam (sunfish, yellow perch, shiners, brook silverside) are expected to continue to be characteristic of the pool areas upstream of each dam. Therefore, because the aquatic biota within the project area (Upper and Middle Ocoee River) are already adapted to highly variable river flows below each dam and not subject to notable shifts in community composition, impacts to aquatic resources under Alternative A are expected to be minor. In addition, as noted in Section 3.4.2.2.1, differences in discharge at the spillway and turbine combined with differences in thermal effects to water passing through the flume as compared to the exposed rock channel may produce some minor temperature differences in the river water. However, because the resident aquatic biota are characteristic of a fishery that is naturally tolerant of such minor

temperature ranges, any temperature variation caused by the above factors is not expected to have a notable effect on the composition or character of aquatic biota in the reservoir or the river below Ocoee No. 1.

3.6.2.2 Alternative B – Proposed Agreements

Under Alternative B, the schedule for water releases would change very slightly from the existing condition. The annual required recreational release volume would be decreased only during the month of September relative to the existing condition. As with the No Action Alternative, the aquatic biota within the project area (Middle Ocoee and Upper Ocoee River) are already adapted to highly variable river flows. Existing species composition and abundances are not expected to undergo discernable change under this proposed action since the releases will be relatively consistent with the existing condition. Therefore, no impacts on aquatic resources are expected under Alternative B.

3.6.2.3 Alternative C – Current Management Regime

Under Alternative C, TVA would continue with the current release schedule. Therefore, there would be no change from the existing conditions and no impacts to aquatic resources due to this alternative.

3.7 Threatened and Endangered Species

3.7.1 Affected Environment

The ESA, 16 United States Code §§ 1531-1543, was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. Likewise, a threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for federal agencies. Under Section 7 of the ESA, federal agencies are required to consider the potential effects of their proposed action on endangered and threatened species and critical habitats. If the proposed action has the potential to affect these resources, the federal agency is required to consult with the USFWS.

The State of Tennessee provides protection for species considered threatened, endangered or deemed in need of management within the state other than those already federally listed under the ESA. Plant species are protected in Tennessee through the Rare Plant Protection and Conservation Act of 1985. The listing of species is managed by TDEC. Additionally, TVA also maintains databases of aquatic and terrestrial animal species that are considered threatened, endangered, special concern, or are otherwise tracked in Tennessee and other states within its power service area because these species are rare and/or vulnerable within the state.

3.7.1.1 Terrestrial Wildlife

A review of the terrestrial animal species in the TVA Regional Heritage database in September 2017 resulted in records for nine state-listed species (common shrew, hellbender, northern pine snake, seepage salamander, smoky shrew, southeastern shrew, southern Appalachian woodrat, Swainson’s warbler, woodland jumping mouse), one federally protected species (bald eagle), and two federally listed species (gray bat and northern long-eared bat) within three miles of the project footprint. No additional federally

listed species have been recorded in Polk County, Tennessee. The USFWS has determined that the federally listed Indiana bat has the potential to occur in the project area, thus this species also will be evaluated (Table 3-14).

Table 3-14. Federally Listed Terrestrial Animal Species Reported From Polk County, Tennessee and Other Species of Conservation Concern Documented Within Three Miles of Ocoee River Whitewater Rafting Agreement Action Area[1]

		Status[2]	
Common Name	**Scientific Name**	**Federal**	**State (Rank)**
Amphibians			
Hellbender[4]	*Cryptobranchus alleganiensis*	PS	D(S3)
Seepage salamander	*Desmognathus aeneus*	--	D(S1)
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DM	D(S3)
Swainson's warbler	*Limnothlypis swainsonii*	--	D(S3)
Mammals			
Common shrew	*Sorex cinereus*	--	D(S4)
Gray bat	*Myotis grisescens*	LE	E(S2)
Indiana bat	*Myotis sodalis*	LE	E(S1)
Northern long-eared bat	*Myotis septentrionalis*	LT	(S1S2)
Smoky shrew	*Sorex fumeus*	--	D(S4)
Southeastern shrew	*Sorex longirostris*	--	D(S4)
Southern Appalachian woodrat	*Neotoma floridana haematoreia*	--	D(S4)
Woodland jumping mouse	*Napaeozapus insignis*	--	D(S4)
Reptiles			
Northern pine snake	*Pituophis melanoleucus*	--	T(S3)

[1] Source: TVA 2017; USFWS 2017a
[2] Status Codes: D = Deemed in Need of Management; DM = Delisted, still being monitored; E = Endangered; LE = Endangered; LT = Listed Threatened; PS = Partial Status; T = Listed Threatened.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Rare; S4 = Apparently Secure.
[4] A subspecies of hellbenders found in the Ozarks of Missouri and Arkansas is federally listed. Species of hellbenders found in Polk County, Tennessee are not federally listed.

Hellbenders are found in cool, fast-flowing, streams and rivers with large shelter rocks. Eggs are laid in depressions created beneath large rocks or submerged logs (Niemiller and Reynolds 2011; Petranka 1998). The nearest known hellbender record occurs approximately 0.9 mile from the project footprint. Suitable habitat for hellbender does occur in the Middle and Upper Ocoee River .

Seepage salamanders inhabit seepages or forested habitats adjacent to small streams. They are found in moist, thick leaf litter where they hunt for invertebrates or beneath logs, rocks, and mats of moss (Niemiller and Reynolds 2011; Petranka 1998). The closest known record of seepage salamanders to the Middle and Upper Ocoee River is approximately 155 feet away. Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts included within the project area.

Swainson's warblers utilize forests with a thick understory typically comprised of rhododendron, but are also known from areas of dense saplings, both coniferous and deciduous. They migrate to Tennessee in mid- to late April and are thought to depart in mid-September (Nicholson 1997). Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts included within the project area.

Common shrews are found in a variety of habits with substantial vegetation, but appear to prefer lowland, moist areas near streams or in floodplains with thick leaf litter. They create systems of tunnels underground in logs and stumps with chambers for food storage, resting, and nesting (Schwartz and Schwartz 2001; NatureServe 2017). The closest record of this species is approximately 1.5 miles from the Ocoee River on a forested ridge between two creeks. Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts included within the project area.

Smoky shrews are found in a variety of forested habitats though they are most abundant in damp, coniferous and deciduous forested habitat with suitable soil for borrowing, fallen trees, and standing hollow trees. They nest beneath stumps, rotted logs, and rocks (NatureServe 2017). The nearest known smoky shrew record is approximately 1.0 mile from Ocoee Lake along an unnamed tributary. Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts included within the project area.

Southeastern shrews are primarily found in wooded areas with dense groundcover (including briars and vines), or in swampy, marshy, boggy areas. It builds nests in depressions in decaying logs and lines them with leaf litter (Schwartz and Schwartz 2001; NatureServe 2017). The closest record of this species is approximately 1.5 miles from the Ocoee River on a forested ridge between two creeks. Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts included within the project area.

Southern Appalachian woodrats are found in dry, mesic, and mixed deciduous forests, ravines, swamps, and bottomlands. They also utilize rock outcrops, cliffs, and talus slopes. Nests are built in rocky crevices, in abandoned buildings, in or under hollow trees, in brush piles (Bunch et. al. 2005; NatureServe 2017). The closest record of southern Appalachian woodrat is approximately 2.2 miles away. Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts within the project area.

Woodland jumping mice occupy cool, moist, hardwood and coniferous forests, with dense vegetation. They live in underground borrows and forage on subterranean fungus (Whittaker 1996). The closest record of woodland jumping mouse is approximately 1.0 mile away. Suitable habitat for this species likely occurs in forested sections of the TVA parcels and USFS tracts within the project area.

Northern pine snakes are generally found in areas of sandy, well-drained soils where they can borrow easily to hunt for prey. In mountainous areas like the project area, they are likely found in dry, rocky areas (Dorcas and Gibbons 2005). The closest record of northern pine snake is approximately 2.1 miles away. Suitable habitat for this species may occur in forested sections of the TVA parcels and USFS tracts within the project area.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with large, mature trees capable of supporting its massive nests. These are usually found near larger waterways where eagles forage (Turcotte and Watts 1999). The closest recorded bald eagle nest is approximately 141 feet from Ocoee Reservoir #1. This nest was last reported active in 2007. Suitable foraging habitat for this species occurs across the Ocoee River.

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976). Although they prefer caves, gray bats have

been documented roosting in large numbers in buildings (Gunier and Elder 1971) and under bridges (Barbour and Davis 1969; Lamb and Wyckoff 2010). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Harvey 1992). The closest gray bat record is known from a mist netting survey effort over Sylco Creek, approximately 0.3 mile from the Middle and Upper Ocoee River. There are no known caves or occupied buildings or bridges within the project area or within three miles of the project area. Foraging habitat for gray bat occurs over the Ocoee River and Ocoee Lake.

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory, often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest edges and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2017c). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002) and bridges (Barbour and Davis 1969). The nearest known records of Indiana bat are roosts in Cherokee National Forest, approximately 18.6 miles away. There are no known caves or occupied buildings or bridges within the project area or within three miles of the action area. Foraging habitat for Indiana bat occurs over the Ocoee River and Ocoee Lake as well as the surrounding forests. Suitable foraging and potential summer roosting habitat occurs in forested sections of the TVA parcels and USFS tracts included within the project area.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by northern long-eared bat is similar to that of Indiana bat, however northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). Twenty-two records of northern long-eared bat are known within three miles of the Middle and Upper Ocoee River. The closest record is approximately 0.3 mile away over Sylco Creek. There are no known caves or occupied buildings or bridges within the project area or within 3 miles of the action area. Foraging habitat for northern long-eared bat occurs over the Ocoee River and Ocoee Lake as well as the surrounding forests. Suitable foraging and potential summer roosting habitat occurs in forested sections of the TVA parcels and USFS tracts within the project area.

3.7.1.2 Aquatic Animals

One federally listed as endangered mussel (tan riffleshell), two fishes deemed in need of management by Tennessee (tangerine darter and Tennessee dace), and one state tracked snail (knotty elimia) have been collected within a 10-mile radius of the project area (TVA 2017) (Table 3-15). However, only the Tennessee dace has been recorded within the project area of the Ocoee River and connected tributaries between Ocoee No. 3 and Ocoee No. 1 Dam. Therefore, the tangerine darter, tan riffleshell, and knotty elimia (with records of the prior two species having not been found within 10 miles in over 25 years) are considered to not occur within the project area. These species will not be addressed further.

The Tennessee dace has a state status of S3 that indicates this species is vulnerable to becoming imperiled within the state. This small (2-inch long) fish is highly localized to headwater streams in upper Tennessee River drainage within the Ridge and Valley physiographic province of Tennessee/Virginia (NatureServe 2017). It lives about three years and is reproductive at age one or two in early- to mid-May. It is usually found in gravel, sand, silt-covered streams that are cool and near springs. This species is an herbivore that presumably eats algae, diatoms, and detritus (NatureServe 2017).

Table 3-15. Records of Federal and State-Listed Aquatic Animal Species Within 10 Miles of the Proposed Project[1]

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status[3]	State Rank[4]	Record in Project Reach
Fishes						
Tangerine Darter	*Percina aurantiaca*	H		D	S3	No
Tennessee Dace	*Chrosomus tennesseensis*	E		D	S3	Yes
Mussels						
Tan Riffleshell	*Epioblasma f. walkeri*	H	END	END	S1	No
Snails						
Knotty Elimia	*Elimia interrupta*	E		TRKD	S1	No

[1] Source: TVA 2017
[2] Heritage Element (=population) Occurrence Rank; E = extant record ≤25 years old; H = historical record >25 years old; X = considered extirpated; ? = uncertain status
[3] Status Codes: CAND = Candidate for federal listing; D = Deemed In Need of Management; END = endangered; EXTI = Extirpated from state or region; PROP = Proposed; PROT = Protected; PSM = Protected Status for Mussels (equivalent to TRKD); SP = State Protected; THR = Threatened; TRKD = Tracked by state natural heritage program (no legal status)
[4] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SX = Extirpated from the state; ? = uncertain status

3.7.1.3 Plants

As discussed in Section 3.5.1 above, two globally rare herbaceous plant habitats, the Hiwassee/Ocoee River Boulder Riverscour Wet Meadow and the Hiwassee/Ocoee Bedrock Riverscour Wet Meadow, occur on the small section of the Ocoee River included within the scope of the proposed whitewater rafting agreement (NatureServe 2017). These habitats contain a unique assemblage of plants, including the federally listed plant species Ruth's golden aster (*Pityopsis ruthii*), and are only found along the Hiwassee and Ocoee rivers in Polk County, Tennessee.

Six state-listed plant species have also been previously reported from within 500 feet of the Middle and Upper Ocoee River (TVA 2017). One additional federally listed plant, white fringeless orchid, has been documented from Polk County, Tennessee. To facilitate analysis, these species have been organized based on their proximity to the river channel (Table 3-16). Plant species that primarily occur in locations that could be affected by recreational releases are considered as occurring in the river channel.

Table 3-16. Federally Listed Plant Species Previously Documented in Polk County, Tennessee and All Plants of Conservation Concern Known from Within 500 Feet of the Ocoee River Within the Project Area[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]	Occurs In Channel?
Wine Vine	*Clematis vinacea*		E	S1	N
Mountain Bush-honeysuckle	*Diervilla sessilifolia* var. *rivularis*		T	S2	N
Southern Lobelia	*Lobelia amoena*		T	S1S2	Y
Fraser's Loosestrife	*Lysimachia fraseri*		E	S2	N
White Fringeless Orchid[4]	*Platanthera integrilabia*	T	E	S2S3	N
Ruth's Golden Aster	*Pityopsis ruthii*	E	E	S1	Y
Nevius' Stonecrop	*Sedum nevii*		E	S1	N
Horsesugar	*Symplocos tinctoria*		S	S2	N

[1] Source: TVA 2017.
[2] Status Codes: E = Listed Endangered; S = Special Concern; T = Listed Threatened.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
[4] Species documented from Polk County, Tennessee but not from within the Ocoee River gorge.

Wine vine (*Clematis vinacea*) – The majority of occurrences for this newly described, globally rare plant are known from the Ocoee River gorge, though the species has also been documented from a handful of sites along the Hiwassee River in Tennessee and at one location in Murray County, Georgia (Floden 2013). In the Ocoee River valley, wine vine is found in woodlands and other dry habitats and is locally abundant along US 64.

Mountain bush-honeysuckle (*Diervilla sessilifolia* var. *rivularis*) – This species is a Southern Appalachian endemic that is rare across its limited range. Mountain bush-honeysuckle has been observed at several river-bank locations along Upper and Middle Ocoee, but the largest populations of the species occur on rock outcrops and bluffs above the high water line.

Southern lobelia (*Lobelia amoena*) – This lobelia has been observed at multiple locations within floodplain forest adjacent to the Ocoee River and in wet, open areas in the channel that can be inundated during higher flows.

Fraser's Loosestrife (*Lysimachia fraseri*) – This globally rare species is found at multiple locations throughout the Ocoee River valley, but is most common in mesic, open conditions found along portions of US 64. This species may occur adjacent to the river channel, but it is not common there.

White fringeless orchid (*Platanthera integrilabia*) – This species is not known to occur in the Ocoee River valley. The nearest and only location for the species in Polk County is approximately 10 miles southwest of the Middle and Upper Ocoee River.

Ruth's golden aster (*Pityopsis ruthii*) – This globally rare, federally endangered plant grows only in crevices of boulders situated in or adjacent to small sections of Ocoee and

Hiwassee Rivers. Approximately 10 percent of the global population of the species occurs in the Middle Ocoee River, often at the regular high water line experienced during recreational releases. Some portion of these plants are periodically inundated during periods of high flows, which are caused both by weather events and human-made causes like maintenance of dam infrastructure.

Ruth's golden aster populations appear to have increased since the early 1980s when the first survey work for the species was conducted. These positive changes appear correlated with the initiation of recreational releases. Early estimates put the population of Ruth's golden aster on the Ocoee River at less than 500 individual plants (White 1977, Wofford and Smith 1980) while the first comprehensive survey in 1985 located 593 individuals (Haggard and Halback 1985). Since beginning a total census of Ruth's golden aster on both the Hiwassee and Ocoee rivers in 2011, the average number of plants on the Ocoee River has been 1,201 (range = 1,053 to1,299).

Nevius' Stonecrop (*Sedum nevii*) – This globally rare species occurs only in Alabama, Georgia, Tennessee (historically in West Virginia). In the Ocoee River valley, Nevius' stonecrop occurs most often on rock outcrops well above elevation of even the highest flows experienced in the river channel.

Horsesugar (*Symplocos tinctoria*) – This shrub or small tree occurs primarily in floodplain forests along the Middle and Upper Ocoee segments of the river. Recreational flows would not inundate the species or its habitat.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action Alternative

3.7.2.1.1 Terrestrial Wildlife

Under Alternative A (No Action Alternative), commercial rafting agreements and easements on the Ocoee River would expire in late 2018. Whitewater boating on the Middle and Upper Ocoee would occur when TVA is not generating power or when water levels were sufficient for boating.

Although no records of hellbender have been reported from the Middle and Upper Ocoee River, potential habitat for hellbender does occur in these sections when water is being released (i.e. when TVA is not generating power). When water is not being released, water levels in the upper section (below Ocoee Dam 3) may be too low to support hellbender movement through this section. Water levels in the sections below Ocoee Dam 2 would still be sufficient to provide movement through the River. The current water release schedule already restricts water flow in these sections for almost 70 percent of the year. Additional reductions in this schedule are not expected to impact any hellbenders that may reach these sections of the Ocoee River from adjacent tributaries. TVA parcels associated with the proposal have the potential to provide habitat for all other threatened or endangered terrestrial animals listed in Table 3-14 in Section 3.7.1.1. However, actions proposed under this alternative are not expected to alter natural habitat beyond current maintenance actions in these terrestrial areas. Therefore, no impacts to habitat would occur and no other threatened or endangered terrestrial animal species are expected to be impacted by the proposed actions.

3.7.2.1.2 Aquatic Animals

The No Action Alternative would result in operations that differ from the existing regime by primarily reducing non-turbine flows with much of the volume re-directed to power generation. This would result in fewer days of flow and/or less flow volume through the Ocoee No. 2 and No. 3 reaches bypassed by the diversions directly to the respective powerhouses. This would result in a reduction in aquatic habitat in each tailwater, particularly downstream of Ocoee No. 3 where non-turbine flows would be more limited. Use of the affected reaches by the Tennessee dace (state tracked) is presumably very limited due to a lack of preferred habitat that includes smaller streams, as well as the extreme variation in existing conditions. Therefore, a change in flow patterns that would reduce tailwater habitat is not expected to significantly alter populations of the Tennessee dace. No federally listed species occur in the affected project area and thus none would be affected.

3.7.2.1.3 Plants

Implementation of the No Action Alternative would result in substantial decreases in the frequency of larger flows comparable to current recreational releases from Ocoee No. 2 and No. 3 dams. Over time this would likely result in a substantial shift in the herbaceous, in-channel habitats currently found along the Middle and Upper Ocoee River.

This shift from a herbaceous community could adversely impact southern lobelia and would likely have an adverse effect on the federally listed Ruth's golden aster, both of which occur primarily in or adjacent to the river channel. Adverse impacts to southern lobelia would likely be less than those experienced by Ruth's golden aster because that species has the ability to persist and reproduce in shady, forested environments. Ruth's golden aster can persist for some time in shady environments, but will not successfully reproduce under those conditions (Moore et al. 2016). Ruth's golden aster is exceedingly rare; the global range is boulders and rock outcrops along small sections of the Ocoee and Hiwassee rivers in Polk County, Tennessee. Substantial changes to in-channel vegetation along the Middle Ocoee River, which is where the species occurs on that river, could endanger approximately 10 percent of the total population of the species. This could result in significant impacts to the plant.

Multiple very rare plant species occur in the Ocoee River gorge, but not primarily within the river channel. Though some isolated individuals occurring near the channel could be indirectly affected by changes to riparian vegetation, nearly all individuals of these state-listed plants occur outside of the riparian zone and would not be impacted by implementation of the No Action Alternative. Federally listed species do not occur on the TVA and USFS tracts that would be made available to the state of Tennessee; state-listed plants are not known to occur on those parcels, but may be present in small numbers. However, given that those parcels are currently used for recreation and no future development is proposed outside of disturbed areas, any impacts to state-listed plants present on those tracts would be minor and insignificant.

Implementation of the No Action Alternative would have no effect on the federally listed white fringeless orchid (because the species does not occur in the Ocoee River gorge) and potential significant impacts on Ruth's golden aster. Impacts to southern lobelia would be small and all other state-listed plants known from the Middle and Upper Ocoee River would not be appreciably impacted by the alternative.

3.7.2.2 Alternative B – Proposed Agreements

3.7.2.2.1 Terrestrial Wildlife

Under Action Alternative B, TVA would agree to provide a water release schedule similar to the one in place for a term of 15 years (assumed to be renewed for an additional 15-year period) on the Middle and Upper sections of the Ocoee. The State of Tennessee would continue to be responsible for site maintenance (including mowing) on their lands. No construction of new facilities or improvements to existing facilities are proposed on USFS Tracts FS #1 and FS #2 and TVA parcels proposed to be managed by the State at this time.

Forested parcels and sections of the Ocoee River have the potential to provide habitat for all of the terrestrial animal species listed in Section 3.7.1. However, actions proposed under this alternative are not expected to alter natural habitat beyond current maintenance actions. Deed restrictions would ensure that any future major vegetation removal (e.g. clearing of trees greater than 3 inches in diameter at breast height), construction, or improvements (including demolition of buildings) would be reviewed by TVA for environmental impacts prior to these actions taking place. Any potential future impacts to federally listed species under Section 7 of the Endangered Species Act would be consulted upon with the USFWS as appropriate. No other threatened or endangered terrestrial animal species are expected to be impacted by the proposed actions. No direct, indirect, or cumulative impacts to terrestrial threatened or endangered terrestrial species are expected to occur as a result of proposed actions under Alternative B.

3.7.2.2.2 Aquatic Animals

The minor changes to the existing flow regime would only reduce recreational flows in the Ocoee No. 2 and 3 tailwaters by a small number of days per year. This change would not significantly alter aquatic habitat in the reach. This insignificant change to aquatic habitat, in combination with a lack of preferred habitat for the state-tracked Tennessee Dace would result in no significant impacts to this species. No federally listed species occur in the affected project area and thus none would be affected.

3.7.2.2.3 Plants

Implementation of the Proposed Action and the associated five-day reduction in flows would not likely result in discernable changes to vegetation along the Middle and Upper Ocoee River. The frequency, duration, and magnitude of recreational flows under this alternative would be comparable to those currently occurring along those sections of the river and would be sufficient to maintain plant habitats found there. In fact, the substantial increase in Ruth’s golden aster populations found along the Middle Ocoee River has taken place during recreational flows that are essentially identical to those proposed in Alternative B. Neither rare plants occurring in the channel or outside of the riparian area on the TVA or USFS tracts proposed for transfer would be appreciably affected by the minor change in operations. Therefore, implementation of this alternative is unlikely to result in adverse impacts to threatened and endangered plant species.

TVA has consulted with the USFWS under Section 7 of the ESA on the potential to affect Ruth’s golden aster. In a letter dated November 1, 2017, the USFWS concurred with TVA’s determination that the proposed action would not likely adversely affect Ruth’s golden aster (Appendix E) and would have no effect on white fringeless orchid because it does not occur in the Ocoee River gorge.

In the letter, the USFWS also concurred that there would be no effect to the snail darter, gray bat, Indiana bat, or northern long-eared bat.

3.7.2.3 Alternative C – Current Management Regime

Alternative C would continue the current schedule of water releases to support recreational rafting. Therefore, there would be no change to the current conditions and no impact to threatened and endangered species.

No effects to the aquatic habitat (other than those caused by natural environmental conditions) would be expected to occur. Additionally, the affected reaches are not preferred habitat for the Tennessee dace. Therefore, the project would not affect the state-tracked Tennessee dace. No federally listed aquatic animal species occur in the affected project area and thus none would be affected. No other threatened or endangered terrestrial animal species are expected to be impacted by the proposed actions.

3.8 Wetlands

3.8.1 Affected Environment

The U.S. Army Corps of Engineers regulates the discharge of dredged or fill material into waters of the United States, including wetlands, under CWA Section 404 Permit [33 United States Code § 1344]. Additionally, EO 11990 – Protection of Wetlands requires federal agencies to avoid possible long-term and short-term impacts to wetlands, and minimize their impact in order to preserve and enhance their natural and beneficial values.

As defined in Section 404 of the CWA, wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Types of wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands and wetland fringe areas can also be found along the edges of many watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood storage, erosion control, water quality improvement, wildlife habitat, and recreation opportunities (33 Code of Federal Regulations [CFR] 328.39(b)).

The Ocoee River project area is in the Southern Metasedimentary Mountains Level IV Ecoregion (66g), a subdivision of the Blue Ridge Mountains Level III Ecoregion (66) (Griffith et al. 1998). Within the Southern Metasedimentary Mountains, the steep, dissected, mountains support Appalachian oak forests at lower elevations, and northern hardwood forests at higher elevations.

Wetlands within the Middle and Upper Ocoee River project area identified on the National Wetlands Inventory maps included lacustrine (i.e., related to a lake) and riverine (i.e., related to a river) (Table 3-17). Since lacustrine and riverine wetlands are considered to be deep-water habitats that lack vegetation, they are discussed in surface water (Section 3.4).

Table 3-17. Wetlands and Other Waters of the U.S. Within the Ocoee River Project Area and Vicinity

Wetland Type	Ocoee River	USFWS and TVA Parcels	5-mile Region
Emergent			24.2
Forested			90.4
Scrub-Shrub			113.9
Open Water			1,896.6
Total			**2,125.1**

Source: USFWS 2017b

The majority of the National Wetlands Inventory wetlands within the 5-mile radius of the project area are open water (89 percent), as well as smaller amounts of palustrine emergent, forested, and scrub-shrub wetlands (see Table 3-17). Areas of emergent/scrub-shrub wetlands are located upstream of Ocoee Dam No. 3 and along some of the smaller tributary channels. Isolated wetlands such as bogs, seeps, and fens are relatively rare considering the high relief of the region. Forested wetlands occur on lower-lying, undisturbed areas and along tributary streams.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would only release water from the TVA dams into the river channel when TVA is not generating power at the Ocoee No. 2 and Ocoee No. 3 Powerhouses and at other times during periods of naturally occurring high river flow. There would be a substantial decrease in the frequency of large flow water releases under this alternative. With the decrease in frequency of water releases, there is potential for woody vegetation to encroach on any herbaceous vegetation that is currently located along the margins of the deep-water habitats of the Ocoee River. However, this potential change in vegetation composition would not affect the current wetland classifications, and no discernable change is anticipated under this alternative. Therefore, there would be no impacts to wetland resources under the No Action Alternative.

3.8.2.2 Alternative B – Proposed Agreements

Under Alternative B, the schedule for water releases would change slightly from the existing condition. As with Alternative A, the wetland resources within the project area are considered to be deep-water habitats and would not be impacted with the proposed water release schedule. The only wetland resources located within the parcels affected by the proposed action are already classified as riverine. No changes to the classification of those resources are anticipated as a result of the proposed action. Therefore, as with Alternative A, there are no impacts to wetland resources under Alternative B.

3.8.2.3 Alternative C – Current Management Regime

Under Alternative C, TVA would continue with the current release schedule. Therefore, there would be no change from the existing conditions and no impacts to wetland resources.

3.9 Natural Areas and Parks

3.9.1 Affected Environment

Natural areas include managed areas, ecologically significant sites, and Nationwide Rivers Inventory streams. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, National Park Service, USFS, state or county) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are tracts of privately owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant, but not specifically managed by TVA's Natural Areas Program. The National Rivers Inventory is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be of more than local or regional significance.

This section addresses natural areas and parks that are on, immediately adjacent to (within 0.5 mile), or within the region of the project area (5-mile radius). As noted in Table 3-18, several natural areas and parks are located within 5 miles of the Middle and Upper Ocoee River.

Five natural or managed areas are located adjacent to the study area, and the project area boundaries are located within ten natural or managed areas. These areas are described below.

Goforth Creek Gorge Protection Planning Site is a TDEC conservation site located adjacent to the Middle Ocoee River, north of US 64. This is an ecologically significant area that supports fishing, hiking, kayaking, and nature viewing.

The Hiwassee/Ocoee Scenic River State Park encompasses various whitewater sites along the Hiwassee and Ocoee Rivers. While whitewater boating is the major feature of this park, there are also opportunities for hiking, picnicking, camping, and fishing (Tennessee State Parks 2016b).

The Little Frog Mountain Wilderness Area is located adjacent to the Upper Ocoee River, northeast of US 64 and covers approximately 4,690 acres (University of Montana 2017). This area is used for recreation including hunting, fishing, hiking, bird watching, and photography.

Portions of the Ocoee No. 2 Dam Reservation, Ocoee No. 2 Reservoir Reservation, and Ocoee No. 3 Reservoir Reservation, areas managed by TVA, are located within and adjacent to the Middle and Upper Ocoee River project area. The Ocoee River from the Parksville Reservoir to Ocoee No. 3 Dam is listed on the Nationwide Rivers Inventory by the National Park Service. This encompasses both the Middle and Upper sections of the Ocoee River. The Ocoee River Gorge was carved out of the Appalachian Mountains by the Ocoee River and is considered a unique geological feature.

Table 3-18. Natural Areas and Parks Within 5 Miles of the Middle and Upper Ocoee River

Park Name	Managing Agency
Big Frog Extension Wilderness Study Area	USDA Forest Service
Big Frog Wilderness Area	USDA Forest Service
Chattahoochee-Oconee National Forests	USDA Forest Service
Cherokee National Forest/South Cherokee National Forest	USDA Forest Service
Cherokee National Game Refuge	USDA Forest Service
Cherokee South State Wildlife Management Area	Tennessee Wildlife Resources Agency (TWRA)
Cohutta State Wildlife Management Area	Georgia Department of Natural Resources, Wildlife Resources Division
Cohutta Wilderness	USDA Forest Service
Ducktown School Conservancy	TDEC
Enota Certified Organic Farm and Garden	Private Ownership
Fourth Fractional Township Wildlife Management Area	TWRA
Goforth Creek Gorge Protection Planning Site	TDEC
Hiwassee/Ocoee Scenic River State Park	Tennessee State Parks
Little Frog Mountain Wilderness	USDA Forest Service
Merrie J Farm (Darden) – Conservation Easement Land Trust of Tennessee	Private Ownership
Ocoee No. 1 Dam Reservation	TVA
Ocoee No. 1 Reservoir Reservation	TVA
Ocoee No. 2 Dam Reservation	TVA
Ocoee No. 2 Reservoir Reservation	TVA
Ocoee No. 3 Reservoir Reservation	TVA
Ocoee River	National Park Service
Ocoee River Gorge - Unique Geological Feature	N/A
Ocoee River/Ruth's Golden Aster Protection Planning Site	TDEC
Ocoee State Bear Reserve	TWRA
Ocoee Whitewater Center	USDA Forest Service
Rock Creek Gorge Scenic Area	USDA Forest Service
Sugarloaf Mountain Park	TVA/Tennessee State Parks
Walkertown Branch Bog	TDEC
William Davenport Designated State Natural Area	TWRA

Source: TVA 2017, Tennessee State Parks 2016b, USFS 2017f

The Ocoee Whitewater Center is an approximately four-acre recreation area located along the Upper Ocoee River, constructed for the 1996 Olympic Canoe and Kayak Slalom competitions. This area offers a visitor center, whitewater rafting, picnicking, hiking, and biking (USFS 2017f).

A TDEC protection planning site for the federally endangered Ruth's Golden Aster is located along an approximately 1-mile stretch of the Ocoee River, south of Ocoee No. 2 Powerhouse. This is an ecologically sensitive area, as it supports one of only two known populations of this species (NatureServe 2017)(see Subsection 3.5.1.1).

