Document Type: EA-Administrative Record
Index Field: Final Environmental Assessment
Project Name: Parksville Reservoir Grass Carp EA
Project Number: 2017-1

TRIPLOID GRASS CARP STOCKING FOR AQUATIC VEGETATION MANAGEMENT IN PARKSVILLE RESERVOIR/OCOEE #1

FINAL ENVIRONMENTAL ASSESSMENT

Polk County, Tennessee

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August 2018

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List of Acronyms

AVM	Avian Vacuolar Myelinopathy
CFR	Code of Federal Regulation
CTGC	Certified Triploid Grass Carp
DDE	Dichlorodiphenyldichloroethylene
DO	Dissolved Oxygen
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
NEPA	National Environmental Policy Act
NLEB	Northern long-eared bat
NTGCICP	National Triploid Grass Carp Inspection and Certification Program
NWI	USFWS National Wetlands Inventory
PCB	polychlorinated biphenyls
RFAI	Reservoir Fish Assemblage Index
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

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CHAPTER 1 - PURPOSE AND NEED FOR ACTION

In recent years, invasive aquatic plants have continued to spread within the Tennessee Valley Authority's (TVA) reservoir system, causing environmental and economic impacts. The spread of the invasive species hydrilla *(Hydrilla verticillata)* throughout the TVA system poses the greatest threat. Hydrilla is capable of rapid growth and reproduction given ideal growing conditions. Hydrilla plant fragments can be easily transported from one waterbody to another via recreational and commercial boating as well as through downstream transport by flow. These transportation and reproduction methods have aided in hydrilla establishment throughout the valley causing conflicts with water resource uses.

Controlling the continued spread of hydrilla increases the overall health and function of newly affected reservoirs, which is an important environmental stewardship objective of TVA's Natural Resources program. Control and minimization of newly established hydrilla populations is the best strategy for reducing long term and costly impacts of the species. If allowed to establish over the course of several years, the cost of management and realized impacts increase exponentially and control options become limited.

Among the reservoirs affected by the spread of hydrilla is TVA's Ocoee Project #1 Reservoir, known locally as Parksville Reservoir, which is located in Polk County, Tennessee. Hydrilla was discovered in 2010, but was relatively isolated to the shallow water habitat around the Ocoee Inn. By 2016, the species was distributed throughout the Reservoir, constituting approximately 182 acres (10 percent) of the water body (Figure 1-1). The majority of hydrilla can be found in the upper third of the Reservoir where abundant shallow water, light accepting habitat is available for growth. Surveys of directly adjoining water bodies (Ocoee #2, Ocoee #3, and the Hiwassee River) in 2016 suggest that hydrilla is currently not present directly above Parksville Reservoir or below Ocoee #1 Dam.

TVA proposes to introduce sterile Triploid Grass carp (*Ctenopharyngodon idella)* as a means of controlling the spread of hydrilla within Parksville Reservoir and to reduce the likelihood of downstream expansion into the Lower Ocoee River and Hiwassee River. Grass carp eat submersed aquatic vegetation including hydrilla. Triploid fish are sterile and unable to naturally reproduce in a river system, which enables the fish populations to be easily monitored. Introduction of certified Triploid Grass Carp (CTGC) into a reservoir to control invasive aquatic plant growth is an effective measure to address new infestations of hydrilla that would otherwise continue to spread. Stocking CTGC is cost effective, provides long term aquatic vegetation management, and reduces the need for large scale herbicide and mechanical management techniques once a plant species becomes established. CTGC also provide better control of submersed plants in moderate- to high-flow reservoirs, like Parksville, where control by herbicides would be limited. Through the successful control of hydrilla, TVA intends to fulfill its mission of environmental stewardship and water resource management objectives in its Natural Resource Plan (TVA 2011) by increasing the overall health and function of the impacted reservoir.

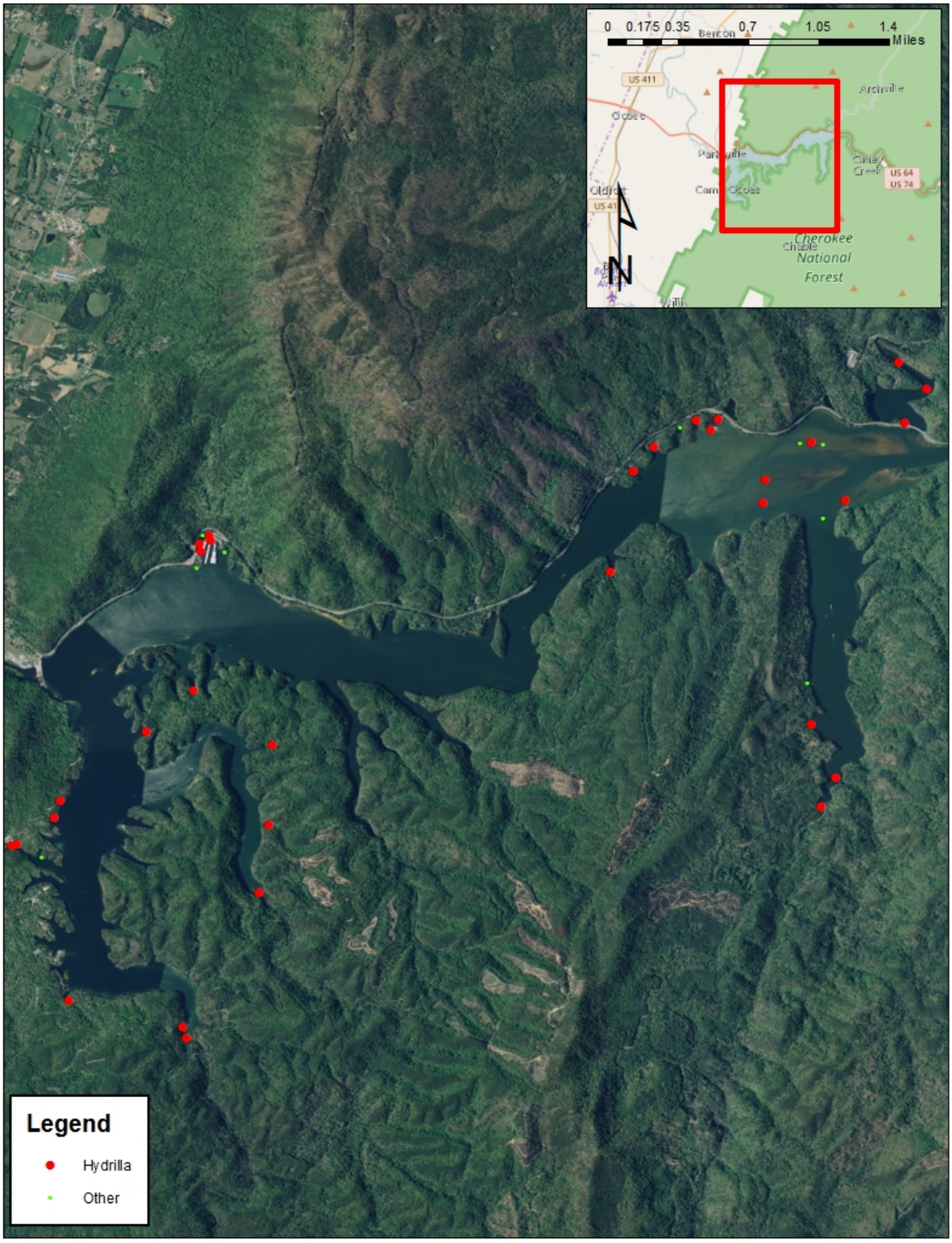

Figure 1-1 Hydrilla Distribution within Parksville Reservoir

1.1 Background

1.1.1 Parksville Reservoir

The Ocoee River rises in the Appalachian Mountains at an elevation of 2,025 feet above sea level with a watershed having an average annual rainfall exceeding that of any part of the United States, with the exception of the states of Oregon and Washington. Two miles below Ducktown, Tennessee, the river enters a narrow gorge which it follows for 10 miles. The river then flows through a wide valley to a narrow gateway between the slopes of Sugar Loaf Mountain on the south side of the river and Bean Mountain (now called Little Mountain) on the north side of the river. The narrow gateway between the mountains was used earlier for a water-powered grist mill.

TVA is a corporate agency and instrumentality of the United States, created by and existing pursuant to the TVA Act of 1933, to foster the social and economic wellbeing of the residents of the Tennessee Valley region. The Parksville dam and hydro plant is the oldest in the TVA system that is still in operation and was the first to supply hydroelectric power to the City of Chattanooga. Ocoee #1 Dam was constructed in 1910-1911 and was acquired from the Tennessee Electric Power Company by TVA in 1939. The reservoir surface area is 5,984 acres and encompasses a drainage area of 595 square miles. The reservoir has a backwater length of 7.5 miles, including 47 miles of shoreline. Parksville Reservoir originally had 85,000 acre-feet of storage when constructed. However much of the reservoir has been filled with silt due to the effects of deforestation caused by the copper smelting operations upstream in the 1930s and 1940s. The Reservoir volume has been reduced by an estimated 75 percent.

1.1.2 Aquatic Vegetation Management

Aquatic plants provide essential functions in aquatic ecosystems including food, shelter, and habitat for various species. They also produce dissolved oxygen (DO), stabilize sediments, and reduce turbidity in aquatic ecosystems. When present in excessive amounts however, these benefits are quickly negated as plant respiration (use of oxygen) can exceed oxygen production, and habitat complexity decreases. Furthermore, various economic impacts can occur as these plants begin to interfere with reservoir uses. Nuisance levels of aquatic plants can restrict recreation, clog water intake and control structures, and degrade water quality as well as increasing sedimentation rates resulting in a loss of flood storage capacity. This is especially true of non-native, invasive species that lack natural regulation through predation and disease.

The Tennessee Valley region's water resources have long been impacted by the establishment and spread of nuisance aquatic plant species. Since its creation in 1933, TVA has managed aquatic plants within its reservoirs on varying scales to ensure multiple uses of the water resources, to suppress reservoir-aging, and preserve flood storage capacity.

Prior to the 1950s, TVA's aquatic plant management focused on emergent aquatic species which initially established along the shoreline and developed self-supporting foliage that emerged at or above the water surface. These species were primarily managed through water level fluctuation, which reduced suitable habitat for these plant species as well as for mosquitoes. In the late 1950s, TVA began experiencing issues in its large main stem reservoirs with submersed non-native invasive aquatic plants, primarily Eurasian watermilfoil (*Myriophyllum spicatum*). Unlike emergent species, submersed species have

the capacity to grow much deeper in the water column, thus potentially impacting a much larger portion of each reservoir. Much like the strategies used for emergent plant control, drawdown and subsequent dewatering of light accepting (littoral) habitat proved moderately successful, especially in reservoirs with a drawdown potential of 10 feet or more. However, drawdowns were not successful in main-stem reservoirs where drawdowns rarely exceeded 7.5 feet. Therefore, TVA began a program using aquatic herbicides, especially products with the active ingredient 2,4-D, to supplement drawdown efforts on reservoirs which could not substantially lower their water levels.

From the late 1980s through the present day, TVA has utilized an integrated approach to management of aquatic plants in its reservoirs. TVA realizes the various benefits of aquatic plants and its objective is neither to eradicate aquatic vegetation nor to allow unmanaged proliferation of aquatic vegetation. Scheduled drawdowns, targeted aquatic herbicide applications in high use public areas, and mechanical harvesting (removal of plants through mechanical means) have been the primary means of management utilized by TVA in the past few decades. However, aquatic plants continued to increase in the system, particularly during prolonged periods of drought in the late 1980s. From 1984 to 1988, aquatic plant distributions in the system increased two-fold from 23,000 acres in 1984 to 46,000 acres in 1988.

Hydrilla began appearing in the TVA system in the 1980s. This species is not impacted by winter drawdown nor susceptible to 2,4-D. By the 2000s, hydrilla replaced most native stands of submersed vegetation, as well as other aggressive introduced species, and quickly became the primary species of aquatic plant in the system. Hydrilla remains the most dominant species today.

Hydrilla has continued to spread into reservoirs thought previously to be uninhabitable by most other submersed species. Currently, hydrilla establishment has been recorded as far west as Kentucky Reservoir and as far east as Parksville Reservoir in the TVA system. Establishment in most of TVA's large main stem reservoirs and resistance to drawdown have aided in system-wide expansion of the species. Once established, hydrilla requires long term, localized management to maintain access around developed public access sites. Downstream transport of fragments and the transport of fragments from one waterbody to another via recreational and commercial boating have contributed to its spread into new reservoirs, including smaller reservoirs intended for recreation and economic development. The best strategy for reducing impacts from hydrilla is to implement management prior to its long term establishment and expansion.

