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FINDING OF NO SIGNIFICANT IMPACT

TENNESSEE VALLEY AUTHORITY

ASIAN CARP MITIGATION
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT
TENNESSEE RIVER RESERVOIR SYSTEM

Tennessee Valley Authority (TVA) has an established mission to enhance the lives of people within the Tennessee Valley through focus on energy, environment, and economic development. TVA's integrated management of the TVA reservoir system including the operation and management of dams and reservoirs on the Tennessee River system is a key component of its mission. The continuing expansion of Asian carp populations within the Tennessee River system has the potential to threaten native ecosystems, rare and protected species, sports fisheries, and public safety, which can lead to reduced recreation, tourism, and property values; and ultimately impact local economies.

Asian carp are migrating into the Tennessee River system by passing through navigation locks. Asian carp can swim through locks when they open to pass recreational watercraft and commercial boat traffic. Blocking fish from passing through the lock would limit Asian carp traveling further upstream. Accordingly, TVA has prepared a programmatic environmental assessment (PEA) to evaluate installation of fish barrier systems at selected lock and dam (L&D) sites along the Tennessee and Clinch rivers and assess the potential environmental and economic impacts of Asian carp range expansion throughout the Tennessee River watershed. Programmatic National Environmental Policy Act (NEPA) reviews address the general environmental issues relating to broad decisions, such as those establishing policies, plans, programs, or a suite of projects, and can effectively frame the scope of subsequent site- and project-specific Federal actions. This approach is appropriate because environmental impacts of TVA's installation of fish barriers at multiple sites are likely to be similar within typical environmental contexts, and they can be effectively evaluated at a broad scale across the Tennessee River watershed. The PEA establishes the process TVA considers when deciding if and when new fish barriers are needed, identifies potential environmental impacts of installed control measures, and establishes mitigation measures for associated environmental impacts. Any future decisions regarding proposed installation of additional fish barriers at other L&D sites not specifically evaluated in the PEA will tier from this PEA. The site-specific reviews may also provide opportunities for additional public review and comment to ensure broad stakeholder input. The PEA is incorporated herein by reference.

Alternatives

Several years of collaborative, multi-agency work has been completed through the Ohio River Basin Asian Carp Partnership to understand Asian carp populations within the Tennessee and Cumberland River systems and identify priority fish barrier needs. This work culminated in the Tennessee River Asian Carp Deterrent Workshop 2020—a series of joint working meetings held in the summer and fall of 2020. Workshop participants included state fisheries resource managers from Kentucky, Tennessee, Mississippi, and Alabama; and aquatic resources staff from the U.S. Geological Survey (USGS), U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), and TVA. This team included many of the leading experts on Asian carp in North America. A "Decision Tree" process was used to determine the most

effective fish barrier technologies and potential installation locations using multiple inputs. For example, the current distribution of Asian carp in the Tennessee River was particularly important and weighted heavily to strategically identify the location of fish barriers where they would be most effective at slowing the leading edge of invasion. Fish barrier technologies were also screened for efficacy, cost, safety, and other factors. Workshops were facilitated by USGS decision analysts to develop the final Decision Tree outcome.

Ten L&D locations, nine along the navigable Tennessee River mainstem and the Melton Hill L&D on the Clinch River, were considered in the PEA. The Decision Tree ranked both the location and the type of fish barrier technologies from most to least effective.

Original alternatives formulated by TVA included the No Action Alternative and five Action Alternatives. Action Alternatives included the deployment of each fish barrier technology separately and in combination at one or more of the 10 L&D sites. Following extensive analysis and recommendations of the Workshop participants through the Decision Tree process, TVA eliminated some of these alternatives. Based on the outcome of the Decision Tree process and TVA's own evaluation, the final Alternatives evaluated in detail within the PEA included:

- Alternative A – No Action Alternative. TVA would not install fish barrier technologies at any of the 10 L&D sites to deter the movement of Asian carp through the Tennessee River system.

- Alternative G – Install a Combined System of Fish Barriers i.e., Bio-Acoustic Fish Fence (BAFF) and Diffused Carbon Dioxide (CO_2) at Multiple L&D sites within the Tennessee River system.

The specific objectives of the fish barrier installations at locks along the Tennessee River system are to:

1. Prevent or impede the upstream migration of Asian carp; and

2. Minimize the recruitment or establishment of Asian carp in the Tennessee River—all while allowing public access, maintaining public safety, preventing interference with navigation, and protecting native species.