The Upper and Middle sections of the Ocoee River are located within the South Cherokee National Forest. The Tennessee Wildlife Resources Agency (TWRA) cooperatively manages the Cherokee National Forest as a Wildlife Management Area. The Cherokee National Forest covers approximately 650,000 acres and is divided into northern and southern sections (USFS 2017a). The South Cherokee National Forest and Wildlife Management Area cover approximately 290,000 acres (TVA 2017). This area is used primarily for recreation, including hunting, fishing, camping, hiking, picnicking, nature viewing, and water activities. The Ocoee State Bear Reserve and Cherokee National Game Refuge, are closed to bear and game hunting, respectively. These lands are located south adjacent to the Ocoee River within the Cherokee Wildlife Management Area/South Cherokee National Forest.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, the existing water release agreements would not be renewed and would expire at the end of 2018. Whitewater rafting and kayaking on the Middle and Upper Ocoee would only be possible during periods of naturally occurring high river flow and when TVA is not generating power at the Ocoee No. 2 and No. 3 Powerhouses. Elimination of scheduled water releases from the Ocoee No. 2 and No. 3 Dams would not directly impact natural areas or parks. However, without predicable flow, guided rafting trips on the Middle and Upper Ocoee River would unsustainable, and the Hiwassee/Ocoee Scenic River State Park and Ocoee Whitewater Center would see a decline in visitors. Private rafting would be available during periods of high flow and additional recreational opportunities, such as hiking, picnicking, camping, biking, and fishing are available at these areas; therefore, indirect impacts to the Hiwassee/Ocoee Scenic River State Park and Ocoee Whitewater Center would be minor. In addition, the Ruth's golden aster benefits from recreational water releases to the Middle Ocoee. As noted in Section 3.7.2, elimination of scheduled water releases to the Middle Ocoee may eventually result in a shift in the herbaceous, in-channel habitats currently found along the Middle Ocoee River. Changes to the in-channel vegetation along this reach of the river could endanger this population of the Ruth's golden aster. Therefore, implementation of this alternative would have a moderate indirect impact to the Ruth's Golden Aster Protection Planning Site. No other natural areas or parks are anticipated to be impacted by this alternative.

3.9.2.2 Alternative B – Proposed Agreements

Under this alternative, five water release days on the Middle Ocoee in late September would be eliminated. There would be no construction or improvements to the parcels of land affected by the proposed action, and this alternative is substantially similar to the current management practice. Therefore, there would be no impacts to natural areas or parks.

3.9.2.3 Alternative C – Current Management Regime

This alternative is the current management practice, and there would be no construction or improvements to the affected parcels of land. Therefore, no impacts to natural areas or parks would result from implementation of this alternative.

3.10 Cultural Resources

3.10.1 Affected Environment

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, as well as locations of important historic events that lack material evidence of those events. Cultural resources that are listed, or considered eligible for listing, on the National Register of Historic Places (NRHP) are called historic properties. To be considered an historic property, a cultural resource must possess both integrity and significance. A historic property's integrity is based on its location, design, setting, materials, workmanship, feeling, and association. The significance is established when historic properties meet at least one of the following criteria: (a) are associated with important historical events or are associated with the lives of significant historic persons; (b) embody distinctive characteristics of a type, period, or method of construction; (c) represent the work of a master, or have high artistic value; or (d) have yielded or may yield information important in history or prehistory (36 CFR Part 60.4).

Section 106 of the NHPA requires federal agencies to consider the effects of their proposed undertakings on historic properties and provide the Advisory Council on Historic Preservation an opportunity to comment on those effects. TVA determined that the Proposed Action Alternative is an "undertaking" as defined by the regulations under NHPA. Once an action is determined to be an undertaking, the regulations require agencies to consider whether the proposed activity has the potential to impact historic properties. If the undertaking is such an activity, then the agency must follow the following steps: (1) involve the appropriate consulting parties; (2) define the area of potential effects (APE); (3) identify historic properties in the APE; (4) evaluate possible effects of the undertaking on historic properties in the APE; and (5) resolve adverse effects (36 CFR § 800.4 through 800.13). An APE is defined as the "geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16.).

Concerning cultural resources, the APE is taken as the affected environment for purposes of this EA. TVA defined the APE to be the following: the Middle and Upper Ocoee River shoreline cutbanks potentially affected by changing water releases; USFS Tracts FS #1 and FS #2 (approximately 3.7 acres); TVA Parcel 1 (8.3 acres), TVA Parcel 2 (15.0 acres), and TVA Parcel 3 (3.87 acres). This APE includes a 1/2-mile radius surrounding the land tracts to account for visual effects to historic structures. Prehistoric and historic archaeological sites may exist in the APE, including along the river shoreline. A review of the Tennessee Historical Commission Viewer and TVA's Integrated Cultural Database indicates that the NRHP listed Ocoee No. 2 Hydroelectric Project and Ocoee No. 3 Hydroelectric Project (including the dams, flume, powerhouse, surge tanks, etc.) lie in view of the APE.

Section 106 of the NHPA requires federal agencies to consult with the respective State Historic Preservation Officer (SHPO) and Indian tribes when proposed federal actions could affect historic and cultural resources, including archaeological resources, which are also protected under the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, in addition to the NHPA.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

As Alternative A would not authorize any changes to land use or increase water releases, this alternative would not increase erosion along the Middle and Upper Ocoee River shoreline cutbanks and would therefore would have no effect to historic properties.

3.10.2.2 Alternative B – Proposed Agreements

Under Alternative B, the 15-year recreation management agreement (assumed to be renewed for an additional 15-year period) stipulates that ground disturbing activities in support of occupation and maintenance would be coordinated with TVA prior to their implementation. As these projects materialize, TVA will consider effects to historic properties pursuant to Section 106 of the NHPA. Also under this alternative TVA water releases would remain the same with the exception of eliminating five weekdays in late September on the Middle Ocoee River. TVA expects the erosive effects of water releases to unrecorded archaeological sites would not increase under this alternative and therefore the recreation agreement and the water releases would have no effect to historic properties. Further, any improvements resulting from the recreation agreement would be reviewed for effects to historic properties prior to their implementation.

TVA is consulting with the Tennessee SHPO about TVA's findings. Pursuant to 36 CFR Part 800.3(f)(2), TVA is also consulting with the following federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP: Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, Muscogee (Creek) Nation of Oklahoma, Alabama-Coushatta Tribe of Texas, Kialegee Tribal Town, Thlopthlocco Tribal Town, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe.

3.10.2.3 Alternative C – Current Management Regime

Alternative C is similar to Alternative B, except that water releases would occur during five additional days in September. Ground disturbing activities in support of occupation and maintenance of TVA parcels under easement to the State would be coordinated with TVA prior to their implementation. As these projects materialize, TVA will consider effects to historic properties pursuant to Section 106 of the NHPA. Also under this alternative, TVA water releases would remain the same and therefore would have no effect to historic properties. TVA expects the erosive effects of water releases to unrecorded archaeological sites would be indiscernible under this alternative given it is a minor increase in release days from Alternative B. Therefore the proposed water releases would have no effect to historic properties. Further, any improvements resulting from the recreation agreement would be reviewed for effects to historic properties prior to their implementation.

3.11 Cumulative Effects

This section supplements preceding analyses and includes the potential for cumulative adverse impacts to the region's environment that could result from the implementation of the proposed management agreements and scheduled water releases. A cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of a project when added to other past, present and reasonably foreseeable future actions (40 CFR 1508.7). Baseline conditions reflect the impacts of past and present actions. The impact analyses summarized in preceding sections are based on

baseline conditions that include the following prior actions which are either explicitly or implicitly considered cumulative impacts:

- Repair and maintenance of the flume at the No. 2 Dam
- Development of the Olympic Whitewater Slalom Venue on the Upper Ocoee River
- Development of the Ocoee Whitewater Center and Ocoee Recreational Corridor
- Transmission line replacement between the Ocoee No.2 and the Ocoee No. 3 Powerhouses

Because these actions are considered part of the baseline, they are not addressed separately in the cumulative effects analysis.

The Corridor K project was first introduced as one of 31 regional projects included in the Appalachian Regional Development Act of 1965. The project was introduced to link the metropolitan areas of Chattanooga, Tennessee and Asheville, North Carolina. TDOT has been working in conjunction with TVA, U.S. Army Corps of Engineers, USFS and other entities since the late 1980s to assess the potential effects of the Corridor K project in Tennessee. A Draft EIS for a proposed project between the Ocoee River Bridge, and Ducktown was completed and approved by the Federal Highway Administration in 2003 with public meetings held in January 2004. The Draft EIS was later rescinded by TDOT in 2008. TDOT determined that a fresh look at Corridor K was warranted and initiated a Transportation Planning Report in 2010 (TDOT 2010). A subsequent Draft EIS was initiated, and was scheduled to be available in late 2015. This document has not been published. Currently, as this project is still in the early development phase, no work has been undertaken and no funding or permits have been issued. Therefore, this project is not considered to be reasonably foreseeable. Ongoing activities including various forms of recreation (rafting, kayaking, camping, hunting, fishing, boating, hiking, biking and picnicking), road maintenance, vegetation management, and wildlife habitat improvements would continue in the region. However, there are no other reasonably foreseeable future actions within the region that could contribute to cumulative effects.

The potential for cumulative effects associated with the alternatives considered in this EA is a function of several factors that include the magnitude of the impact and the sensitivity of the resource affected in addition to the quality and condition of the baseline. The water release and management agreements considered in this EA would only affect the flow regime of the Ocoee River and would not result in any ground disturbance or construction activities. Therefore, there would be no cumulative impacts to air quality, climate change, floodplains, solid and hazardous waste, noise, visual resources or public health and safety associated with any construction or ground disturbing activity. Accordingly, the potential for cumulative effects are largely driven by the flow regime change within the middle and lower sections of the river and the change in recreation use and the associated economic impacts.

Under the No Action Alternative, scheduled water releases would be eliminated and whitewater rafting would only be possible during periods of high non-turbine flow. Recreational users that would normally use the Middle and Upper sections of the Ocoee River would likely utilize alternate whitewater rafting rivers such as the Gauly, Nolichcucky, Chatooga, and Nantahala. As a result, increased traffic and economic input would be shifted to other locations. Given that there are no foreseeable future actions that would

impact the availability of these sites, the cumulative impact would be minor and not detectable on a regional level.

Under Alternative B, recreational use of the Ocoee River would be reduced by five weekdays in September and recreators would have to travel to the alternate sites in the region described above during this period. Due to the relatively low numbers of users who have historically used the Ocoee River on these days, and the potential distribution of this use across multiple sites, there would not be a significant cumulative effect associated with this change. However, during the review of the draft EA, TVA received many comments from the public that reflected that these five days are very important in particular to many within the private boating community.

TVA operation of the Hiwassee and Ocoee Rivers likely affect populations of Ruth's golden aster, but the overall effect is unclear. Ruth's golden aster populations have clearly increased along the Ocoee River since monitoring began in 1987, but comprehensive data for the Hiwassee River has only been gathered since 2011. Various sources note the decline of Ruth's golden aster at discrete locations along the Hiwassee River, but the census data does not suggest the overall population is currently in obvious decline. Previously, river scouring was the only known ecological mechanism that maintained habitat for the species. However, Moore et al. 2016 noted that periodic drought apparently inhibits colonization of trees at many locations along the Hiwassee River. While the effect of TVA operation of the Hiwassee River is not completely understood, the cumulative impact of implementing Alternative B, as modified, on the Ocoee River would be negligible compared to the current operations regime.

Alternative C represents the current condition. Because there would be no change to current water releases or management agreements under this alternative, there would be no adverse cumulative effects.

3.12 Unavoidable Adverse Impacts

Unavoidable adverse impacts are the effects of the proposed action on natural and human resources that would remain after mitigation measures or best management practices have been applied. Mitigation measures and best management practices are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. Impacts associated with the proposed changed in water release schedules have the potential to cause unavoidable adverse effects to natural and human resources.

Changes in the flow regime associated with the No Action Alternative have the potential to have a negative impact to the rare plant communities present along the Middle and Upper Ocoee River and impact economic resources. Given the rarity of the habitats found in this area and the magnitude of economic impact, these impacts may be significant.

Alternatives B and C would entail a minor change in water release schedules and the current condition. Implementation of either of these alternatives would result in unavoidable minor economic adverse effects.

3.13 Relationship of Short-Term Uses to Long-Term Productivity

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This EA focuses on the analysis of environmental impacts associated with the implementation of water release and

recreation management agreements to continue commercial whitewater rafting on the Ocoee River. For the purposes of this section, the proposed 15-year management agreement (assumed to be renewable for one 15-year period) is considered a short-term use of the environment, and the long term is initiated upon expiration of whitewater rafting management agreements. This section includes an evaluation of the extent that short-term uses preclude any options for future long-term use of the Middle and Upper Ocoee River.

The No Action Alternative would impact commercial recreational use during the short-term. As identified in this EA, it is anticipated that recreational users may identify alternative locations for commercial rafting. However, implementation of this alternative would not change the productivity of natural resources or preclude any options for future long-term use of the river.

Implementation of Alternatives B and C would not significantly change the management of flow released to the Upper and Middle Ocoee River and would not change the productivity of natural resources. In addition, because no construction or improvements are proposed to the parcels of land affected by the proposed actions, no loss of productivity of natural resources is anticipated. The short-term use of the Middle and Upper Ocoee River for commercial whitewater rafting would not preclude any options for future long-term use of the river.

3.14 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be recovered or reversed. Irreversible is a term that describes the loss of future options. It applies primarily to the impacts of use of nonrenewable resources, such as minerals or cultural resources, or to those factors such as soil productivity, that are renewable only over long periods of time. A commitment of a resource would be considered irretrievable when the project would directly eliminate the resource, its productivity, or its utility for the life of the project and possibly beyond. No construction or improvements are proposed on the parcels of land affected by the proposed alternatives. Therefore, a decision on the proposed alternatives in this EA would not result in irreversible and irretrievable commitments.

CHAPTER 4 – LIST OF PREPARERS

4.1 NEPA Project Management

Name:	**Matthew Higdon (TVA)**
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Name:	**Bill Elzinga (Amec Foster Wheeler)**
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4.2 Other Contributors

4.2.1 Tennessee Valley Authority

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4.2.2 Amec Foster Wheeler

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Name:	**Matthew Bingham (Veritas)**
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Name:	**Linda Hart**
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Name	**Wayne Ingram P.E.**
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Name	**Emily Kinzinger**
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Name:	**Keara Pringle**
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Experience:	1 year experience in NEPA

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CHAPTER 5 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

Following is a list of the agencies, tribes, and organizations who received notice of the final EA's availability with instructions on how to access the EA on the TVA project webpage.

5.1 Federal Agencies

Department of Agriculture, Forest Service, Cherokee National Forest
Department of Agriculture, Natural Resources Conservation Service, Tennessee State Conservationist
Department of Army, Corps of Engineers, Nashville District
Department of the Interior, National Park Service

5.2 Federally Recognized Tribes

Absentee Shawnee Tribe of Oklahoma
Alabama-Quassarte Tribal Town of the Creek Nation of Oklahoma
Alabama-Coushatta Tribe of Texas
Cherokee Nation of Oklahoma
Chickasaw Nation
Choctaw Nation of Oklahoma
Coushatta Tribe of Louisiana
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Jena Band of Choctaw Indians
Kialegee Tribal Town
Mississippi Band of Choctaw Indians
Muscogee Creek Nation
Poarch Band of Creek Indians
Seminole Nation of Oklahoma
Shawnee Tribe
Thlopthlocco Tribal Town
United Keetoowah Band of Cherokee Indians in Oklahoma

5.3 State Agencies/Officials

Representative Dan Howell, Tennessee House of Representatives
Senator Mike Bell, Tennessee Senate
Tennessee Department of Economic and Community Development
Tennessee Department of Environment and Conservation
Tennessee Historical Commission
Tennessee Wildlife Resources Agency

5.4 Local Agencies/Officials

Bradley County Commission, Tennessee
Cherokee County Commission, North Carolina
City Manager, Ducktown, Tennessee
County Executive, Polk County, Tennessee
County Manager, Cherokee County, North Carolina
County Mayor, Bradley County, Tennessee
County Mayor, Monroe County, Tennessee
Polk County Commission, Tennessee

5.5 Individuals and Organizations

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Z. Bopp
B. Brewer
S. Brown (Main Street Cleveland)
T. Bryant
A. Buckner
C. Burton
Carolina Ocoee
Cascade Outdoors
L. Case
J. Cheveallier
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High Country Adventures
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J. Hussey

K. Jenkins
J. Jones
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J. Ledbetter
K. Levitt
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L. Luke
C. McCarter
B. McPherson
Mountain True
F. Mueller
Nantahala Outdoor Center
J. Norton
Ocoee Inn Rafting
Ocoee Outdoors
Ocoee Rafting LLC
Ocoee River Outfitters Association
Ocoee River Rats
Outdoor Alliance
Outland Expeditions
R. Pace
R. Paden
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T. Pinckney Jr.
Polk County Chamber of Commerce
S. Pritchett
M. Przybysz
Quest Expeditions
Raft One Company
A. Reddington
D. Richardson
TW Robinson
J. Rogers
Rolling Thunder River Company
J. Ryan
M. Scarborough
M. Shillinger
P. Shoun
Sierra Club
C. Smith
Southern Environmental Law Center
J. Staley
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R. Steeves
S. Stone
R&D Teal
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Tennessee Scenic River Association
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CHAPTER 6 – LITERATURE CITED

American Whitewater. 2017a. National Whitewater Inventory. Retrieved from https://www.americanwhitewater.org/content/River/view/ (accessed September 2017).

American Whitewater. 2017b. AW in the Southeast. Retrieved from https://www.americanwhitewater.org/content/Regional/view/region/SE/.

Barbour, R.W. and Davis, W.H. 1969. Bats of America. University of Kentucky Press, Lexington, Kentucky, 286 pp.

Beauchamp, Melanie. 2013. Tennessee's Ocoee River Officially Most Popular Whitewater Rafting River in America. Retrieved from http://www.prweb.com/releases/2013/5/prweb10766133.htm (accessed September 2017).

Brady, J., T.H. Kunz, M.D. Tuttle and D. Wilson, 1982. Gray bat recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado 80205. 143 pp.

Bunch, M., S. Miller, and D. Webster. 2005. Eastern Woodrat. South Carolina Department of Natural Resources. Retrieved from http://www.dnr.sc.gov/cwcs/pdf/easternwoodrat.pdf (accessed September 2017).

Butchkoski, C. M., and J. D. Hassinger. 2002. Ecology of a maternity colony roosting in a building. *In* Kurta, A. and J. Kennedy, eds. *The Indiana Bat: Biology and Management of an Endangered Species.* Bat Conservation International, Austin, Texas.

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance under the National Environmental Policy Act, Executive Office of the President, Washington, DC. Retrieved from https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf (accessed August 2017).

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. December 1979, Reprinted 1992.

Dorcas, L. and W. Gibbons. 2005. *Snakes of the Southeast*. The University of Georgia Press, Athens. 253 pp.

Eddlemon, Kirk. 2014a. Whitewater of the Southern Appalachians Volume 1: The Plateau. New Castle, Colorado: Wolverine Publishing, LLC.

Eddlemon, Kirk. 2014b. Whitewater of the Southern Appalachians Volume 2: The Mountains. New Castle, Colorado: Wolverine Publishing, LLC.

Federal Highway Administration. 2003. Draft Environmental Impact Statement and Draft Section 4(f) Evaluation, Appalachian Development Highway System Corridor K (Relocated US 64) From West of the Ocoee River to State Route 68 Near Ducktown, Polk County, Tennessee. No. FHWA-TN-EIS-03-01-D.

Floden, Aaron. 2013. A new leatherflower (*Clematis: Ranunculaceae*) from the Southern Appalachians. Journal of the Botanical Research Institute of Texas 7(1):1-7.

Georgia Department of Natural Resources. 2016. Draft 2016 Integrated 305(b) / 303(d) List – Lakes, Environmental Protection Division. Retrieved from

https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/303d_Draft_Lakes_Y2016.pdf (accessed September 2017).

Griffith, G. E, J.M. Omernik and S. Azevedo. 1998. Ecoregions of Tennessee (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale1:1,250,000).

Gunier, W. J., and W. H. Elder. 1971. Experimental homing of gray bats to a maternity colony in a Missouri barn. *American Midland Naturalist 86(2): 502-506.*

Haggard, D. and M. Halback. 1985. *Heterotheca ruthii* (Small) Harms. Unpublished report to Tennessee Department of Environment and Conservation, Division of Ecological Services, Nashville, Tennessee.

Harvey, M. J. 1992. Bats of the eastern United States. Arkansas Game and Fish Commission, Little Rock, Arkansas. 46 pp.

Hawks Nest Hydro, LLC. 2015. Hawks Nest Hydroelectric Project (FERC No. 2512), Glen Ferris Hydroelectric Project (FERC No. 14439) Draft Recreation Flow Assessment Study Report. Gauley Bridge, WV: Hawks Nest Hydro, LLC.

Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D. and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354

Hynes, Stephen, Nick Hanley, and Eoghan Garvey. 2007. Up the Proverbial Creek without a Paddle: Accounting for Variable Participant Skill Levels in Recreational Demand Modelling. Environmental and Resource Economics 36(4): 389-521.

Kurta, A., S. W. Murray, and D. H. Miller. 2002. Roost selection and movements across the summer landscape. Pages 118-129 in A. Kurta and J. Kennedy, editors. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Lamb, J. and G. Wyckoff. 2010. White-nose Syndrome Monitoring and Response Report for Tennessee. Retrieved from http://www.tennessee.gov/assets/entities/twra/attachments/2010WNSreportrevised_2016.pdf (accessed September 2017).

Moore, P.A., P.A. Wadl, J.A. Skinner, R.N. Trigiano, E.C. Bernard, W.E. Klingeman, and A.J. Dattilo. 2016. Current knowledge, threats, and future efforts to sustain populations of *Pityopsis ruthii* (Asteraceae), an endangered southern Appalachian species. The Journal of the Torrey Botanical Society 143:117-134.

Morse, Steve. 2013a. The Estimated Economic Impacts of Ocoee River Whitewater Rafting on the Local Economy, 2012. Retrieved from www.americaoutdoors.org/america_outdoors/pdf/Ocoee2pp.pdf (accessed April 2017).

Morse, Steve. 2013b. Economic Impacts of Visitor Spending & Whitewater Rafting on the Ocoee River. Knoxville, Tennessee: University of Tennessee Department of Retail, Hospitality & Tourism Management.

National Geographic. 2017. Ocoee Whitewater Center. Retrieved from http://www.tennesseerivervalleygeotourism.org/content/ocoee-whitewater-center/tenF6084606E10DB0F05 (accessed March 2017).

National Weather Service. 1982. Evaporation Atlas for the Contiguous 48 United States, Technical Report NWS 33, National Oceanic and Atmospheric Administration, Washington, D.C.

NatureServe. 2017. NatureServe Explorer: An Online Encyclopedia of Life [Web Application]. Arlington, Virginia: NatureServe. Retrieved from http://explorer.natureserve.org (accessed September 2017).

Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington D.C. 587pp.

Pruitt, L., and L. TeWinkel, editors. 2007. Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota. 260 pgs. Retrieved from http://www.fws.gov/midwest/endangered/mammals/inba/pdf/inba_fnldrftrecpln_apr07.pdf (accessed December 2016).

Tennessee Department of Environment and Conservation (TDEC). 1988. Ocoee River General Management Plan, Prepared in cooperation with Forest Service and Tennessee Valley Authority. Nashville, Tennessee.

TDEC. 2013. Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-04, Use Classifications for Surface Waters. December 2013.

TDEC. 2014. 2014 305(b) Report The Status of Water Quality in Tennessee, Nashville, Tennessee. Retrieved from http://www.tennessee.gov/assets/entities/environment/attachments/wr_wq_report-305b-2014.pdf (accessed September 2017).

TDEC. 2017. Proposed Final Year 2016 303(d) List, May 2017

Tennessee Department of Transportation (TDOT). 2010. Transportation Planning Report. Corridor K SR 40 (US^$) from West of the Ocoee River to SR 68 Near Ducktown. Polk County PIN # 102420.00 Federal, Project No. APD-NHE-40 (15). May 2010

TDOT. 2013. Traffic Map, Polk County Tennessee. Retrieved from http://www.tn.gov/assets/entities/tdot/attachments/map-traffic-70traffic.pdf (accessed August 2017).

Tennessee State Parks. 2016a. Ocoee River Visitation Info, Middle Ocoee River and Upper Ocoee River 2016.

Tennessee State Parks. 2016b. Hiwassee/Ocoee Scenic River State Park, Tennessee. Retrieved from http://tnstateparks.com/assets/pdf/additional-content/park-brochures/hiwassee-ocoee_brochure-2016.pdf (Accessed October 2017).

Tennessee Valley Authority. 1979. Final Environmental Impact Statement – Rehabilitation of the Ocoee No. 2 Hydro Plant. Tennessee Valley Authority, Chattanooga, Tennessee. Retrieved from https://books.google.com/books?id=c9c3AQAAMAAJ&pg=PA14&lpg=PA14&dq=rehabilitation+of+the+Ocoee+Dam&source=bl&ots=EsFnTGv2Ef&sig=mct_T8RLmjJmP7mZuRwjK--wX_Q&hl=en&sa=X&ved=0ahUKEwjjvNm1uObUAhUM_4MKHbszAIQQ6AEINTAC#v=onepage&q=rehabilitation%20of%20the%20Ocoee%20Dam&f=false (accessed June 2017).

TVA. 1997. TVA 1997 Upper Ocoee River Corridor Recreational Development, Polk County, Tennessee, Ocoee Ranger District, Cherokee National Forest. Record of Decision Federal Register Vol. 62, No. 75. April 18, 1997.

TVA. 2004. Reservoir Operations Study Final Programmatic Environmental Impact Statement. Prepared in cooperation with the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. Retrieved from https://www.tva.gov/Environment/Environmental-Stewardship/Environmental-Reviews/Reservoir-Operations-Study (accessed June 2016).

TVA. 2006. Ocoee 2 – Ocoee 3 Transmission Line Replacement Environmental Assessment. Polk County, Tennessee. November 2006.

TVA. 2009. Mountain Reservoirs Land Management Plan, Chatuge, Hiwassee, Blue Ridge, Nottely, Ocoee's 1,2, and 3, Apalachia, and Fontana Reservoirs, Georgia, North Carolina, and Tennessee. Final Environmental Impact Statement. July 2009.

TVA. 2017. Tennessee Regional Natural Heritage Program Database (accessed September 2017).

Turcotte, W. H. and D. L. Watts. 1999. Birds of Mississippi. University Press of Mississippi, Jackson, Mississippi.

Tuttle, M. D. 1976. Population ecology of the gray bat (Myotis grisescens): philopatry, timing, and patterns of movement, weight loss during migration, and seasonal adaptive strategies. Occasional Papers of the Museum of Natural History, University of Kansas, 54:1-38.

U.S. Census Bureau (USCB). 2017a. 2010 Census. Detailed Tables. Retrieved from American FactFinder http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed September 2017).

U.S. Census Bureau (USCB). 2017b. American Community Survey 2011-2015. Detailed Tables. Retrieved from American FactFinder: http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed September 2017).

U.S. Census Bureau (USCB). 2017c. Community Facts. Retrieved from American FactFinder https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml (accessed September 2017).

U.S. Census Bureau (USCB). 2017d. Poverty Thresholds for 2015. Detailed Table. Retrieved from http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html (accessed February 2017).

U. S. Environmental Protection Agency (EPA). 2016. Environmental Justice. Retrieved from https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (accessed February 2017).

U.S. Forest Service (USFS). 1994. Final EIS – 1996 Olympic Whitewater Slalom Venue Ocoee River, Polk County, Tennessee. Management Bulletin R8-MB 68-A, USDA Forest Service, Southern Region [TVA index number 314].

USFS. 1997. Final EIS – Upper Ocoee River Corridor Recreational Development, Polk County, Ocoee Ranger District, Cherokee National Forest. Management Bulletin R8-MB 79A, USDA Forest Service, Southern Region [TVA index number 1313].

USFS. 2004a. Final Environmental Impact Statement for the Revised Land and Resource Management Plan, Management Bulletin R8-MB-114B, January 2004. Retrieved from http://www.fs.fed.us/r8/cherokee/planning2003/preview.shtml (date of access undetermined).

USFS 2004b. Revised Land and Resource Management Plan Cherokee National Forest Management Bulletin R8-MB 114B. USFS Southern Region. January 2004.

USFS. 2008. Ocoee and Hiwassee Rivers Corridor Management Plan, Cherokee National Forest. Forest Service Region 8. February 2008.

U.S. Forest Service (USFS). 2017a. Cherokee National Forest, Hunting. Retrieved from https://www.fs.usda.gov/activity/cherokee/recreation/hunting (accessed August 2017).

U.S. Forest Service. 2017b. Ocoee River Outfitter and Guide Companies. Retrieved from https://www.fs.usda.gov/detail/cherokee/recreation/?cid=stelprdb5276624 (accessed March 2017).

U.S. Forest Service. 2017c. Ocoee Whitewater Center. Retrieved from https://www.fs.usda.gov/generalinfo/cherokee/recreation/generalinfo/?groupid=71012&recid=35096 (accessed March 2017).

U.S. Forest Service. 2017d. Tellico River Zone. Retrieved from https://www.fs.usda.gov/recarea/cherokee/recarea/?recid=35128 (accessed March 2017).

U.S. Forest Service. 2017e. Whitewater on the Cherokee National Forest. Retrieved from https://www.fs.usda.gov/detail/cherokee/recreation/?cid=stelprdb5271037 (accessed March 2017).

USFS. 2017f. Ocoee Whitewater Center. Retrieved from https://www.fs.usda.gov/generalinfo/cherokee/recreation/generalinfo/?groupid=71012&recid=35096 (accessed October 2017).

U.S. Fish and Wildlife Service (USFWS). 2013. Bald and Golden Eagle Protection Act. Retrieved from http://www.fws.gov/northeast/ecologicalservices/eagleact.html (accessed February 2017).

USFWS. 2014. Northern Long-eared Bat Interim Conference and Planning. Retrieved from https://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf (accessed September 2017).

USFWS. 2017a. Information for Planning and Consultation. Retrieved from https://ecos.fws.gov/ipac/location/index (accessed May 2016).

USFWS 2017b. National Wetlands Inventory Website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Retrieved from http://www.fws.gov/wetlands/ (accessed September 2017)

USFWS. 2017c. 2017 Range-Wide Indiana Bat Summer Survey Guidelines. Retrieved from http://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2015IndianaBatSummerSurveyGuidelines01April2015.pdf (accessed September 2017).

U.S. Geological Survey. 2017. National Water Information System: Web Interface. Retrieved from https://waterdata.usgs.gov/nwis (accessed September 2017).

University of Montana. 2017. Wilderness Connect. Little Frog Mountain Wilderness. Retrieved from http://www.wilderness.net/NWPS/wildView?WID=322&tab=General (accessed September 2017)

Whitaker, J.O. 1996. National *Audubon Society: Field Guide to North American Mammals*. Alfred A. Knopf, Inc., New York.

White, A.J. 1977. An autecological study of the endangered species, *Heterotheca ruthii* (Small) Harms. M.S. thesis. University of Tennessee, Knoxville, Tennessee. 83 p.

Wofford, B.E. and D.K. Smith. 1980. Status report on *Heterotheca ruthii* (Small) Harms to the U.S. Department of the Interior, Fish and Wildlife Service, Region 4. Department of Botany, University of Tennessee, Knoxville, Tennessee.