Currently, hydrilla occurs in only 10 percent of Parksville Reservoir. There is no winter drawdown and TVA does not currently use herbicides to manage aquatic vegetation at this Reservoir. Unabated, hydrilla has the potential to spread throughout the Reservoir, impacting nearshore access areas and thus limiting reservoir use. The species also poses the potential to spread above Parksville Reservoir and below Ocoee #1 Dam, which could interfere with local commercial recreation opportunities, industry, and economic development. Once established, long term management strategies including chemical and mechanical methods would likely be required to maintain access. Use of such control would be limited in areas with moderate- to high-flow, allowing unabated establishment and spread in those areas.

1.2 Decision to be Made

TVA has prepared this Environmental Assessment (EA) to consider whether to approve the proposed introduction of CTGC to Parksville Reservoir to manage the spread of hydrilla.

1.3 Scope of the Environmental Assessment

Pursuant to the National Environmental Policy Act (NEPA) and its implementing regulations promulgated by the Council on Environmental Quality (40 Code of Federal Regulations [CFR] §§ 1500–1508), federal agencies are required to evaluate the potential environmental impacts of any proposals for major federal actions. TVA prepared this EA to assess the potential consequences of TVA's Proposed Action Alternative on the environment and human health in accordance with NEPA and TVA's procedures for implementing NEPA (TVA 1983).

This EA describes the existing environment at the project site, analyzes potential environmental impacts associated with the Proposed Action Alternative and the No Action Alternative, and characterizes cumulative impacts that could result from the proposed project in relation to other ongoing or reasonably foreseeable proposed activities within the surrounding area of the Parksville Reservoir.

Although hydrilla occurs on only 10 percent of the reservoir, the project Study Area includes the waters and shore lands around the entire Parksville Reservoir.

This EA consists of six chapters discussing the project alternatives, environmental resources potentially affected, and analyses of impacts. The structure of the EA is outlined below:

- **Chapter 1.0:** Describes the purpose and need for the project, the decision to be made, related environmental reviews and consultation requirements, necessary permits or licenses, and the EA overview.
- **Chapter 2.0:** Describes the Proposed Action and No Action alternatives and provides a comparison of alternatives.
- **Chapter 3.0:** Discusses the affected environment within the Study Area and provides an analysis of the potential direct, indirect, and cumulative impacts on environmental resources of the alternatives. Mitigation measures also are proposed, as appropriate.
- **Chapters 4.0, 5.0, and 6.0:** Contain the list of preparers of this EA, the EA distribution list, and the literature cited in preparation of this EA, respectively.

Based on the nature of the proposal, TVA's experience with conducting environmental reviews, and other available information, the potential effects to the following resources are considered in this environmental review:

- Surface Water
- Aquatic Ecology
- Wildlife
- Threatened and Endangered Species (terrestrial wildlife species)
- Wetlands
- Socioeconomics and environmental justice
- Recreation
- Natural Areas

TVA determined that there would be no or negligible impacts for the resources listed below for the reasons stated. Thus, TVA determined that detailed analysis was unnecessary for these resources because there is no potential for significant environmental impacts. They are not discussed further in the EA.

- Air Quality – Because no air impacts would result from introducing the CTGC in the reservoir, the issue is dismissed from further review.

- Cultural Resources – While Ocoee #1 dam and Ocoee #2, Flume and Powerhouse are listed on the National Register of Historic Places, TVA does not anticipate any impacts to the dam. The Proposed Action Alternative would have "no potential to cause effects," 36 C.F.R. § 800.3; therefore, consultation with the Tennessee Historic Preservation Officer is unnecessary. TVA has met requirements under the National Historic Preservation Act.

- Floodplains – The introduction of the CTGC in the reservoir would not impact floodplains.

- Groundwater – While reservoir waters may be affected by the project, groundwater resources would not be affected.

- Solid and Hazardous Waste – Because no solid or hazardous wastes would be generated by the proposal, the issue is dismissed from further review.

- Navigation – Other than personal recreational watercraft (addressed in Recreation), there is no commercial navigation on the reservoir. No watercourses would be blocked or otherwise affected by the proposed project.

- Noise – No noise impacts would result from introducing the CTGC in the reservoir.

- Threatened and Endangered Plant Species – An April 2018 review of the TVA Natural Heritage Database indicated that six state-listed and one federally listed plant species have been previously reported from within 500 feet of Parksville Reservoir, between river mile 20 and Ocoee Dam # 1 (TVA 2018). Federally endangered Ruth's golden aster is found in cracks of river boulders in the Ocoee and Hiawassee Rivers. One additional federally listed plant, white fringeless orchid, has been documented from Polk County, Tennessee. Rare plant species previously reported from adjacent to Parksville Reservoir occupy a variety of terrestrial habitats, including woodlands, rock outcrops, roadsides, and floodplain forests.

None of the identified species occupy aquatic habitat similar to that of the invasive species hydrilla or potential habitat for introduced CTGC. Therefore, the proposed action would have no effect on state or federally listed plant species

- Transportation – No impacts to traffic or transportation infrastructure would result from the project.

- Visual Resources – In some locations, the elimination of hydrilla from the reservoir may have beneficial impacts by improving the appearance of the reservoir. However, such effects would be negligible.

- Land Use – No change to land uses would result from the proposed action.

- Prime Farmland – Prime farmlands would not be affected by the proposed action.

1.4 Necessary Permits

TVA would secure any permits necessary to undertake the Proposed Action Alternative. All permits would be held by TVA. TVA must obtain approval from the Tennessee Wildlife Resources Agency (TWRA) to stock fish within waters of the State. In addition, TVA may consult with the Tennessee Department of Environment and Conservation (TDEC) and the US Department of Agriculture – Animal and Plant Health Inspection Service. The US Fish and Wildlife Service (USFWS) oversees certification of triploid grass carp via the National Triploid Grass Carp Inspection and Certification Program (NTGCICP). TVA would obtain the necessary permits from TWRA and follow all procedures required by the USFWS before and during stocking of CTGC.

1.5 Public Outreach

TVA released this document for public review and comment. TVA notified interested elected officials and other stakeholders that the draft EA was available for review and comment for a 30-day period. TVA also notified government agencies, including TDEC, TWRA, the U.S. Forest Service, the U.S. Army Corps of Engineers (USACE), and the USFWS. An electronic version of the document was posted on TVA's website. In addition, public notices were published on June 20, 2018 in two local newspapers (The Cleveland Daily Banner and The Advocate & Democrat), soliciting comments from other agencies, the general public, and any interested organizations (Appendix A). TVA only received one letter from TDEC, who had no comments on the draft EA (Appendix B).

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CHAPTER 2 - ALTERNATIVES

2.1 Description of Alternatives

Preliminary scoping by TVA has determined that from the standpoint of NEPA, there is one alternative available to TVA that achieves TVA's purpose and need. In this section, the alternative, called the Proposed Action Alternative, and the alternative of taking no action, are analyzed in detail.

2.1.1 No Action Alternative

Under the No Action Alternative, TVA would not stock Parksville Reservoir with CTGC to address the spread of hydrilla. TVA does not perform aquatic vegetation management in this reservoir, and would not change its management of aquatic plants. This lack of action is not expected to reduce hydrilla abundance and would allow hydrilla to continue to grow in the majority of the Reservoir.

Parksville Reservoir is subject to TVA's aquatic vegetation treatment program as outlined in its 2015 memo for the 1993 Aquatic Plant Management Program, Supplemental Environmental Impact Statement. The memo addresses the application of herbicides as a means of aquatic vegetation management for various species including hyrdilla. If TVA wanted to implement aquatic vegetation herbicide treatment at Parksville in the future, a reservoir specific environmental review would be completed to evaluate the potential impacts of the treatment program.

The potential environmental effects of adopting the No Action Alternative are considered in the EA to provide a baseline for comparing the potential effects of implementing the proposed action.

2.1.2 Proposed Action Alternative

Under the Proposed Action Alternative, TVA would stock CTGC for maximized control of hydrilla into Parksville Reservoir. TVA would survey standing hydrilla biomass and coverage within Parksville Reservoir annually to inform all management decisions. TVA would also continue to monitor other reservoirs within the Ocoee system (i.e., Ocoee #2 and Ocoee #3), and downstream Hiwassee river for early hydrilla detection. Should hydrilla introductions occur in these surrounding reservoirs, TVA would consider what management actions might be appropriate in these surrounding reservoirs as funding allows and subject to additional environmental review.

Description of Proposed Stocking Program

The introduction of triploid grass carp is generally considered an environmentally safe means of controlling nuisance aquatic vegetation in both open and closed waters (USFWS Biological Opinion 1987). The USFWS holds jurisdiction over certification of triploid grass carp per the NTGCICP. The USFWS has issued a Biological Opinion stating that use of triploid grass carp for aquatic weed control is environmentally safe and that triploid grass carp may be stocked in closed or open waters[1] (USFWS 1987). TVA would obtain the necessary permits/approvals and follow all procedures required by the USFWS and TWRA

[1] Closed water systems are those where no water flows out, and water which is not evaporated will remain in the system indefinitely. An open water system is where water constantly flows out under almost all climatic circumstances.

before and during stocking of CTGC. The use of only CTGC is an important precaution to prevent stocked individuals from reproducing to unwanted levels in target areas, as well from spreading to unintended areas should they escape. Without continued restocking, CTGC populations will eventually die out over their life span.

Under the Proposed Action Alternative, TVA would stock Parksville Reservoir with CTGC over approximately six years. Grass carp effectiveness after initial stocking is often delayed as much as four years before efficacy is noted (Stich et al. 2013). Therefore, TVA would stock Parksville Reservoir over several years to establish a staggered age class structure and reduce the potential for a single stocking age class collapse before CTGC vegetation control is achieved.

The stocking rate would be determined on the amount of hydrilla standing biomass established, the projected coverage in the reservoir, and the desired level of vegetation management. Typical stocking rates across the country range from 5 to 50 individuals per vegetated acre. Stocking of CTGC would be based on a total number of fish per vegetated acre of submersed plants in a given year. Vegetated acres would be determined annually with the use of hydroacoustic and point sampling of the entire littoral zone of the reservoir.

Baseline stockings would occur in Years 1 and 2 to establish appropriate rate for control, and subsequent maintenance stocking would occur in year 3 and beyond to account for a projected mortality of 30 percent annually. Target stocking rate for CTGC would be to maintain 20 fish per vegetated acre for approximately 10 years, followed by maintaining 1 fish per 8 surface acres thereafter (Kirk and Manuel 2012). Stocking of CTGC would target 15 fish per vegetated acre in Year 1, and 7.25 fish per vegetated acre in Year 2 for a total rate of 22.25 fish per vegetated acre. A 30 percent mortality rate would be assumed of newly stocked individuals (year 0), followed by a 20 percent mortality for year 1+ individuals annually and accounted for during supplemental stocking each year.

Stocking would occur in early fall of 2018 to late spring of 2019 from pre-determined areas around Parksville Reservoir. Only CTGC of 10-12 inches would be stocked to reduce the likelihood of predation by gamefish and other fish-eating (piscivorous) bird and mammal species. Based on a projected population of 20 fish per vegetated acre after Year 2, and a 20 percent mortality rate over Years 1 and 2, supplemental stocking in Year 3 would be at a rate of 4.5 fish per vegetated acre. Continued restocking rates would be informed by surveys of submersed plants in the year prior to each stocking.

As mentioned above, TVA expects that there would be a 4-year time lag from initial stockings until significant reductions in hydrilla densities are observed. Therefore, Year 4 would be considered an observatory year and active management would be minimal. Active management and supplemental stocking in Years 5 and 6 would be informed by observations and survey information gathered in Year 4. TVA would restock CTGC based on monitoring after Year 4 to maintain control of hydrilla. Because of the ability of hydrilla to re-grow from tubers and turions[2] that persist in the bottom sediments, it is likely that stocking of CTGC would be a permanent part of TVA's Aquatic Plant Management Plan on Parksville Reservoir. However, if aquatic vegetation surveys show management to be successful, maintenance stocking of CTGC at a reduced rate may be appropriate.

[2] A turion is a wintering bud of some aquatic plant species that becomes detached and remains dormant at the bottom of the water.

2.2 Other Alternatives Evaluated, but Dismissed from Further Consideration

TVA evaluated a range of alternatives for addressing the spread of nuisance aquatic vegetation in its 1993 Supplemental EIS. These included various other biological controls, mechanical controls (harvesting), physical controls (barrier mats), and water level manipulation.