Appendix A – Public Scoping Comments

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#	Date	Commenter	Location	Comment
1	6/19/2017	C. Walbridge	Bruceton Mills, WV	As a whitewater paddler and long time sales rep to the rafting industry I strongly support the plan for continued water releases on the Upper and Middle Ocoee River. They're good for the sport and the region's economy.
2	6/19/2017	C. Harjes	-	Thank you for continuing recreational releases on the Ocoee, and please consider more high water releases. The Ocoee is a staple of Southeastern whitewater, both commercially and purely recreationally. Maintaining the current release schedule would continue this. However there is substantial room for improvement if possible, primarily in water levels- the Ocoee is rocky and marginal at 1200 CFS, great at 1500, and rowdy and awesome at 1800 and higher. Mixing in a few of these healthier releases, possibly even conditional on normal or better inflow, would greatly improve the quality and variety of challenges and fun to be had on this wonderful river. Thank you for your consideration.
3	6/20/2017	K. Blanchard	Memphis, TN	Ocoee Dam # 2 and #3- continue current release dates or increase the dates: Please continue the opportunity for recreational activities on the Ocoee river and possibly expand the release days. We have taken commercial trips on the river and hope to continue to do so. My family lived in Memphis and we spent the weekends playing on the river. We either camped or stayed in hotels. We also ate out at the local places near there. We had a great time and encouraged our Memphis friends to visit.
4	6/19/2017	R. Steeves	-	I'm a private boater who spends many weekends running the Ocoee, driving there from Durham, NC, and have over 400 descents of the Middle Ocoee. Every year I attend the Ocoee Drawdown season that is planned for elimination. That's a 9-day window I would not be in the area. If the schedule no longer needs to be the end of September, that week would be of even more benefit if scheduled during the summer months where students are out of school and the weather is warmer. Moving it to the summer could provide a substantial economic benefit. With the new more focused flow levels, there would be benefit to periods of time with a slightly more increased flow to provide a different experience. I would gladly pay an annual fee (much like the Nantahala) to support those services. Thank you for your consideration.
5	6/22/2017	Anonymous	-	It's a shame this "pork barrel" / behind closed doors / deal was passed. Now the taxpayers have to foot the bill, instead of the rafters/outfitters paying their bill.
6	6/23/2017	J. Dugger	-	Subject: Proposed Future Ocoee Recreation Management Thanks for the opportunity to express my suggestions for the management of the middle Ocoee. Many of us travel a long distance to raft and kayak the Ocoee. Usually, when there is a holiday during the week, it allows us to take 4 days of vacation from work to get two weekends plus of paddling. 1. Memorial Day, 4th of July, and Labor Day, I would like to suggest that the river run that entire week. That would allow participants from further distances making the Ocoee a desirable destination for a full week of vacation. Memorial Day and Labor Day always fall on Monday. Since the 4th of July holiday can vary, we get either Friday or Monday off if it falls on a weekend. That day we get off would determine which week the river could run. 2. I've noticed that the number of people rafting has remained about the same the last few years. This might suggest that this activity has become a "mature" market. To energize more excitement and use, higher water levels could entice previous paddlers to return for that excitement. I would suggest early June and Aug for these levels, as well as a couple of days the week of the 4th of July.

#	Date	Commenter	Location	Comment
				3. I don't believe the early release's in March and early April are needed anymore with the availability of other rivers running with those dam's now releasing during this period. Those days could be substituted for the additional days around holidays. 4. Already this year, the take out parking lot for private paddlers has been full, forcing some people to park across the highway. This is a dangerous situation with the speed limit being 45 mph, and blind curves on either side, and people trying to cross the road with boats. 5. Recently I drove to Knoxville following TN Hwy 411. This 4 lane, divided highway, for the most part is 45 mph with only a few stretches 55 mph. Yet, the two lane, winding road along the middle Ocoee is posted 45 mph, but many cars and trucks exceed that speed. The road has sharp, blind turns, with lots of bus traffic. This is extremely fast for 18 wheeler's also. I think the state highway dept should conduct a study to reduce the maximum speed to 35 mph and should instruct the state police to vigorously enforce the limit. I have never seen a driver ticketed on this section of the highway. 6. The shoulder on the road has deteriorated over the years and will need significant work to be widened to a safe distance. On the other side of the road, there are "unguarded" culverts as well as a deep ditch in places. The ditch caused a van, which dropped its right wheel into it, when the driver over corrected by pulling the steering wheel to the left, caused the van to cross the highway and plunge into the upper part of the lake about 15 years ago killing three children. (but it could have hit a bus carrying rafters) The road has only gotten worse since with little maintenance, except the maintenance done after the rock slide a couple of years ago. 7. Since all of the bus drivers have a CDL license, they are the only personnel subject to drug testing. The raft guides are part time employees during the summer, yet they are responsible for the safety of their passengers. With that kind of responsibility, they should be subject to drug testing for public safety. I think the majority of them are very responsible and concerned for their customers, but it only takes one incident to harm the integrity of the management system. Finally, I would like to invite the decision holders to spend a day at the Ocoee during its busy time in June or July on a Saturday. Rafting, hiking down to some of the rapids, talking with customers and private boaters at the takeouts and walking along the road at overlooks. Over the years, it seems that the decision makers sit behind a desk, read our comments, discard the ones they don't understand, misunderstand, or personally disagree with and make decisions that effect us, and not them. There is no substitute for experience, and hands on information FYI, I first paddled the Ocoee in late March 1986. I am just a recreational paddler. Now, semi-retired, I spend my entire summer at the Ocoee. Should you have any questions or require additional information, please bring them to my attention via e mail or cell. Thanks for your attention to this very important challenge to improve the facilities and management of the Ocoee.
7	6/29/2017	J. Cheveallier	-	I'll keep my comments short. I am in favor of renewing the release schedule on the Ocoee River. It's been made clear how much the local economy has grown to depend on revenue generated by the thousands of people who come to this area each year. If the river no longer provided the recreational opportunities it currently does it would prove disastrous. For my personal reasons. I'd like to see the river flows continue because I love kayaking it every year. Thank you for your consideration.

#	Date	Commenter	Location	Comment
8	7/3/2017	R. Griest	Atlanta, GA	I write to strongly encourage the TVA to consider the recreational value of the Ocoee River in the upcoming agreements. From the first time I rafted the Ocoee as a young boy at summer camp, it has been a special place for me. Now a professional in Atlanta in my 30s, the Ocoee is a place where I clear my mind, enjoy good company, and take in the outdoors as a whitewater kayaker. I cannot emphasize enough what a great recreational asset it is for the entire southeast. Please continue to provide consistent recreational releases so that generations to come may also enjoy this great resource. One specific issue the TVA should consider is the offering of increased volume releases. These releases would allow paddlers to experience a slightly more intense Ocoee, and would create some fun and excitement for commercial rafters and private paddlers alike. Thank you for your consideration and continued support of the paddling community.
9	7/3/2017	T. Bryant	-	Would not the boating public would be better served by adding hours to the summer release schedule? Why would we not have releases on Tuesday and Wednesdays when the weather is best? This would allow more users to take advantage of the available releases. This could be accomplished by deleting March and early April releases. Add those days or hours to weekdays during the summer months. Paddlers have a number of river options during the spring for boating. You see very few rafters or any other boaters in April and March. I'm sure it would help generate more income for the rafting companies, restaurants, hotels and other small business owners. ….. Why would we not have releases on Tuesday and Wednesdays when the weather is best? This would allow more users to take advantage of the available releases. Can we delete some of the March and early April releases and add those days or hours to weekdays during the summer. You see very few rafters or any other boaters in April and March. I'm sure it would help generate more income and create jobs for all the small business owners.
10	7/6/2017	T. Pinckney	-	I read the recent proposal for Ocoee river TVA releases starting in 2019. While I'm glad that there will be continued releases on the middle Ocoee at the same schedule as we currently have, I'm dismayed to see that the upper Ocoee will have a reduction in number of releases. I have fond memories of boating on the Ocoee with my dad. It's a beautiful river and also a great economic asset to the state of TN to have boaters visit from out-of-state like my dad and I. I understand that it's a complicated set of priorities to manage power generation and recreational access. However I feel like many times too much weight is given to power generation and not enough to recreation. As the TVA is a governmental organization it's also a bit odd that the water releases require payment to the TVA for lost power revenue. The TVA's charter also includes economic development and white water boating certainly qualifies as such. Thank you.
11	7/7/2017	T. Pinckney Jr.	-	My son … wrote you expressing his hopes that the TVA will maintain and possibly increase releases on both the Upper and Middle sections of the Ocoee. As to economic impact, our visits would usually consist of 9 motel nights plus breakfasts and dinners as well as incidentals. Thus if you multiply our one family's expenditures by all the people on the river, the impact is substantial. Plus you have the most fun, easily accessed, white water rivers anywhere in the country. It is a real treasure for the nation!!! Sincerely.

#	Date	Commenter	Location	Comment
12	7/7/2017	J. Hubbard	-	I am a private boater that kayaks on the Upper and Middle Ocoee River many times each year. I live in the Chattanooga area. I am pleased that TVA, the State of Tennessee, and the Ocoee River Rafting Industry came to a mutually beneficial agreement that insures recreational releases on the Upper and Middle Ocoee for the next 15 years. This is an economic benefit to the area and a recreational benefit to the many paying rafting customers and private boaters that come to the Ocoee River for it world class whitewater experience. Thank you to all, including TVA, who made this agreement possible.
13	7/10/2017	J. Ryan	-	As an avid whitewater kayaker, kayaking instructor, swiftwater rescue instructor, and conservationist, I consider the new Ocoee river agreements to be fair and beneficial to the river community and I hope to TVA, as well. Thank you for the opportunity to comment.
14	7/11/2017	R & D Teal	-	I am glad there is an extended agreement in place. A few comments and questions: - Why doesn't TVA count at least some of the lost power generation revenue as a "cost" to TVA's Economic Development (ED) mission? TVA spends millions to generate economic development. These releases generate $44M in economic development. Seems to me the Economic Development budget should contribute some to offset lost generation revenue. It could be based on what TVA typically spends per Million Dollars of Economic Development generated. - Where are the easements on TVA and USFS land? - What aren't private boaters charged in a manner similar to the daily/yearly permits needed to paddle the Nantahala River? That system seems to work very well. - Disappointed to lose what has become known as "Secret Week" in September. I understand TVA's need no long exists. It would be good to move those 5 days to other days or the Upper.
15	7/12/2017	J. Pack, Lake Blue Ridge Civic Association	-	This letter is in response to the TVA's Request for Comments Regarding the Proposed Ocoee River Whitewater Rafting Agreements. The Lake Blue Ridge Civic Association (LBRCA) wishes to go on record as not just providing comments on the proposed agreement, but being in disagreement with the entire recreational release arrangement in principal. Our logic, which mirrors your request to evaluate environmental, economic, recreational, and other impacts, is provided in the bullet points below: - All of the water for the recreational releases comes from Lake Blue Ridge, which has a small volume inventory of water. The quick drain and refill activities associated with the recreational releases erode the shoreline and harm the fishing nests. - The contract negotiations between the TVA and the rafting organization have not included any input from the Lake Blue Ridge area, where all the water comes from. We're pretty sure the TVA appreciates a voice in decisions that affect its future, and so does the Lake Blue Ridge Civic Association and Fannin County. Reopen this discussion and give us a voice. - The TVA does not prioritize recreation as a driver in managing lake levels, but somehow will allow recreation to become important if the user offers funds in exchange for more water. Is this offer available to Lake Blue Ridge residents, in which we can keep more water if we pay for it? - While the TVA claims it would be releasing water anyway, the arrangement of huge releases within short time periods (six, seven, eight, and even ten hours at a time) causes the lake level to change rapidly. Docks and boats, particularly for non-residents, are placed in jeopardy throughout the release days, and often can't be managed without damage.

#	Date	Commenter	Location	Comment
				- TVA commits to releasing this volume of water with no regard to wet or dry periods or rainfall. In dry times, this practice empties Lake Blue Ridge even faster, further penalizing area residents and lake users, and in wet times would seem to add to flood risks further downstream. - TVA already makes revenue from Fannin County in several ways. TVA has a monopoly on electric sales, and also draws revenue from the dam generators, when they work. This practice of huge water releases to Tennessee benefits that state, which incidentally houses the headquarters of TVA, while penalizing Georgia lake and area property owners who already pay a premium in property taxes to be near the water. - TVA has continually denied the LBRCA's request to change the local Operating Guide to allow for a longer lake season into the fall, despite the potential benefits to the local economy, citing their interest in avoiding the expense and effort to repeat the 2004 EIS. However, the practice of releasing huge amounts of water would seem to be in violation of TVA's own rules for strict adherence to the Operating Guide. Will the 2004 EIS be repeated as a step toward the decision to go with the proposed contract? If not, why not? In summary, the State of Georgia, Fannin County, and Lake Blue Ridge area residents have suffered enough from the practice of recreational releases. Please end this practice when the current contract expires. Let the whitewater rafting companies live with the same conditions as Lake Blue Ridge residents-they can raft when it rains a lot, and they can do without when its dry. This is the same logic as the TVA applies to Lake Blue Ridge regarding our water levels. Please do not hesitate to contact me if you have questions about this letter. Sincerely, Jon Pack President, Lake Blue Ridge Civic Association
16	7/16/2017	L. Case	Columbia, SC	The five weekdays in late September are the best 5 days to paddle the Ocoee. It's a tradition. Honor history. Keep the Fab Five.
17	7/16/2017	T. Gonzalez	Asheville, NC	Please keep the 5 day window of generating in September in place. This helps the local economy greatly due to its original nenes use by private boaters who come from neighboring states as well as Tennessee and pour much needed funds into the lead cal economy.
18	7/16/2017	J. Staley	-	• Ocoee River releases are extremely valuable to the paddling community, the general public and the regional economy. TVA should fully consider these benefits. • The TVA should consider an alternative under which they continue to provide the current schedule for the next 15-20 years, and provide any releases not paid for by the proposed payment agreements free of charge as a public benefit. • The TVA should consider modest increases in flow volumes (total of 1200-1500cfs) during some releases to provide higher quality and more diverse recreation experiences. • TVA should consider takeout improvements for private paddlers on the Middle Ocoee. Like other paddlers, I plan my vacations around these releases. Especially the 5day release in September. Thank you for your time

#	Date	Commenter	Location	Comment
19	7/16/2017	G. Grant	-	I am grateful that an agreement has been reached with TVA, the state of Tennessee, and other interested parties concerning the continued releases for whitewater on the Ocoee River. I am a long-term resident of Chattanooga, TN and have been paddling the Ocoee River since 1977. The Ocoee is a very important local resource to me and indeed, one of the reasons that I stayed in the SE TN area for so many years. However, I am strongly opposed to the loss of the weekdays in the Fall (usually the last week of September). While I understand that the week was originally scheduled due to required maintenance that is no longer needed, nevertheless, this week should be included and remain in the annual release schedule. I would like to understand the reason for the removal of this week of releases since it is a very popular time to paddle the Ocoee with a number of boaters. I have spoken with many private boaters from the Southeastern US who regularly schedule a week of vacation around this week of releases. These people come from San Antonio, New Orleans, and Fayetteville, Arkansas. They will schedule a week or more of fall vacation around this release. Its discontinuation will mean loss revenues for tourism business in Polk County, TN as well as the surrounding area. Hotels, cabins, and other lodgings, restaurants, and gas stations will all feel the effect economically if this week is continued. Many boaters come to SE TN for this week of releases. The weather is typically warm, but not hot, dry, and fall is just beginning in the mountains. There has been a noted increase also in commercial rafting during the week of fall releases. If TVA is concerned about a maximum number of release dates, I would suggest dropping the two sets of weekend releases in March, which are far less popular than the week of releases. The weather is not as good then, and the boat traffic on the Ocoee is reduced. In summary, I am opposed to the loss of the Fall weekday releases in the schedule for 2019 and beyond. Economically, it does not make sense for the area. If you wish to contact me for additional comments, my email address is ….. Thanks for your consideration. Sincerely.
20	7/16/2017	Shayna	-	Hello, Please consider keeping the late September release dates as many boaters plan vacations around those days. September is usually a slower month as most tourists are gone and the leaves haven't changed yet. That week provides a nice boost in restaurant and lodging sales. Please consider releasing a bit more water too. The Ocoee runs at a boney water level and since Americans aren't getting any smaller, a bit more water would be helpful and enjoyable for all. Thank you.

#	Date	Commenter	Location	Comment
21	7/17/2017	K. Yount	-	Thank you for working with the state and commercial and private whitewater interests . I would like to propose some additional considerations that would make for a better experience on the Ocoee. Increase the flow on the Middle Ocoee on days when the Upper Ocoee is releasing as well. Since the upper Ocoee releases at 1400 cfs, the middle Ocoee flow should be increased from 1200 to 1400 on those days as well. Build more restrooms at both the Ocoee 2 put in and at the private boater take out. Consider adding and servicing portable toilets while these are being built. Allow for more companies to apply for and receive commercial use permits. The current system of a cap on the number of permits given out bars entry to new entrepreneurs entering the market. Under the guise of protecting the resource from overcrowding, the cap on permits really protects those who got to the party early enough from having to compete against a new generation of entrepreneurs. Anyone who is able to secure liability insurance and that wishes to operate a commercial operation should be allowed to apply for an receive a permit. The amount of people who wish to raft the Ocoee is going to always be high and it shouldn't matter whether there are 24 or 100 companies competing for their share of that number. Thank you for providing power and water releases; and for hearing comments.
22	7/17/2017	C. McCarter	-	I am writing in response to the proposed release calendar for 2019 on the Ocoee river. Ocoee River releases are extremely valuable to the paddling community and local economy. The TVA should consider an alternative under which they continue to provide release on the current schedule, including the release for five weekdays in late September. This week-long release has become a sacred time for me and my family. We have planned vacations around this release and I urge you to consider agreeing to continue with the current schedule. Thank you for your consideration.
23	7/17/2017	D. Watford	-	• Ocoee River releases are extremely valuable to the paddling community, the general public and the regional economy. TVA should fully consider these benefits. • The TVA should consider an alternative under which they continue to provide the current schedule for the next 15-20 years, and provide any releases not paid for by the proposed payment agreements free of charge as a public benefit. • The TVA should consider modest increases in flow volumes (total of 1200-1500cfs) during some releases to provide higher quality and more diverse recreation experiences. • TVA should consider takeout improvements for private paddlers on the Middle Ocoee.
24	7/17/2017	J. Hussey	Fayetteville, AR	I have been an Ocoee paddler since 1987. I have driven to Tennessee from Arkansas almost every year since then sometimes twice and three times a year. I now spend at least one month of the summer in the Ocoee area, starting in 2012, renting a vacation home. I appreciate what is made available to me as a private boater by having scheduled releases that I can count on. I hope the proposed plan will be amended to include the full week of releases in the fall. I enjoy coming then as much as the summer releases. Thank you.

#	Date	Commenter	Location	Comment
25	7/16/2017	J. Jones	Kansas City, MO	Subject: Ocoee Secret Week I'm writing to reiterate my support for the following points list below. I currently live in Kansas City Missouri, and spend about 25 days each year paddling the upper and middle ocoee. I am alarmed to learn that secret week may no longer happen in the future, as that is one of the times that I paddle the ocoee river outside of my summer break. I hope you will consider the following points as you look to make future decisions. • Ocoee River releases are extremely valuable to the paddling community, the general public and the regional economy. TVA should fully consider these benefits. • The TVA should consider an alternative under which they continue to provide the current schedule for the next 15-20 years, and provide any releases not paid for by the proposed payment agreements free of charge as a public benefit. • The TVA should consider modest increases in flow volumes (total of 1200-1500cfs) during some releases to provide higher quality and more diverse recreation experiences. • TVA should consider takeout improvements for private paddlers on the Middle Ocoee.
26	7/16/2017	F. Mueller	-	Hi! Please do not eliminate the 5 weekdays from the middle Ocoee release schedule. We plan our vacation around that on a yearly basis, it is the highlight of the year!
27	7/16/2017	A. Buckner	Franklin, NC	I agree with and echo AW' s position on the Ocoee. • Ocoee River releases are extremely valuable to the paddling community, the general public and the regional economy. TVA should fully consider these benefits. • The TVA should consider an alternative under which they continue to provide the current schedule for the next 15-20 years, and provide any releases not paid for by the proposed payment agreements free of charge as a public benefit. • The TVA should consider modest increases in flow volumes (total of 1200-1500cfs) during some releases to provide higher quality and more diverse recreation experiences. • TVA should consider takeout improvements for private paddlers on the Middle Ocoee.
28	7/17/2017	B. Brewer	Fayetteville, AR	Please reconsider removing the fall draw down week from the Ocoee release schedule. I have been coming out every year since 1995, usually with a group of friends. Last year ten of us drove across Tennessee and paddled that week. It is a great time of year to be on the Ocoee and it will be sad to go elsewhere starting in 2019.
29	7/18/2017	D. Richardson	-	I am writing to encourage TVA to keep the weekday releases for the Ocoee No. 2 dam/ Middle Ocoee the last week of September. For most of the past 30 years, I have participated in paddling the Ocoee during this week and have been joined by friends from Texas, Arkansas, Virginia, Maryland, and other areas who come to this area of Tennessee specially for this week of recreational releases. These September weekday releases offer several advantages to BOTH the local economy and to those in the paddling community, e.g. • By continuing weekday releases, local restaurants, hotels/ lodging facilities, grocery stores, gas stations, etc. get a boost during a slow time of year. • Tourists and paddlers get to see this area at a less crowded time of year and are more likely to come back to this area. ALSO: any mechanical system, including the powerhouses on the Ocoee River, requires periodic maintenance. It makes sense to do this during times of the year when power demands for cooling and heating are lower, i.e. around the time of the annual fall weekday releases. Respectfully submitted.

#	Date	Commenter	Location	Comment
30	7/18/2017	M. Hollingsworth	-	I have recently started whitewater kayaking, I am a member of a local club, and through this it has brought my "pocketbook" to local businesses. Not only does recreational kayaking, SUP, and rafting bring revenue to the area, but it also promotes use of state parks, camping, hiking, and other activities. Promoting healthier lifestyles and opens people's eyes too nature conservation. In a world where phones, tablets, and TV remove people from the beauty that surrounds them, the Ocoee and what it represents, for private boaters and raft companies alike, is immeasurable. I would respectfully object to the elimination of the 5 business day release in September, as this is still at the height of the season and urge you to reconsider this dismissal and instead ask that you retain the agreement previously agreed upon, and maybe even extend it? Sincerely.
31	7/16/2017	R. Huff	-	I would very much like to keep in the release schedule the annual 5 consecutive days in late September or early October.
32	7/19/2017	H. Austin, Eastern Band of the Cherokee Indians	-	This proposed agreement does not seem as though it will have any adverse impacts on Cherokee resources or human remains. However, if there are known burials located in the banks or put-in/take-out locations along the Ocoee River that could be negatively impacted by maintenance or increased traffic, we would like to see measures taken to ensure that those sites will have additional protection. If possible, I would like to request that some shovel testing be conducted in conjunction with the Environmental Assessment to determine the presence or lack of historic properties and/or graves. Sincerely, Holly Austin Tribal Historic Preservation Office Eastern Band of the Cherokee Indians
33	7/19/2017	K. Colburn, American Whitewater	Washington, DC	Dear Mr. Smith, Attached are American Whitewater's comments on the Ocoee River Whitewater Rafting Agreements scoping notice. Thank you for considering these comments. Kevin Colburn National Stewardship Director American Whitewater **See letter below.**
34	7/20/2017	M. Przybysz	Chattanooga TN	Thanks in advance for reading my comments. First, I'd like to say if it weren't for Ocoee releases, I wouldn't be living in Chattanooga and currently using TVA power or spending my money in Tennessee. I relocated to Polk County in 2000, by 2001 I was living there year round and did so until 2007. During that time, I registered my vehicle in Polk County, shopped for groceries and ate at restaurants. The TVA releases enabled me to both work and live there. Since 2007, I have lived in Chattanooga, I still travel to the river regularly where I purchase gas and food in Bradley/Polk County areas on my to and from the river. I have enjoyed the releases on the Ocoee since 2000, I appreciate TVA and the rafting outfitters working together to continue the releases. The river releases provide many benefits to Polk County and the surrounding communities, and I believe TVA should consider

#	Date	Commenter	Location	Comment
				these factors when weighing the decisions to change the flows. I like the idea of the extra 30 acres for the state to manage the take-out for the river. I'd love for TVA to consider more flow than promised through the rafting agreement. And finally, I respectfully request TVA to continue releasing for one week in the fall as that's one of the best and most peaceful times to be on the river. The weather is generally amazing and it provides an amazing opportunity to see the region and use the river. Thanks for your time.
35	8/21/2017	C. Lowe-Zepeda, Muscogee (Creek) Nation	Okmulgee, OK	Thank you for the correspondence regarding the recreational management along the Ocoee River. The project area located in Polk County, Tennessee is within our historic area of interest. The Muscogee (Creek) Nation is unaware of any Muscogee cultural or sacred sites located within the immediate project area. We concur that there should be no effects to any known historic/cultural properties and that work should proceed as planned. However, as the project is located in a area that is of general historic interest to the Tribe, we request that work be stopped and our office contacted immediately if any Native American cultural materials are encountered. This stipulation should be placed on the construction plans to insure contractors are aware of it. Please feel free to contact me with an further questions or concerns.

Kevin Colburn
National Stewardship Director
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www.americanwhitewater.org

July 19, 2017

Tennessee Valley Authority
c/o Russell D. Smith
400 W. Summit Hill Drive, WT-11D
Knoxville, Tennessee 37902
Submitted electronically to: PLIC@tva.gov

Dear Mr. Smith,

American Whitewater is a national non-profit organization with a mission to conserve and restore our nation's whitewater resources and to enhance opportunities to enjoy them safely. Our members are primarily non-commercial kayakers, rafters, and canoeists, and significant portion of our membership lives in the region served by the TVA. Many of our members regularly visit the Ocoee River to enjoy its treasured rapids. The historic flow releases on the middle and upper Ocoee have had profound benefits to the regional economy and the quality of life of our members. Our interest is in no net loss of releases, and we are supportive of continuing the current or an enhanced flow regime into the future and offer the following scoping comments to that end.

We support full consideration of the proposal described by TVA in the scoping notice, with minor caveats.

The TVA proposes to continue the historic flow regime on both the upper and middle Ocoee River for the next 15 years, except that a block of weekday releases in the fall will be eliminated. At this time we support this proposal and its full consideration, with the caveat described below concerning continuation of the fall block of weekday releases without charge.

One very important element of the scoping notice, which we request be carried forward in the NEPA analysis is the statement that: "The proposed water release agreement would not apply fees or restrict access to private boaters." Our support of the proposed future management is contingent upon this statement remaining in the plan.

We request that the TVA fully consider the benefits of Ocoee River releases on the local and regional economy.

The releases on the Ocoee River area create major economic benefits for the region and the rural area nearest to the river. A recent study found 622 jobs and an economic impact of $43.83 million associated with whitewater rafting throughout the 2012 paddling season.[1]

A Forest Service and TVA analysis of the Upper Ocoee found significant economic benefits of releases on that reach in a 1997 Environmental Impact Statement titled Upper Ocoee River Corridor Land and Water-Based Recreational Development.[2]

American Whitewater created an online survey regarding paddling the Ocoee River in 2016 that received 762 responses, 673 of which were private boaters. Key results are summarized below and additional data is available upon request.

- 70% of respondents stay overnight in the area, 60% of respondents typically camp.
- 88% of respondents sometimes go out to eat when visiting the Ocoee, and over half go out to eat in the area more than 10 times annually.
- 38% of respondents spend $21-40/day, and 44% spend more than $40/day.
- The average daily expenditure reported from private paddler respondents was greater than or equal to $49.72 per person (n=667). When multiplied by the 15,712 private user days on the Upper and Middle Ocoee in 2015, this results in local annual private boater direct expenditures of $781,195. The full economic impact of private boating is significantly higher than this figure based on the standard economic practice of factoring in multipliers to direct expenditure data.
- 78% of respondents said they would surf at a whitewater park if one were available. Respondents would go out to eat, shop, bike, hike and camp more if better options existed.

The economic benefits of the Ocoee dam releases are vital to the regional economy and far outweigh the foregone power generation revenues associated with the program. TVA's analysis of the release program must fully account for these benefits at the local and regional scale.

We request that the TVA provide historical releases not paid for by the proposed payment agreements free of charge as a public benefit.

The scoping notice outlines a plan that includes a schedule framework and proposed schedules for 2019, and a proposal to eliminate a block of fall weekday releases. It is unclear whether and how this schedule could be changed in the future based on any number of factors. To ensure a sound NEPA process that analyzes the actual flow regime to

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[1] See http://www.americaoutdoors.org/america_outdoors/pdf/Ocoee2pp.pdf

[2] See https://www.gpo.gov/fdsys/pkg/FR-1997-02-21/pdf/97-4323.pdf, and https://www.gpo.gov/fdsys/pkg/FR-1997-04-18/pdf/97-10008.pdf

be provided, and to provide the paddling community with certainty in the flows that will be provided, we request that the TVA explicitly state that there will be no net loss in releases for the forthcoming 15 years.

We also request that TVA explicitly commit to provide any historic release days not covered or funded through the payment system as a public benefit free of charge. This includes the fall block of weekday releases that TVA has proposed to eliminate, and any releases that may be unfunded in the future via unforeseen circumstances.

We request that the TVA consider modest increases in flow volumes (total of 1200-1500cfs) during some releases to provide higher quality recreation experiences.

One of the primary findings of our private boater survey was an interest in slightly higher Middle Ocoee releases, in the range of 1200 to 1500cfs. We ask that TVA consider the costs and benefits of such releases in the analysis. We propose that these slightly higher releases could enhance the recreation experiences of commercial customers as well as private paddlers, leading to increased visitation. It may be that these higher flows could be utilized during shoulder season or other times of lower visitation to attract more visitors to the area, or they could be employed during seasons of greater water availability.

We request that the TVA consider the benefits of the Ocoee release program on rare plant species compared with the release program in the Hiwassee River below Apalachia Dam.

Ruth's golden aster, Pityopsis ruthii, is a federally endangered endemic plant that's sole habitats are the bypassed river reaches of the Ocoee and Hiwassee rivers. Annual monitoring from 1987 through 2014 revealed that Ocoee populations have consistently grown to more than double their original size over that timeframe. Monitoring since 1987 of three Hiwassee River sites has shown consistent declines in populations of Ruth's golden aster, with current populations roughly half of their 1987 levels.[3]

The distinct flow regimes of these two rivers are often cited as the primary driver of the plant's divergent population trends. The middle Ocoee's roughly 116 annual pulse flow releases, mostly during the growing season, appear to benefit Ruth's golden aster. There are no analogous pulse flows on the Hiwassee River below Apalachia Dam, where flows are typically flat-lined at a very low level for the entire year. The result has been significant woody vegetation encroachment in the Hiwassee River channel, and indeed the river channel is essentially forested in some sections.[4]

The current and historical flow regime on the Ocoee is working for Ruth's golden aster. Significant reductions in releases would make the Ocoee flow regime more similar to the

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[3] Moore, Philip A., et al. Current knowledge, threats, and future efforts to sustain populations of Pityopsis ruthii (Asteraceae), an endangered southern Appalachian species. Journal of the Torrey Botanical Society 143(2): 117–134, 2016.
[4] *Id*, pg. 123

Hiwassee flow regime, and could reverse the positive population trends of the Ocoee population of the plant. We request that TVA acknowledge the relationship between the flow regimes of these reaches and Ruth's golden aster populations. The data on this rare plant suggest that continuing a release schedule similar to the current schedule on the Ocoee River would likely continue to benefit Ruth's golden aster.

At the same time, to quote the US Fish and Wildlife Service, the data "suggest that providing periodic intermediate-to-high flows could be an important component of management to improve growth rates in the Hiwassee population and reduce the extinction risk it faces," and that "Improved flows will be an important component in any long-term solution for controlling vegetation succession and maintaining suitable habitat conditions for *P. ruthii* in the Hiwassee drainage."[5] We request that the TVA analysis contain a comparative analysis of Ruth's golden aster population trends between the two rivers, and that that analysis trigger an immediate and separate assessment of the need for ecological pulse flows on the Hiwassee River downstream of Apalachia Dam.