Other biological controls identified in the 1993 Supplemental EIS include insects, fungi or bacteria. The use of insects as an effective biological control is still being debated as there are no known native species that feed on hydrilla that can survive Tennessee winters. There have been some non-native insect species found that feed only on hydrilla and have been introduced to the United States. However, these insects are not predictable and do not reduce the need for other management options. No fungi or bacteria have been identified to help control hydrilla.

In 2016, TVA changed the drawdown regime on Parksville Reservoir such that summer pools are now maintained year-round. This change was made to support the U.S. Environmental Protection Agency's (USEPA) 2011 decision that keeping the contaminated sediments in the reservoir inundated year-round under deeper water would help improve water quality. This permanent pool elevation is only affected by flood and drought conditions. Also, dormant hydrilla tubers are rarely impacted by winter drawdown in the southern United States as they remain deep in the hydrosoil. Therefore, water level manipulation would not be an effective aquatic vegetative management strategy for this reservoir.

Physical controls such as a barrier/benthic mats can interfere with fish spawning, are difficult to install, must be regularly inspected and maintained, and are expensive. Physical controls and water level manipulation were not addressed further in this EA because they do not fully meet TVA's objectives, purpose, or need for the project.

2.3 Comparison of Alternatives

A comparison of impacts associated with implementing the No Action Alternative and the Proposed Action Alternative is provided in Table 2-1.

Table 2-1 Comparison of Impacts of the No Action Alternative and the Proposed Action Alternative

Resource Area	No Action Alternative	Proposed Action Alternative
Aquatic Ecology	Long-term increases in hydrilla populations would reduce native aquatic plant diversity, decrease algal growth, decrease macroinvertebrates, and reduce fish diversity and populations.	Long-term decreases in hydrilla populations would increase native aquatic plant diversity, increase algal growth, increase macroinvertebrates, and increase fish diversity and populations.
Surface Water	Direct, indirect and cumulative negative water quality impacts would occur due to the continued increase in hydrilla, which would cause increased nutrients, decreased algal growth, and decreased water clarity.	Initially, potential increase in nutrients resulting in minor, short-term impacts to water quality. Long-term improvement as density of hydrilla is reduced, leading to more stable DO, pH, and other water quality measures.
Terrestrial Ecology (Wildlife)	Negative direct, indirect and cumulative impacts to terrestrial wildlife as a result of the increase in hydrilla.	Insignificant adverse impacts to common wildlife populations and beneficial impacts to some specific, common wildlife species.
Threatened and Endangered Terrestrial Species	Northern pine snake, seepage salamander, smoky shrew, southern Appalachian woodrat, and woodland jumping mouse would not be impacted by actions under this alternative. No effect to Gray ,Indiana, or Northern Long Eared Bats. Bald eagle may be negatively affected.	Northern pine snake, seepage salamander, smoky shrew, southern Appalachian woodrat, and woodland jumping mouse would not be impacted. No effect to Gray Bat, Indiana Bat or Northern Long Eared Bat. Bald eagle may be beneficially affected.
Wetlands	Minor direct, indirect or cumulative wetland impacts. The increase in hydrilla would result in reduced aquatic plant species diversity and reduced wetland quality. No direct, indirect or cumulative impacts to emergent and forested wetlands.	Short term impacts to non-native aquatic bed wetland communities. The gradual, localized loss of this non-native habitat would be insignificant. No direct, indirect or cumulative impacts to emergent and forested wetlands. Potential beneficial impacts on wetlands over time as native aquatics plant reestablish.

Resource Area	No Action Alternative	Proposed Action Alternative
Recreation	Potential positive impact on certain activities such as boat fishing or waterfowl viewing, but adverse impacts on other recreational activities such as general boating, camping, whitewater rafting, swimming and water sports.	Beneficial indirect, direct, and cumulative recreational impacts.
Socioeconomics and Environmental Justice	Potential significant impact on the local economy due to decrease in recreational opportunities. No disproportionate impacts on minority or poverty communities.	Beneficial direct, indirect and cumulative impacts to the local economy due to increase in recreational opportunities. No disproportionate impacts on minority or poverty communities.
Natural Areas	Minor direct, indirect and cumulative impacts to natural areas	No significant direct, indirect or cumulative impacts to natural areas

2.4 Identification of Mitigation Measures

TVA did not identify any non-routine measures necessary to avoid, minimize, or mitigate adverse impacts on the environment.

2.5 The Preferred Alternative

The Proposed Action Alternative, stocking CTGC into Parksville Reservoir for maximized control of invasive, non-native hydrilla, is TVA's preferred alternative.

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CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes those resources or issues potentially affected by TVA's proposal. As stated in Chapter 1, the Study Area for the project encompasses the entire reservoir, including shore lands. According to TVA's most recent assessment of hydrilla on Parksville Reservoir, as much as 10 percent of the reservoir is affected by the nuisance vegetation.

3.1 Aquatic Ecology

3.1.1 Affected Environment

The proposed project is located in Polk County, Tennessee. This project area drains to several streams within the (8-digit HUC 06020003) Ocoee watershed and is located in the Blue Ridge Ecoregion. From the late 1800s until the 1980s, the Ducktown Mining District and the surrounding Copper Basin were nearly devoid of vegetation. During this period, tens of millions of cubic yards of soil were eroded and transported to the Ocoee River. In addition, a variety of mining and industrial wastes, principally acid-generating and heavy-metal-bearing materials, were discharged into creeks in the mining district and carried downstream into the Ocoee River. As a result of the sediment and chemical contaminants, aquatic life and aquatic habitat in the Ocoee River were significantly degraded. Historical sampling of the river recorded elevated concentrations of several hazardous substances or contaminants in the river's water and sediments, including copper, iron, lead, and zinc, as well as low pH (acidic conditions) (USEPA 2011).

TVA has monitored water quality and aquatic ecology conditions of the reservoirs in the Tennessee River system since 1990. The purpose of this monitoring program is to provide information on the "health" or integrity of Tennessee Valley reservoirs. The ecological health evaluation is based on five ecological indicators: DO, chlorophyll, sediment quality, fish assemblage, and benthic macroinvertebrates. Each indicator is evaluated separately based on expectations under reference conditions and assigned an ecological rating of "Good," "Fair," or "Poor" (TVA 2016a).

3.1.1.1 Physical and Chemical Characteristics

Monitoring takes place at one station on Parksville Reservoir located in the dam's forebay (the deep, still water near the dam) on a two-year cycle. The overall ecological health condition of Parksville Reservoir rated fair in 2017 scoring slightly lower than in recent years. This is due to consistent problems with high chlorophyll concentrations and low DO levels near the bottom of the reservoir. Parksville rated fair most years prior to 2006 then rated good to high fair through 2014. The lowest ecological health score (poor) recorded for Parksville Reservoir occurred in 1999 due to concurrent low scores for bottom life and fish. These ratings are briefly explained in the paragraphs that follow.

Dissolved Oxygen

Dissolved oxygen is considered here as a qualitative component of ecological health for the reservoir (i.e., how well it supports aquatic life). Dissolved Oxygen was rated fair due to a small area of low DO (less than 2 milligram/liter) near the reservoir bottom in late autumn. Dissolved oxygen also rated "fair" in 2005 and 2006, but it typically receives a "good" rating. (TVA 2018)

Chlorophyll

Chlorophyll, a surrogate measure for the amount of algae (phytoplankton) in the water, is important because it provides insights into the level of primary productivity within a water body and can provide a measure of nutrient enrichment. High chlorophyll concentrations indicate excessive algal growth, which often signals nutrient enrichment. Nutrient enrichment can lead to algal blooms which lower or eliminate DO that fish and other aquatic life need to survive and can even lead to growth of human-harming bacteria.

Chlorophyll is typically rated good, but due to an elevated concentration in April 2017 it is rated fair. It should be noted that chlorophyll concentrations in Parksville are assessed relative to expectations for the Blue Ridge Ecoregion, which has naturally low nutrient concentrations. Therefore, chlorophyll concentrations are expected to be much lower in Parksville than in other Tennessee Valley reservoirs located outside the Blue Ridge Ecoregion. (TVA 2018)

Sediment Quality

Sediments provide habitat for many aquatic organisms and are also a major repository for many of the more persistent chemicals that are introduced into the aquatic environment. A "Good" rating means sediment is free from polychlorinated biphenyls (PCBs), pesticides and large concentrations of metals. Sediment quality remains the most important ecological health issue for Parksville Reservoir. Past mining practices in the Copper Basin left a legacy of very high concentrations of several metals in Parksville Reservoir including: arsenic, copper, iron, lead and zinc. In addition, historically, elevated amounts of PCBs have been found in the sediment. Concentrations of PCBs and several metals appear to be decreasing through time, although concentrations remain above normal levels. (TVA 2017)

3.1.1.2 Aquatic Animals

Grass Carp

The grass carp (or white amur, *Ctenopharyngodon idella,* Figure 3-1) is an herbivorous fish native to large river systems of Eastern Asia and has been used world-wide as food and as a biological control of aquatic weeds. Initial stocking of the grass carp for weed control in the United States took place in 1963 as part of cooperative effort between the USFWS and Auburn University (Mitchell and Kelly 2006). The species has since been utilized in 35 different states, primarily for weed control in closed public or private waterbodies. Introductions of diploid (reproductively fertile) grass carp in the early 1960s negatively impacted submersed plants (both native and non-native species) in the Mississippi and Missouri Rivers because the fertile grass carp have been successfully reproducing in these systems for over 50 years. Therefore, most states currently limit the use of grass carp to only artificially produced, triploid (sterile) fish in order to prevent any further natural reproduction in other river systems. The USFWS would test these fish for reproductive conditions to certify that only triploid fish are used. Triploid condition is induced by cold, heat, or pressure shocking of fertilized grass carp eggs that renders fish sterile.

Triploid grass carp have been erroneously associated with bighead (*Hypophthalmichthys nobilis)*, black (*Mylopharyngodon piceus*) and silver (*Hypophthalmichthys molitrix*) carp, which have all become species of concern within the United States. Like the grass carp, all of these species originate from Asia and are subsequently lumped under the classification of "Asian Carp." Bighead and silver carp consume phytoplankton, upsetting native food webs and reducing food availability for many native species. Black carp consume snails

and threaten various native mollusk populations. Therefore, these species are not used as biological control for aquatic vegetation.

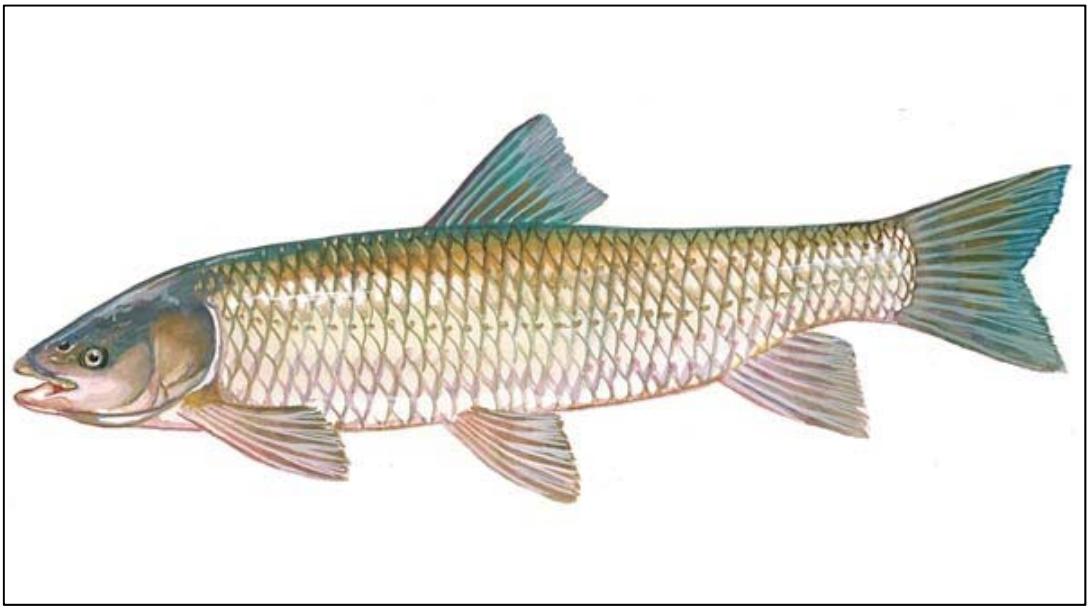

Figure 3-1 Grass carp or white amur (*Ctenopharyngodon idella*)

Grass carp can live more than 20 years in ideal conditions and can grow to weigh more than 80 pounds. Grass carp are almost solely herbivorous and rarely consume any animal material beyond invertebrates in the juvenile life stage. Consumption rates are affected by size of fish (consumption rates decrease as fish age and grow) and various environmental characteristics including water temperature, salinity, and oxygen content of water. (Sutton and Vandiver 2006)

Grass carp are considered to be generalist feeders, but tend to selectively feed on preferred species such as hydrilla, southern naiad, and duckweed if those species are available. If populations of their preferred plant species are diminished, however, grass carp will feed on nearly all other submersed aquatic vegetation except Eurasian watermilfoil. Grass carp are not recommended as a good option for invasive plant control in natural water bodies with diverse native populations of submersed plant species, as native species may be readily consumed once the target nuisance species have been depleted. In most reservoirs, diverse assemblages of submersed plants are absent or low in abundance when a naturally occurring seed bank is not present. (Garner et al. 2013).

Fish Assemblages and Macroinvertebrates

TVA typically monitors fisheries in Parksville Reservoir during October and November. The fish assemblage in the forebay of Parksville Reservoir generally rates Fair. As in previous years, a lack of species diversity, particularly the absence or low numbers of intolerant species, lowered the overall fish community score. The TWRA stocks Parksville with multiple fish species to increase the fishing potential and overall fish community in the reservoir. These fish include rainbow trout, walleye, and bluegill. In 2017, TWRA initiated an effort to reintroduce the native muskellunge (muskies) to Parksville with an October stocking. TWRA monitors the stocked fish to keep track of population size and potential impacts.

TVA also monitors contaminants in fish fillets from TVA reservoirs and their major tributary streams. TVA coordinates fish tissue studies in the Tennessee Valley region with state agencies that are responsible for advising the public of health risks from eating contaminated fish. TVA assists the states by collecting fish from TVA reservoirs and testing the tissue for metals, pesticides, PCBs, and other chemicals that could affect human health. As of October 2017, there are no TWRA precautionary consumption advisories associated with Parksville Reservoir (TVA 2018).

The overall condition of benthic (bottom-dwelling) macroinvertebrates in Parksville Reservoir has usually been rated as Good, including the most recent evaluation, compared to other reservoirs in the Tennessee Valley's interior plateau ecoregion. (TVA 2018)

3.1.1.3 Aquatic Vegetation

Like most reservoirs, Parksville Reservoir has very low diversity in terms of native, naturally occurring aquatic plants. During TVA's 2016 survey of Parksville Reservoir, in addition to the exotic hydrilla, common water nymph (*Najas guadalupensis*) and horned pondweed (*Zanichellia palustris*) were the only native submersed plants present.

Hydrilla is a submersed aquatic plant species native to Africa, Australia and parts of Asia that is highly invasive and can cause severe ecological alterations and economic impacts (Langeland 1996). Potential economic impacts could include decrease in commercial fishing; decrease in recreational activities that impact tourism; or clogging and/or damaging dams, power plants, and other water control structures. After introduction into Florida during the 1950s, the species has continued to spread, establishing itself as far north as Maine and as far west as Washington (Bailey and Calhoun 2008, Madeira et al. 2000). Hydrilla is uniquely adapted to grow in shaded areas with less than 1 percent sunlight, so that growth is limited only by extremely low water clarity and depth of light penetration. Therefore, hydrilla can survive at depths not previously inhabitable by many other species. Hydrilla has been reported at depths of greater than 20 feet in the Tennessee Valley.

Monoecious[3] hydrilla is the only biotype in Parksville Reservoir (Figure 3-2). It has a shorter growing season (four to six weeks) at greater depths than other aquatic plant species (Madeira et al. 2000, Netherland 1997). The monoecious biotype has a higher tuber production, thus exacerbating the threat of potential spread in cooler, deeper waterbodies like those within the TVA system (Steward 1987). One square meter of monoecious hydrilla produces between 20 and 900 tubers annually. Once hydrilla is well established in a water body, it is virtually impossible to manage on a reservoir-wide scale and requires costly management and maintenance measures.

Hydrilla was discovered in Parksville Reservoir in 2010, however the species remained relatively isolated to the narrow littoral zone around the Ocoee Inn and did not impact recreation until 2016. Baseline surveys of submersed aquatic vegetation in Parksville Reservoir were last conducted on October 18-19, 2016 (Figure 3-3). An estimated total of 182 acres of submersed aquatic vegetation was identified within the approximately 1,930 acres of the Reservoir. Hydrilla was the most dominant species in the reservoir, which also included water nymph (*Najas guadalupensis*), horned pondweed (*Zanichellia palustris*), and green algae (*Chara sp*.).

[3] A monoecious plant biotype has both the male and female reproductive organs in the same individual and does not need pollination for reproduction. A dioecious plant biotype has the male and female reproductive organs in separate individuals.

Figure 3-2 Dioecious hydrilla (left) and monoecious hydrilla (right).

Hydrilla is present in approximately 182 acres (approximately 10 percent) of the reservoir (see Figure 1-1). The greatest concentrations of hydrilla were found in the upper third of the reservoir where abundant littoral habitat is available for growth; however, the plant has established colonies throughout the reservoir. Surveys of directly adjoining water bodies in 2016 suggest that hydrilla is currently not present directly above Parksville Reservoir or below Ocoee #1 Dam.

3.1.1 Environmental Consequences

3.1.1.1 No Action Alternative

3.1.1.1.1 Physical and Chemical Characteristics

If no CTGC were stocked in Parksville Reservoir, it is likely that hydrilla would eventually spread, establish a tuber bank, and increase in overall abundance over time since TVA does not perform aquatic vegetation management (herbicide or mechanical removal) in this reservoir. Mats of hydrilla along the banks would have minor beneficial impacts as they absorb wave energy and reduce bank erosion and sediment runoff into the reservoir.

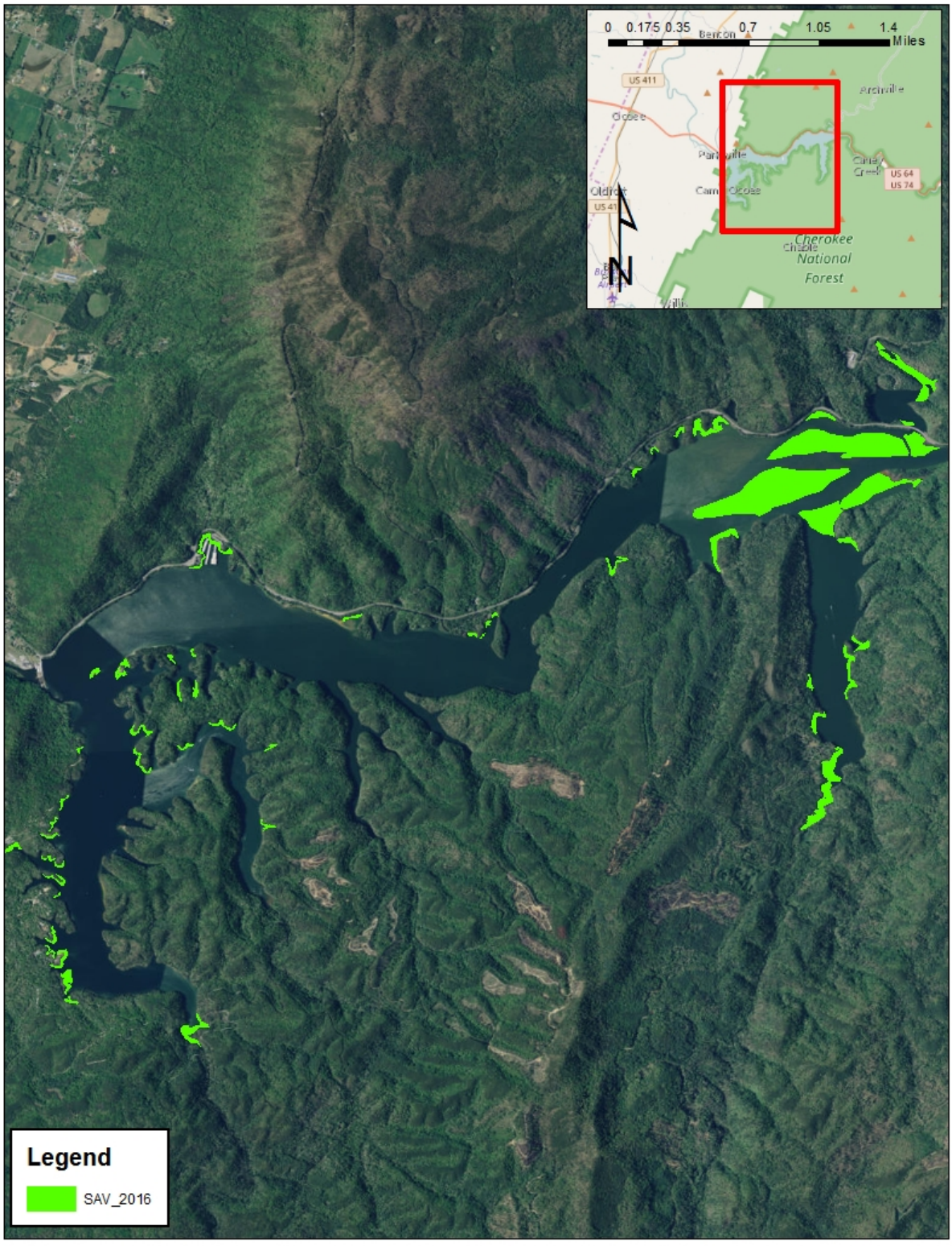

Figure 3-3 2016 Submersed Aquatic Vegetation (SAV) Distribution in Parksville Reservoir

Long-term increases in hydrilla abundance and distribution within the littoral zone would eventually result in decreased DO levels, fluctuations in pH (acidity), and a decline in temperature and light penetration relative to current levels. Therefore, there would be direct, indirect and cumulative impacts from the continued expansion of hydrilla populations associated with the No Action Alternative. However, the physical and chemical changes to open water areas of the reservoir, especially in locations where depths are greater than 20 feet, would not change significantly over time.

3.1.1.1.2 Aquatic Animals

With long-term increases of hydrilla in the reservoir, there would likely be some level of cascading effects through the food chain. Particularly in littoral areas of the reservoir, excessive abundance of hydrilla would cause shading that would decrease algae and phytoplankton, which reduces zooplankton abundance. Fish, macroinvertebrates, and trophic processes dependent on algal production would therefore be expected to decline in these areas. Overall fish and invertebrate community diversity, as well as reservoir ecological health scores, may decline over time, particularly within the littoral zone. Open water fish and invertebrate species that are adept at living in deeper waters would not change significantly.

3.1.1.1.3 Aquatic Vegetation

The implementation of the No Action Alternative would presumably result in increased invasive aquatic plant coverage, which could eventually result in reductions in native aquatic plant species diversity. Therefore, there may be increasingly adverse impacts to existing aquatic vegetation under the No Action Alternative.

3.1.1.2 Proposed Action Alternative

3.1.1.2.1 Physical and Chemical Characteristics

The introduction of CTGC to reduce hydrilla biomass in littoral areas of Parksville Reservoir would shift the overall utilization of nutrients in the water column away from hydrilla and toward utilization by algae at the primary production level. It is unclear if and how much overall primary and secondary production would change throughout the reservoir. TVA expects that trophic levels and species composition would shift, but that overall reservoir production would not change significantly.

Hydrilla would be reduced gradually, allowing native aquatic vegetation to reestablish, which would help stabilize sediment. Based on observations in Guntersville Reservoir, where grass carp were stocked and native vegetation reestablished, TVA would expect little to no alteration in sediment stability and transport within Parksville Reservoir.

The removal of the hydrilla mats could reduce wave buffering to the banks and result in greater bank erosion and sediment runoff into the reservoir. However, because native aquatic vegetation is expected to grow as more open water habitat is made available, the banks could be sufficiently vegetated or protected by man-made structures. Therefore, bank degradation and sediment runoff would not be expected to change significantly.

3.1.1.2.2 Aquatic Animals

The reduction of hydrilla would allow more sunlight to penetrate the water column, which would result in increased algal and phytoplankton production, as well as zooplankton and planktivorous invertebrates and fish. Therefore, we would expect to see a shift in the

proportions toward these trophic groups and predators (fish, birds, and mammals) that utilize or prefer planktivorous invertebrates and fish species. The amount of shift toward these trophic interactions is difficult to predict quantitatively. Overall changes in biomass within the reservoir would not be expected to change significantly, but a greater community diversity would be expected due to greater variation in primary production sources within the Parksville Reservoir.