We request that the TVA consider access improvements for private paddlers.

Our survey produced many calls for improved take out facilities on the Middle Ocoee. We request that TVA consider the costs and benefits of investing in improved and expanded take-out options for private boaters on the Middle Ocoee.

Our survey also produced many comments requesting that the Upper Ocoee put in remain open for longer hours for post-trip vehicle recovery. The locking of the gate is a limiting factor to use, and one easily resolved. We request that TVA consider investing in solutions to this problem, such as automatic gates or expanded staffing and parking hours.

Thank you for considering these comments.

Sincerely,

Kevin Colburn
National Stewardship Director
American Whitewater
PO Box 1540
Cullowhee, NC 28723
828-712-4825
kevin@americanwhitewater.org

[5] U.S. Fish and Wildlife Service, Southeast Region, Tennessee Ecological Services Field Office. Ruth's Golden Aster: 5-Year Review: Summary and Evaluation. https://www.fws.gov/southeast//pdf/five-year-reviews/ruths-golden-aster.pdf

Appendix B – Public Comments on the Draft EA

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Introduction

The Draft Environmental Assessment (EA) for the Ocoee River Whitewater Rafting Agreement was released to the public on November 30, 2017. The availability of the Draft EA was announced in regional and local newspapers. A news release was issued to the media and posted to the TVA's web site and hard copies were made available by request. TVA's agency involvement included sending notices to local, state and federal agencies and federally recognized tribes to inform them of the availability of the Draft EA.

TVA accepted comments submitted by mail, email, and through the project web site. During the comment period, TVA held one public meeting on December 11, 2017, at Cleveland State Community College in Cleveland, Tennessee to describe the proposed actions and to accept comments on the Draft EA. Thirty-eight people attended the meeting.

TVA accepted comments through January 5, 2017. At the end of the comment period, TVA had received comment submissions on the Draft EA from 27 members of the public, organizations, and intergovernmental agencies. One comment was received from a state agency, nine from nongovernmental organizations, and the remainder were from private citizens and businesses.

The comment submissions were carefully reviewed and summarized and the EA was edited and revised as appropriate. Comment summaries and TVA's responses to them are provided in Table B-1. Detailed comments received are provided in Table B-2. This table is followed by three comment letters which were too large to fit into the table.

Table B-1. Summarized Comments on the Draft EA and TVA Responses

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
1	Beaty, Bopp, Grant, Hatcher, Steves, Tennant, Tennessee Valley Canoe Club (TVCC)	5-day Water Release Loss	Opposed to elimination of 5 days of release under Alternative B. Commenters cite loss to private boaters and the local economy.	After considering public comments on the proposal and further internal deliberations, TVA has identified Alternative C as its preferred alternative. Alternative C is essentially the current management regime for water releases on the Ocoee River. Under Alternative C, TVA would implement the agreement with the State of Tennessee that establishes a framework for water releases for a 15 year period beginning in 2019 and addresses recreation management agreements along the river corridor. As described in section 2.2.2.1 of the EA, TVA would also include provisions to allow for some flexibility in the water release schedule within a calendar year.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
2	Arp, Cooke, Davis, Hamby, Jenkins, Robinson	Water Release Schedule	Support of changes to water release agreement including later weekday releases, flexibility in changing hours of releases, times, and days. Support for release schedule on July 4 and other national holidays that fall on a Tuesday or Wednesday and consider flexibility to provide a 6-day a week release during July.	TVA has modified Alternatives B and C to allow flexibility into the annual recreation schedule. The revised Alternative C would allow the Development Fund Board to request limited changes to the release schedule. See section 2.2.2.1 for more information. While such modifications do not address each of the concerns raised by the commenters (e.g., there would no changes to hours of releases), the modifications increase calendar flexibility and allow the Development Fund Board an opportunity to optimize the recreation release schedule.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
3	Gilliam	Water Level Check	Requests the installation of a real time gauge at the Ocoee No. 2 Dam. The ability to check water levels remotely would benefit commercial operators in scheduling trips for customers.	There is a gauge installed at Ocoee No. 2 dam that provides real time flows over the dam. TVA will work to make this data available to the public for flows up to 3,000 cfs.
4	Burton, Tennant, Southern Environmental Law Center (SELC), TVCC	Support Alternative C	Support Alternative C	After additional consideration and internal deliberation, TVA has indicated Alternative C is its preferred alternative.
5	Grant	Cost of September Releases	Commenter estimates the additional 5 days in September eliminated under Alternative B bring in more revenue than the cost of replacement power. What it costs to supply water for cost of providing Fall releases which were disputed by TVA and suggests commercial rafting still takes place during this time which would provide some reimbursement of the cost.	Comment noted. Section 3.1.2.2.2 of the EA was revised to include an estimate of the annual power costs for the five days in September and the impacts that would be incurred by both the local economy and TVA. Impacts to commercial rafting from this loss were explicitly included in the analysis in Section 3.1.2.2 where it states: "In addition, the five days in September where rafting is eliminated accounts for approximately 400 trips, for a total impact of a loss of 8,445 trips (4.7 percent of total trips)."
6	Fletcher, Grant, Rogers, SELC	Economic Benefits to Local Economy	Discontinuation of September releases will mean the loss of revenues for tourism businesses in Polk County. Commenter states that TVA consultant said the economic benefit in Table 3.8 was undervalued. These financial costs should be discussed.	After considering public comments, TVA has modified its preferred alternative to Alternative C, which does not eliminate the five whitewater release days in September. As stated in Comment #5, economic impacts related to the loss of commercial rafting was explicitly included in the analysis of Alternative B (in Section 3.1.2.2). TVA has added additional analysis to the EA that addresses the economic impacts resulting from the loss of private rafting during the 5-day period in September that would

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
				occur under Alternative B.
7	Hamby	Flume Box	By adjusting the hours of release per day it may be possible to keep the flume box wet and raft a six or seven day schedule.	TVA operates the flume to ensure that there is a 48-hour period within each week that water flows through the flume. The water flow is needed to maintain the wooden flume. As noted above, TVA has modified Alternatives B and C, as well as selected a new preferred alternative, Alternative C. The modifications to both alternatives were made, to increase flexibility in the release schedule. TVA would consider a limited amount of calendar adjustments. Water release days may be traded under certain circumstances described in section 2.2.2.1. Under the provision, days may be traded such that in some weeks there may six consecutive days of water releases.
8	SELC	Support for Agreement	We strongly support the agreement reached by representatives of the rafting industry, the State of Tennessee, the USFS and TVA to ensure predictable flows.	Comment noted.
9	SELC	Additional Analysis	TVA cannot adopt Alternative B over Alternative C without additional analysis. The DEA dismisses any differences between Alternatives B and C as minor and does not quantify or otherwise assess the differences in their environmental impacts.	After additional consideration and internal deliberation, TVA has indicated the modified Alternative C is its preferred alternative. Additionally, Table 2-1 provides a summary of the impacts to the resources affected and differences among the alternatives. Environmental impacts are analyzed and quantified in detail in Chapter 3 of the EA.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
10	SELC	TVA is required to provide flows regardless of compensation	TVA must provide flows regardless of compensation. Not only can TVA provide flows in the bypass reaches of the Ocoee without reimbursement, it must provide certain flows to meet the requirements of state and federal environmental laws without compensation.	The TVA Act instructs the Agency to balance often competing needs for the resources of the Tennessee Valley. Those resources include water and water flows, which are vital to biological resources, navigation, power generation and recreation. TVA balances these needs in full compliance with all federal and state laws and will continue to do so. TVA seeks to receive reimbursement for the loss of hydroelectricity from the diversion of flows for recreation not only because TVA could not do so absent compensation, but to ensure that TVA's ratepayers and recreators shoulder the burden as equitably as possible.
11	SELC	Flow requirements and FEMA guidelines	TVA must disclose whether and to what extent it would spill water as required by FEMA guidelines. And flows during maintenance should be publicly noticed.	TVA updates the water release schedules periodically throughout the day on the TVA website. Next-day release schedules are usually available by 6 p.m. of the current day. When maintenance is performed on Ocoee 2 Powerhouse or flume, water is not diverted though the flume to generate electricity, but flows over the dam and into the channel of the Ocoee River. Therefore, supplemental recreation releases would not be required. FEMA's 1993 Federal Guidelines for Dam Safety require that operators test all spillway and outlet gates on a regular schedule, utilizing both primary and auxiliary power systems. Although not required to, TVA adheres to FEMA's guidelines as a matter of policy. So, while TVA does not indicate on its website that the releases are related to testing of spillways and gates, the releases associated with these tests are posted to the public website. And as previously stated, testing of gates would result in flows going over the dam and into the bypass reach

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
				of the Ocoee River, creating additional recreation releases.
12	SELC	Navigation	TVA must provide flows to promote navigation.	The Ocoee River is identified as navigable water by the U.S.US Army Corps of Engineers from River mile 38.8 at the Tennessee-Georgia State Line to its confluence with the Hiwassee River. Alternatives B and C allow for recreational releases which maintain navigability of the upper and middle sections of the River. Additionally, Alternatives A, B and C allow for navigable uses during times of high flows or when the facilities are not generating electricity. Additionally, after additional consideration and internal deliberation, TVA has indicated the modified Alternative C is the preferred alternative. This alternative represents the current release structure and maintains the existing navigable conditions of the Ocoee River.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
13	SELC	Clean Water Act Permitting	Diverting water from the historic river channels requires Section 401 Water Quality Certification and an Aquatic Resources Alteration Permit.	TVA and TDEC are having ongoing discussions regarding the applicability of TDEC's ARAP program and §401 Water Quality Certification for recreational whitewater releases.
14	SELC	Antidegradation	Additional water withdraws under Alternative B would cause additional, measurable degradation	As stated in Section 3.4.2.2, TVA found in its analysis that there would be a very slight change to the existing aquatic ecology under Alternative B but that no adverse impacts on aquatic resources are expected. Likewise, TVA found that Alternative B would not result in any changes to water quality; thus, the proposal would not alter the TDEC designation of the Ocoee River. In the final EA, TVA identifies Alternative C as its preferred alternative.
15	SELC	Special Use Permit	TVA is required to obtain a special use permit from the Forest Service to operate the Flume	The operation of the flume is not within the scope of this environmental review.
16	SELC	Riparian Rights	TVA must provide flows needed to protect riparian rights of the U.S. Forest Service	After additional consideration and internal deliberation, TVA has indicated the modified Alternative C is its preferred alternative. There would be no change in flows from current conditions. The U.S. Forest Service has served as a cooperating agency in conducting this review and has provided requirements regarding the flows within the whitewater section.
17	SELC	Cost of Replacement Power	In the economic analysis, TVA fails to quantify the actual cost to consumers of the replacement power for the five days in September that are lost in Alternative B.	Section 3.1.2.2.2 of the EA was revised to include an estimate of the annual power costs for the five days in September.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
18	SELC	Cumulative Impacts	The decision between Alternatives B and C carries potentially significant cumulative impacts regarding the Apalachia Dam on the Hiwassee River and endangered species which are not meaningfully discussed.	In its analysis, TVA states that Ruth's golden astor are only in the Ocoee and Hiwassee rivers and explains that TVA's past management of the Ocoee has impacted the globally rare Hiwassee/Ocoee River Boulder Riverscour Wet Meadow and the Hiwassee/Ocoee Bedrock Riverscour Wet Meadow habitats, wherein the Ruth's golden aster occurs. While qualitative and quantitative evidence exists that documents the decline of Pityopsis ruthii populations at sites along the Hiwassee River, these sites represent a small part of the total population. No evidence currently exists to suggest the overall population is currently in decline. TVA has revised section 3.11 (Cumulative Effects) of the EA to address the cumulative effects of the proposed releases on the Ocoee River to the Ruth's golden aster.
19	SELC	Final EA	We respectfully ask that TVA select Alternative C, but, if it decides to move forward with Alternative B, we expect to see a Final EA that more transparently and accurately explores the differences between the two action alternatives.	Comment noted. In the final EA, TVA identifies Alternative C as its preferred alternative.
20	TWF	Support for Alternative B	The Federation generally supports Alternative B, with caveat that questions and comments regarding impacts to the economy, recreation and ecology are addressed.	Comment noted.
21	TWF	Middle Ocoee Fees	Middle Ocoee River Fees (page 7 of Draft EA): Is this part of the license fee and separate from the user fee? Need to more clearly show breakdown of fees.	Comment noted. The section of the EA discussing licensing and fees has been updated to increase readability.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
22	TWF	Editorial	(page 7, paragraph 2 of Draft EA) Need to edit sentence as there appears to be a word omitted. Should this be lost revenues/funds?	TVA edited the text.
23	TWF	Water Quality	Given that TDEC has already assessed and designated the Ocoee as being impaired for water quality and flow alteration, the Federation does not support a reduction in these flows due to the potential adverse impacts to the aquatic ecology and recreational opportunities.	Comment noted. In its analysis, TVA found that there would be a very slight change to the existing aquatic ecology under Alternative B and that no adverse impacts on aquatic resources are expected. Likewise, TVA found that Alternative B would not result in any changes to water quality; thus, the proposal would not alter the TDEC designation of the Ocoee River as impaired. The EA does disclose impacts to recreational opportunities. As noted above, TVA identifies Alternative C as its preferred alternative in the final EA. Alternative C essentially represents the current management regime.
24	TWF	Wildlife	There needs to be assurances that no construction or improvements would occur on the TVA parcels or USFS tracts without the NEPA process being triggered and further environmental review.	The three TVA parcels would be under a 30-year easement to the State. The terms of the easements include the requirement that additional environmental review would be conducted when TVA considers any proposed improvements to the parcels, beyond the routine operation and maintenance activities to existing facilities. The review process would adhere to requirements under NEPA, Section 106 of the National Historic Preservation Act, Section 7 of the Endangered Species Act, and any other applicable regulations or Executive Orders. For clarification, TVA added a statement to Section 2.2.2.2 to note these requirements.
25	TWF	Wildlife	With what frequency will monitoring studies for the federally endangered mussel and fishes in need of management be done?	In its analyses, TVA determined that none of the alternatives analyzed in the EA would affect federally listed aquatic species. The alternatives would not significantly alter the populations of any species determined in need of management. Thus,

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
				there are no ESA monitoring obligations from the actions under review in this EA. TVA conducts Fish and benthic macroinvertebrate monitoring on 528 of 611 Hydrologic Unit (HUC-11) watersheds within the Tennessee Valley. This monitoring data is collected in support of our Stream Ecological Health Monitoring Program. These surveys are conducted on a 5-year rotational basis and include multiple locations within the Ocoee River corridor. Additionally, TVA has monitored two locations within the study area, immediately downstream of the Ocoee 2 Powerhouse and above the Olympic section, on an annual basis since 2009.
26	TWF	Recreation	We urge that TVA consider no new loss of releases over the next 15 years in order to maximize value to the paddling community, commercial rafting opportunities, Polk County and the regional economy.	Comment noted. TVA identifies Alternative C as its preferred alternative in the final EA. Alternative C is essentially the same as current management regime. The alternative would retain the five days of releases in late September each year.
27	Arp, McPherson	Water Release Schedule	It does not make logical sense to release water on days there is little to no business. Commenter provides days and times water is used least and should be considered changed.	Comment noted. The proposed agreement with the State of Tennessee, as represented in the EA as Alternative B, was developed by TVA in conjunction with multiple stakeholder groups (including outfitters, private paddlers, and Federal, state and local officials) over a 5 year period. Alternatives B and C, as modified, would allow for additional flexibility in the annual water release schedule. TVA anticipates that the Development Fund Board would make requests to modify the release calendar to reflect customer and stakeholder demand. TVA also anticipates that the Board's requests would optimize the release schedule by improving recreation opportunities and economic benefits.

Comment Number	Commenters (Individuals or Organizations)	Subject	Condensed Comment	TVA Response
28	Arp	Cap System	Requests cap only be between 11:00am and 3:00pm on Saturdays.	Comment noted. The user cap limit is described and established by the State of Tennessee in law (TCA 0400-02-10.11). TVA has no authority in establishing or applying the cap limit. New rules regarding how the State manages the whitewater contracts will be developed by TDEC in 2018.

Table B-2. Comments Received on Draft EA

Name	Organization	Comment
Comments Received at Public Meeting December 11, 2017		
Beaty, Brandon	Tennessee Valley Canoe Club, ACE Kayaking, Jackson Kayak	We would like to see the days taken away in September replaced or given back.
Fletcher, Don		The economic benefits of the September week of releases are significantly underestimated by excluding out of state private boaters.
Grant, Greg & Paula	Tennessee Valley Canoe Club	Addition of weekday releases end of Sept. Table 3.8 places an economic value to Polk Co. and surrounding area of $38,000. (Difference between alternating B & C). Water cost for release of those 5 days about $25,000. Economic benefit surpasses cost in retaining those weekday releases end of Sept. Many people from out of travel to the Ocoee for those releases. Probably additional economic benefit from those out of area visitors.
Ledbetter, Jim	Tennessee Valley Canoe Club	I applaud the agency for recognizing the impact the recreational community gives. Thankful for a long range plan. I encourage more releases and more emphasis on solar power to lessen the need for hydro.
McPherson, Blake	Ocoee River Outfitters Association	TVA should consider taking weekday water in late August and add Tuesdays and Wednesdays in July. Those weekdays in August are mostly wasted. We could add several thousand visitors and paying customers in July.
Norton, Judy		Please raise the water level for commercial flow. What is 1200 CFS now is not what it was historically.
Rogers, Jenny	Welcome Valley Village Lodging	I am happy to see the new agreement with TVA and the rafting industry. Overall, it will be good for Polk County. However, as a 23-year county resident, I believe the economic benefit cited by the rafting industry is extremely overstated with regard to their contribution to Polk County. The rafting industry does not contribute their fair share to our community. Our county struggles every year to make ends meet, and our schools are desperately in need of repairs that the county cannot afford to make. Polk County used to receive $250,000+ from the rafting industry via a rafting tax. The tax has been ruled illegal by the courts citing a law that was written for Homeland Security and never intended to be applied in this situation. However, there are other ways the rafting industry could contribute to their Polk County Community. They could set up a "Local School Allocation Fund" into which each rafting company voluntarily contributed $3,000-$5000/year (depending on size). My small Polk County Lodging business pays in $10,000/year directly to Polk County via a 3% county lodging tax and 2.25% of the sales tax. Less than

Name	Organization	Comment
		20% of our customers ever step foot in a raft! We don't expect an exemption from paying our sales + lodging tax because we're bringing in tourist to spend money in Polk County!
Stark, Meryl	Tennessee Valley Canoe Club	Thank you maintaining the majority of the release schedule to preserve the economic well-being of Polk County. Having consistent Ocoee releases also keeps a resource for training on whitewater to promote safe boating. Do not underestimate the impact of private boaters.
Comments Received via U.S Mail		
Curry, Heather	Tennessee Valley Canoe Club	I am writing on behalf of the Tennessee Valley Canoe Club (TVCC) regarding the new whitewater use agreement between TVA, the state of Tennessee, and the outfitters on the Ocoee River. With the majority of TVCC's membership living in the Greater Chattanooga and Knoxville region, the Ocoee is out club's "backyard river run." While we are generally in favor of the new agreement and schedule, we do not support the loss of 5 days in the last week of September. This "Secret Week," as it has been dubbed, gives private paddlers an opportunity to enjoy this public resource minus the commercial interests. Additionally, many private boaters from out of state plan their annual holidays around this 5 day window of releases. Discontinuation of the "Secret Week" will mean a loss of revenue for Polk County, area lodging, restaurants, and gas stations. Oftentimes, the economic impact of the private boating community is overlooked. However, many times it is the private boating which patronizes the local businesses and donates funds to local charities on a continuous, year round basis. As such, our club supports Alternative C proposed in TVA's DEA. This would allow for the continuation of the 5 weekday releases in late September and give our members a rare chance at enjoying the river minus commercial interests. Our members would even support a shorter release time (4 hour release) in order to keep these 5 days on the calendar. TVCC has been in existence since 1967 and we recently celebrated our club's 50th anniversary. From our very humble beginnings, TVCC has grown tremendously from a "mom and pop" paddling organization to over 900 members strong; our club is considered the leading private boater group in the Southeast region. Each year TVCC hosts the Ocoee Race which raises funds for the Team River Runner organization benefiting wounded military veterans. During out

Name	Organization	Comment
		annual Paddle School, TVCC holds classes and training trips on the Ocoee River. The Ocoee River is a critical asset to the private boating community. Thank you for your time and for TVA's commitment to bettering our local economy and region.
Grant, Gregory		I am a long-term resident of Chattanooga, TN and have been paddling the Ocoee River regularly since 1977. The Ocoee is a very important local resource to me and indeed, it is one of the reasons that I chose to remain in the southeastern Tennessee area for so many years. I remain strongly opposed to the loss of the five weekdays of release in the Fall (typically the last week of September). In that regard, I attended the Ocoee Open Meeting at Cleveland State that was held on Monday, December 11. I spoke with several representatives from TVA and other organizations there, expressing my concerns. I was not able to get satisfactory responses on December 11 so they suggested that I bring these concerns to you during this written comment period. I would note that the continuation of this September week of releases was included as Option C in the Ocoee River Whitewater Rafting Agreement pdf document that TVA distributed prior to the December 11 meeting. However, Option C was not presented nor discussed by TVA representatives. My argument for the continuation of the September releases is based upon simple economics - the week brings in more money to the area that it costs. Costs for the water for the September releases. Using the $11.78 M amount over 15 years and the number of hours of release on the Upper and Lower Ocoee, I estimated the cost of the five September days (6 hours per day) to be approximately $22,000. TVA Officials at the December 11 meeting disputed my numbers and stated the figure was more likely $30,000. For the sake of argument, let us use this higher figure. First, the $30,000 represents a very small portion of TVA's overall budget. It is my understanding that the American Whitewater Association requested that TVA donate these five days as a "goodwill gesture" to the entire whitewater community, both private and commercial boaters. However, that was rejected by TVA. Over the past seven years, I would note that there has always been some commercial rafting every day during the September week so there will be at least some reimbursement of

Name	Organization	Comment
		the water costs through that mechanism. Economic Benefits to Polk County Data from the Ocoee River Whitewater Rafting Agreement pdf document, Table 3.8, show that the economic value to Polk County and the surrounding area is $38,000 (Difference between Alternatives B and C). Therefore, there is more economic benefit to the area than cost. I have spoken with many private boaters from the Southeastern United States and other regions who regularly schedule a week of vacation around this week of releases. These people come from Denver, New Orleans, Houston, and Little Rock. They will schedule at least a week of their fall vacation around this release. The weekend before the September Ocoee releases includes the two-day Guest Appreciation Festival at the Nantahala Outdoor Center and water releases on the Upper Nantahala and Cheoah Rivers. Boaters will combine these activities with the week of Ocoee releases. The discontinuation of September releases will mean the loss revenues for tourism businesses in Polk County, TN as well as the surrounding area. Hotels, cabins, and other lodgings, campgrounds, restaurants, and gas stations will all feel the effect economically if this September week is terminated. During the Cleveland State meeting, I spoke with Matthew F. Bingham, the Principal Economist who consulted for TVA and prepared these economic estimations. Mr. Bingham was not aware that many paddlers coming for the September week travel far greater distances compared to typical summertime paddlers and accordingly spend more money in the Ocoee region. He said that the figure of $38,000 for the economic benefit in Table 3.8 was undervalued, and the benefit would have been even greater. TVA representatives stated that there may be fall releases due to maintenance, similar to the September week, but that these would not be scheduled far in advance. Paddlers coming from long distances in the region, such as Texas or Colorado, would not make vacation plans unless they were assured that there would be a several days of water releases on the Ocoee. One other issue I raised with TVA representatives at the Cleveland State Meeting - private boaters would gladly be willing to assist TVA and the outfitters in reimbursement for the water releases, particularly if the September release week

Name	Organization	Comment
		is included in the schedule. In discussing the issue of private boater fees with TVA representatives, the problem seemed to be largely the lack of a suitable payment mechanism. I would note, however, the USFS has successively solved a similar issue on the Nantahala River where private boaters purchase an annual pass that they wear on their lifejackets. In summary, I am opposed to the loss of the Fall weekday releases in the schedule for 2019 and beyond. Economically, it does not make sense for the Polk County area, an area that relies heavily upon tourism and the Ocoee River. I have enjoyed paddling the Ocoee during these Fall releases for many, many years. I hope future paddlers will continue to have that opportunity as well.
Hamby, Jerry	Ocoee Inn Rafting, Inc.	When the first Water Release Schedule was worked out between TVA and the Outfitters in the 1980's, the months of June, July and August were the busiest months for rafting on the Ocoee River. However, earlier and earlier school start dates are slowly but surely eroding river use in the month of August. Some of our river guides at Ocoee Inn Rafting teach school and are starting back to school the fourth week of JULY. Weekend usage in August is still good, but weekday usage continues to dwindle. The earlier school start dates are putting increased pressure on Saturday usage (cap days) in July and possibly resulting in long-term decreases in annual river usage. A continued decrease in river usage could negatively affect the outfitter's ability to pay for some of the scheduled water release dates. TVA needs to have some flexibility in future water release schedules on the Ocoee. For instance, schedule a water release on the 4th of July or other National Holiday when the holiday falls on a Tuesday or Wednesday. National Holidays are understandably busy rafting days during the season. Since the rafting business is a highly seasonal business to begin with, it makes sense to be operational when a multitude of potential customers are available.

Name	Organization	Comment
		Changing customer recreation patters could in the future necessitate water releases on Tuesdays or Wednesdays or both in late June and all of July. While realizing that TVA needs to keep the flume box "wet" a couple days a week, an attitude of positive flexible planning by TVA, the State, the new Board and the outfitters could make water release date revisions as future market conditions warrant. By adjusting the hours of release per day it may be possible to keep the flume box wet and raft a six or seven day schedule during the peak of the rafting season. TVA needs to be flexible with the Governor appointed Board recommendations.
Comments Received via Email		
Hatcher, Dr. Jeffrey C.		I have a long connection to TVA- I grew up fishing and hunting at Kentucky Lake, Lake Barkley and Land Between the Lakes. The phrase "TVA" to me meant great time spent around well managed resources with my dad and my grandfather. I have to say I have been very disappointed in the Ocoee relicensing process. The loss of the "drawdown" week (typically the first week of October), the last week of weekday paddling, is a huge loss for boaters. This has been a time for "private boaters" to have the river nearly completely to themselves, without the hectic race of rubber rafts careening down on them. Honestly, the whole thing feels like a money grab for TVA which seems short sighted considering the huge economic impact that boaters have on small towns like Ducktown and Copperhill. I wish that you would do better by our community.
Steeves, Rick		In reference to the proposal at: https://www.tva.gov/Environment/Environmental-Stewardship/Environmental-Reviews/Ocoee-River-Whitewater-Rafting-Agreements One statement made is: "The proposed water release agreement would not apply fees or restrict access to private boaters." but that's not completely true, because with the elimination of five weekdays in late September, there are five days that I will not be able to boat. I have been up to the Ocoee for that week for the past decade, and I am not the only one. I know an entire group that comes up all the way from Texas! The Ocoee is normally inundated with raft traffic. Nine days of boating with little to no raft traffic means private boaters have the opportunity to enjoy the Ocoee in its natural beauty. Thank you for your consideration of these comments.

Name	Organization	Comment
Bopp, Zach		I would like to voice my opinion for the Ocoee release dates which include the 5 weekdays in September, which is option C. Option C follows in the pattern that everyone is used to and depends upon. Recreation plays a huge roll in the total economy of the area, scaling it back would hurt the community immensely. This is why I am in favor of option C. Thank you for your time.
Robinson, Tera Wilson		I want later weekday releases on the Ocoee. I started paddling the Ocoee in 1999. I moved to Chattanooga to be near it, as did many of my friends. We locals, work during the week and 4 pm shut off time is too late to get in an evening run. Many of us start race training in July and need the extra hours of water to paddle during the week. I want it on until at least 6pm. I am in my 40s now and the Ocoee is great whitewater without all of the hazards of other rivers. I have raced in the TVCC race for 9 consecutive years and placed in the top 3 each time. My son is a raft guide. We bought a raft to take friends and family down. I'm trying to tell you that it's special. Our community is special and we need some weekday releases that go later into the evening. My husband wants more Upper releases. Paddlers are willing to do their part, not to ride on the backs of the rafters. Please give us a chance. LOVE!
Davis, Lamar	Outland Expeditions, Inc.	I have been an Outfitter on the Ocoee River since 1981, and I would like to see more flexibility with changes that could be made to the water release schedule for the Ocoee River in the upcoming contract. Maybe give the board flexibility to change the hours of releases and times. Also, the original water release schedule was based on the Opryland theme park, the days and the hours – which is over 34 years old. THAT THEME PARK WENT OUT OF BUSINESS OVER 20 YEARS AGO, so apparently the inflexibility of their schedule could have been the demise of their business. Also, In the original water release, schools were getting out in early June and going back in early September, and now they are getting out in late May and going back in late August. We have two weeks in August when nobody uses the river. The flexibility of moving those days/hours and moving them to other days would have more of an economic impact for the development of the Ocoee and the surrounding businesses. The new contract should take into account the outdated release and time schedule of the Ocoee River. Hopefully, there will be some insight in the

Name	Organization	Comment
		management of the releases and the ability to change to hours and days of releases to reflect the new economic development for the Ocoee. Let's all work together for the benefit of local business, the state of Tennessee, and the Ocoee River by being flexible on release dates and times of release. Let the new board have some control over the releases and their times.
Cooke, Ryan	Lake Ocoee Inn & Marina/Ocoee Inn Rafting	Apple released the first iPhone in late summer early fall of 2007, it's hard to believe that was 10 years ago and look how times have changed. The recreating public has changed over the last 20 years, not as drastically as the cellular telephone market, but there have been lots of new trends. I do not feel that setting a release schedule today for the next 15 years is prudent for TVA or the Ocoee River Outfitters. I feel TVA needs to be flexible with Governor appointed board based on the water release schedule going forward. TVA and the ORREDF should work together for the future and not limit themselves to today.
Jenkins, Keith	Quest Expeditions, Inc. and Ocoee River Outfitters Association	It is important that the proposed release calendar for 2019 is confirmed within this Draft Environmental Assessment to allow flexibility to accommodate changes for the vacationing public. The current release schedule is based on busy days of a 34-year-old amusement park that is now closed. TVA should recognize the economic benefit and assist with adjustments to future release schedules that expands economic benefit. In addition, TVA should agree to work with the guidance from the board of the Ocoee River Recreational Economic Development Fund (ORREDF) to promote value for Ocoee River users. TVA should consider the flexibility to provide a 6 day a week release during the month of July if recommended by ORREDF. TVA's issue is the flume line will dry out and TVA will need Tuesdays and Wednesdays to wet the wooden flume line. In 1996 TVA released water 6 days a week for a two-week period during July. A release Wednesday through Monday occurred with no detrimental effects to that flume line from an additional 6-hour water release. The release schedule should allow for adjustments to better accommodate the demand of Ocoee River recreation. The prior agreement, original management plan and the 1984 release calendar included July 4th when that date falls on a Tuesday or Wednesday as an 8-hour release day. TVA released water on July 4th when on a Tuesday or Wednesday, 1984 through 1995. TVA stopped that practice sometime after the 1995 season. This has created the loss of up to 7 busy days from the schedules and thousands of dollars in economic benefit. TVA should correct this and agree to release on the three major holidays, Memorial Day Monday, July 4th when on a Tuesday and/or

Name	Organization	Comment
		Wednesday and Labor Day Monday. The current proposed release framework stated in this Draft EA clearly expresses a water release for holidays during the summer, see page 23, 2.1 under TVA Water Release Framework. TVA has also removed Labor Day Monday from the 2019 proposed release calendar shown in the exhibits of this Draft Environmental Assessment. It is important that issues are resolved as this EA moves through the process to completion. I want to thank you for TVA's effort to resolve these issues and the opportunity to make comments.
Butler, Michael	Tennessee Wildlife Federation	**See letter below.**
Arp, Angie	Ocoee Rafting, LLC	**See letter below.**
Gilliam, Kip		I feel that all users of the Ocoee River would benefit greatly if there was access to a real time gauge at Ocoee Number 2 Dam. Currently the only gauge for river levels on the Middle Ocoee section is below the Number 2 Powerhouse. The only information that this provides river users is what the river flow is at the take out 5 miles downstream. It takes approximately 1 to 1 1/2 hours for water coming over the dam at Number 2 Dam to reach the gauge, therefore making it not very reliable. Commercial operations are stopped at levels above 3,000 cfs, the only way to know if the river is above that is to go to the put-in and ask a park ranger. The ability to check to water levels remotely would benefit commercial operators to make plans for their clients in the event of water levels being too high. In the 22 years I have been involved in rafting on the Ocoee I would estimate that we are shut down to high water an average of 3 times per season. Showing up at the put-in with 60-70 clients only to be told the water is too high is not ideal for anyone.
Tennant, Michelle		I'm a whitewater paddler and a business owner. I prefer the Ocoee to NOT lose any days paddling in the future years, please. I also request to be added to any communications about this matter. Oh and I vote for alternative C. PS: additional release days and higher flows would be beneficial to the rafting community.
Burton, Clayton		I've been following the Ocoee releases for a while and just found out today's the last day for comments. I enjoy the Ocoee the way it is now, including the drawdown days in Sept. I'd love to see Alternative C selected. Thanks for working on this! I'm sure there's a huge amount of variables and interests at stake here.