3.1.1.2.3 Aquatic Vegetation

Although the CTGC may eat some native aquatic plant life, thereby reducing aquatic plant diversity, these decreases are not expected to be significant. Reservoirs like Parksville are not diverse ecosystems for aquatic plants. The proposed action may also provide a benefit to native plant population as hydrilla population decreases, native plant populations would likely increase.

There is a rare possibility that the introduction of CTGC could result in a drastic reduction in aquatic plants in the reservoir and creation of an algae dominated system. This outcome would reduce water clarity and make nutrients readily available within the water column. However, the proposed sustained stocking of CTGC over several years would decrease the possibility of this happening on Parksville Reservoir because those rare cases occur when a high stocking rate (100+ per acre) was used (Garner et al. 2013). The proposed action also includes annual surveys and monitoring to avoid such impacts. Surveys would directly inform and drive all management decisions and allow for adjustments to stocking rate each year. As noted in Section 2.1.2.2, TVA would maintain a low to moderate maintenance stocking based on the annual biomass surveys. This allows TVA to adjust the stocking rate in a way to greatly reduce the risk of complete aquatic plant removal (Stick et al. 2013). For example, if hydrilla biomass is decreasing too fast and algal blooms are created, TVA would stock less fish or no fish at all the following stocking year. Therefore, there would likely be only minor impacts to aquatic plants as hydrilla is reduced over time.

3.2 Surface Water

3.2.1 Affected Environment

As previously stated, mining activities from the 1800's until the 1980's have severely impacted the Ocoee River Watershed. Due to severe deforestation, millions of cubic yards of soil and mining and industrial wastes were eroded into the Ocoee River, much of which settled out in Parksville Reservoir. As a result, approximately 75 percent of the reservoir has silted in.

The federal Clean Water Act requires states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by each state. The assessment of Tennessee's waters was based on a water quality evaluation that took place during 2015 and early 2016 (TDEC 2017). Water quality limited streams are those that have one or more properties that violate water quality standards. They are considered impaired and not fully meeting their designated uses. The Ocoee River and Parksville Reservoir are both listed on the TDEC 303(d) list. The Ocoee River and Parkville Reservoir are listed for flow alteration, due to the upstream impoundment dams and for copper, iron, zinc, and loss of biological integrity due

to siltation from mine tailings, contaminated sediments and impacts from abounded mines. Currently there are no fish advisories associated with the Parksville Reservoir.

In 2016, TVA changed the drawdown regime such that summer pool elevations would be maintained year round. This change was made to support the USEPA's 2011 decision that keeping the contaminated sediments in the reservoir inundated year-round under deeper water would help improve water quality.

Precipitation in the general area of the proposed project averages about 60.12 inches per year. The wettest month is March with an average of 6.42 inches of precipitation, and the driest month is October with 3.27 inches. The average annual air temperature is 57 degrees Fahrenheit, ranging from a monthly average of 44 degrees Fahrenheit to 70 degrees Fahrenheit (US Climate Data 2018). Stream flow varies with rainfall and averages about 31.52 inches of runoff per year, i.e., approximately 2.32 cubic feet per second, per square mile of drainage area (USGS 2008).

3.2.2 Environmental Consequences

3.2.2.1 The No Action Alternative

Under the No Action Alternative, it would be expected that aquatic vegetation would continue to grow and increase. The increase in aquatic plant vegetation would degrade water quality by causing extreme fluctuations in DO, pH (acidity), and other conditions (TVA 1990). Therefore, there would be negative direct, indirect and cumulative surface water impacts from the continued expansion of hydrilla populations associated with the No Action Alternative.

3.2.2.2 The Proposed Action Alternative

Aquatic plants can have positive effects on water bodies by reducing wave action erosion on shorelines, providing a food source for aquatic fish species, and providing cover and protection for fish species. However, invasive or nuisance species can decrease more desirable vegetation species and impact the water quality of the water body by causing extreme fluctuations in DO, pH, and other conditions (TVA 1990).

Grass carp potentially can impact water quality characteristics such as nutrients, DO, pH, calcium, water clarity, turbidity, and chlorophyll (an indicator of phytoplankton activity). Grass carp eat aquatic plants and then excrete nutrients into the water. The nutrient rich fecal material sinks to the bottom, and only a small portion of the nutrients become available to phytoplankton (Hestand and Carter 1978, Leslie et al. 1987).

A demonstration of the use of CTGC was conducted by TVA in the Guntersville Reservoir and found that nutrient release from grass carp wastes would not be measurable (TVA 1990). Without a significant increase in nutrients, any changes in associated water quality characteristics such as algal growth, pH, DO, and water clarity would likely be minor and of short duration. Minor, indirect effects of increased shoreline erosion and turbidity at some portions of the reservoir may occur with the initial reduction of aquatic vegetation levels. Experiences at other locations where grass carp have been used indicate that no odors or other objectionable aesthetic conditions are associated with use of grass carp for vegetation reduction (TVA 1990).

This proposed action would reduce the total quantity of hydrilla, but as the hydrilla population decreases, native plant populations would likely increase. As mentioned above,

there is a potential for shoreline erosion due to wave action and increased turbidity. However, emergent shoreline vegetation, which would not be readily eaten by grass carp until other preferred foods had been eliminated, would stabilize large portions of the reservoir shoreline (TVA 1990). As part of the Proposed Action, TVA would survey Parksville Reservoir annually to inform all management decisions, which would include adjusting stockings if erosion was increasing due to slow emergent vegetation growth. Also, the water quality characteristics would likely improve as the reservoir system and aquatic life adjust to the introduction of CTGC. The overall reduction in the density of hydrilla on Parksville Reservoir would limit the existing fluctuations in DO, pH, and other conditions. Therefore, there would be minor long-term beneficial impacts under the proposed action.

Overall, there would be minor temporary indirect, direct and cumulative surface water impacts from the initial stocking of CTGC into Parksville Reservoir and minor long-term beneficial impacts under the Proposed Action Alternative.

3.3 Terrestrial Ecology - Wildlife

3.3.1 Affected Environment

Parksville Reservoir is a dammed reservoir that provides habitat for common terrestrial and amphibious species. The open water provides habitat for common diving waterfowl species such as bufflehead, canvas back, common merganser, ring-necked duck, and lesser scaup. Other species such as Canada goose, double crested cormorant, and osprey are also likely to use this open water habitat. Sedimentation in the western side of the action has created shallow areas that may provide some emergent and aquatic vegetation foraging habitat including Hydrophilla. Additional small communities of pondweeds and emergent vegetation are scattered across the reservoir. These areas may provide suitable habitat for common dabbling ducks such as coots, gadwall, grebes, pintail, teals, and mallards, shovelers, and widgeons. The drawdown regime on this reservoir changed in 2016 such that summer pools are now maintained year-round. Small areas of mudflats that used to occur in areas where sediment has built up are no longer seasonally exposed. At this time, the action area no longer provides temporarily stopover habitat for shorebirds during migration (National Geographic 2002). Prior to the drawdown schedule change, no shorebird nesting occurrences had been documented on these mudflats.

Common amphibians may utilize the areas with emergent and submerged vegetation along shorelines. Species potential found here include American bullfrog, Cope's gray treefrog, green frog, southern leopard frog, and upland chorus frog (Redmond and Scott 2018). Reptiles that also may use these areas or open water areas include common musk turtle, common snapping turtle, midland watersnake, midland painted turtle, and queen snake (Buhlmann et al. 2008, Gibbons and Dorcas 2005). Mammals that may use this reservoir include beavers and muskrat (Whittaker 1996).

Migratory birds of concern in this area as listed by the USFWS Information for Planning and Consultation website are bald eagle, black-billed cuckoo, bobolink, Cerulean warbler, eastern whip-poor-will, Kentucky warbler, prairie warbler, red-headed woodpecker, rusty blackbird, wood thrush, and yellow-bellied sapsucker. Of these species the bald eagle is the only species with the potential to use the action area. This species would use the action area for foraging only. No heronries or other aggregations of migratory birds are known within three miles of this reservoir. No caves are known within three miles of this reservoir.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Diversity of food for terrestrial and amphibious wildlife species (aquatic macroinvertebrates and fish communities) would likely decrease as a result of the spread of hydrilla. Only common wildlife species with generalist diets would be able to utilize this hydrilla dominated habitat. Populations of some waterfowl that eat hydrilla (American coot, mallard) may increase due to the increase in food availability. Eventually the reservoir would be filled with hydrilla. Large mats of hydrilla throughout the reservoir would block access to more ideal waterfowl hunting grounds. Habitat for species requiring open water (diving ducks, goose, cormorants) would be severely limited. Species of water birds requiring open water habitat would leave Parksville Reservoir to find more suitable habitat elsewhere. Common amphibian species, beavers, muskrats, and some turtle species would persist as long as some areas remained permeable to movement through the water column and food was available. Overall, there would be negative direct, indirect and cumulative impacts to terrestrial wildlife.

Presence of hydrilla in the southeastern United States also has been linked to a cyanobacteria that produces a neurotoxin that can cause neurological disease in birds (avian vacuolar myelinopathy or AVM). Birds that eat the hydrilla (such as American coot and mallards) can contract the disease, which causes brain lesions and impairs motor skills. It is thought that this bacteria may be passed up through the food chain to bald eagles that prey on these impaired waterbirds, ultimately resulting in the death of bald eagles. This cyanobacteria has also been documented causing brain lesions in turtles and grass carp. More research is needed to evaluate the potential spread of this disease-causing cyanobacteria and its implications on spread of disease through the food chain (Wilde et al 2014). The presence of this cyanobacteria on Parksville Reservoir is unknown. However, it is reasonable to assume that the potential for presence and spread of this disease on Parksville Reservoir would increase as hydrilla continues to spread. Until the presence/absence of this cyanobacteria is determined, the impacts of this bacteria under this alternative to wildlife populations are not reasonable to assume at this time.

3.3.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, immediate effects of the CTGC would be to provide an additional food source to wildlife species able to capture and consume large fish (stocked carp would be 10-12 inches long). Populations of species such as osprey, double crested cormorants, and muskrat may benefit from the increased availability of food.

Controlling the spread of hydrilla across Parksville Reservoir would maintain open water habitat available to wildlife. Natural wetlands would continue to support the common species that need emergent wetland vegetation as quantities of hydrilla decrease. Open water would remain available to other common wildlife species that require this habitat.

Although the CTGC may eat some native aquatic plant life, thereby reducing aquatic plant diversity and thus aquatic macro invertebrate diversity, these decreases are not expected to be significant. Reservoirs like Parksville are not thought to be very diverse ecosystems for aquatic plants or macroinvertebrates. Thus the potential decrease in diversity of these food sources are not expected to impact wildlife populations.

The implementation of the Proposed Action Alternative is not expected to negatively affect common wildlife populations and may result in indirect, direct and cumulative benefits to some specific common wildlife species.

3.4 Threatened and Endangered Terrestrial Species

3.4.1 Affected Environment

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the United States or elsewhere. The ESA (Section 7) outlines procedures for federal agencies to follow when taking actions that may affect federally listed species or their designated critical habitat. In addition, 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, the Tennessee Natural Heritage Program and TVA both maintain databases of aquatic and terrestrial plant and animal species that are considered threatened, endangered, of special concern, or are otherwise tracked in Tennessee because the species is rare and/or vulnerable within the state.

An April 2018 review of the TVA Natural Heritage Database indicated that five state-listed species (northern pine snake, seepage salamander, smoky shrew, southern Appalachian woodrat, and woodland jumping mouse), one federally protected species (bald eagle), and one federally listed species (northern long-eared bat) exist within three miles of the project area. One additional federally listed species (gray bat) has been documented in Polk County, Tennessee. The USFWS has determined that the federally endangered Indiana bat has the potential to occur in Polk County. Thus, they have the potential to occur in the project area and impacts to these species will be evaluated for this project (Table 3-1).

Table 3-1 State and Federally Listed Terrestrial Animal Species Reported from Polk County, Tennessee and other species of conservation concern within a 3-Mile Radius of the Project Area[1]

		Status[2]	
Common Name	**Scientific Name**	**Federal**	**State (Rank[3])**
Amphibians			
Seepage salamander	*Desmognathus aeneus*	--	D(S1)
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DM	D(S3)
Mammals			
Gray bat[4]	*Myotis grisescens*	LE	E(S2)
Indiana bat[5]	*Myotis sodalis*	LE	E(S1)
Northern long-eared bat	*Myotis septentrionalis*	LT	--(S1S2)
Smoky Shrew	*Sorex fumeus*	--	D(S4)
Southern Appalachian Woodrat	*Neotoma floridana haematoreia*	--	D(S2)
Woodland Jumping Mouse	*Napaeozapus insignis*	--	D(S4)
Reptiles			
Northern pine snake	*Pituophis melanoleucus melanoleucus*	--	T(S3)

[1] Source: TVA Regional Natural Heritage Database, extracted 4/16/2018; USFWS Ecological Conservation Online System (https://ecos.fws.gov/ecp/), and Tennessee Bat Working Group species occurrence maps (http://www.tnbwg.org/), accessed 4/16/2018.
[2] Status Codes: D = Deemed in need of management; DM = Delisted, recovered, and still being monitored; E = Endangered; LE = Listed Endangered; LT = Listed Threatened, T = Threatened.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure.
[4] Federally listed species reported from Polk County, Tennessee, but not known within three miles of the project area.
[5] Federally endangered species that the USFWS has determined that has the potential to exist state-wide, though no records are currently known from Polk County, Tennessee.

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 action area is approximately 1.8 miles away from the action area. Suitable habitat for this species likely occurs immediately adjacent to action area, but not in the reservoir itself.

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 3.0 miles

from the action area. Suitable habitat for this species likely occurs immediately adjacent to action area but not in the reservoir itself.

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 2.0 miles away. Suitable habitat for this species likely occurs immediately adjacent to action area but not in the reservoir itself.

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 1.9 mile away. Suitable habitat for this species likely occurs immediately adjacent to action area but not in the reservoir itself.

Northern pine snakes are found in well-drained sandy soils in pine and pine-oak woodlands and on dry mountain ridges (NatureServe 2015). Habitat for this species may exist immediately adjacent to the project area, but does not exist within the proposed action 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 the proposed action area. This nest was last reported active in 2007. Suitable foraging habitat for this species occurs across the Ocoee River and Parksville Reservoir.

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). The closest gray bat record is known from a mist netting survey effort over Sylco Creek, approximately 0.4 miles from the project footprint.

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. 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 19.8 miles away.

The NLEB 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 NLEB is similar to Indiana bat; however it is thought that northern long-eared bats are more opportunistic in roost site selection. Thirteen mist net capture records of NLEB are known within three miles of the project

footprint. The closest of these is approximately 0.4 mile away over Sylco Creek. Forested habitat around Parksville Reservoir may provide suitable summer roosting habitat for NLEB, but this forested habitat is not within the action area of the proposed project.

No caves are known to exist within three miles of the project area. These bat species emerge at dusk to forage over forest canopies, along forest edges and tree lines, along riparian areas and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, Harvey 1992, USFWS 2018, USFWS 2014). Parksville Reservoir itself may provide foraging habitat and drinking water for the gray bat, Indiana bat, and NLEB.

3.4.2 Environmental Consequences

3.4.2.1 The No Action Alternative

Northern pine snake, seepage salamander, smoky shrew, southern Appalachian woodrat, and woodland jumping mouse would not be impacted by actions under this alternative as suitable habitat for these species would not be impacted. Gray bat, Indiana bat, and NLEB that may forage over Parksville Reservoir also are not likely to be impacted by the No Action Alternative. Although these species are known to forage over open water like Parksville Reservoir that would be impacted by the spread of hydrilla, their foraging habitat also occurs over and under forest canopies and mountain streams. These forested habitats would not be impacted by the proposed actions, therefore foraging availability for federally listed bats is not expected to be impacted by this alternative.

Bald eagle may be negatively impacted by this alternative. The spread of hydrilla throughout the reservoir would reduce foraging habitat and make foraging more challenging for this species. As open water is reduced to small patches temporarily opened by mechanical removal and herbicide, fish would be much less visible to bald eagles as the fish hide under the dense mats of hydrilla. Additionally, if the cyanobacteria causing Avian Vacuolar Myelopathy (AVM) is present in Parksville Reservoir, the spread of hydrilla, on which the cyanobacteria is found, would have the potential to lead to bald eagle mortality. However, since the presence or absence of this cyanobacteria in Parksville Reservoir has not been tested, potential impacts of this alternative to AVM in bald eagle populations are not reasonable to anticipate at this time.

3.4.2.2 The Proposed Action Alternative

Implementation of the proposed action would not affect habitat for northern pine snake, seepage salamander, smoky shrew, southern Appalachian woodrat, or woodland jumping mouse. Open water would continue to be available for foraging bats under this proposed alternative. Therefore, the Northern pine snake, gray bat, Indiana bat, and NLEB would not be directly, indirectly or cumulatively impacted by the proposed actions. The introduced grass carp would provide an additional food source to bald eagles. The presence of grass carp would keep open water habitats exposed allowing for foraging eagles to easily find prey. Therefore, bald eagles may benefit from the Proposed Action Alternative from the increase in potential foraging habitat.

3.5 Wetlands

3.5.1 Affected Environment

Wetlands are areas that are inundated or saturated by water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USEPA regulations at 40

C.F.R § 230.3(t)). Wetlands generally include swamps, marshes bogs and similar areas. Wetlands are highly productive and biologically diverse ecosystems that provide multiple public benefits such as flood control, reservoir shoreline stabilization, improved water quality and habitat for fish and wildlife resources.

Section 404 of the Clean Water Act prohibits the discharge of dredge and fill material to waters of the United States, which include most wetlands, unless authorized by a permit issued by the USACE. The scope of this regulation includes most construction activities in wetlands. Executive Order 11990, Protection of Wetlands, requires Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance their natural and beneficial values.

Parksville Reservoir is located within the Southern Metasedimentary Mountains subdivision of the Blue Ridge Ecoregion. Wetlands within this region comprise less than one percent of land cover (Taylor and Kurtz 2016). Forested and scrub-shrub wetlands are uncommon due to the relatively steep topography surrounding the reservoir. Emergent wetlands have a greater potential to occur and are primarily associated with mudflats and within the upper reaches of larger embayments such as Baker Creek and Sylco Creek (Figure 3-4).

In 2016, aquatic bed wetlands composed primarily of hydrilla were found to be present in 10 percent of the Reservoir. The greatest concentrations of hydrilla were found in the upper third of the Reservoir where abundant littoral habitat is available for growth (Figure 1-1).

3.5.1 Environmental Consequences

3.5.1.1 No Action Alternative

The implementation of the No Action Alternative, continuation of the present integrated management approach, would likely result in increased coverage of aquatic bed wetlands because of the expansion of hydrilla. The No Action Alternative might initially result in increased aquatic plant coverage, but this could eventually result in reductions in aquatic plant species diversity and subsequent reduction in wetland habitat value. However, there would be no impacts to forested wetland communities in the area.

3.5.1.2 Proposed Action Alternative

Under the Proposed Action Alternative, there is a potential for the proposed project to impact aquatic bed wetland vegetation. The project does not propose dredge or fill within wetlands, so no state or federal permits are required. Over a period of 3-4 years, grass carp would reduce the surface coverage, biomass, and species composition of aquatic bed wetlands (Santos et al. 2011). There would be minor, secondary impacts to aquatic communities (invertebrates, zooplankton, fish) that utilize these aquatic bed wetlands as habitat.

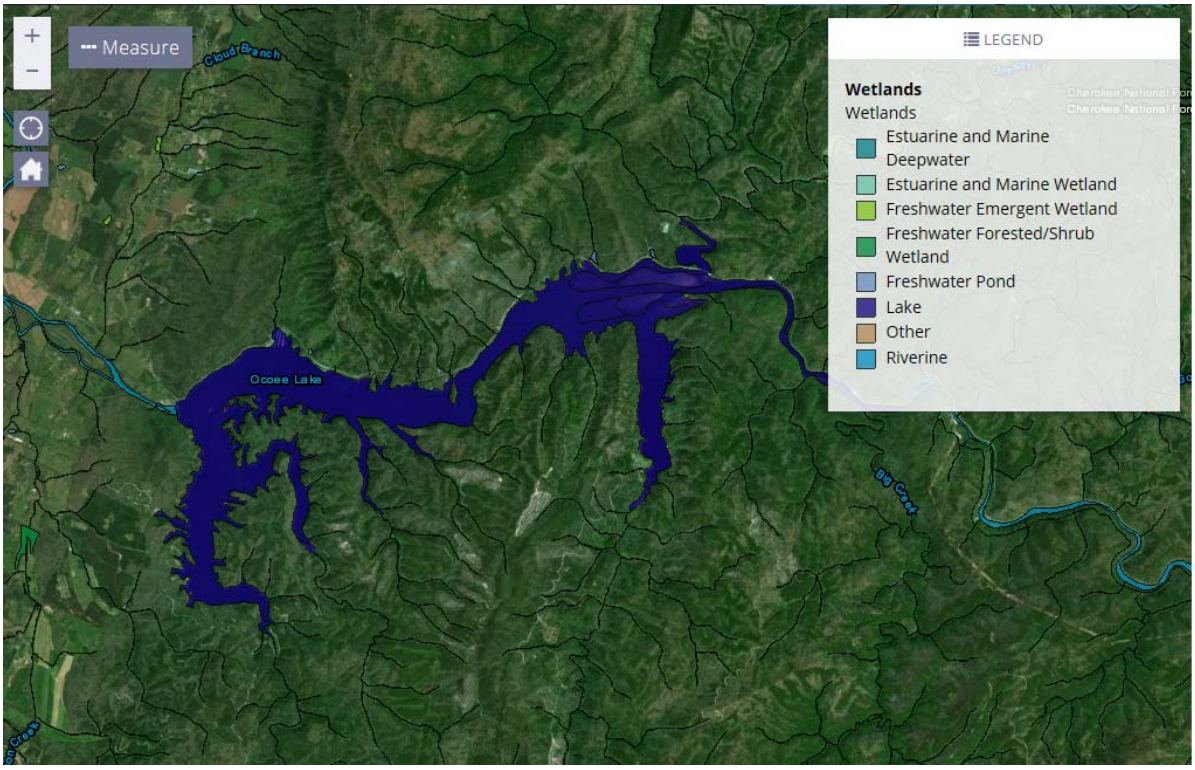

Figure 3-4 National Wetland Inventory – Parksville Reservoir

If the proposed stocking is successful, unavoidable losses of aquatic bed wetlands and localized aquatic habitat would initially occur as CTGC decrease the volume of hydrilla within the aquatic bed wetlands. As discussed in Section 2.2, TVA has evaluated other alternatives for invasive aquatic vegetation management. No other method has shown to be as effective as introducing CTGC as a biological control. In accordance with Executive Order 11990, TVA has determined that no practicable alternative exists to remove hydrilla from the existing aquatic wetland beds. Additionally, there is the potential that native populations of submerged, aquatic bed wetlands would reestablish in conjunction with the decrease in hydrilla by having a greater area for growth and potential for re-establishment (USACE 2016). Therefore, there is a potential for minor long-term beneficial impacts on wetlands.

Grass carp do not consume emergent wetland vegetation even when the waterbody is heavily stocked or over stocked (Department of Ecology, State of Washington 2011). Therefore, the stocking of CTGC would have no direct, indirect or cumulative impacts on the emergent wetlands found on Parksville Reservoir. There would also be no direct, indirect or cumulative impacts to forested wetlands anticipated under the Proposed Action Alternative.

In summary, there would be short term impacts to non-native aquatic bed wetland communities associated with the Proposed Action Alternative. The gradual, localized loss of this non-native habitat would be insignificant in context of regional aquatic bed wetland resources and would potentially allow for the reestablishment of native aquatic bed wetland vegetation. There will be no impacts to emergent and forested wetland communities in the area.

3.6 Recreation

3.6.1 Affected Environment

Parksville Reservoir is utilized for a variety of recreation uses such as boating, swimming, picnicking, fishing, and camping. Developed recreation areas on the reservoir shoreline include Ocoee Inn and Marina, Mac Point Beach, Parksville Lake Campground, Parksville Beach, Camp Ocoee (YMCA), Camp Cherokee (Boy Scouts of America), and three public boat ramps. Hydrilla is currently present in the waters adjacent to these recreation areas. The Ocoee River whitewater floatway, one of the most popular rivers in the eastern United States for whitewater boating and rafting, lies just upstream from the headwaters of Parksville Reservoir. This recreation area is managed by the State of Tennessee as part of the Hiwassee/Ocoee Scenic River State Park. To date, hydrilla has not been found within this section of the Ocoee River.

The presence of aquatic plants can have both positive and negative impacts on reservoir recreation users. For example, the presence of hydrilla can enhance fishing and water based waterfowl hunting or viewing activities. However, these plants can have a negative impact on activities such as power boating, paddle boating, water skiing, swimming and wading.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Under the No Action Alternative, hydrilla in Parksville Reservoir would likely continue to increase and expand beyond the present level. This could have some positive impact on certain activities such as boat fishing or waterfowl viewing. However, aquatic plants cause problems when they reach excessive levels. They can interfere with recreational opportunities such as boating, water skiing, bank fishing, swimming, and wading. These plants can clog boat propellers and make it hard for boaters to reach ramps and docks. They can also impede swimmers, waders, and sport paddle boats. Therefore, adverse indirect, direct and cumulative impacts on recreational activities such as general boating, camping, swimming and water sports would occur under this alternative.