Name	Organization	Comment
Abkowitz, Kendra Director of Policy and Planning	Tennessee Department of Environment and Conservation	The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) Draft Environmental Assessment (EA) for the Ocoee River Whitewater Rafting Agreement. TVA is considering a new management agreement with the U.S. Department of Agriculture Forest Service (USFS), and the State of Tennessee (State) to establish partner responsibilities for recreational management along the Ocoee River in Polk County, Tennessee. The proposed agreement addresses water releases from Ocoee Dams 2 and 3 for a term of 15 years and a land action to improve recreation management. Actions considered in detail within the Draft EA included: Alternative A - No Action - Under the No Action Alternative, the agreements and easements enabling commercial rafting on the Middle and Upper Ocoee River would expire at the end of 2018 and would not be replaced with new agreements. Thereafter, whitewater boating (rafting and kayaking) on the Middle and Upper Ocoee would only be possible during periods of naturally occurring high river flow and /or when TVA is not generating power at the Ocoee No. 2 and Ocoee No. 3 Powerhouses. Alternative B - Proposed Action - As part of the proposed agreements, TVA would provide scheduled water releases for a term of 15 years on the Middle and Upper sections of the Ocoee River, below the Ocoee No. 2 and No. 3 Dams. The water releases would be provided on a schedule similar to that defined by the water release agreements currently in place. Alternative C - Current Management Regime - Alternative C is similar to Alternative B, except under this alternative, TVA would continue releasing water to the Middle Ocoee River for the five weekdays in late September that are not scheduled under Alternative B. Thus, over the 15 year agreement (assumed to be renewed for an additional 15 year period), TVA would provide a total of up to 116 release days per year. This is the current management practice and the water release schedules would be consistent with the framework described in Section 2.1 above. Under this alternative, however, TVA would not receive compensation for the additional five release days in September. Water releases on the Upper Ocoee River would continue to be provided as described under Alternative B. TDEC has reviewed the Draft EA and determined that it has no additional

Name	Organization	Comment
		comments regarding the proposed action or alternatives at this time. TDEC appreciates the opportunity to comment on this Draft EA. Please not that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.
Colburn, Kevin and Evans, Sam	American Whitewater, Southern Environmental Law Center	**See letter below.**

TENNESSEE WILDLIFE FEDERATION
Champions of Tennessee's Great Outdoors

January 4, 2018

Tennessee Valley Authority
c/o Russell D. Smith and Matthew Higdon
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902

Re.: Ocoee River Whitewater Rafting Agreements, Tennessee Wildlife Federation Comments

Dear Mr. Smith and Mr. Higdon,

The following are the official comments of the Tennessee Wildlife Federation (the Federation) on the draft environmental assessment of the proposed management agreement with the U.S. Forest Service and the State of Tennessee to establish partner responsibilities for recreational management along the Ocoee River in Polk County, Tennessee.

Given the serious (recreational, economic, and environmental) implications associated with Alternative A – the no action alternative, the Federation does not support this option. Of the three proposed alternatives, Alternative B (TVA's preferred option) appears to have the most minimal impacts. The Federation generally supports Alternative B, with questions and comments focused primarily on this alternative.

Middle Ocoee River Fees

Page 7 states, "When this limit is reached, the number of boaters is capped on the equivalent day of the next year. The State collects an additional $0.50 per commercial rafter on the Middle Ocoee River for the reimbursement of its site maintenance expenses. Rafters floating both the Upper and Middle Ocoee sections are charged $0.50 per day by the State, rather than $0.50 for each section. There are no restrictions on the number of non-commercial, private whitewater boats using the Ocoee River."

Is this part of the license fee and separate from the user fee referenced below? Need to more clearly show the breakdown of fees.

On page 7, paragraph two states, "TVA received $7.4 million in 1984 to recover lost

resulting from the replacement price of power resulting from water releases to the Middle Ocoee River to support whitewater recreation.

Need to edit this sentence, as there appears to be a word omitted. Should this be lost revenues/funds?

Flow Conditions

Page 54 states that Under Alternative B, the annual required recreational release volume would be decreased only during the month of September at Ocoee No. 2 Dam relative to the existing condition. Overall, this alternative would represent an approximate 3.5 percent reduction in the annual recreational release volume at Ocoee No. 2 Dam. Assuming that releases at Blue Ridge and at Ocoee No. 3 Dam are not influenced by demand for recreational release at Ocoee No. 2 Dam, there would be no appreciable change at Ocoee No. 3 Dam compared to the existing condition.

TDEC's proposed 2016 final 303(d) list (TDEC 2017) identifies four water body segments that constitute the Ocoee River reach within the study area that have been identified as "Category 5" water bodies, indicating that one or more uses are impaired. Causes of impairment identified are copper, iron, and zinc concentrations and siltation associated with historic mining activities in the watershed. The water bodies are also identified as being impaired by "flow alteration", Category 4c, which involves no pollutant. The Ocoee River from Ocoee No. 2 Dam to the Ocoee No. 3 Dam (which constitutes the Upper Ocoee River) is also identified as impacted by flow alteration.

Under the Alternative Actions B and C, there would be a reduction of recreational flows to the flow regime by five days per year, Given that TDEC has already assessed and designated the Ocoee as being impaired for water quality and flow alteration, the Federation does not support a reduction in these flows due to the potential adverse impacts to the aquatic ecology and recreational opportunities.

Plant and Wildlife Considerations

Under Alternative B, the draft EA states that elimination of water releases from Ocoee No. 2 dam during five weekdays in late September would have no discernible effect on surrounding vegetation communities in the project area since this alternative only differs slightly from current water release operations agreements. The globally rare Hiwassee/Ocoee River Boulder Riverscour Wet Meadow and the Hiwassee/Ocoee Bedrock Riverscour Wet Meadow communities would not be appreciably impacted by the minor change in water releases. In addition, there would be no construction or improvements to the TVA parcels and USFS tracts affected by the proposed change in management, and therefore, there would be no impacts to the surrounding vegetation communities.

The draft EA also states that there would be no effect on wildlife communities associated with Alternative B since this alternative only differs slightly from current water release operations and no construction or improvements would occur on the TVA parcels and USFS tracts.

There need to be assurances that no construction or improvements would occur on the TVA parcels or USFS tracts without the NEPA process being triggered and further environmental review.

Aquatic Ecology and Aquatic Animals

According to the draft EA, the primary aquatic resource within the project area includes the Ocoee River, more specifically the sections referred to as the Upper and Middle Ocoee and its tributaries. One federally listed as endangered mussel (tan riffleshell), two fishes deemed in need of management by Tennessee (tangerine darter and Tennessee dace), and one state tracked snail (knotty elimia) have been collected within a 10-mile radius of the project area (TVA 2017) (Table 3-15).

Page 71 of the draft EA states that the minor changes to the existing flow regime would only reduce recreational flows in the Ocoee No. 2 and 3 tailwaters by a small number of days per year. This change would not significantly alter aquatic habitat in the reach. This insignificant change to aquatic habitat, in combination with a lack of preferred habitat for the state-tracked Tennessee Dace would result in no significant impacts to this species. No federally listed species occur in the affected project area and thus none would be affected.

With what frequency will monitoring studies for the federally endangered mussel and fishes in need of management be done?

Recreational Impacts

As noted in the report by Veritas Consulting, "Without predictable flow, all self-guided and commercially guided rafting on previous release days is expected to be unsustainable." Similarly, "In addition to losses in economic value to recreators resulting from lost trips under Alternative B, there would also be impacts to the economy resulting from the lost trips."

The Federation supports the renewal agreement for releases to continue to support recreation on the Ocoee River and the existing ecological conditions. We urge that TVA consider no net loss of releases over the next 15 years in order to maximize value to the paddling community, commercial rafting opportunities, Polk County and the regional economy. While we generally support Alternative B, this is with the caveat that the aforementioned points for clarification and considerations to minimize impacts to the economy, recreation and ecological flows, are adequately addressed.

Sincerely,

Mike Butler
CEO

From: Angie Arp
Sent: Friday, January 05, 2018 11:26 AM
Subject: RE: Comments

January 4, 2018

VIA ELECTRONIC MAIL

Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

RE: Ocoee River – TVA Water Release Schedule

To Whom It May Concern:

My name is Angie Arp and I own and operate Ocoee Rafting. I wanted to take a moment to request changes to the Ocoee River water release schedule that I think would have a positive impact on the outfitters and would also provide a positive impact for others that depend on the rafting industry. I understand the purpose of the water release is to primarily allow outfitters the opportunity to provide rafting service on the Ocoee River, which in turn creates tourism. Tourism is a vital part of the economic engine for the nation, as it is in the state of Tennessee. Rafting services on the Ocoee River generates hundreds of thousands of dollars into the economy in this area and the logical thought process would be to maximize the use of the water release to its fullest capacity. Therefore, I am requesting the water release schedule be changed from what it has been for the past 30 years to a release that would be more beneficial to the outfitters, the public, and the economy in this area. By changing the schedule, it would eliminate the waste of water on days that there is very little to no rafting and would allow the outfitters to provide services on days and hours that the demand is most needed. As you know, whitewater rafting is seasonal and most of the business opportunity occurs only in the summer months during the time period schools are out for summer vacation beginning Memorial Day Weekend to the first week of August. And even during this time frame, a large percent of business for all outfitters is compressed into four to five weeks from July 1st until the first week of August just before school starts. Over the past 30 years, outfitters have been able to determine the days and hours of water release that can provide the most benefit to the rafting industry.

Ocoee Rafting is one of the oldest outfitters on the river and since 2001 I have been operating the business. I have tried every way possible to create more business in the Spring and the Fall, but most of the days, even if you gave free trips away, there would still only be a handful of people that would participate. The average person does not want to participate in water activities except during the warmer months and prime vacation months, so logically the warmer days and the days during the time period that school is out are the days that the outfitters need to try to maximize their business. It does not make logical sense to release water on days there is little to no business. If the outfitters are not using the water and generating business, nothing goes back into the economy and the efforts and the water is wasted and non-profitable. Below is a list of the days and times water is used least and should be considered changed:

All the days in March should be eliminated or at least Sundays. The hours for the first two Sundays in April and the last two Sundays in October should be cut from 10:00 AM – 4:00 PM to 11:00 AM – 3:00 PM. With March, April, and the end of October being the colder weather

months, there is very little opportunity to increase business during these months. The outfitters do need days to train in the spring, but these changes could still allow ample enough time to train.

Monday and Thursday in the last two weeks of August should be eliminated due to lack of business once school starts. Even as one of the largest outfitters, years ago I stopped offering trips on Sundays in April and October, as well as Monday and Thursday the last two weeks of August because of the lack of bookings. Even with heavy marketing and discounting, it was just not economical to offer trips on these days.

Other days of water release that is not beneficial for outfitters and could be considered a waste is the 9:00 AM - 7:00 PM water release in August on Sundays and the September Sunday water release from 9:00 AM – 5:00 PM. Often Ocoee Rafting has some of the latest trips on the river and it is very rare to see trips putting on after 6:00 PM on Sundays in August. In the summer months, many take weekend trips to go rafting. They raft on Saturday or early Sunday and travel home on Sunday afternoon in time to get home and get ready for work on Monday. Thus, late Sunday trips are not needed. Water release should be changed to 9:00 AM – 6:00 PM on Sunday's in August and after Labor Day weekend, Sundays in September should be changed to 10:00 AM – 4:00 PM.

Eliminating the days and hours mentioned above would provide an opportunity to use the water release at times that would be more beneficial for the outfitters and would allow them the opportunity to meet the demand on certain days, as well as increase the opportunity to grow their business. Adding additional hours and days to the peak rafting season, would be a great benefit to rafting tourism industry. With many schools beginning their calendar year the first week of August, the season for rafting has shortened over the past 30 years. With a large percent of the outfitters' business being within a six-week period, from the last week in June to the first week in August, a cap or limit on Saturday's business, no rafting on Tuesday or Wednesday, and with short six to seven-hour water release hours cutting off at 4:00 on several weekdays, these restrictions give outfitters little opportunity to increase business or meet the demand on some days.

Additional days and hours of water release that would be beneficial to the outfitters and the rafting industry are as follows:

Adding an additional hour to Mondays and Thursdays in July and the first week of August, changing the water release cut off from 4:00 PM to 5:00 PM. Water cut off at 4:00 PM on peak days in July, when the largest percent of business is done, is simply not enough time to meet the demand on hot summer days. It puts too much stress on outfitters to meet the 4:00 cut-off and often causes rushed trips. The additional hour of water release from 4:00 PM to 5:00 PM on Monday and Thursdays for five to six weeks would only be 10 to 12 hours of additional water release, but the change would allow the outfitters to meet the demand for service during the busiest month of the season and would allow for a more enjoyable trip for guest, without being rushed. Adding water release on Tuesday and Wednesday in July would also add even more opportunity for the outfitters to do business during the peak season. If not both days at least adding one day or the other during July and for the first week of August would be a great opportunity for the outfitters and would increase visitors to the area. The additional days during the peak season could generate hundreds of thousands more revenue into the local economy.

If four days were cut in March and four weekdays were cut in the last two weeks of August (Monday and Thursdays), this would be a total of eight days, which would justify adding

water release on Tuesday and Wednesday in July and the first week of August. The Sunday hours cut in April, September and October would compensate for the extra hour in the afternoon on Monday and Thursdays in July and the first week of August. These changes would allow for the outfitters to have water release during the time that could be capitalized upon and could create more revenue for the outfitters and the economy in the area. Additionally, eliminating water release on days that there is not efficient use would eliminate waste of efforts and would give opportunity for the water to be used more efficiently.

I also would like to comment on the Cap System. I understand the cap was put in place to alleviate overcrowding on the river. The peak times on the river are from 11:00 AM – 3:00 PM, which has not changed over the past 30 years and will most likely not change. However, the water release on Saturday is from 9:00 AM – 7:00 PM and during the morning hours of 9:00 AM – 11:00 AM and afternoon hours of 3:00 PM – 7:00 PM, the river is not overly crowded. I am requesting the cap only be between the hours of 11:00 AM – 3:00 PM on Saturdays.

It makes no sense to stop an outfitter from putting on the river after 4:00 PM simply because they have met their cap, yet there is no other outfitter even at the put-in. This concept costs everyone for no reason. The put-in and river is generally only overcrowded between certain hours. For the hours it is not crowed, why should outfitters not be able to capitalize on these times? Additionally, there is no way that outfitters with larger cap numbers can use their cap between the time of 11:00 AM – 3:00 PM and they shouldn't be restricted to the business they can do if they are willing to put on the river at times other than the peak time. This would also be a way for smaller companies with smaller cap numbers to have the opportunity to do at least some business on Saturday and would eliminate other companies from being restricted from increasing their business on the busiest days of the season. It would be very simple, begin adding outfitters numbers to apply toward their cap at 11:00 AM up until 3:00 PM or 4:00 PM. This change could increase all outfitters business and still meet the safety factor which is the reason for the cap in the first place.

I humbly ask that my request be given consideration by either TVA changing the water release schedule to meet the outfitters needs or the new board be given the flexibility to change hours and dates of the water release to meet the demands of the outfitters as needed. Going forward with a new contract, the Ocoee River Outfitters should be given the opportunity to have a water release schedule that will be conducive to their needs, in which will also be beneficial to others that depend on the success of the whitewater rafting industry.

Regards,

Angie Arp
Owner of Ocoee Rafting

Southern Environmental Law Center

AMERICAN WHITEWATER

January 5, 2018

Via First Class U.S. Mail and Electronic Mail

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RE: Comments on the Draft Environmental Assessment for the Ocoee River Whitewater Rafting Agreements

Mr. Higdon,

Please accept the following comments on the Draft Environmental Assessment (Draft EA or DEA) on behalf of American Whitewater, and the Southern Environmental Law Center.

We strongly support the agreement reached by representatives of the rafting industry, the State of Tennessee, the United States Forest Service (USFS) and the Tennessee Valley Authority (TVA), to ensure predictable flows ("the Agreement"). Frequent flows in the bypassed reaches below the Ocoee No. 2 and Ocoee No. 3 dams are good for the river's ecology, the region's economy, and the recreation community.

We appreciate TVA's efforts to maintain the current flow regime to the extent possible, and we agree with TVA's conclusion that Alternative C would have no significant adverse impact. We also believe that the flows described in Alternative C would meet all applicable requirements of state or federal law. We submit these comments, however, to explain why TVA cannot reject Alternative C in favor of Alternative B without additional explanation.

To summarize at the outset, Alternative B is a change from the current, beneficial flow regime that would negatively affect the area's economy, recreation, and ecology. These impacts are potentially significant, and they merit at least some attempt to quantify the differences between the Alternatives.

Second, and more importantly, TVA's rejection of Alternative C is premised on the assertion that flows could not or would not be provided absent compensation for the lost power potential. To the contrary, TVA can provide flows, even at the expense of power generation, for environmental and recreational purposes. Indeed, in order to meet the requirements of state and

federal law, TVA must release some quantity of water in the bypassed reaches of the Ocoee to provide for navigation, protect water quality, maintain and restore rare species' habitats, and protect recreation resources. Some of these requirements apply directly to TVA's own decisionmaking process, but some are applicable through state and federal permit requirements.

We strongly believe that these requirements, including permit requirements, can be easily satisfied by Alternative C, which is inclusive of and compatible with the Agreement. To reiterate, we support the Agreement itself and applaud the willingness of federal, state, and private partners to work together to find solutions for the benefit of the rafting and recreation community. We believe the Agreement should be finalized at the conclusion of this NEPA process and implemented on schedule, and thereafter incorporated into any subsequently issued state or federal permit.

1. Background

TVA operates the Ocoee No. 2 and No. 3 dams on the Ocoee River. In the routine operation of these facilities, water is diverted by tunnel or flume from each reservoir to its respective powerhouse. Water is returned to the river at the powerhouse, but several miles of the river are bypassed by each diversion (the Upper and Middle Ocoee). The withdrawals and diversions are intended solely for the generation of electric power. The dams are capable of releasing water through the bypassed reaches, and in the process providing benefits for aquatic species and recreation, but flows in the bypassed reaches are unavailable for power production.

Under normal operating conditions, TVA withdraws and diverts essentially all flows from the Upper and Middle Ocoee, except to the extent that recreational flows are provided by agreement. For both dams, the flow regime is governed by an agreement that expires in 2018. The decision whether to continue providing recreational or other flows is a federal action with potentially significant effects, and TVA is accordingly preparing an Environmental Assessment (EA).

In the Draft EA, TVA considered two "action" alternatives, one of which (Alternative C) would continue the current beneficial flow regime. TVA proposes instead to adopt Alternative B, which would increase water withdrawals, diverting water around the Middle Ocoee for five additional days each year in September, but leave withdrawals from the Upper Ocoee unchanged from current levels.

2. TVA Cannot Adopt Alternative B Over Alternative C Without Additional Analysis

As noted above, we agree with TVA's conclusion that Alternative C would have no significant adverse impact. The current flow regime is beneficial for a variety of resources, including recreational paddling, and Alternative C would not substantially change the status quo for those resources.

We have reservations, however, about TVA's conclusions with respect to Alternative B. The Draft EA dismisses any differences between Alternatives B and C as "minor" and does not quantify or otherwise assess the differences in their environmental impacts. See Draft EA at §

2.3, Table 2-1. TVA claims, surprisingly, that the proposed changes in Alternative B will have no impact to environmental resources. Draft EA at § 2.3, Table 2-1; § 2.5 ("No activities that would have adverse impacts on the environment are proposed.").

In our view, Alternative B would have adverse economic, recreational, and ecological impacts. These impacts should not be dismissed as insignificant without more explanation.

Private boaters travel from around the region to take advantage of the block of the weekday flows in question. Suitable flows for paddling on other regional rivers are relatively rare in September, and the September releases without question have unique recreational value. The financial costs and recreational benefits of these releases should be discussed, not dismissed, by TVA.

The decision between Alternatives B and C makes a big difference in economic impact to the local economy. According to TVA's economic analysis, the market model is based on a total of 184,518 guided raft trips per year in 2016. *See* Draft EA App'x C §2.2. According to the Draft EA, the five days in September that are lost in Alternative B account for approximately 400 rafting trips. *See* Draft EA, App'x C at § 3.2.1. These 400 trips can be quantified by looking at the difference in Alternatives B and C in Table 9, "Summary of Environmental Consequences", see Draft EA App'x C § 4. The 400 lost rafting trips would result in a total (direct, indirect and induced) annual loss of industrial output of $53,913, value added of $28,859, indirect business tax of $4,854 and labor income of $17,662, resulting in the loss of approximately one job per year based on the IMPLAN modeling. According to this modeling "Total Industrial Output refers to the dollar value of goods and services produced. Value-added impacts are employee compensation, proprietor and property type income, and tax on production and imports. Business Tax includes excise taxes, property and sales tax paid by businesses, fees, fines, licenses, and permits. Labor Income is the sum of employee compensation and proprietor income." Furthermore, the annual total loss of economic benefit for the recreator is $38,000. *See* Draft EA Appx C §2.3. These losses are significant in a county that relies heavily on tourism.

On the other hand, in the economic analysis provided in the Draft EA, TVA fails to quantify the actual cost to consumers of the replacement power for the five days in September that are lost in Alternative B. In fact, TVA does not include any data for the cost of power lost from water release in the Draft EA at all. Without the actual cost of power data for the consumer as a comparison, it is impossible for stakeholders to analyze the cost/ benefit analysis of the economic benefit to Polk County compared to the loss by consumers. Furthermore, the increase of the current facility maintenance fee of $0.50 per rafter charged to about 10% of the current per-rafter revenue of $45 to $55 per-trip (or approximately $5 per customer) results in approximately $875,000 in compensated costs when multiplied by the 175,000 estimated commercial trips per year (184,518 guided trips in 2016 minus number of lost trips due to fee increase under Alternative C of 8,050). *See* Draft EA App'x C §3.2.1- 3.3.1. TVA asserts that the State's operation, maintenance and administrative costs are estimated to be $450,000, resulting in approximately $425,000 that would benefit TVA ratepayers and defer the cost of power for the five additional days in September in Alternative C. *See* Draft EA App'x C § 3.2.1.

The decision between Alternative B and C also carries potentially significant cumulative impacts, not meaningfully discussed the Draft EA. TVA asserts that continuing the current management regime would not result in adverse cumulative effects because "there would be no change." Draft EA at § 3.11. TVA extends this rationale further, claiming that eliminating five days of flow in September would not result in adverse cumulative effects because those days have "relatively low numbers of users." *Id.* This explanation misconceives the scope of NEPA's required cumulative impacts analysis. Cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency … or person undertakes such other actions." 40 C.F.R. § 1508.7. In other words, cumulative impacts include the continuing effects of TVA's own past actions. *See, e.g., Ohio Valley Envtl. Coalition v. Hurst*, 604 F. Supp. 2d 860, 884 (S.D.W.V. 2009) (finding that Corps of Engineers unlawfully failed to consider the cumulative impacts of its own past actions).

As American Whitewater explained in its scoping comments, the effects of this decision are cumulative with the effects of TVA's operation of the Apalachia dam on the Hiwassee River. To begin with, as TVA explained in its River Operations Study (ROS), flow regimes from the Hiwassee and Ocoee have a cumulative effect on downstream water quantity, and the need to deliver at least 600 cfs, from the Ocoee and Hiwassee together, to the Tennessee River. *See* ROS Environmental Impact Statement. More importantly, the Ocoee dams and the Apalachia dam impact two rare ecological community types found nowhere else in the world.[1] These river systems also support the only two known populations of the federally endangered and globally critically imperiled Ruth's golden aster, *Pityopsis ruthii*.[2]

Pityopsis ruthii "requires periodic flooding and scouring to remove competing vegetation." *Id.* As a result, "[t]he Hiwassee River population is especially threatened by competing vegetation; dams have prevented natural scouring processes and allowed competing vegetation to increase and displace and shade *Pityopsis ruthii*." *Id.* While the Ocoee population is considered "fairly stable" due to regular scouring flows, it consists of only about 600 plants. *Id.* In contrast, the much larger Hiwassee population, which supports about 10,000 plants, has a "high projected risk of extinction within 50 years." *Id.* In other words, TVA's operation of the Apalachia dam is expected to extirpate 94% of *P. ruthii* individuals. The impacts of TVA's operations on both rivers must be addressed together, and the risk of changing the flow regime on the Ocoee—which is demonstrably working for *P. ruthii*—should be assessed in this broader context. We realize that the Fish and Wildlife Service agreed that Alternative B is "not likely to adversely affect Ruth's golden aster," but this determination was explicitly based on the information in the Draft EA, which at best incompletely discusses the effects of Alternative B. Letter from USFWS to TVA (Nov. 1, 2017). We encourage TVA to take another hard look and assess the incremental effect of increased withdrawals during September. If Alternative C is chosen, however, we doubt that any additional analysis would be necessary.

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[1] NatureServe, Ecological Association Comprehensive Reports for Hiwassee/Ocoee River Boulder Riverscour Wet Meadow (CEGL008455) and Hiwassee/Ocoee Bedrock Riverscour Wet Meadow (CEGL008496), available from http://explorer.natureserve.org.

[2] NatureServe, Description of *Pityopsis ruthii* (PDAST7B080) available from http://explorer.natureserve.org.

TVA's preference for Alternative B appears to be based on the impacts to power consumers. TVA claims that Alternative C would not enable "TVA to produce power in a reliable and cost effective manner." *See* DEA pg. 22. TVA claims that "TVA consumers would bear the fractional cost associated with the replacement power generation associated for the five additional release days in September."

Under NEPA, of course, TVA is ultimately responsible for deciding how to weigh the impacts of reduced recreational flows against the impacts to power consumers of lost power generation capacity, but it should do so in light of quantifiable and comparable information. From our review of the available information, the impacts to TVA's power consumers would be, at most, modest, while the impact of decreased flows to the Ocoee area's ecology, economy, and recreation community would be profound.

First, the DEA contains no evidence that the extremely small and undisclosed incremental cost of the five days of relevant releases would jeopardize the reliability of the TVA power system or somehow render the system or even the project itself not cost effective. Indeed these claims stretch believability, especially since the successful provision of these very same releases over the past few decades proves that TVA can provide these releases without compensation and without disrupting the reliability of the TVA system. History proves TVA's basis for the selection of Alternative B over Alternative A wrong.

Second, while it may be factually true that consumers will bear the "fractional cost" of five days' lost power under Alternative C, that cost would be vanishingly small. Importantly, the "fractional cost" associated with this claim is not disclosed in the DEA, and must be if it is to be relied upon. Regardless, we see no basis in law or policy for denying mitigation based on fractional cost increases, especially given that it would be the only flow mitigation costs that would be actually borne by TVA.

While TVA overreaches to dismiss Alternative C, the DEA turns a blind eye to the undeniable, albeit not quantified adverse economic, recreational, and ecological impacts of Alternative B. These impacts cannot be dismissed as insignificant without more explanation and transparency. TVA has the information needed to perform this analysis already, and it must present that information in a way that is useful for public commenters.

3. The Additional Flows in Alternative C are Allowed by Law Without Compensation, and They Are Needed to Meet the Requirements of State and Federal Law

The Draft EA assumes that any recreational flows must be paid for. This assumption artificially and unlawfully constrains the Draft EA's purpose and need, range of alternatives, and impacts analysis. TVA can provide uncompensated flows, and should provide such flows as described in Alternative C. The additional flows in Alternative C are important not only because they would ensure no significant impact, but also because they would allow TVA to meet other requirements of State and Federal law.

The Draft EA asserts that TVA "must produce power in a reliable and cost effective manner *which necessitates that TVA be reimbursed for the cost of replacement power*." Draft EA

at § 1.3 (emphasis added); *see also id.* at § 2.2 (limiting alternative analysis based on "the need for TVA to be reimbursed for the replacement power generation"). This assumption creates a false choice; in addition to the choices of compensated flows and no flows, there is of course another option—free flows—as evidenced by Alternative C. In TVA's words, the only the decision is "whether or not to enter into new agreements," *id.* at § 1.4, but we emphatically disagree: There could be flows for mitigation in addition compensated flows.

TVA's EA should fully explore whether to continue diverting water from the Ocoee for power generation and, if so, at what level.[3] TVA can release water for recreation and other environmental purposes, and its NEPA analysis must account for this discretion. *See Ocoee River Council v. TVA*, 540 F. Supp. 788, 800 (E.D.TN 1981) (holding that "TVA, in basing its decision to reconstruct Ocoee No. 2 solely upon the project's impact upon power production, and without allowing for recreational releases of water absent separate funding, has violated the requirements of NEPA"). We appreciate TVA's addition of Alternative C. Were it not for the addition of Alternative C, the Draft EA would clearly be inadequate and unlawful under *Ocoee River Council.*[4]

As recognized by the addition of Alternative C, TVA *can* release water as needed to protect environmental and recreational values, and it is *deciding* not to do so when it diverts water for power generation. This decision requires meaningful NEPA analysis. As explained in the previous section, if TVA intends to move forward with Alternative B, it must provide additional analysis for the reviewing public to compare the effects between Alternatives B and C.

To be sure, nothing prevents TVA from seeking compensation for flows it could provide for free (or for flows in addition to those required under other laws). Likewise, however, nothing prevents TVA from providing "free" flows in addition to flows for which it is compensated. As a result, if TVA intends to move ahead with Alternative B its analysis should better explain how it weighed the impacts and risks associated with increased withdrawals from the Middle Ocoee against the "fractional cost" to power consumers. TVA cannot reject Alternative C based on a categorical policy that it "must" be compensated for recreational flows.

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[3] TVA's choice of "no action" alternative shows that the relevant decision is whether to spill water (rather than whether to "enter agreements"). If "no action" means cessation of flows, then "action" means continuation of flows at some level, a decision to which there may be reasonable alternatives. There are only two possible interpretations of "no action" according to the Council on Environmental Quality: If an agency is already engaged in "ongoing" programs or management, then "no action" may be a continuation of the existing management scheme. NEPA's Forty Most Asked Questions, 46 Fed. Reg. 18026. Applied here, no action could therefore mean continuation of the flows as under the current agreement. Otherwise, according to CEQ, "no action" means that the "proposed activity would not take place." *Id.* This is the interpretation utilized by TVA, which means that the "proposed activity" is *flow*, not "agreement," and action alternatives must therefore consider varying flow regimes. The agreement reflected in the Letter of Intent is merely one possible flow regime. Alternative C is another.