If hydrilla were to spread upstream from its current location, it could establish in the put-in/take-out sites utilized by the whitewater recreational businesses. Floating hydrilla mats could also move into the major flow areas which would interfere with recreational use of the Ocoee whitewater floatway. The presence of these plants within this section of the Ocoee River could have a significant negative impact on the recreational use of this resource.

3.6.2.2 Proposed Action Alternative

The Proposed Action Alternative is expected to lead to an overall reduction in the density of hydrilla, while still allowing some aquatic plants to remain. The reduction of hydrilla, especially in open water habitat and around existing recreational facilities, would provide optimum conditions for meeting the widest range of recreational activities on Parksville Reservoir (TVA 1990). Additionally, aquatic plants would continue to provide some benefits to boat fishing and waterfowl watching/hunting activities while opportunities for other activities such as general boating, swimming, and shoreline camping would be enhanced. The Proposed Action Alternative would also minimize the potential for hydrilla to invade the lower reaches of the Ocoee River whitewater floatway. Therefore, beneficial indirect, direct and cumulative recreational impacts are anticipated under the Proposed Action Alternative.

3.7 Socioeconomic Conditions and Environmental Justice

3.7.1 Affected Environment

Census data available online through U.S. Census Bureau is summarized in Table 3-2. The most recent 10-year census data (2010) was utilized for population statistics. Intermittent estimates conducted after the formal 2010 census are available, but the base year of 2010 was used for analysis (U.S. Census Bureau 2018).

Table 3-2 Demographics Data for Polk County, Tennessee

Statistic	Polk County	State of Tennessee	National
2010 Population	16,825	6,346,105	308,745,538
Median household income*	$41,520	$44,621	$53,482
Percent Minorities, 2010 Census	2.5%	22.4%	27.6%
Percent below poverty level*	17.8%	17.8%	15.6%
Unemployment rate**	4.2%	3.4%	4.1%

*2016 American Community Survey 5-Year Estimates
**May 2018 United States Department of Labor – Bureau of Labor Statistics.

Polk County's median household income is $41,520 or 6.9 percent lower than the state's median income of $44,621 and 22.4 percent lower that nation median income of $53,482. Polk County also experiences a lower percentage of minorities and higher unemployment rates as compared to state and national rates. The county's poverty percentage is the same as the state's, but higher than the national rate.

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Under the No Action Alternative, the proposed project would not be implemented and no direct impacts to socioeconomic conditions or environmental justice would occur. However, hydrilla would continue to spread and impact local recreational opportunities. The loss of potential recreational activities would have a minor impact on the local economy as people would stop going to Parksville Reservoir for recreational purposes (general boating, camping, swimming and water sports). However, if hydrilla were to spread into the whitewater sections of the Ocoee River, there could be significant negative economic impacts from a decrease the recreational value of that system. Polk County does experience higher poverty, but there would be no disproportionate impacts on these communities.

3.7.2.2 Proposed Action Alternative

The Proposed Action Alternative is expected to lead to an overall reduction in the density of hydrilla. Under this alternative, aquatic plants would continue to provide some benefits to boat fishing and waterfowl watching/hunting activities while opportunities for other activities such as general boating, swimming, and shoreline camping would be enhanced. Recreational opportunities would increase, which would lead to beneficial direct, indirect

and cumulative impacts to the local economy. There would be no disproportionate impacts on minority or poverty communities.

3.8 Natural Areas

3.8.1 Affected Environment

Natural areas include managed areas, ecologically significant sites, and Nationwide Rivers Inventory streams. This section addresses natural areas that are within, immediately adjacent to (within 0.5 mile), or within the region of the project area (5-mile radius). A review of TVA's Natural Heritage database indicated that Cherokee National Forest is the only natural area contained within the proposed project area, though the forest's ownership boundary ends at the edge of the reservoir. The Ocoee River, which is part of the National Rivers Inventory, is immediately adjacent to the project area and flows into and out of Parksville Reservoir. Rock Creek Gorge Scenic Area is 0.9 miles north of the project area and is part of Cherokee National Forest. Sugarloaf Mountain Park is located 0.5 mile from the Ocoee #1 dam, outside of the project area.

A protection planning site for the federally endangered Ruth's golden aster is located 2.4 miles east of the project area on the Ocoee River. The Big Frog Wilderness/Cohutta Wilderness is the largest contiguous Federally Designated Wilderness east of the Mississippi River and is home to over 120 miles of trails; the northwestern edge of this Big Frog is 4.0 miles from the southeastern portion of Parksville Reservoir. Trew Organic Farms is a privately owned certified organic farm located 4.4 miles northwest of the project area that produces several varieties of produce and livestock.

3.8.1 Environmental Consequences

3.8.1.1 No Action Alternative

Under the No Action Alternative, hydrilla in Parksville Reservoir would likely continue to increase and expand beyond the present level and potentially impact recreational opportunities within and surrounding the Reservoir. The loss of potential recreational activities could have a minor impact on the adjacent natural areas, especially parks that contain access to the Reservoir or Ocoee River. If hydrilla spreads to the Ocoee River, there is a potential for minor impacts to occur in this National Inventory River. Incremental changes to natural areas resulting from natural environmental processes and anthropogenic disturbance may continue, but these changes would not result from the proposed project. Overall, there would be minor direct, indirect, and cumulative impacts to natural areas under the No Action Alternative.

3.8.1.2 Proposed Action Alternative

The introduction of CTGC would not result in any immediate disturbances or alterations to the natural areas within the immediate vicinity of Parksville Reservoir. Implementation of the Proposed Action Alternative would not significantly affect natural areas at the local, regional, or state level.

3.9 Cumulative Impacts

The stocking of Parksville Reservoir with CTGC would have minor cumulative impacts on the ecosystem of the Reservoir as the CTGC begin to feed on hydrilla. This includes minor cumulative impacts to aquatic bed wetlands, natural areas, localized aquatic habitat, and some aquatic plants. The introduction of CTGC would lead to a decrease in hydrilla

biomass and a shift in aquatic species composition and nutrient levels. However, this shift would not impact the overall production (aquatic life, nutrients, etc.) in the reservoir.

Over time, the reduction of hydrilla would be cumulatively beneficial to recreational activities, the local economy, some wildlife species (osprey, double crested cormorants, and muskrat), and native aquatic plant species. While there would be some minor impacts to resources on Parksville Reservoir, the overall beneficial impacts of CTGC's helping to reduce hydrilla biomass outweighs those negative impacts.

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CHAPTER 4 - LIST OF PREPARERS

Table 4-1 summarizes the expertise and contribution made to the EA by the Project Team.

Table 4-1 Environmental Assessment Project Team

Name/Education	Experience	Project Role
Elizabeth B. Hamrick *M.S., Wildlife,* *B.S. Biology*	9 years in biological surveys and environmental reviews	Threatened and Endangered Species (terrestrial animals), ecological resources (wildlife)
Brett M. Hartis *Ph.D., Fisheries, Wildlife, and Conservation Biology; M.S., Natural Resources Management* *B.S., Biology*	13 years in fisheries and aquatic plant science	Project Manager and aquatic vegetation
Charles Howard *M.S., Zoology; B.S., Biology*	25 years in aquatic ecology research, impact assessment, and endangered species conservation.	Aquatic Ecology
Tim L. Keeling *B.S., Computer Science*	39 years in application and database design	Heritage data viewer, data quality
Robert Marker *B.S. Recreation Resources Management*	46 years in recreation planning and management	Recreation
Loretta A. McNamee *B.S. Environmental Biology*	10 years in NEPA compliance	NEPA Compliance and document preparation
Kim Pilarski-Hall *M.S., Geography, Minor Ecology*	21 years in wetlands assessment and delineation	Wetlands, Natural Areas
W. Doug White *B.S., Forestry*	15 years in water resources management and NEPA compliance	NEPA compliance and document preparation
Chevales Williams *B.S., Environmental Engineering*	12 years of experience in water quality monitoring and compliance; 11 years in NEPA planning and environmental services	Surface Water

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CHAPTER 5 - ENVIRONMENTAL ASSESSMENT RECIPIENTS (AGENCIES AND ORGANIZATIONS)

5.1 Federal Agencies

- U.S. Army Corps of Engineers, Nashville District
- U.S. Fish and Wildlife Service, Cookeville, Tennessee
- U.S. Forest Service, Cherokee National Forest, Ocoee Ranger District

5.2 State Agencies

- Hiwassee/Ocoee Scenic River State Park
- Tennessee Department of Agriculture
- Tennessee Department of Environment and Conservation
  - Bureau of Parks and Conservation
  - Bureau of Environment
  - Division of Natural Areas
  - Division of Natural Heritage
  - State Parks
- Tennessee Historical Commission
- Tennessee Wildlife Resources Agency

5.3 Local Governments and Organizations

- Ocoee River Outfitters Association
- Lake Ocoee Inn and Marina

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Appendix A – Public Notice Publications

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Cleveland Daily Banner—Wednesday, June 20, 2018—B7

15. Yard Sales

MOVING - Garage Sale. Come up the hill and get some great bargains. Pictures, household, clothes, shoes, purses, tools, rugs, carpet, Christmas items, some furniture. Saturday, June 23, 8am-noon. Come on up! 3435 Ridgeway Drive NW, close to Mountain View Inn.

MOVING SALE Saturday, June 23, 8am-1pm. Rain or shine. 215 Robin Lane NW. Collectibles, households.

18. Articles For Sale

CAR TOP carrier hard shell with straps $50. 815-761-4705.

FIREARMS. NEW Sccy Pistol, 9mm, $199. George's Pawn Shop, 122 South Ocoee Street, 423-476-8774.

28. Cemetery Lots For Sale

LOTS FOR sale in Sunset Memorial Gardens in Garden of the Crosses. 404-918-0096.

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Recycle this newspaper

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29. Help Wanted - Part-time

AFTERNOON TEACHERS needed part- time. First United Methodist Child Development Center. Please call for more information 423-478-1426.

NEED SOMEONE with plasma burner to burn holes in thin metal (423)339-3999.

PART- TIME help need, flexible schedule. Apply at the Champion Cleaners, Spring Creek location.

PERSONAL SECRETARY, have laptop computer and clerical skills. Perform clerical/ administrative duties. 423-339-3999.

THE CLEVELAND Daily Banner is currently accepting applications for:
Mail Room/
Circulation Department

Fast paced work.
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Mandatory Saturday nights.

Must be 18 years or older and able to lift 50 lbs.
Background check and drug screen required.

Apply in person
Monday- Friday, 9am-4pm at 1505 25th Street NW
NO PHONE CALLS PLEASE.

30. Help Wanted - Full Time

A/ C TECH position, residential and commercial experience a plus. Excellent pay and benefits. 423-336-5958.

ARE YOU interested in working for an organization that makes a positive impact? The Samaritan Center is looking for a full- time processor/ cashier. We're looking for a dependable and efficient individual that is dependable, hard- working and a team player. Hours are Sundays from 12-5pm and Monday-Thursday 8am-5pm. $9.00 an hour. Apply in person at The Samaritan Center, 9231 Lee Highway, Ooltewah, TN 37363.

CLEVELAND ROOFING Co., Inc. is looking for Roofers and Laborers. Work is available immediately. No experience necessary. Foreman also needed. Must be able to pass a drug test. Hourly pay is based on experience. Employee benefits and 401K. Must apply in person at 307 Industrial Way SW, Cleveland, TN 37311.

FULL TIME medical assistant needed for large family practice in Cleveland. Looking for a cheerful individual who is a team player! Responsibilities include greeting patients and obtaining vitals, injections etc. Monday- Friday. Email resume to: seekingcma@gmail.com

FULL TIME receptionist needed for busy medical office. Must be willing to work between the hours of 8am-7pm. Some experience required. Send resume' to: medicalreceptionists7311@aol.com

EXPERIENCED CAREGIVERS and CNAs who are available to work all shifts. Please apply in person at 60 25th Street NW #3, in Cleveland, Monday- Friday from 11am-4pm.

HOMEMAKER – 37.5 hours/ week, $9.25/ hour. Care for elderly, young adults, chronic or terminally ill, convalescing & disabled. Routine household tasks: dust, mop, sweep, linens, trash, laundry, iron, mend, cook, assist with personal cleanliness/ hygiene, shopping, errands, appointments. Must live in Bradley or Meigs County. Email: ksmithers@partnershipfca.com. Call (423) 697-3811.