[4] Indeed, unless TVA considers alternative flow regimes, including "free" flows over and above those already agreed upon, the Letter of Intent would constitute a predetermination of the decision. *Compare Metcalf v. Daley*, 214 F.3d 1135, 1143 (9th Cir. 2000) (holding that agency's contractual agreements preceding NEPA analysis unlawfully prejudiced its decision) *with Tennessee Envtl. Council v. TVA*, 32 F. Supp. at 884-85 (explaining that an agency does not predetermine the outcome unless "it actually has 'limited the choice of reasonable alternatives'") (quoting *Nat'l Audubon Soc'y v. Dep't of the Navy*, 422 F.3d 174, 206 (4th Cir. 2005)). Here, there is nothing inherently unlawful about TVA's negotiation for reimbursement prior to undertaking environmental analysis, but limiting the scope of alternatives based on that agreement would have been arbitrary and capricious.

4. TVA Must Provide Flows Regardless of Compensation

Not only *can* TVA provide flows in the bypass reaches of the Ocoee without reimbursement; it *must* provide certain flows to meet the requirements of state and federal environmental laws regardless of reimbursement. Together, these laws require TVA to mitigate impacts to navigation, recreation, habitat, and water quality. We believe that the additional flows in Alternative C are needed to comply with these requirements, as explained more fully below.

Indeed, Alternative A ("no action") should include a discussion of these requirements, which would require flows to be provided even if no agreement were reached for reimbursement. Again, to be clear, nothing prevents TVA from seeking reimbursement for flows that are also needed to meet environmental requirements, but by failing to acknowledge these mitigation requirements, TVA is forcing the State (and, indirectly, the most important industry in an economically distressed area) to pay for water that would be spilled even absent compensation. Still, with the additional flows under Alternative C, management of the Ocoee could both meet applicable legal requirements and could reasonably be seen as a "fair deal."

Below are the requirements of state and federal law requiring TVA to provide flows in the Upper and Middle Ocoee regardless of whether TVA receives reimbursement for lost power potential. Two of these requirements are related to separate agency permitting processes. These permitting processes became effective in 1976 and 1987, respectively, upon the enactment of the Federal Land Policy Management Act and the promulgation of Tennessee's Aquatic Resource Alteration Permit regulations. It appears that neither TVA nor the regulating agencies (TDEC and USFS) have been aware that TVA has been operating without needed permits.

Because these permit requirements were not triggered by the current NEPA decision, they do not control or constrain the current NEPA decision. We support the proposed timeline for this decision and the finalization of the Agreement, and there is no legal or practical reason that the permits discussed herein would need to come before this decision or would require any delay in its implementation. Based on the participation of TDEC and USFS in the Letter of Intent, it is clear that any permit conditions required will be compatible with the Agreement. However, it is prudent that TVA adopt an alternative now that will satisfy permit requirements in the future without any additional NEPA analysis.

a. TVA Must Provide Flows During Required Maintenance and Flows During Maintenance Should Be Noticed to the Public

TVA must disclose whether and to what extent it would spill water in the bypass reaches of the Ocoee in order to perform scheduled or reasonably predictable inspections or maintenance of its facilities, as required by FEMA guidelines. Flows during maintenance should be publicly noticed. If TVA is performing required maintenance during scheduled recreational releases, additional release days should be added to the schedule; they have been paid for.

b. TVA Must Provide Flows to Promote Navigation

TVA must provide flows in the Upper and Middle Ocoee in order to promote navigation. 16 U.S.C. § 831h-1. In our view, Alternative C (and, to a lesser degree, Alternative B) would satisfy this statutory directive. This is a positive benefit of either action alternative that should have been mentioned directly in the Draft EA's comparison of alternatives.

To begin with the basics, TVA does not own the water in the Ocoee River. The State of Tennessee holds the waters of the State, including the Ocoee River, in public trust for the people of Tennessee. Tenn. Code Ann § 69-3-102. *Accord Goodwin v. Thompson*, 83 Tenn. 209, 212 (1885) (noting that "the use of ... stream[s] belongs to the public"). The public's right to use the water can be superseded only to the extent specifically provided by federal law--specifically, by the TVA Act.

TVA is authorized to construct and operate dams and reservoirs, but this authority is limited: TVA is directed to regulate stream flow "primarily for the purposes of promoting navigation and controlling floods." 16 U.S.C. § 831h-1. Only "[s]o far as may be consistent with" these primary purposes, TVA is "authorized to ... operate facilities for the generation of electric energy." *Id.* Furthermore, this mandate applies not only to the TVA system as a whole, but to "the operation of *any* dam or reservoir in [TVA's] possession." *Id.* (emphasis added).

The Ocoee River is navigable. *Moscheo v. Polk County*, 2009 WL 2868754 (Tenn. Ct. App. 2009); *see also State v. West Tennessee Land Co.*, 158 S.W. 746 (Tenn. 1913) (use by canoes and small crafts established navigability, even where the water contained obstacles like tree stumps). Under its organic statute, therefore, TVA's primary obligation in the operation of the Ocoee No. 2 and No. 3 dams is to provide flows sufficient to support navigation of the river by small craft. Only to the extent consistent with this duty to "promot[e] navigation" can TVA divert water from the riverbed for power generation.

Notably, spilling water in the bypass reaches of the Ocoee would not adversely affect downstream navigation or flood control. Whether flows run down the riverbed or through the tunnel and flume, the volume released can be controlled to meet downstream needs. TVA's current management of the river amply demonstrates that recreational flows can be timed to promote downstream navigation. The only question is whether (and how much) water stored behind the Ocoee No. 2 and No. 3 dams will be spilled to promote navigation on the Upper and Middle Ocoee or instead diverted to generate power.

To be clear, operation of the Ocoee diversion projects can be consistent with promoting navigation, even if some water is diverted for power generation. Under a natural flow regime, flows might often be too low, too high, or too unpredictable for navigation. Storing water in the reservoirs and releasing it in higher pulses on a regular schedule therefore improves navigation. And, as mentioned above, we believe that both Alternative B and C would "promote navigation," albeit to varying degrees. But this statutory obligation holds regardless of the impact of the flow regime on power generation. In the Draft EA, however, TVA has turned the question upside down, choosing Alternative B primarily because of its positive effect on power generation. To remedy this mistake, TVA must consider and adopt an alternative, like Alternative C, that includes recreation flows *in addition to* the flows for which it will be reimbursed.

c. TVA Must Provide Flows in Order to Meet the Requirements of State Laws Respecting the Control and Abatement of Water Pollution

Under the Clean Water Act, TVA is "subject to … all … State ... requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution in the same manner, and to the same extent as any nongovernmental entity." CWA § 313, 16 U.S.C. § 1323.[5] Tennessee law requires a permit for nonpoint pollution caused by flow alteration. As a condition of such a permit, Tennessee cannot allow expanded withdrawals from waters already impaired by existing withdrawals.

i. TVA Must Provide Flows as a Required Condition of an Aquatic Resource Alteration Permit (ARAP)

TVA must provide flows as a required condition of a state Aquatic Resource Alteration Permit (ARAP). Tennessee law provides: "It is unlawful for any person [defined to include a federal agency] … except in accordance with the conditions of a valid permit" to "alter[] … the physical … properties of any waters of the state" or to "diver[t] … water through a flume for the purpose of generation of electric power." Tenn. Code Ann. §§ 69-3-108(b); 69-3-103(26).

There are two types of water quality permits under Tennessee law: National Pollution Discharge Elimination System (NPDES) permits are used to authorize the discharge of wastewater through a pipe, ditch, or other conveyance, while Aquatic Resource Alteration Permits (ARAPs) are used to authorize all other activities requiring a permit--i.e., discharges of dredged or fill material and nonpoint pollution not otherwise exempted from permitting requirements. Tenn. Admin. Code § 400-40-07-.03(4). Water withdrawals or diversions are considered "nonpoint" pollution, *PUD No. 1 v. Wash. Dep't of Ecology*, 511 U.S. 700, 719 (1994) (citing CWA § 304(f), which defines "changes in ... flow" as nonpoint pollution), and they are therefore regulated under the ARAP program. *E.g.*, TDEC Notice of Determination for NRS12.195 (2015).

TVA is not exempt from the requirements of the ARAP program. In prior litigation over the operation of Ocoee No. 2, the Sixth Circuit held that TVA's dam was not subject to NPDES permitting because flow alterations are nonpoint, not point source, in nature, but that it could be subject to state regulation "as a nonpoint source" of pollution. *TVA v. Tenn. Water Quality Ctrl. Bd.* (*TWQCB*), 717 F.2d 992, 999-1000 (6th Cir. 1983). In that case, the Sixth Circuit declined to define the limits of state authority to regulate withdrawals or diversions as nonpoint pollution, *id.* at 1000, but the question has since been settled. Regulation of flows to protect designated uses or effectuate a state antidegradation policy, including flows from legacy hydropower projects, is "within a State's legitimate legislative business, and the Clean Water Act provides for a system that respects the States' concerns." *S.D. Warren Co. v. Maine Bd. of Envtl. Prot.*, 547 U.S. 370,

[5] In prior litigation relating to Ocoee No. 2, TVA took the position that § 313 applies only to the extent that a federal agency is causing or may cause the "discharge or runoff of pollutants." *TVA v. Tenn. Water Quality Ctrl. Bd.* (*TWQCB*), 717 F.2d 992, 997 (6th Cir. 1983). The Sixth Circuit expressly declined to adopt this interpretation of § 313 and held that TVA dams could be subject to State regulation of nonpoint pollution. *Id.* at 999-1000. Section 313, by its plain language, applies to agencies "(1) having jurisdiction over any property or facility *or* (2) engaged in any activity resulting, or which may result, in the discharge of runoff of pollutants." 16 U.S.C. § 1323 (emphasis added).

386 (2006); *see also PUD No. 1*, 511 U.S. at 714-15, 718-19. Tennessee regulates water withdrawal or diversion as nonpoint source pollution requiring an ARAP. TVA, "to the same extent as any nongovernmental entity," is subject to that permit requirement.

In addition, the Ocoee dams are not exempt from permitting under the ARAP "grandfather" clause, which provides that "[e]xisting water withdrawals on July 25, 2000 which do not adversely alter or effect the classified use of the source stream are not subject to these requirements." Tenn. Admin. Code 400-40-07-.02(4). The Ocoee No. 2 and No. 3 dams are not eligible for this exemption because the classified uses of the Middle and Upper Ocoee are adversely affected by TVA withdrawals: both reaches are impaired due to flow alteration. And, of course, TVA is proposing to increase withdrawals from the levels that existed on July 25, 2000, by eliminating five days of flow on the Middle Ocoee each September.

TVA has not applied for or received an ARAP for the proposed action, but we recognize of course that TDEC is a party to the Letter of Intent, which, to say the least, suggests that TDEC will view Alternative C favorably because of its compatibility with the Agreement. After the conclusion of this NEPA process, and after the Agreement is finalized, TVA should submit an application under. Tenn. Admin. Code 400-40-07. We believe that Alternative C would be eligible for an ARAP because it would protect the Ocoee's resource values. *See id.* at -.04(5)(c). Alternative B, in contrast, would impact those resource values by decreasing flow levels and would likely require some additional mitigation.

ii. TVA Must Comply With State Antidegradation Requirements

In addition, TVA must comply with Tennessee's antidegradation requirements. This is both a freestanding requirement, which TVA must apply to its own decisions,[6] and a prerequisite for issuance of an ARAP permit. The Tennessee Water Quality Control Act requires that permits include conditions needed to meet the purposes of the Act, including applicable water quality standards. Tenn. Code Ann. § 69-3-108(g). The relevant reaches of the Ocoee are classified, among other uses, for fish and aquatic life (FAL) and recreation (REC). Tenn. Admin. Code 400-40-04. For those classifications, the applicable water quality standards specify that "[s]tream or other waterbody flows shall support the fish and aquatic life criteria," including numerical standards for dissolved oxygen and temperature and qualitative standards for biological integrity and habitat. Tenn. Admin. Code 400-40-03-.03(3). Flows must also support the river's recreational uses. *Id.* at -.03(4).

Under Tennessee's antidegradation rule, "no new or expanded water withdrawals that will cause additional measurable degradation" can be allowed if the water already fails to meet water quality criteria. Tenn. Admin. Code 400-4-03-.06(2). And, as noted above, the Middle and Upper Ocoee are impaired for their classified uses due to flow alteration. Consequently, these stretches of river are "unavailable" for increased diversion for power generation. In addition, the Ocoee is a "Tier II" or "Exceptional Tennessee Water," *see* Tenn. Admin. Code 400-40-03-.06(4)(a)(1), a classification that makes it unavailable for increased water withdrawals unless they are necessary to accommodate important economic or social development and will not violate water quality criteria. *Id.* at -.06(4)(c). Alternative B, by increasing withdrawals by five

[6] *E.g.*, *Oregon Natural Resources Council v. USFS*, 834 F.2d 842, 851-52 (9th Cir. 1987).

days on the Middle Ocoee, would cause additional measurable degradation during that timeframe and is therefore unlawful. The requirements of the antidegradation rule cannot be met unless TVA continues to spill at least as much water as currently provided under existing agreements. This strongly militates in favor of Alternative C, and we encourage TVA to give careful consideration to this requirement both in its own NEPA decision now, and because it must be met in the future in connection with an ARAP permit.

d. TVA Must Comply With the Conditions of a Special Use Permit

Section 501 of the Federal Land Policy and Management Act (FLPMA) authorizes the Forest Service "with respect to lands in the National Forest System . . . to grant, issue, or renew rights-of-way over, upon, under, or through such lands for . . . facilities and systems for the impoundment, storage, transportation, or distribution of water . . . [or] systems for generation, transmission, and distribution of electric energy." 43 U.S.C. § 1761(a). The Forest Service calls these rights-of-way special-use authorizations or special use permits. 36 C.F.R. Part 251. For projects outside of Federal Energy Regulatory Commission (FERC) jurisdiction, the Forest Service issues permits under its FLPMA authority. Forest Service Handbook (FSH) 2709.15, ch. 61.4. TVA's dams are not subject to FERC jurisdiction. 16 U.S.C. § 831y-1.

Operation of a facility on National Forest lands without a Special Use permit is unlawful unless "the Forest Service cannot issue a special-use authorization per Section 501(d) of the FLPMA." FSH 2709.15, ch. 64.2.[7] Section 501(d) was added to FLPMA with the Energy Policy Act of 1992 and applies in a narrow set of circumstances in which Congress sought to *restore* the authority of the Forest Service and Bureau of Land Management to issue permits for projects on federal lands. This amendment directly overturned a decision by the U.S. Court of Appeals for the Ninth Circuit, which had held that new hydroelectric projects licensed under part I of the FPA were not subject to permitting under FLPMA, a policy held by FERC itself until 1990. *Id.*; *State of California v. FERC*, 966 F.2d 1541, 1554-1561 (1992). Section 501(d) clarifies Congress' intent that the Forest Service has the power to require a special use authorization for new hydroelectric projects that had not yet received FERC licenses (or been granted exemptions from licensing) at the time the Energy Policy Act was enacted, but grandfathering projects that had previously failed to apply for a Forest Service right-of-way in reliance on FERC's old policy (but had nonetheless applied for a FERC permit and been duly granted a license or exemption). *See* Henwood Assoc., Inc., 63 FERC P 61227, 62627-28 (1993).

Section 501(d) was not intended to apply, and does not apply by its own terms,[8] to create an exception for pre-1992 projects generally or to Federal dam operators who are not licensed or

[7] The FSH also notes an exception from FERC licensing requirements for projects authorized before 1920. This exception is created by the Federal Power Act, 16 U.S.C. § 816, and it has no bearing on non-jurisdictional projects, for which USFS permitting authority is drawn directly from FLPMA.

[8] In order to qualify for the limited exception under Section 501(d), a project must meet each of three conditions: it must have been "licensed pursuant to, or granted an exemption from, part I of the Federal Power Act"; it must be "located on lands subject to a reservation under section 24 of the Federal Power Act"; and it must not have "receive[d] a permit, right-of-way or other approval under [FLPMA] prior to October 24, 1992." 43 U.S.C. § 1761(d). Under the plain language of the statute, the flume for the Ocoee No. 2 dam does not qualify for the Section 501(d) exception. First, Ocoee No. 2 was never "licensed" or "granted an exemption from" part I of the Federal

otherwise regulated under the FPA. FLPMA itself authorizes the Forest Service to require a permit for federal dam operators on National Forest lands. 43 U.S.C. § 1767. TVA is therefore obligated to apply for a special use permit from the Forest Service for the flume for the Ocoee No. 2 dam, which runs across Cherokee National Forest lands but appears to lack a valid right-of-way.

During the permitting process, the Forest Service will assess environmental effects of the proposed use, including instream flow needs, and establish conditions to ensure that flows will be adequate to meet environmental and other management needs. Forest Service Manual Ch. 2540. In addition, the Forest Service must determine whether issuing the permit would be consistent with management direction in Cherokee National Forest's comprehensive management plan, the Revised Land and Resource Management Plan (RLRMP, 2004). 16 U.S.C. § 1604(i). The RLRMP recognizes that the Ocoee is impaired by an altered flow regime and commits that "If significant water withdrawal emerges as an issue within a particular stream or watershed, instream flow needs to support dependent resources will be developed." RLRMP at 9-10. The relevant "dependent resources" for the Upper and Middle Ocoee are their rare communities and water based recreation activities. Whenever possible, the RLRMP states that water-based recreation is to be "enhance[d]," *id.* at 56, Goal 31, and a "[p]rimary management need[]" for the Ocoee's rare community is "maintenance of desirable in-stream flows."

Based on the direction in the RLRMP and the Letter of Intent, it is clear that the Forest Service believes the existing flow regime is "desirable" for the maintenance of the Ocoee's rare community and recreational use. The Forest Service could not legally issue a permit for increased withdrawals at the expense of resources that it seeks to maintain and, if possible, to enhance under the Forest Plan. Accordingly, while Alternative C would be likely to receive a special use permit, Alternative B would likely require additional mitigation which, in turn, might require additional NEPA analysis at a later date.

e. TVA Must Provide Flows Needed to Protect Riparian Rights Under State Law

TVA must also respect the rights of other riparian owners under state law. The Clean Water Act provides for "the authority of each State to allocate quantities of water." 33 U.S.C. § 1251(g); *see also PUD No. 1*, 511 U.S. at 720 (explaining that the CWA "preserves the authority of each State to allocate water quantity as between users," in addition to State authority to regulate flows in order to control water pollution).

Power Act (FPA). The FPA has always been wholly inapplicable to the Ocoee No. 2 facility. The dam and flume were in operation before part I of the FPA was enacted (originally as the Federal Water Power Act), and the facilities were later purchased by TVA, which has since its creation operated outside of FPA jurisdiction. Second, the land on which the flume is located is not "subject to a reservation under section 24 of the [FPA]." Section 24 applies only to federally-owned lands *other than* "reservations," which are defined by the FPA to include "national forests." 16 U.S.C. § 796(2). If federally owned lands are proposed for use in a hydropower project, but would otherwise be available for "entry, location, or other disposal" (i.e., available for homestead and mining claims), Section 24 provisionally sets them aside in order to ensure that the hydropower development gets first priority. 16 U.S.C. § 818. Because National Forests are already reserved from disposal, 16 U.S.C. § 796(2), Section 24 has no applicability.

Tennessee law allocates quantities of water under the common law doctrine of riparian rights. *The Pointe v. Lake Mgmt. Ass'n*, 50 S.W.3d 471, 476 (Tenn. Ct. App. 2000). Under that doctrine, riparian owners are entitled to the reasonable use of the water. *H.B. Bowling Coal Co. v. Ruffner*, 100 S.W. 116 (Tenn. 1907). Upstream riparian owners, as a result, cannot use waters unreasonably to the detriment of downstream owners. "What is a reasonable and permissible diversion of the water of a running stream, with respect to the rights of riparian proprietors, depends upon the size and character of the stream, the purpose for which the diversion is made, and ... the circumstances of the particular case." *Cox v. Howell*, 65 S.W. 868 (Tenn. 1901). When settling a dispute, "natural" uses like domestic use and livestock take priority over "artificial" uses like power production. *Id.* In addition to the rights of a riparian owner, the public holds an easement "in the free and uninterrupted use and enjoyment of [the] stream for all the purposes of transportation and navigation to which it is naturally adapted." *Webster v. Harris*, 69 S.W. 782, 784 (Tenn. 1902).

The USFS, as a downstream riparian owner, is entitled to reasonable use of the Ocoee. The Revised Land and Resources Management Plan (RLRMP) outlines the uses that the Cherokee National Forest intends to manage for, as described above. These are "natural" uses of the river, and are protected by Tennessee law. The citizens of Tennessee, in addition, are entitled to the use of the water for the purposes to which it is adapted, including navigation by small craft. For both reasons, Alternative C should be chosen.

f. TVA Must Comply With State Conditions Imposed During Section 401 Certification

Finally, we note that Tennessee's water quality requirements also apply to TVA's operation of the Ocoee facilities under Section 401 of the Clean Water Act. The required special use permit is a "federal license or permit ... [for] the ... operation of facilities[] which may result in [a] discharge," and it therefore requires a Section 401 certification under the Clean Water Act. 33 U.S.C. § 1341(a); *S.D. Warren*, 547 U.S. 370 (holding that tailwater is a "discharge" for purposes of Section 401(a)). During the certification process, TDEC may impose any conditions (including conditions on flows) necessary to meet state water quality and antidegradation requirements. *PUD No. 1*, 511 U.S. at .714-15, 718-19. In other words, it doesn't matter which permit process is initiated first; TDEC is empowered to approve TVA's flow decision under the same ARAP rules. *See* Tenn. Admin. Code 400-40-07-.03(4), (7).

4. Conclusion:

We fully support the continuation of recreational releases in the Upper and Middle Ocoee River, without interruption or significant modification. The Draft EA contains ample evidence in support of continuing the release regime. Where TVA falters is in selecting Alternative B over Alternative C, based on inadequate information and a hollow claim that flow releases must be bought and never provided for free. We disagree: based on the state and federal law cited in these comments we feel strongly that TVA can and should provide some level of flow mitigation regardless of compensation. We believe that Alternative C would excel at meeting all legal requirements in a timely manner. We respectfully ask that TVA select Alternative C, but, if it

decides to move forward with Alternative B, we expect to see a Final EA that more transparently and accurately explores the differences between the two action alternatives.

Thank you for your attention to these comments. We look forward to working with you on the timely implementation of continued releases on the Ocoee River.

Sincerely,

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May 1, 2018

Via First Class U.S. Mail and Electronic Mail

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RE: Supplemental Comments on the Draft Environmental Assessment for the Ocoee River Whitewater Rafting Agreements

Mr. Higdon,

Please accept the following supplemental comments on the Ocoee River Whitewater Rafting Agreements Draft Environmental Assessment (Draft EA) on behalf of American Whitewater and the Southern Environmental Law Center. We offer these supplemental comments to clarify our January 5, 2018 comments and to encourage TVA to finalize its decision and adopt Alternative C without delay.

In Section 4.c of our prior letter, we noted that the Ocoee's diversions are subject to the requirements of Tennessee's ARAP program. In our comments, we explained that Alternative C is the better choice because it more clearly conforms to ARAP requirements, not to suggest that an ARAP must precede this decision. Given the unique circumstances here, we continue to believe that an ARAP application may be submitted "[a]fter the conclusion of this NEPA process, and after the Agreement is finalized."

In the context of the NEPA analysis, TVA can fully respond to and address Section 4.c of our prior letter, and our interests in this NEPA process, by adopting an alternative that is substantially similar to Alternative C in the Final Environmental Assessment and Decision Notice.

Thank you for your consideration of these supplemental comments. We hope that they are helpful to clarify the issues we previously raised. We look forward to celebrating with you a timely decision that ensures continued flows for the benefit of the Ocoee's ecology, economy,

and recreation community. We are committed to working with you and the State thereafter in a subsequent collaborative and efficient ARAP process that adopts and incorporates both the Agreement and your NEPA decision.

Sincerely,

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Appendix C – Water Release Scheduling Framework

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Ocoee River Release Scheduling - General Framework

Under the agreement with the State of Tennessee, TVA would establish an annual release schedule based on the following framework. In addition, TVA would consider changes to the release schedule at the request of the Board under certain circumstances (see Section 2.2.2.1). Therefore, the release schedule is subject to change. In addition to the releases in the agreement, TVA would provide recreational water releases on five week days in late September.

Releases from Ocoee No. 2 Dam for the Middle Ocoee (Scheduling Framework)	
March	• The last two Saturdays in March will be 6 hour release days. • The following Sundays will each be 6 hours release days. In some years (2029 and 2035) the following Sunday is April 1.
April and May	• With the exception of when April 1 is a Sunday, all Saturdays and Sundays in April and May, through Memorial Day are 8 hour release days. • Memorial Day is an 8-hour release day. • Starting the Thursday after Memorial Day, weekday releases are 6 hour days.
June	• Releases are made every day of the week, except Tuesdays and Wednesdays*. • All Saturdays and Sundays between Memorial Day and Labor Day weekend, excluding Labor Day, are 10 hours release days. • Weekday releases are 6 hour days.
July	• Releases are made every day of the week, except Tuesdays and Wednesdays*. • All Saturdays and Sundays between Memorial Day and Labor Day weekend, excluding Labor Day, are 10 hours release days. • Mondays in July and August are 6 hour release days. • Beginning July 1, the first 6 Thursdays are 7 hour release days, and the following Fridays are 8 hour release days.
August	• Releases are made every day of the week, except Tuesdays and Wednesdays*. • All Saturdays and Sundays between Memorial Day and Labor Day weekend, excluding Labor Day, are 10 hours release days. • Mondays in July and August are 6 hour release days. • Beginning July 1, the first 6 Thursdays are 7 hour release days, and the following Fridays are 8 hour release days. The remaining Thursdays and Fridays in August through Labor Day are 6 hour release days.
September	• Releases are made every day of the week, except Tuesdays and Wednesdays*, through Labor Day. • All Saturdays and Sundays between Memorial Day and Labor Day weekend, excluding Labor Day, are 10 hours release days. • Labor Day is an eight hour release day. • After Labor Day, there are 3 Saturdays with 10 hour release days, and the Sundays of those same weekends are 8 hour release days. • Thursdays and Fridays before Labor Day are 6 hour release days. • Beginning on the last Monday of September, there will be 5 consecutive weekdays with 6 hour releases (*these releases are not part of the agreement with the State of Tennessee*). • The season ends with 5 weekends of 6 hour releases on both Saturday and Sunday. These 5 weekends will sometimes start the last weekend in September, depending on the number of Saturdays in September, and continue through the month of October.
October	• The season ends with 5 weekends of 6 hour releases on both Saturday and Sunday. These 5 weekends will sometimes start the last weekend in September, depending on the number of Saturdays in September, and continue through the month of October. • Rafting concludes on the last Saturday of October.
November	• November 1 will be a 6 hour release day when it is a Sunday

* These 2 consecutive days of no recreation releases ensures that the wooden flume is wetted adequately each week to minimize leakage.

Releases from Ocoee No. 3 Dam for the Upper Ocoee

Below Ocoee #3, TVA currently provides 34 days of releases on most weekends through mid-May to mid-September. Under Alternative B, the same releases would occur through the 15-year term of the proposed agreement. From June until August, there are and would continue to be 12 Sundays with five hours of releases. Additionally, the Sunday before Memorial Day and the Sunday before Labor Day are and would continue to be eight hour release days. From May through September, there are and would be 10 Saturdays with eight-hour releases, typically in July and August, and 10 Saturdays with six hours of releases, typically distributed within May, June and September.

Consistent with TVA's management decision in the 1997 ROD, an additional 20 release days for recreational use and 20 release days for special events may be requested by the outfitters or others for special events, provided reimbursement for the replacement power is given.

Appendix D – Evaluation of Economic Effects from Alternative Ocoee River Release Schedules

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Technical Appendix
Evaluation of Economic Effects from Alternative Ocoee River Release Schedules

Prepared for:

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1. Overview

The Ocoee River is one of the most popular rivers in the eastern United States for whitewater boating and rafting. Two sections of the river, commonly known as the Upper Ocoee and the Middle Ocoee, are used for whitewater recreation. Commercial outfitters provide rafting and other paddling services on the Upper and Middle sections of the Ocoee River. Up to 25 companies may be registered with the State to provide rafting services on the Ocoee River. Whitewater recreation on both river sections is dependent on the release of water from TVA dams into the river channel.

As part of NEPA activities TVA evaluated the economic implications of three different Ocoee River Dams release alternatives. These include Alternative A the “No Action” alternative in which flow reverts to only being used to produce electricity, Alternative B the “Proposed Action” where in channel flow typically used for hydroelectric generation is diverted for recreational water release days with a slight reduction in available release days (5 September weekdays less than current conditions) and rafting costs increase by approximately $5 per and Alternative C “Current” which is identical to Alternative B with additional water release days. The selected alternative will be included in an agreement that covers a 15 year period that is extendable to a total of 30 years. This evaluation considers the first 15 years however annual results are applicable for the 30 year period as well.

Trips to the Ocoee River may provide economic benefits rafters, those who provide rafting services and those who support the rafting industry directly or indirectly. The release of water from the Ocoee dams to support recreation means that less hydropower is generated. This leads to costs to TVA which occur as other forms of generation are used to offset unavailable lower cost hydropower. Also, the numerous river users mean some level of facility provision and maintenance is required. This is currently provided by the State, but would under some alternatives be borne by Ocoee River rafters and outfitters. Economic effects related to the rafting industry that the analysts conducting this evaluation determined to be potentially the most important are those that would affect power generation, the southeastern rafting market, and local business and residents.

The cost to provide replacement power was estimated by TVA using a production cost model known as Planning and Risk, a Ventyx tool. The model produces details about the projected usage of TVA’s generating resources to meet forecasted demand over any desired time horizon (hourly, daily, weekly, monthly, or yearly) in the future. The production cost model provides the marginal cost of power based on projected future supply and demand given current expectations

of future system conditions. Inputs to this model are alternative release schedules. Outputs are the average replacement cost of energy on a weekly basis.

Economic implications for the southeastern rafting market and local economies proximate to the Ocoee River were evaluated using linked simulation models. The rafting market approach begins with a travel cost based model of the demand for rafting in the southeast. The supply of Ocoee River rafting is developed based on costs and revenues of providing trips.

Inputs to the travel cost based model include changes to:

- *Cost* to outfitters to supply commercial rafting trips
- *Quality* of rafting at the Ocoee River and similar eastern U.S. rivers
- *Availability* of rafting at particular times.

Outputs of the model include changes in:

- *Consumer surplus,* which is an economic measure of the value that rafters derive from the rafting trips they take
- *Rafting trips* taken by type (single or multiple day)
- *Expenditures* by rafters taking single or multiple-day trips and expenditure type (e.g. restaurants, hotels).

Rafting use levels (including expenditures) under the Ocoee's existing conditions have economic impacts on local economies and employment. This evaluation uses input/output (I/O) analysis to estimate the economic impact of these use levels on local economies and employment.

The I/O models characterize changes in demand for one industry in terms of their effect on all industries within a local economic area. Inputs to the I/O model are the:

- *Direct expenditures,* which represent the initial, baseline expenditures across each industry.

The outputs of this analysis are direct baseline employment, indirect and induced expenditures, employment, and tax payments in the local economy, which are defined as Polk and Bradley County, Tennessee. These include:

- *Direct employment* that occur as the rafting and directly related industries experience a reduction in revenues that is equal to rafter reduction in expenditures
- *Indirect revenues and employment* as a result of inter-industry transactions as supplying industries adjust to demands from the directly affected industries

- *Induced revenues and employment* that reflect local spending that result from income changes in the directly and indirectly affected industry sectors.

Economic implications of rafting include economic benefits and economic impacts. Economic benefits accrue to rafters as consumer surplus, which is the amount rafters would be willing to pay above and beyond costs.[1] Economic benefits can't be observed directly but can be identified using travel cost modeling techniques. The economic benefits of rafting have been identified in several studies. Rosenberger (2016) compiled the Recreation Use Values Database (RUVD) for North America. The RUVD includes economic valuation studies estimating the consumer surplus (value above costs) use value of recreation activities (per person per day) in the U.S. and Canada from 1958 to 2015. Rosenberger adjusted the 3,192 estimates of diverse recreational activities in the RUVD to 2016 U.S. dollars. Rosenberger estimated a mean consumer surplus use value of $117.39 per single-day trip for non-motorized boating, including whitewater rafting.

English and Bowker (1996) estimated per trip consumer surplus for a zonal travel-cost model for outfitted rafting on the Chattooga River along Georgia's border with South Carolina. The authors collected data from a random sample of households who used commercial outfitter services on the Chattooga River. English and Bowker's estimates of consumer surplus use value per rafting trip ranged from $31.66 to $70.46 (2016 U.S. dollars).

English, Bowker, and Donovan (1996) studied per trip consumer surplus use value associated with guided whitewater rafting on the Chattooga River (Georgia and South Carolina) and the Nantahala River in rural western North Carolina. The authors estimated household recreation demand functions based on an individual travel-cost model. Their findings show average per trip consumer surplus estimates between $89 and $286 (1996 U.S. dollars). The estimates vary based on modeling assumptions regarding the opportunity cost of time and river quality.

Economic impacts are different from benefits in that they measure exchange rather than value. Economic impacts from rafting occur as rafters spend money in local economies. The most recent evaluation of the local economics of Ocoee River rafting was conducted by Dr. Steve Morse. This study was requested by the Ocoee River Outfitters Association with support from the America Outdoors Association (Morse 2013a, 2013b). Morse and other researchers from the University of Tennessee studied the 2012 economic impacts of visitor spending by Ocoee River rafters. Morse's team conducted visitor spending surveys at the Ocoee River from June 8 to

[1] For example, if a hypothetical rafter is willing to pay a total (including travel costs and fees) of $150 for a rafting trip but the actual cost of the trip is $75, the rafter received $75 in consumer surplus.

September 20, 2012. The researchers asked rafters how much they spent in the local area while rafting the Ocoee River. The survey data “represented the spending patterns of 3,118 rafters visiting the Ocoee River in 2012” (Morse 2013a, 2013b).

2. Methods

The alternatives being evaluated imply changes to Ocoee River rafting availability and costs. Existing information from economic studies including the Morse study, a recent edition of IMPLAN, and recent rafting counts were employed to develop an integrated local economic impact and supply and demand based representation of eastern U.S. rafting.

2.1 Model of Demand for Eastern Rafting

Demand for Ocoee River rafting is influenced by the population of potential rafters and the quality, cost, and location of other premiere rafting sites.[2] The Morse study effort included a survey of Ocoee River rafters that requested information about their rafting trip. As depicted in Figure 1, survey results indicate that Ocoee River rafters come from all over the United States but are primarily from the Eastern United States.

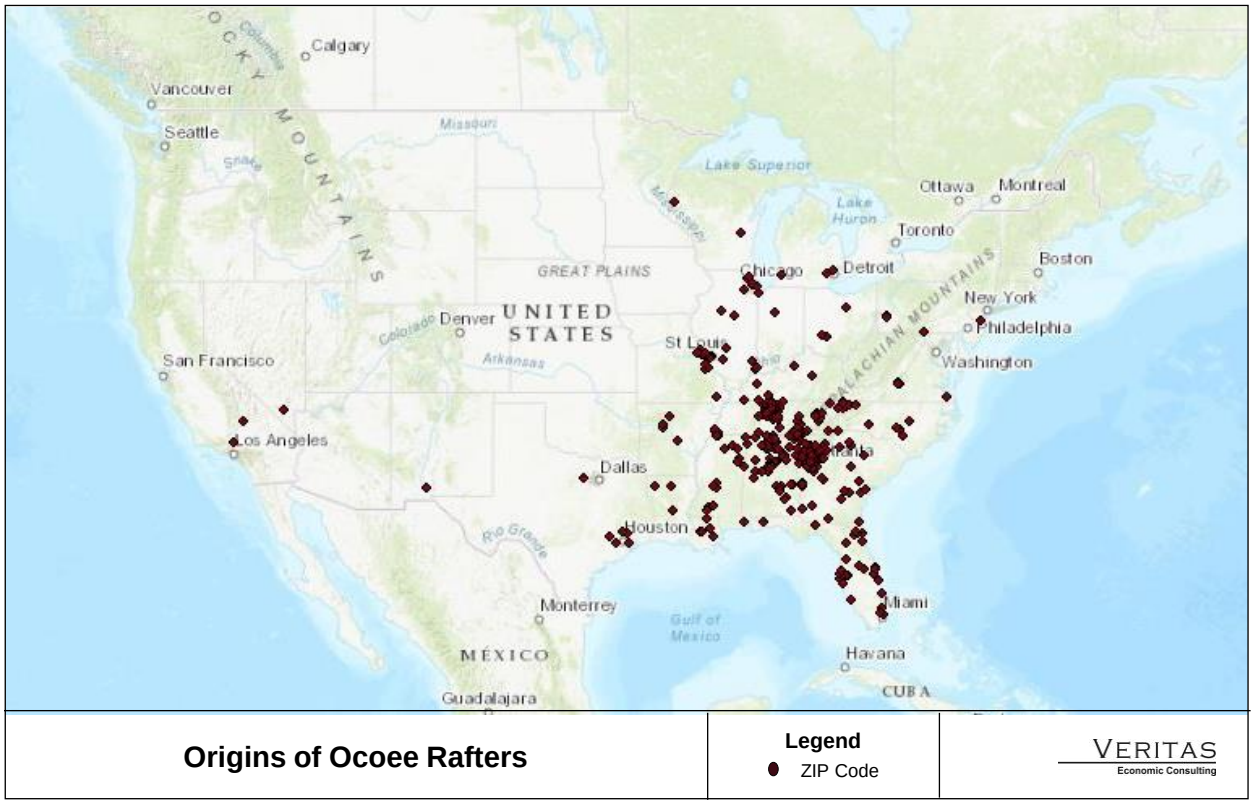

Figure 1: Origins of Ocoee River Rafters

Based on the widespread geography of rafter origins in the Morse study, potential Ocoee River rafters were specified as coming from the center of the 474 counties within 350 miles of the

[2] Rafting on the Ocoee River may also compete with theme parks, such as Six Flags Over Georgia. Although this is possible, it was not feasible to include "unlike" competitors in this evaluation.

Ocoee. To find the substitute rafting sites needed to develop the demand model, information from American Whitewater (2017a, 2017b), Eddlemon (2014a, 2014b), print and online media articles, the USFS (2017c, 2017d, 2017e, 2017f), web sites for Ocoee River outfitters, the National Park Service, National Geographic (2017), Riverfacts.com, Hawks Nest Hydroelectric Project (Hawks Nest Hydro, LLC 2015), and others were considered. These sources identified whitewater rafting sites in Tennessee, Alabama, Georgia, Kentucky, North Carolina, Virginia, and West Virginia. From the initial list of more than 100 alternate rafting sites, a group was selected as the most likely sites that Ocoee rafters would choose if whitewater rafting trips to the Ocoee were unavailable. These include other well-known rafting rivers such as the Gauley, Nolichucky, Chattooga, and Nantahala. Figure 2 depicts origin counties and alternative rafting sites specified in economic modeling.

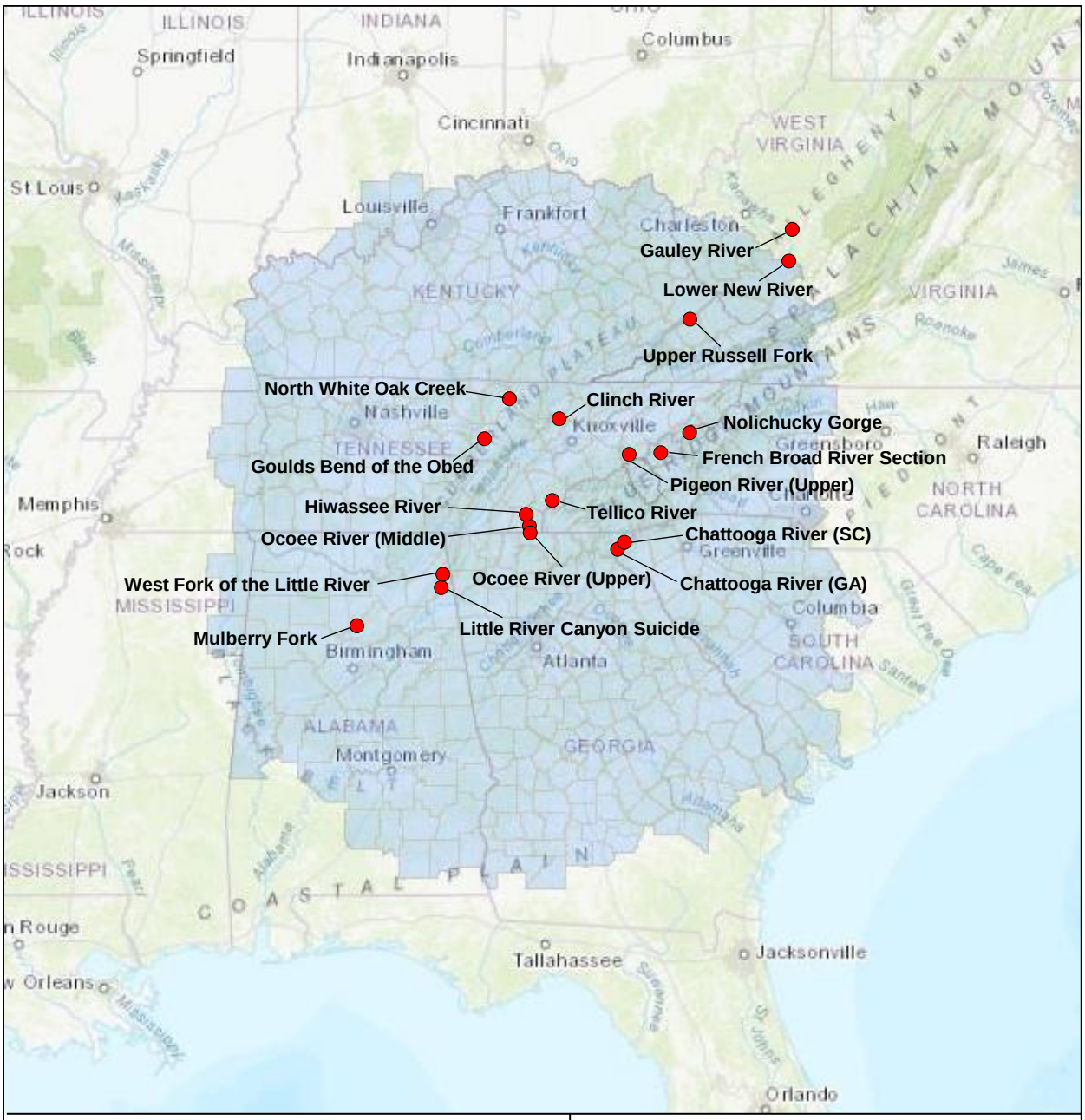

Figure 2: Origin Counties and Alternative Rafting Sites Specified in Economic Modeling

Distances and travel costs from the centers of these counties to the Ocoee River and other premiere eastern U.S. rafting destinations were calculated using truck routing software (PCMiler) and standard AAA per-mile travel costs. The quality of the Ocoee River and alternative premier rafting sites was specified using the site quality metrics of Hynes, Hanley, and Garvey (2007). Although a related econometric model was developed for whitewater opportunities in Ireland no similar studies of preferences in the U.S. are available. The relevant site quality metrics are whitewater quality, parking quality, crowding, water pollution, scenic quality and water level predictability.[3]

The alternate whitewater rafting sites identified were studied and assigned ratings in each category identified above (whitewater quality, parking, crowding, water pollution, scenic quality, and predictability of water level). Table 1 lists the sources of information used for rating each alternate whitewater site in these six categories.

Table 1
Sources of Information for Rating Whitewater Rafting Sites

Category	Source of Information
Whitewater quality	American Whitewater (2017a, 2017b), Eddlemon (2014a, 2014b), print and online media articles. Based on published information, the Ocoee River receives the highest rating on the scale (5) because of its whitewater class and people's enjoyment of Ocoee whitewater trips.
Parking quality	Published reports, aerial views from Google Earth.
Crowding	Published reports. A rating of "5" means that a site is not crowded with whitewater rafters.
Water quality	Published water quality reports from Tennessee Department of Environment & Conservation (TDEC) and other states' environmental agencies.
Scenic rating	Published reports, including Eddlemon (2014a, 2014b).
Predictability of water level	American Whitewater (2017a, 2017b), Eddlemon (2014a, 2014b), published reports (including gauge readings).

Table 2 includes the site quality information specified in the model.

[3] Rafters may consider additional factors including safety and run length. Factors that are omitted from this specification are effectively assumed to be constant across rafting sites.

Table 2
Site Quality Ratings

Site	Whitewater Quality	Parking Quality	Not Crowded	Water Quality	Scenic Rating	Reliability of Water Level
Ocoee River (Middle), TN	5	4	1	3	4	5
Gauley River, WV	5	3	1	4	5	5
Ocoee River (Upper), TN	5	2	1	3	4	5
Little River Canyon Suicide, AL	5	4	3	4	4	4
Nolichucky Gorge, TN	5	2	4	4	4	3
Lower New River, WV	4	2	3	4	5	5
Mulberry Fork, AL	4	2	3	3	3	5
French Broad River Section 9 to Hot Springs, NC	4	2	3	3	5	4
West Fork of the Little River, AL	4	3	4	5	4	3
Upper Russell Fork, VA	4	3	3	4	5	3
Pigeon River (Upper), TN	4	2	3	4	4	3
Chattooga River, GA	4	4	5	4	5	2
North White Oak Creek, TN	4	2	4	4	3	2
Hiwassee River, TN	3	2	3	5	4	4
Tellico River, TN	3	2	4	4	4	3
Chattooga River, SC and GA	3	1	5	4	5	2
Goulds Bend of the Obed, TN	3	3	4	4	4	2

This information (population, travel costs, site characteristics) was combined in a commercial rafting site-choice demand model that is used to characterize the "demand" for eastern U.S. rafting. This modeling structure is professionally accepted, useful for policy-simulation predictions, consistent with economic theory, and capable of identifying resource values.[4] The site choice model identifies the probability of selecting each rafting site based on the site characteristics of all relevant choices for rafters (e.g., distance from the rafters' home to each river and river quality). In the site choice framework, a rafter chooses a site by comparing characteristics across all sites. The mathematical structure is presented in Equation 1 below.

$$P_i(j) = \frac{\exp(V_{ij})}{\sum_{j=1}^{J} \exp(V_{ik})} \quad \textbf{(1)}$$

This equation represents the probability that on any particular recreation choice occasion, a recreator (identified by *i*) will choose to visit a particular site (identified by *j*). This likelihood,

[4] The statistical basis for choice theory is the standard conditional logit model.

identified by *Pi(j)*, is determined on the basis of both site characteristics and parameters representing the values recreators hold for those site characteristics. To estimate total trips for any given site *j*, *Pi(j)* is summed over all recreators' choice occasions.[5]

Changes in trips and resource values are evaluated by developing an equivalent structure with site characteristics modified to represent differences between alternatives. finding the difference in trips between this policy simulation model and the base case. Equation 2 presents the mathematics for an individual.

$$AnnualChoiceOccasions_i \left[\frac{\exp(V_{ij})}{\sum_{j=1}^{J} \exp(V_{ik})} - \frac{\exp(\overline{V}_{ij})}{\sum_{j=2}^{J} \exp(\overline{V}_{ik})} \right] \quad \textbf{(2)}$$

Aggregating over individuals identifies changes in trips for each alternative.

When distance is converted to travel cost, the site-choice framework supports the calculation of monetary changes in value associated with changes in site characteristics. Equation 3 presents the mathematical structure used to evaluate the change in annual value that a recreator attributes to the policy.

$$CV_i = \frac{AnnualTrips_i}{\varphi_i} \left[\ln\left(\sum_{j=1}^{J} e_{ij}^{V} \right) - \ln\left(\sum_{j=1}^{J} e_{ij}^{\overline{V}} \right) \right] \quad (3)$$

CV_i refers to the compensating variation or economic benefit rafter i has for the change.[6]

2.2 Supply of Ocoee River Commercial Rafting

Ocoee River rafting trips are "supplied" by companies that provide guided rafting trips on a per-person fee basis. The supply curve or "supply" for Ocoee River guided rafting trips represents the amount of trips each rafting company is willing and able to provide at a given price.

There is not a readily available source that includes the detailed cost information needed to compose the supply curve for Ocoee rafting. Evaluation of IMPLAN (an economic impact modeling platform) data indicates that approximately 91 percent of revenues in the rafting category for a particular zip code could be accounted for by Ocoee rafting companies. Costs for these companies include employee compensation (24 percent of the total revenue), facility

[5] In the simulation context, this is accomplished by multiplying the likelihood of selecting each site (equation 1) by the total number of trips.

[6] This information is useful for evaluating changes via a utilitarian perspective, such as benefit-cost analysis.

(6 percent of the total revenue) and others (20 percent of the total revenue) with the remainder going to a large number of small categories.

Supply conditions were characterized by developing a representation of per-trip costs with total average trip costs ranging from $45 to $55. Capacity is specified to be rafting trips provided by each company as indicated by the outfitter data. Average cost is specified to be lower for larger companies. This comes from lower average facility and labor costs. Ordering these from lowest cost to highest cost results in a market marginal cost curve—the "supply" of rafting.

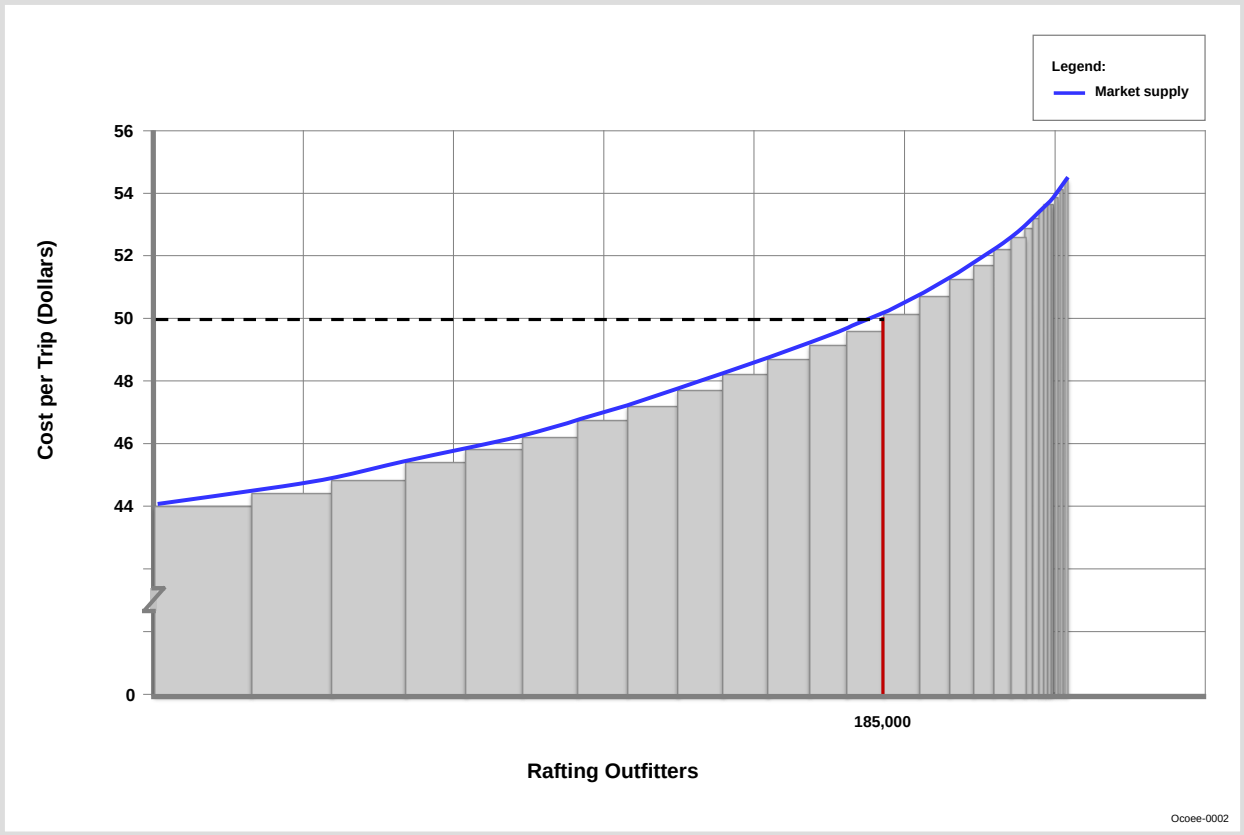

Figure 3: Supply of Rafting on the Ocoee River

To complete the characterization of the baseline rafting market the representation of supply is integrated with the demand model by specifying that the average price of rafting is $50. The market model is then calibrated to replicate the 184,518 guided rafting trips to the Ocoee River. This is consistent with guided rafting trips for the most recent year with available information (2016).

2.3 Tourism Effects

Rafting trips result in tourism expenditure. Expenditure and trip data on the Ocoee River from Morse (2013a) indicates that 59 percent of visits to the Ocoee River are day visits. The remaining 41-percent are overnight visits that stayed within 60 miles of the Ocoee River. Of the overnight visits, hotel stays accounts for 40 percent of overnight trips, while 30 percent of overnight trips stay in rented cabins or homes, 21 percent stay with friends or relatives, and 9 percent stay at campgrounds. When combined, day trips account for 59 percent of total annual trips, overnight trips spent with friends and family account for 8 percent of annual trips, overnight trips spent at a hotel are 17 percent of total annual trips, overnight trips spent at a rented cabin or house are 13 percent of total annual trips, and overnight trips spent at a campground are 4 percent of total annual trips to the Ocoee River.

Table 3 presents the breakdown of average spending by Ocoee River whitewater rafters in 2012 (Morse 2013a). Rafting trip and fees are the highest expenditures. This is because both day and overnight visitors spend money in these categories.

Table 3
Breakdown of Average Spending Per Person

Expenditure Category	Per Person Spending (2017 dollars)
Rafting trip and fees	$41.30
Lodging	$29.37
Food and beverage	$23.33
Transportation	$16.34
Retail, souvenirs, etc.	$9.95
Total	$120.29

Source: Morse (2013a)

For this analysis, these expenditure rates are further broken down by trip type and average per-day expenditures. Table 4 presents the expenditure breakdown by trip type. For example, day visitors spend about $90 per visitor. Because these visitors come from nearby, this $90 does not include lodging expenditures.

Overnight visitors spend between $118 and $219 per visit per person. Overnight visitors who stay with friends and family do not spend money on lodging. When these specifications are made, overnight visitors who stay with friends and family spend an average of $124.49. Overnight visitors who stay in hotels, rented cabins or houses, and at private or public campgrounds have lodging costs. Visitors who stay at hotels or motels spend about $219 per trip, followed by visitors

who stay in rented cabins or homes at approximately $197, and lastly, visitors who stay in private or public campgrounds, with an average spending per trip of approximately $118.

Day visitors and overnight visitors who stay with friends and relatives spend the most on costs associated with the rafting trip, followed by food and beverage, transportation, and souvenirs/retail. Overnight visitors who stay at hotels spend the most on the rafting trip relative to the other expenditure categories. Overnight visitors who stay in rented cabins or homes spend the most on lodging. Visitors who stay in private or public campgrounds spend the most on the rafting trip.

Table 4
Expenditures by Sector and Trip Type (2017 Dollars)

		Overnight Visitors			
Expenditure Category	**Day Visitors**	**Relatives or Friends**	**Hotel or Motel**	**Rented Cabin or House**	**Private or Public Campground**
Rafting trip and fees	$47.43	$57.06	$70.67	$63.80	$44.24
Lodging	—	—	$50.35	$68.52	$12.34
Food & beverage	$17.99	$29.07	$42.73	$31.07	$25.57
Transportation	$14.58	$27.75	$32.67	$20.63	$23.85
Retail, souvenirs, etc.	$9.73	$10.61	$22.35	$13.06	$11.62
Average spending per visitor	$89.73	$124.49	$218.77	$197.09	$117.61

Source: Morse (2013a)

Each expenditure category in Table 4 comprises a variety of sectors. Rafting trips and fees include recreation fees, parking fees, and outfitter fees (e.g., Ocoee River Outfitters). Lodging includes hotels, rental cabins and homes and private or public campgrounds. The food and beverage category includes full-service restaurants, limited-service restaurants, and all other food and drinking places (e.g., mobile food concession stands). Transportation includes expenditures at gas stations and car rentals. Souvenir/retail expenditures are spent at souvenir shops, health and personal care stores (e.g., pharmacies) and general merchandise stores (e.g., Walmart).

Per-trip expenditures by category from Table 4 were used to identify per-trip direct, indirect and induced economic impacts under the baseline condition. Table 5 presents the economic impacts associated with baseline conditions based on expenditures from the 2012 Morse study, trips and inter-market relationships in IMPLAN from 2016. Total Industrial Output refers to the dollar value of goods and services produced. Value-added impacts are employee compensation, proprietor and property type income, and tax on production and imports. Indirect Business Tax

includes excise taxes, property and sales tax paid by businesses, fees, fines, licenses, and permits. Labor Income is the sum of employee compensation and proprietor income.

Table 5
Baseline Annual Economic Impacts from Commercial Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total industrial output	$18,413,162	$3,578,289	$4,056,327	$26,047,778
Total value added	$9,777,943	$1,762,641	$2,402,532	$13,943,116
Indirect business tax	$1,946,492	$148,233	$250,578	$2,345,303
Labor income	$5,830,918	$1,163,662	$1,565,430	$8,533,010
Employment	320.4	32.0	32.5	384.9

The estimated level of direct expenditures by rafters in baseline conditions is approximately $22.67 million. Retail expenditures are specified to be gross retail sales (i.e., purchaser prices) as opposed to gross retail margin (i.e., producer prices). IMPLAN applies the appropriate margin to the gross retail sales; therefore, the output results only reflect the margined value. All non-transportation expenditures are modeled to occur in the local market which is specified to be the counties which border the Upper and Middle Ocoee (Polk and Bradley) counties. Only half of the transportation expenditures are specified for these counties to account for origin or in route gas purchases. After these adjustments are made, the estimated level of direct expenditures in baseline conditions is approximately $18.41 million. This expenditure level is responsible for about $9.78 million in value-added economic effects of which $1.95 million are indirect business taxes and 320 employees making $5.83 million in labor income in Polk and Bradley Counties. The total federal, state, and local indirect business taxes do not include personal income tax or social security taxes.

The indirect output (i.e., amount of inter-industry transactions from supplying industries) is $3.58 million. This output is associated with 32 jobs receiving a total of $1.16 million in labor income. The induced effects (i.e., amount of local spending that result from income in the directly and indirectly affected industry sectors) are estimated to be $4.06 million in industrial output. This output is associated with almost 33 jobs, receiving a total of $1.57 million in labor income. In total, under the baseline conditions the expenditures by rafters of the Ocoee River results is close to $26.05 million in industrial output, $13.94 million in value-added impacts, $2.35 million in indirect business taxes, and almost 385 jobs receiving a total of $8.53 million in labor income.

3. Evaluation of Alternatives

Three potential actions for Ocoee flow were evaluated. These include Alternative A the "No Action" alternative in which flow reverts to only being used to produce electricity, Alternative B the "Proposed Action" in which there is a slight reduction in available flow (5 September weekdays less than current conditions) and rafting costs increase by approximately $5 per and Alternative C "Current" which is identical to Alternative B with additional water release days.

The most economically important features of the alternatives are the changes in the availability/reliability of Ocoee River flow and changes in the direct cost of Ocoee River rafting. Changes to availability and reliability of rafting occur as planned releases are eliminated under Alternative A or curtailed under Alternative B. Changes to the direct cost of Ocoee River rafting occur for both Alternatives B and C as per-rafter fees increase by approximately $5 to account for facility maintenance costs that were previously provided by the State.

These effects are evaluated by first adjusting the rafting supply and demand conditions to reflect the proposed changes in water release schedules and cost. Changes in availability and reliability are identified by developing models that are calibrated to produce the trip numbers associated with the changes. Implications for consumer surplus are developed as output from the model. Changes in cost are evaluated by changing the cost structure of rafting outfitters and observing the model-produced changes in trip numbers and consumer surplus.

Implications for expenditures are derived based on the number and type (overnight or not) of rafting trips for each alternative. Expenditures by sector for each alternative are an input to the local economic impact model. These direct expenditures are used to identify the total local economic impact (direct, indirect, induced) effect on expenditures and employment.

3.1 Alternative A – No Action

3.1.1 Rafting-Related Economic Impacts

Under the No Action Alternative there is no agreement on water releases for recreation purposes. TVA would operate the Ocoee dams as it does its other assets – as part of an overall system to manage water for flood control, hydroelectric power generation, recreation, water supply, water quality, aquatic habitat, and other uses. Without predictable flow, all self-guided and commercially guided rafting on previous release days is expected to be unsustainable.

Based on 2016 rafter counts this would result in the loss of approximately 200,000 annual rafting trips: 181,438 commercially-guided trips and 18,598 recreational trips. The economic model used for this analysis estimates that the present value of the losses in economic benefits

(consumer surplus) associated with these lost rafting trips over a 15-year time period is approximately $289 million ($19.3 million in annual losses).

This is the lost value to those 200,000 recreators who would have preferred to take rafting trips on the Ocoee River, but the river would no longer support rafting. Consequently they either have to go to another location that is either farther away, is of lower quality than the Ocoee, or both. The economic value measure reflects how much more they would prefer to take their trips to the Ocoee River than to the other farther away and/or lower quality rafting sites.

Private rafting and kayaking would still exist under this alternative when conditions are favorable during periods of rain/high flow that would produce excess non-turbine flow. Private rafting and kayaking is expected to be driven by local opportunistic recreators. This is not expected to result in a trip differential related to experience or desirability. Accordingly, there is no change to these rafters' well-being or expenditures.

In addition to losses in economic value resulting from lost trips under the No Action Alternative, there would also be economic impacts resulting from the lost trips. The analysis uses IMPLAN to assess the economic impacts resulting from the lost trips. To use the IMPLAN model, per-trip expenditures by category from Table 4 were used to identify per-trip indirect and induced economic impacts. Table 6 presents the economic impacts associated with implementation of Alternative A. Under Alternative A, all economic impacts associated with baseline conditions are lost because managed water releases for recreation purposes would be eliminated.

Table 6
Alternative A – Estimated Annual Economic Losses from Whitewater Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$18,413,162	$3,578,289	$4,056,327	$26,047,778
Total Value Added	$9,777,943	$1,762,641	$2,402,532	$13,943,116
Indirect Business Tax	$1,946,492	$148,233	$250,578	$2,345,303
Labor Income	$5,830,918	$1,163,662	$1,565,430	$8,533,010
Employment	320.4	32.0	32.5	384.9

3.1.2 Cost of Power

Under the No Action Alternative water previously released in support of rafting would be made available as needed by TVA to generate electricity at the No. 2 and No. 3 Powerhouses. As such, the higher cost of generation of replacement power under the baseline condition would not be passed on to TVA rate payers under the No Action Alternative.

3.2 Alternative B – Proposed Action

3.2.1 Rafting-Related Economic Impacts

Under the proposed action, TVA would operate the dams similarly to current operations but with a slight reduction in release days. The current facility maintenance fee of $0.50 per rafter charged to commercial rafting operations would be increased. The new fee is expected to be about 10 percent of current per-rafter revenue of $45 to $55 per-trip and would be used to support the State's operation, maintenance and administrative costs which are estimated to be $450,000 in 2019.