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30. Help Wanted - Full Time

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Excellent working hours and conditions.
Weekly pay, paid medical/ life insurance: 401(k); paid holidays, vacation/ personal leave time

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Request for Comments

TVA

Draft Environmental Assessment for Proposed Stocking of Triploid Grass Carp in Parksville Reservoir

The Tennessee Valley Authority (TVA) requests your comments on the draft environmental assessment (EA) on its proposal to introduce certified sterile (triploid) grass carp into TVA's Ocoee Project No.1 Reservoir, locally referred to as Parksville Reservoir, to control the spread of the invasive aquatic plant, hydrilla. Grass carp eat aquatic vegetation, including hydrilla, and therefore are an effective measure to address infestations of hydrilla that would otherwise continue to spread. Triploid carp are sterile and cannot naturally reproduce, which enables the fish populations to be easily monitored and controlled without chance of long-term establishment. Stocking grass carp is cost-effective, provides long-term aquatic vegetation management and reduces the need for large-scale herbicide and mechanical management techniques. The control of hydrilla increases the overall health and function of newly affected reservoirs, which is an important environmental stewardship objective of TVA's Natural Resources program.

TVA has prepared a draft environmental assessment to analyze impacts to the environment from the proposed project. TVA is interested in receiving comments regarding the action's potential to affect the environment and to identify any other issues associated with this request. Any comments received, including names and addresses, will become part of the administrative record and will be available for public inspection. All written comments on this proposed action must be received on or before July 10, 2018. Written comments may be mailed to the address below or emailed to wdwhite0@tva.gov. Substantive comments received during the comment period and TVA's responses will be included in the final EA.

W. Douglas White
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902

SUBMITTED PHOTO

Yates signs National Garden Week proclamation

County Mayor Tim Yates recently signed a proclamation designating the week of June 4-11 as National Garden Week. Pictured with Mayor Yates is the President of the Sequoyah Trail Garden Club, Elizabeth Harris.

Key lockboxes can help protect home or business

BY TOMMY MILLSAPS
General Manager & Editor

The Sweetwater Fire Department (SFD) wants to work with homeowners and businesses to increase the speed in which firefighters can access buildings in case of a fire or an emergency.

SFD is recommending that businesses obtain special protective boxes, secured to the exterior of the structure, that will hold keys to get inside their buildings. The Fire Department will have a special key that will unlock the box and get the key out to have faster access to the building in case of an emergency. No one else will be able to access the box.

"We can have immediate access and be inside in seconds without causing unnecessary property damage in the process," SFD firefighter Tripp Hall said.

The City Codes Enforcement Office is actually now requiring the boxes on new commercial construction, City Planning and Codes Enforcement Officer Scott Wilson said, while the Fire Department strongly recommends businesses and homeowners get one of the lock boxes.

To order one of the lock boxes, which includes several models, visit the website www.knoxbox.com. Hall said SFD is automatically alerted when a lockbox is purchased. The boxes cost about $310 and up.

Hall said when SFD responds to an alarm, especially at a business, they often have to wait on someone with a key to come unlock the door or are faced with the prospect of having to break a door down. If a fire is not obvious, firefighters still need to get in and check to see if there is a fire in wiring or hidden in the ceiling. They would rather not break in. However, if firefighters have to wait minutes on someone with a key to arrive, they lose their advantage of being able to tackle a hidden fire early.

Hall said there are numerous protections in place to safeguard their access key, including an automatic log of when the key is used for access.

One of the benefits of this product for residential access is for the elderly, vacation homes, or folks who travel often. Residential or commercial, anyone can purchase these lockboxes to secure a key outside for immediate access by firefighters. The Sweetwater Fire Department has specific mounting instructions for these boxes.

On another fire safety front, Sweetwater Fire Department still has smoke detectors they will install in your home. For more information, call the Fire Department at 423-337-6724.

Editor@advocateanddemocrat.com | 337-7101

Monroe County Schools increases assistant principals supplements

BY JESSICA KENT
Staff Writer

Assistant principals in the Monroe County School System will see an increase to their supplement pay in the upcoming school year.

During the Board of Education's meeting on Thursday night, the board voted to increase assistant principal supplements in the 2018-19 school year.

Director of Schools Tim Blankenship said assistant principals at the high school level currently get a supplement of $2,250. They will now receive a $3,500 supplement. Sequoyah High School has three assistant principals, Sweetwater High School has two assistant principals and Tellico Plains High School has one.

At the elementary and middle school levels, full-time assistant principals received a $500 supplement this past school year. Next year, their supplement will increase to $2,250. Coker Creek Elementary School and Rural Vale School do not have full-time assistants. The assistants at those two schools will see an increase from $250 to $500.

"This comes at a total cost of $18,000," said Blankenship. "I think it is money well spent."

First District School Board member Faye Green asked how much head coaches receive as a supplement. Blankenship said head football and basketball coaches receive a $5,000 supplement.

"While I appreciate the increase for assistants, I would like to see them match coaches at least," said Green. "We require that some admin be at all ballgames at the high school level. The assistant principal often has to be at games and they're still below head coaches."

The School Board agreed to look more into that in the 2019-2020 fiscal year budget.

Also at the meeting:

• The School Board approved a lengthy consent agenda, numerous budget amendments, the 2018-19 Differentiated Pay Plan for the school system, the upcoming fiscal year's meeting calendar for the Board of Education, policies on their first and second reading as recommended by the Policy Committee, and the Transportation Services Contract for 2018 to 2022.

The board also approved a memorandum of understanding with Centerstone of Tennessee Inc. and Access Medical Care for behavior health services for the upcoming school year, in addition to approving the renewal of contracts with the Little Tennessee Valley Education Cooperative, Grace Rehabilitation Center and The King's Daughters' School for special education services for the 2018-19 school year.

> **'While I appreciate the increase for assistants, I would like to see them match coaches at least.'**
>
> Faye Green
> First District School Board member

• The Board of Education heard many requests and updates from the Maintenance Department. See related story inside this edition.

• The board voted to continue giving a $1,500 donation to Monroe County's Imagination Library program. Marsha Boring Standridge said there are currently 1,579 children who are enrolled to receive books during their first five years of life.

• At the request of Blankenship, the School Board voted to purchase a new Special Education bus from some of the remaining funds in the 2017-18 fiscal year budget.

"I'd like to take $45,000 to buy a bus to run the Rafter route with. I don't think it will take the full amount, but we want to make sure," said Blankenship. "It will end up paying for itself. We are buying one that has 10-15,000 miles on it and it will be driven by a school system employee."

• The board voted to not run buses on 10 a.m. dismissal days during the upcoming school year.

"Every day that we don't run buses it saves us about $10,000 countywide," said Blankenship.

• The school system will also be switching to Reinhart Foodservice for food vending.

"That will save us $84,504," said Blankenship. "Every system around us has gone to this vendor. If we can save $84,000, that's something we can spend on kids."

The Maintenance Department is also changing custodial supply vendors.

"We had problems out of our last company. Invoices didn't match what was being left. There were weeks where they charged us more than $500 extra. I finally told them a couple months ago that we were done."

The system will now utilize the services of Kelsan, Inc.

• The board voted to send a resolution to state representatives and senators in support of a fire station being built on property owned by the Monroe County School System near the Central Office. The City of Madisonville is applying for a grant for the new fire hall after the school system entered into a lease with the city to allow the construction at 205 Oak Grove Road.

"We want to point out that it's on the side of Madisonville divided by railroad track and that for the safety of students we need this," said Chairwoman Janie Harrill.

"We've done our part by donating the land for the station."

• In his director of schools report, Blankenship said Central Office staff will be off the week of the Fourth of July. "This summer we will be working somewhere in the building. They're redoing the floors so we will be in different parts. We will have signs up," he said.

Blankenship also announced that Becky Duncan has been named a teacher and assistant principal for kindergarten through sixth grades at the Alternative School. No new money was added for the position, he said, as a position wasn't needed at an elementary school for the upcoming school year.

Last school year, Blankenship said the school system gave a $800 incentive for teachers and professional employees if they missed three days or less.

"We had 102 teachers and professional employees who missed three days or less," he said. "It was a cost of $30,600 but we saved on substitutes. It was a win, win for the kids."

• There will be a PECCA (Professional Educators Collaborative Conferencing Act) meeting on Thursday, June 21 at 3 p.m. followed by an insurance meeting from 4 p.m. to 6 p.m.

The School Board will also meet in a special called meeting at 5 p.m. prior to the July 12 monthly meeting at 6:30 p.m. to open the bids for qualifications for the building projects at Madisonville Middle School, Tellico Plains Junior High School and Sweetwater High School.

jessica.kent@advocateanddemocrat.com | 337-7101

Appendix B – Draft Environmental Assessment Public Comments

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STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

SHARI MEGHREBLIAN, PhD
COMMISSIONER

BILL HASLAM
GOVERNOR

July 10, 2018

Via Electronic Mail to wdwhite0@tva.gov
Attn: W. Douglas White, NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, Tennessee 37902

Dear Mr. White:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Draft Environmental Assessment* (Draft EA) which proposed to *introduce certified sterile (triploid) grass carp (CTGC) into TVA's Ocoee Project #1 Reservoir*, locally referred to as Parksville Reservoir, to control the spread of the invasive aquatic plant, hydrilla. Hydrilla currently occurs in roughly 182 acres (10%) of Parksville Reservoir and if unabated could spread into the rest of Parksville Reservoir, and potentially to other reservoirs in the TVA system.[1] According to the Draft EA grass carp eat aquatic vegetation, including hydrilla, and can be an effective measure to address infestations of hydrilla that would otherwise continue to spread. Additionally, triploid carp are sterile and cannot naturally reproduce, which enables the fish populations to be easily monitored and controlled without chance of long term establishment.[2]

Actions considered in detail within the Draft EA include:

- **No Action Alternative**. Under the No Action Alternative, TVA would not stock Parksville Reservoir with CTGC to address the spread of hydrilla. TVA does not perform aquatic vegetation management in Parksville Reservoir, and would not change its management of aquatic plants; therefore it is expected that hydrilla would continue to grow in the majority of the Reservoir.[3]The potential environmental effects of adopting the No Action Alternative are considered in the Draft EA to provide a baseline for comparing the potential effects of implementing the proposed action

[1] Hydrilla is capable of rapid growth and reproduction given ideal growing conditions. Hydrilla plant fragments can also be easily transported from one waterbody to another via recreational and commercial boating. The control of hydrilla increases the overall health and function of newly affected reservoirs, which is an important environmental stewardship objective of TVA's Natural Resources program.
[2] Stocking grass carp is cost effective, provides long term aquatic vegetation management, and reduces the need for large scale herbicide and mechanical management techniques.
[3] Parksville Reservoir is subject to TVA's aquatic vegetation treatment program as outlined in its 2015 memo for the 1993 Aquatic Plant Management Program, Supplemental Environmental Impact Statement. The memo addresses the application of herbicides as a means of aquatic vegetation management for various species including hydrilla. If TVA wanted to implement aquatic vegetation herbicide treatment at Parksville in the future, a reservoir specific environmental review would be completed to evaluate the potential impacts of the treatment program.

- **Proposed Action Alternative**. Under the Proposed Action Alternative, TVA would stock CTGC for maximized control of hydrilla into Parksville Reservoir. TVA would survey standing hydrilla biomass and coverage within Parksville Reservoir annually to inform all management decisions. TVA would also continue to monitor other reservoirs within the Ocoee system (i.e., Ocoee #2 and Ocoee #3), and downstream Hiwassee river for early hydrilla detection. Should hydrilla introductions occur in these surrounding reservoirs, TVA would consider what management actions might be appropriate in these surrounding reservoirs as funding allows and subject to additional environmental review.

TDEC has reviewed the Draft EA and determined that it has no additional comments regarding the proposed action or no action alternative at this time.[4] TDEC appreciates the opportunity to comment on this Draft EA. Please note 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.

Sincerely,

Kendra Abkowitz

Kendra Abkowitz, PhD
Assistant Commissioner, Office of Policy and Sustainable Practices
Tennessee Department of Environment and Conservation
Kendra.Abkowitz@tn.gov
(615) 532-8689

cc: Bill Avant, TDEC, TSP
Tom Moss, TDEC, DWR
Stephanie Williams, TDEC, DNA

[4] TDEC concurs that the use of CTGC to address hydrilla in Parksville Reservoir is a more preferential management technique than the application of the herbicide 2,4 D or mechanical management practices which could potentially increase turbidity and possibly affect water quality.