This increase in maintenance fees shifts some ongoing cost from taxpayers to some mixture of operators and customers. To evaluate the implications of the rafting cost increase the supply demand framework described above was applied. Because the cost increase would apply evenly to all rafting companies, a per-trip price increase equivalent to the cost increase was added to the supply curve (described above). The resulting simulation indicates that adding $5 per trip to the overall costs experienced by rafters results in an annual reduction of 8,050 trips, which represents a 4.4 percent reduction in trips annually. In addition, the five days in September where rafting is eliminated accounts for approximately 400 trips, for a total impact of a loss of 8,445 trips (4.7percent of total trips).

The present value of the loss in economic benefits (commercial surplus) to recreators associated with 8,445 lost trips over a 15-year time period is approximately $12.2 million (approximately $813,000 in annual losses). These are losses to recreators who would have preferred to take rafting trips to the Ocoee River, but the increased costs of Ocoee River trips or the lack of availability during those five days has them either going to another location that is of lower quality or not rafting at all. The economic value measure reflects how much more they would prefer to take their trips to the Ocoee River than to other lower quality rafting sites or to not raft at all.

In addition to losses in economic value to recreators resulting from lost trips under Alternative B, there would also be impacts to the economy resulting from the lost trips. The analysis uses IMPLAN to assess the economic impacts resulting from the lost trips. To use the IMPLAN model, per-trip expenditures by category from Table 4 were used to identify per-trip indirect and induced economic impacts.

Table 7 presents the economic impacts associated with implementation of Alternative B.

Table 7
Estimated Annual Economic Losses from Whitewater Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$857,055	$166,554	$188,805	$1,212,414
Total Value Added	$455,122	$82,043	$111,828	$648,993
Indirect Business Tax	$90,601	$6,900	$11,663	$109,164
Labor Income	$270,148	$54,164	$72,864	$397,176
Employment	14.9	1.5	1.5	17.9

The estimated level of direct expenditures by the 8,445 rafters in Alternative B is approximately $1.06 million. After adjustments are made to retail and transportation expenditures, the estimated level of direct expenditures that will be lost under Alternative B is approximately $857,000. This expenditure level is responsible for about $455,000 in value-added impacts of which $91,000 are indirect business taxes and 15 employees making $270,000 in labor income in Polk and Bradley counties. The total federal, state, and local indirect business taxes do not include personal income tax or social security taxes.

The indirect losses (i.e., changes in inter-industry transactions as supplying industries respond to decreased demand from the directly affected industries) is $167,000 in output. This output is associated with approximately two jobs receiving a total of $54,000 in labor income. The induced losses (i.e., changes in local spending that result from income changes in the directly and indirectly affected industry sectors) are estimated to be $189,000 in industrial output. This output is associated with approximately two jobs, receiving a total of $73,000 in labor income. In total, the expenditures by rafters of the Ocoee River results in close to $1.21 million in lost industrial output, $649,000 in lost value-added impacts, $109,000 in lost indirect business taxes, and almost 18 lost jobs receiving a total of $397,000 in labor income.

3.2.2 Cost of Power

In conjunction with Alternative B, TVA would continue to release water from Ocoee No. 3 and No. 2 dams to support commercial rafting. Consequently, TVA would reduce the amount of hydropower generation and would have to shift loads to other generation facilities at a higher production cost. However, in accordance with renewed agreements for water supply TVA would be compensated for the differential cost of power. As such, TVA consumers would not bear the marginal cost associated with reduced hydropower generation under this alternative.

3.3 Alternative C – Current Management Regime

3.3.1 Rafting-Related Economic Impacts

Under this alternative, TVA would continue to release water from Ocoee No. 3 and No. 2 dams to support commercial rafting similar to the baseline condition. However, the existing fee of $0.50 per rafter charged to commercial rafting operations would be increased as described under Alternative B.

As described under Alternative B, this increase from existing costs would fall on some mixture of operators and customers and result in an annual reduction of 8,050 trips, which represents a 4.4 percent reduction in trips annually. There would be no change in the current release schedule and therefore no additional loss in rafting trips.

The present value of the loss in economic benefit (commercial surplus) to recreators associated with these lost rafting trips over a 15-year time period is approximately $11.6 million (approximately $775,000 in annual losses).

Table 8 presents the impacts to the economy associated with Alternative C.

Table 8
Alternative C – Estimated Annual Economic Losses from Whitewater Rafters on the Ocoee (2017 Dollars)

Economic Indicator	Direct	Indirect	Induced	Total
Total Industrial Output	$818,944	$159,148	$180,409	$1,158,501
Total Value Added	$434,884	$78,395	$106,855	$620,134
Indirect Business Tax	$86,572	$6,593	$11,145	$104,310
Labor Income	$258,135	$51,755	$69,624	$379,514
Employment	14.2	1.4	1.4	17.0

The estimated level of direct expenditures by the 8,050 rafters in Alternative C is approximately $1.01 million. After adjustments are made to retail and transportation expenditures, the estimated level of direct expenditures that will be lost under Alternative C is approximately $819,000. This expenditure level is responsible for about $435,000 in value-added impacts of which $87,000 are indirect business taxes and 14 employees making $258,000 in labor income in Polk and Bradley Counties. The total federal, state, and local indirect business taxes do not include personal income tax or social security taxes.

The indirect losses (i.e., changes in inter-industry transactions as supplying industries respond to increased demands from the directly affected industries) is $159,000 in output. This output is associated with over one job receiving a total of $52,000 in labor income. The induced

losses (i.e., changes in local spending that result from income changes in the directly and indirectly affected industry sectors) are estimated to be $180,000 in industrial output. This output is associated with over one job, receiving a total of $70,000 in labor income. In total, the expenditures by rafters of the Ocoee River results in close to $1.16 million in lost industrial output, $620,000 in lost value-added impacts, $104,000 in lost indirect business taxes, and almost 17 lost jobs receiving a total of $380,000 in labor income.

3.3.2 Cost of Power

In conjunction with Alternative C, TVA would continue to release water from Ocoee No. 3 and No. 2 dams to support commercial rafting. Consequently, TVA would reduce the amount of hydropower generation and would have to shift loads to other generation facilities at a higher production cost. In accordance with renewed agreements for water supply TVA would be compensated for the differential cost of power for all recreational days extending through August. However, no compensation would be provided for the five additional release days scheduled in September. As such, TVA consumers would not bear the marginal associated with reduced hydropower generation under this alternative for most of the recreational season, but would bear the fractional cost associated with the loss of hydropower generation in September.

4. Summary of Economic Effects

Recreational rafting on the Ocoee River has an impact on the local economy, individual rafters and TVA consumers. Economic impacts from rafting occur as rafters spend money in local economies. Rafters receive benefits when the amount they are willing to pay for commercial rafting on the Ocoee River exceeds actual cost (commercial surplus) and the costs incurred by TVA to provide replacement power on recreational release days are absorbed by TVA consumers.

Total impacts to the economy (annual losses), impacts to the recreator and impacts to the TVA rate payer are summarized in Table 9 for each of the proposed alternatives.

Table 9
Summary of Environmental Consequences

	Alternative A	Alternative B	Alternative C
Lost Rafting Trips	200,000	8,445	8,050
Total Annual Losses			
Total Industrial Output	$26,047,778	$1,212,414	$1,158,501
Total Value Added	$13,943,116	$648,993	$620,134
Indirect Business Tax	$2,345,303	$109,164	$104,310
Labor Income	$8,533,010	$397,176	$379,514
Employment	384.9	17.9	17.0
Impact to Recreator			
Total Loss of Economic Benefit (15 years)	$289 million	$12.2 million	$11.6 million
Annual Loss of Economic Benefit	$19.3 million	$813,000	$775,000
Impact to TVA Consumer			
Cost of Replacement Power	No cost	No cost	Cost associated with five release days in September

Under Alternative A, the loss of approximately 200,000 rafting trips would result in approximately $26.05 million in lost expenditures in the local economy. This would result in a $13.94 million in lost value-added impacts, $2.35 million in lost indirect business taxes, and almost 385 lost jobs receiving a total of $8.53 million in labor income. In addition the losses in economic benefits to rafters (consumer surplus) associated with these lost rafting trips over a 15-year time period is approximately $289 million ($19.3 million in annual losses). The estimated impact to the local economy and to rafters would be significant.

However, there would be a minor beneficial impact under the No Action Alternative as the cost of generation of replacement power under the baseline condition would not be passed on to TVA rate payers.

The estimated level of expenditures in the local economy that would be lost due to the loss of 8,445 rafting trips (4.7 percent of total trips) as a result of the fee increase and loss of five recreational release days in September under Alternative B is approximately $1.2 million. This expenditure level is responsible for about $650,000 in value-added impacts of which $109,000 are indirect business taxes and 18 employees making $397,000 in labor income. The impact to individual rafters over a 15-year time period is approximately $12.2 million (approximately $813,000 in annual losses). This would be a minor impact relative to the No Action Alternative, (Alternative A).

Under Alternative B, TVA would be compensated for the cost of replacement power which would have a beneficial impact on TVA consumers.

The estimated level of expenditures in the local economy that would be lost due to the loss of 8,050 rafting trips (4.4 percent of total trips) as a result of the fee increase under Alternative C is approximately $1.1 million. This expenditure level is responsible for about $620,000 in value-added impacts of which $104,000 are indirect business taxes and 17 employees making $379,000 in labor income. The impact to individual rafters over a 15-year time period is approximately $11.6 million (approximately $775,000 in annual losses). This would be a minor impact relative to the No Action Alternative, although incrementally less than Alternative B.

Under Alternative C, TVA would be compensated for the differential cost of power for all recreational days extending through August. However, no compensation would be provided for the five additional release days scheduled in September. As such, TVA consumers would bear the fractional cost associated with the loss of hydropower generation during this period. Therefore there would be minor impact to TVA consumers relative to Alternatives A and B.

5. References

American Whitewater. 2017a. "National Whitewater Inventory." Retrieved from https://www.americanwhitewater.org/content/River/view/. Retrieved September 2017.

American Whitewater. 2017b. "AW in the Southeast." Retrieved from https://www.americanwhitewater.org/content/Regional/view/region/SE/. Retrieved on April 5, 2017.

Beauchamp, Melanie. 2013. "Tennessee's Ocoee River Officially Most Popular Whitewater Rafting River in America." Available at http://www.prweb.com/releases/2013/5/prweb10766133.htm. Retrieved on September 15, 2017.

Eddlemon, Kirk. 2014a. *Whitewater of the Southern Appalachians Volume 1: The Plateau*. New Castle, CO: Wolverine Publishing, LLC.

Eddlemon, Kirk. 2014b. *Whitewater of the Southern Appalachians Volume 2: The Mountains*. New Castle, CO: Wolverine Publishing, LLC.

English, Donald B.K., and J.M. Bowker. 1996. "Sensitivity of Whitewater Rafting Consumers Surplus to Pecuniary Travel Cost Specifications." *Journal of Environmental Management* 47:79–91.

English, Donald B.K., J.M. Bowker, and Jason A. Donovan. 1996. "Toward a Value for Guided Rafting on Southern Rivers." *Journal of Agricultural and Applied Economics* 28(2):423–432.

Hawks Nest Hydro, LLC. 2015. *Hawks Nest Hydroelectric Project (FERC No. 2512), Glen Ferris Hydroelectric Project (FERC No. 14439) Draft Recreation Flow Assessment Study Report*. Gauley Bridge, WV: Hawks Nest Hydro, LLC.

Hynes, Stephen, Nick Hanley, and Eoghan Garvey. 2007. "Up the Proverbial Creek without a Paddle: Accounting for Variable Participant Skill Levels in Recreational Demand Modelling." *Environmental and Resource Economics* 36(4):389–521.

Morse, Steve. 2013a. "The Estimated Economic Impacts of Ocoee River Whitewater Rafting on the Local Economy, 2012." Available at www.americaoutdoors.org/america_outdoors/pdf/Ocoee2pp.pdf. Retrieved on April 5, 2017.

Morse, Steve. 2013b. "Economic Impacts of Visitor Spending & Whitewater Rafting on the Ocoee River." Knoxville, TN: University of Tennessee Dept. of Retail, Hospitality & Tourism Management.

National Geographic. 2017. Ocoee Whitewater Center. Retrieved from http://www.tennesseerivervalleygeotourism.org/content/ocoee-whitewater-center/tenF6084606E10DB0F05. Retrieved March 2017.

Rosenberger, Randall S. 2016. "Recreation Use Values Database Summary." Available at http://recvaluation.forestry.oregonstate.edu/database. Retrieved on June 22, 2016.

Tennessee Department of State Division of Publications. 2010. "Archived Rules and Regulations Filings." Available at http://tnsos.org/rules/ArchivedRules.php?resultpage=29&sort=RuleChapter&direction=desc. Retrieved on April 12, 2017.

U.S. Forest Service. 2017c. Ocoee River Outfitter and Guide Companies. Retrieved from https://www.fs.usda.gov/detail/cherokee/recreation/?cid=stelprdb5276624. Retrieved March 2017.

U.S. Forest Service. 2017d. Ocoee Whitewater Center. Retrieved from https://www.fs.usda.gov/generalinfo/cherokee/recreation/generalinfo/?groupid=71012&recid=35096. Retrieved March 2017.

U.S. Forest Service. 2017e. Tellico River Zone. Retrieved from https://www.fs.usda.gov/recarea/cherokee/recarea/?recid=35128. Retrieved March 2017.

U.S. Forest Service. 2017f. Whitewater on the Cherokee National Forest. Retrieved from https://www.fs.usda.gov/detail/cherokee/recreation/?cid=stelprdb5271037. Retrieved March 2017.

Appendix E – Coordination

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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

December 15, 2017

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), OCOEE RIVER WHITEWATER RAFTING AGREEMENTS, POLK COUNTY, TENNESEE

TVA proposes to provide water releases from Ocoee Dam No. 2 and No. 3 for a term of 15 years on the middle and upper sections of the Ocoee River beginning in 2019 (Latitude 35.133937, Longitude -84.683502). Water releases would be based on a schedule framework similar to the water release agreements currently in place. On the upper Ocoee, there would be no change to scheduled releases. On the middle Ocoee, the release schedule would be the same as the current schedule, except for the elimination of five weekdays in late September each year.

Under the proposed management agreement, TVA would also grant a 30-year recreation easement to the State across three tracts of land. The State would be responsible for a commercial-use permitting program and oversight of commercial rafting activities on the Ocoee River, both administered by Tennessee State Parks. The State's responsibilities would include all general operational and maintenance activities necessary to facilitate commercial whitewater operations within the TVA easement area. The State would also be responsible for emergency first response, law enforcement, traffic management, and other appropriate tasks along the Ocoee River corridor. Improvements projects beyond routine operational and maintenance activities to existing facilities would be coordinated with TVA for review under Section 106 of the National Historic Preservation Act.

TVA finds that the changes to the water release schedule would not change existing conditions along the middle and upper Ocoee River. The management agreement, however, would authorize the state to perform ground disturbing maintenance activities that have the potential to affect archaeological sites. Therefore, TVA contracted with the University of Tennessee Archaeological Research Laboratory (ARL) to perform an archaeological survey of 43.7 acres of TVA land proposed for management under the agreement. Enclose for your review is ARL's report titled *Phase I Archaeological Survey of Tracts XT2OCR-1RE, XT2OCR-2RE, X3OCR-3RE, and XTOCR-14RE on the Ocoee River, Polk County, Tennessee*. TVA considers the 43.7 acres of TVA land to be the area of potential effects (APE) for this undertaking.

ARL identified no new archaeological sites and revisited two previously recorded archaeological sites, 40PK174 and 40PK388, within the APE. The Federal Highways Administration (FHWA) and the Tennessee State Historic Preservation Officer (SHPO) determined 40PK174 to be ineligible for the National Register of Historic Places (NRHP). TVA has now reviewed the consensus determination between the FHWA and SHPO and the recommendation of ARL and agrees the site is ineligible for the NRHP. ARL also revisited site 40PK388 and has expanded the site boundary as a result. ARL evaluated findings from the previous investigations and findings from the current investigation and recommends 40PK388 to be ineligible for the NRHP. TVA agrees with this recommendation.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and eligible for the NRHP.

Pursuant to 36 CFR § 800(4)(d)(2), we are seeking your concurrence that 40PK174 and 40PK388 remain ineligible for the NRHP and with TVA's finding that the undertaking would have no effect to historic properties.

If you have any questions or comments, please contact Ted Wells by phone, (865) 632-2259 or by email, ewwells@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

EWW:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

PHASE I ARCHAEOLOGICAL SURVEY OF TRACTS XT2OCR-1RE, XT2OCR-2RE, X30CR-3R, AND XTOCR-14RE ON THE OCOEE RIVER, POLK COUNTY, TENNESSEE

DRAFT

By Valerie E. Altizer, Michael G. Angst, Howard Haygood and Howard J. Cyr

With contributions by

Bradley A. Creswell

Kandace D. Hollenbach

Report Prepared for:

Ted Wells

Lead Agency:
Biological and Cultural Compliance
Tennessee Valley Authority

Michael G. Angst, Archaeologist in General Charge
Howard Cyr, Archaeologist in Direct Charge

Archaeological Research Laboratory
Department of Anthropology
The University of Tennessee
Rm 237, Middlebrook Building
Knoxville, Tennessee 37996-0060
(865) 946-1882

December 2017

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

December 15, 2017

To Those Listed:

TENNESSEE VALLEY AUTHORITY (TVA), OCOEE RIVER WHITEWATER RAFTING AGREEMENTS, POLK COUNTY, TENNESEE

TVA proposes to provide water releases from Ocoee Dam No. 2 and No. 3 for a term of 15 years on the middle and upper sections of the Ocoee River beginning in 2019 (Latitude 35.133937, Longitude -84.683502). Water releases would be based on a schedule framework similar to the water release agreements currently in place. On the upper Ocoee, there would be no change to scheduled releases. On the middle Ocoee, the release schedule would be the same as the current schedule, except for the elimination of five weekdays in late September each year.

Under the proposed management agreement, TVA would also grant a 30-year recreation easement to the State across three tracts of land. The State would be responsible for a commercial-use permitting program and oversight of commercial rafting activities on the Ocoee River, both administered by Tennessee State Parks. The State's responsibilities would include all general operational and maintenance activities necessary to facilitate commercial whitewater operations within the TVA easement area. The State would also be responsible for emergency first response, law enforcement, traffic management, and other appropriate tasks along the Ocoee River corridor. Improvements projects beyond routine operational and maintenance activities to existing facilities would be coordinated with TVA for review under Section 106 of the National Historic Preservation Act.

TVA finds that the changes to the water release schedule would not change existing conditions along the middle and upper Ocoee River. The management agreement, however, would authorize the state to perform ground disturbing maintenance activities that have the potential to affect archaeological sites. Therefore, TVA contracted with the University of Tennessee Archaeological Research Laboratory (ARL) to perform an archaeological survey of 43.7 acres of TVA land proposed for management under the agreement. Enclosed for our review is ARL's report titled *Phase I Archaeological Survey of Tracts XT2OCR-1RE, XT2OCR-2RE, X3OCR-3RE, and XTOCR-14RE on the Ocoee River, Polk County, Tennessee*. TVA considers the 43.7 acres of TVA land to be the area of potential effects (APE) for this undertaking.

ARL identified no new archaeological sites and revisited two previously recorded archaeological sites, 40PK174 and 40PK388, within the APE. The Federal Highways Administration (FHWA) and the Tennessee State Historic Preservation Officer (SHPO) determined 40PK174 to be ineligible for the National Register of Historic Places (NRHP). TVA has now reviewed the consensus determination between the FHWA and SHPO and the recommendation of ARL and agrees the site is ineligible for the NRHP. ARL also revisited site 40PK388 and has expanded

the site boundary as a result. ARL evaluated findings from the previous investigations and findings from the current investigation and recommends 40PK388 to be ineligible for the NRHP. TVA agrees with this recommendation.

TVA finds that 40PK174 and 40PK388 remain ineligible for the NRHP and that the undertaking would have no effect to historic properties.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with the following federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and are eligible for the NRHP: Absentee Shawnee Tribe of Oklahoma, Alabama-Coushatta Tribe of Texas, Coushatta Tribe of Louisiana, Cherokee Nation, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation, Shawnee Tribe, Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians in Oklahoma.

By this letter, pursuant to 36 CFR§ 800.2(c)(2)(ii), 800.3(f)(2), and 800.4(a)(4)(b), TVA is providing notification of these findings and is seeking your comments regarding any properties that may be of religious and cultural significance and may be eligible for inclusion in the NRHP.

Please respond by January 14, 2018 if you have any comments on the proposed undertaking. If you have any questions, please contact me by phone at (865) 632-6461, or by email at pbezzell@tva.gov.

Sincerely,

Pat Bernard Ezzell

Patricia Bernard Ezzell
Senior Program Manager
Tribal Relations and Corporate Historian

EWW:ABM
Enclosures
cc (Enclosures):

IDENTICAL LETTER MAILED TO THE FOLLOWING ON DECEMBER 15, 2017:

Ms. Holly Austin (NHPA)
Federal Cultural Resource Law Liaison
Tribal Historic Preservation Office
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

cc: Mr. Russell Townsend
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

Mr. Brett Barnes
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Ms. RaeLynn Butler
Manager
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

cc: Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

Mr. Bryant Celestine
Tribal Historic Preservation Officer
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, Texas 77351

Mr. Terry Clouthier
Thlopthlocco Tribal Town
Tribal Historic Preservation Officer
Post Office Box 188
Okemah, Oklahoma 74859

Mr. David Cook
Tribal Administrator
Kialegee Tribal Town
Post Office Box 332
Wetumka, Oklahoma 74883

Dr. Linda Langley
Tribal Historic Preservation Officer
Coushatta Tribe of Louisiana
Post Office Box 10
Elton, Louisiana 70532

Ms. Karen Pritchett
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

Ms. Erin Thompson
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Ms. Tonya Tipton
Shawnee Tribe
Post Office Box 189
Miami, Oklahoma 74355

Ms. Elizabeth Toombs
Cherokee Nation
Post Office Box 948
Tahlequah, Oklahoma 74465

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

December 27, 2017

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Ocoee River Whitewater Rafting Agreements, Polk County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that archaeological site 40PK174 and 40PK388 are not eligible for listing in the National Register of Historic Places. We further concur that no National Register eligible historic properties will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Absentee Shawnee Tribe of Oklahoma
Cultural/Tribal Historic Preservation Department
2025 S. Gordon Cooper Dr.
Shawnee, Oklahoma 74801
Phone: (405) 275-4030 ext 6340

1/3/18

RE: OCOEE RIVER WHITEWATER RAFTING AGREEMENTS, POLK COUNTY, TENNESSEE

To Whom It May Concern:

This response is regarding the request from your office for a review of the project listed above. We have reviewed the information provided in your letter of December 15, 2017. We find after review of this information that we concur with your findings of no adverse effects. We have no objection to the project in Polk County, Tennessee, and we defer comment to your office as well as to the State Historic Preservation Office and/or the State Archaeologist.

We remain interested in further communications regarding this project due to the location. The Shawnee people have a documented historical presence in Tennessee. While there are no documented village sites within the project site or within a close proximity outside the project site, there still remains the potential of finding unknown sites in and surrounding the project location.

It is further advised that if the area of potential effect changes or in the event of an inadvertent discovery of human remains or other cultural resources that we receive notification within 48 hours. As well, any advertent discovery of human remains or other cultural resources should remain in situ until consultation with interested tribes and agencies is undertaken.

Thank you for your time and patience in communications regarding section 106 and NAGPRA issues. We appreciate your continued efforts in such matters. Please do not hesitate to contact me at the information below if you have any questions or concerns.

Best Regards,

Erin Thompson
Tribal Historic Preservation Officer
Absentee Shawnee Tribe of Oklahoma
2025 Gordon Cooper Drive
Shawnee, OK 74801
(P) 405.275.4030 Ext. 6340

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

October 25, 2017

Ms. Mary E. Jennings
Field Supervisor
U. S. Fish and Wildlife Service
446 Neal Street
Cookeville, Tennessee 28501

Dear Ms. Jennings:

TENNESSEE VALLEY AUTHORITY OCOEE RIVER 2018 WHITEWATER RAFTING AGREEMENTS

Tennessee Valley Authority (TVA) is proposing to amend current agreements that govern recreational whitewater releases from Ocoee No. 2 Dam (Middle Ocoee) and Ocoee No. 3 Dam (Upper Ocoee), which expire in late 2018. The frequency, duration, and magnitude of the proposed releases included within the preferred alternative are very similar to current conditions. There would be no change to the current schedule of release to the Upper Ocoee. TVA would continue to provide water releases from Ocoee No. 3 Dam for recreational use on 34 weekend days. TVA would provide water releases from Ocoee No. 2 Dam based on the same framework for determining annual water release schedules that has been in place since 1984, with one minor difference: TVA would eliminate releases currently occurring on five weekdays in late September. Thus, over the 15-year period of the proposed agreement, TVA would provide between 106 and 112 release days annually. In addition to the minimal changes to the release schedule, TVA would grant a 30-year easement on three parcels of land (approximately 27.2 acres) to the state of Tennessee. Also, the U.S. Forest Service would make two tracts available to the state. These areas are currently developed for recreation and contain facilities like water access, restrooms, and vehicle parking. No construction or improvements on these parcels are proposed at this time.

Review of the TVA Regional Natural Heritage database and the U.S. Fish and Wildlife Service IPaC website indicated six species listed as endangered or threatened under the Endangered Species Act could occur along the Middle and Upper Ocoee River in Polk County, Tennessee. These species include one fish (snail darter), three mammals (gray bat, Indiana bat, and northern long-eared bat), and two plants (Ruth's golden aster and white fringeless orchid).

Snail darter occurs in Polk County, Tennessee within the Ocoee River. However, this species has not been collected upstream of Ocoee River mile 5.8, which is approximately six miles downstream of Ocoee No. 1 Dam. The most recent collection of the snail darter at this location was in 1993 (TVA Natural Heritage Database 2017). Given the action area of the project occurring upstream of Ocoee No. 1 Dam for all of the alternatives, TVA has determined that the snail darter would not be affected by the proposed project.

Foraging habitat for gray bat, Indiana bat, and northern long-eared bat occurs over the Ocoee River. Additional foraging habitat and potentially suitable roosting habitat for Indiana bat and northern long-eared bat occurs in and over forested parcels reviewed in the proposed recreational agreement. No records of Indiana bat are known from Polk County, Tennessee. The closest Indiana bat records are roosting records in Cherokee National Forest which is approximately 18.6 miles away. Gray bats and northern long-eared bats have been reported from mist netting efforts as close as 0.3 miles from the sections of the Ocoee River under review. There are no caves known within three miles of the action area. No caves or occupied buildings or bridges are known from the parcels of land under review.

No construction of new facilities or improvements to existing facilities are proposed at this time. Proposed actions are not expected to alter terrestrial natural habitat. Deed restrictions on TVA owned lands would ensure that any future major vegetation removal (e.g. clearing of trees greater than 3 inches in diameter at breast height), construction, or improvements (including demolition of buildings) would be reviewed by TVA for environmental impacts prior to these actions taking place. Any potential future impacts to federally listed species under Section 7 of the Endangered Species Act would be consulted upon with the U.S. Fish and Wildlife Service as appropriate. Any potential changes to the water release regime on the Ocoee River would not impact foraging bats. Proposed actions would not affect gray bat, Indiana bat, or northern long-eared bat.

Botanical surveys were not conducted specifically for this project, but the Ocoee River gorge has been extensively studied. The full extent of Ruth's golden aster has been mapped by TVA using submeter GPS and large swaths of the valley have been reviewed to support the potential expansion of HWY 64 (Corridor K). White fringeless orchid has never been reported from the Ocoee River gorge and no habitat for the species occurs there. The proposed agreement would have no effect on white fringeless orchid.

Ruth's golden aster occurs sporadically throughout the Middle Ocoee; plants along this section of river account for approximately ten percent of the global population. Some portion of these plants is periodically inundated during periods of high flow, which are caused both by weather events and human-made causes like maintenance of dam infrastructure. The frequency, duration, and magnitude of the proposed recreational flows would be comparable to those currently occurring along that section of river and would be sufficient to maintain rare plant habitats found there. The proposed five-day reduction in flows would not likely produce any observable effects to plant communities present along the Middle Ocoee and are not likely to adversely affect Ruth's golden aster. Recreational flows comparable to what is occurring now along the Middle Ocoee appear to be beneficial to the species. Ruth's golden aster populations appear to have increased since the early 1980's when the first survey work for the species was conducted. These positive changes appear correlated with the initiation of recreational releases. Early estimates put the population of Ruth's golden aster on the Ocoee River at less than 500 individual plants while the first comprehensive survey in 1985 located 593 individuals. Since beginning an annual total census of Ruth's golden aster on both the Hiwassee and Ocoee river 2011, the average number of plants on the Ocoee River has been 1201 (range = 1053 to 1299). The substantial increase in plants found along the Middle Ocoee has taken place

during recreational flow regimes that are essentially identical to those proposed here. Ruth's golden aster does not occur on the five parcels that TVA and the U.S. Forest Service would make available to the state of Tennessee. In addition, river recreation, which has been suggested as having the potential to negatively impact the species, is projected to be flat or decrease slightly under the proposed flow regime. The proposed changes to whitewater rafting agreements on the Ocoee River are unlikely to result in negative impacts to Ruth's golden aster.

We respectfully request your concurrence with TVA's determination that the proposed changes to the Ocoee whitewater rafting agreement are not likely to adversely affect Ruth's golden aster. Should you have any questions or wish to discuss the project in more detail, please contact Adam Dattilo at (865) 632-2403.

Sincerely,

John T. Baxter, Jr.
Manager
Biological Compliance

AJD:ABM
Enclosures

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee ES Office
446 Neal Street
Cookeville, Tennessee 38501

November 1, 2017

John T. Baxter, Jr.
Manager
Endangered Species Act Compliance
Tennessee Valley Authority
400 W Summit Hill Dr.
Knoxville, Tennessee 37902

Subject: FWS# 2018-I-0056 & 2018-CPA-0064. Tennessee Valley Authority – Ocoee River 2018 Whitewater Rafting Agreements in Polk County, Tennessee.

Dear Mr. Baxter:

Thank you for your correspondence dated October 25, 2017, regarding the Tennessee Valley Authority's (TVA) proposal to amend the current agreements that govern recreational whitewater releases from Ocoee No. 2 Dam (Middle Ocoee) and Ocoee No. 3 Dam (Upper Ocoee), which expire in 2018. The proposed amendment would eliminate releases currently occurring on five weekdays in late September from the Middle Ocoee. No changes are proposed for the Upper Ocoee. The agreement would authorize the amended operation schedule for a term of 15 years. In addition to the amended release schedule, TVA would grant a 30-year easement on three (3) parcels of land (approximately 27.2 acres) to the state of Tennessee. The area is currently developed for recreational purposes. There is no anticipation of construction associated with this land transaction. U.S. Fish and Wildlife Service (Service) personnel have reviewed the submitted information, and we offer the following comments.

TVA has identified the snail darter (*Percina tanasi*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), Ruth's golden aster (*Pityopsis ruthii*), and white fringeless orchid (*Platanthera integrilabia*) as federally threatened or endangered species that could occur within the action area, using the Service's IPaC database. TVA has determined that the proposed action may affect, but is not likely to adversely affect Ruth's golden aster. Based upon the provided information, the Service concurs with this determination. Furthermore, TVA has determined that the proposed action would have no effect on the snail darter, gray bat, Indiana bat, northern long-eared bat, and white fringeless orchid. The Service acknowledges and agrees with this determination. We note, however, that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not

necessarily provide conclusive evidence that protected species are present or absent at a specific locality. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of the action that may affect listed species or critical habitat in a manner not previously considered, (2) the action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the action.

Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact Dustin Boles of my staff at 931/525-4984, or by email at *dustin_boles@fws.gov.*

Sincerely,

Mary E. Jennings

Mary E. Jennings
Field Supervisor