Barrier deployment at each location would entail the installation of BAFF or a combined BAFF and CO_2 system at each selected location. BAFF systems would be implemented below the lock chamber whereas CO_2 systems would be installed within the lock chamber. Workshop recommendations included the staged deployment of barriers at multiple L&D locations as the most effective means by which to control Asian carp expansion within the Tennessee River system. The BAFF system was recommended for immediate installation at Kentucky, Wilson, and Pickwick Landing locks, followed by Guntersville lock. However, given limited resources, BAFF installation should be prioritized at Kentucky and Wilson locks first, then Pickwick Landing lock, and then Guntersville lock. Supplemental CO_2 fish barriers were also recommended for installation at Kentucky and Guntersville to provide redundancy to the BAFF system.

Preferred Alternative

Alternative G is TVA's preferred alternative. Under Alternative G, barrier systems would be deployed using a combined system approach as summarized below:

Deployment Location[1]	Priority[2]	Technology
Kentucky	1 (with Wilson)	BAFF/CO_2
Wilson	1 (with Kentucky)	BAFF
Pickwick Landing	2	BAFF
Guntersville	3	BAFF/CO_2
Nickajack	4	BAFF
Chickamauga	5	BAFF
Watts Bar	6	BAFF

[1] Depending upon future conditions, TVA may elect to deploy additional fish barrier systems at other L&Ds under Alternative G following any necessary site-specific review.

[2] Priority order was established by the Workshop participants as explained in PEA Section 2.4.2, Outcome of the Decision Tree Process.

Alternative G is consistent with the established purpose and need to control the abundance and range expansion of Asian carp within the Tennessee River reservoir system and its tributaries by installing fish barriers at strategic L&D locations. Alternative G would reduce potential future ecosystem and economic consequences associated with the establishment of Asian carp in the Tennessee River system.

Impacts Assessment

At this time, design phase of the project at each dam location is conceptual; however, any construction and operational impacts are bounded by values established in the PEA. Once designs have been advanced, TVA will review plans to ensure the designs adhere to these values. For example, land-based construction would be limited to developed land use types adjacent to the existing L&D infrastructure, and fish barrier technologies would be installed in open water areas downstream of the lock or in the lock chamber. Land-based portions of the fish barriers would consist of equipment buildings, compressor buildings, and temporary laydown areas up to 1 acre. Both the permanent installations and short-term equipment staging would be confined to previously developed land, in areas allocated for compatible uses per established reservoir land management plans.

Based on the analyses in the PEA, TVA concludes that the implementation of Alternative G would not impact groundwater, prime farmland, wetlands, or environmental justice (i.e., low income or minority) populations.

During construction and maintenance of the fish barriers and associated support systems, there would be minor impacts to aquatic ecology, recreation, managed and natural areas, soils, surface water, floodplains, land use, vegetation, wildlife, solid and hazardous waste generation, visual resources, transportation, and noise. However, due to the small project footprint and the location of proposed facilities in areas of existing developed and open water land uses, these impacts would be minor and temporary and minimized through the use of appropriate best management practices (BMPs) during construction and maintenance activities. TVA has fulfilled its Section 7 Endangered Species Act (ESA) obligations by receiving concurrence from the USFWS on *May Affect, Not Likely to Adversely Affect* determinations for federally listed species due to proposed actions at dams in Kentucky (Kentucky Dam), Tennessee (Pickwick Dam), and Alabama (Wilson Dam and Guntersville Dam).

Air quality impacts would occur from emissions during site preparation, use of vehicles by the construction workforce, and the operation of construction and dredging equipment. Site preparation and vehicular traffic over paved and unpaved roads at the project site would result in the emission of fugitive dust during active construction periods. Impacts would be minor and localized, and emissions would not exceed applicable air quality standards.

Construction of the fish barriers would result in greenhouse gas (GHG) emissions from construction vehicles. Impacts associated with tree clearing and the loss of carbon sequestration would be minimal as construction of support buildings would be targeted for previously developed areas and would require little to no clearing of forested land. Consequently, emissions of GHGs would be negligible in comparison to regional emissions and would not impact global climate change. Operation of both the BAFF and CO_2 fish barriers would require power primarily provided onsite via the TVA grid; however, a generator would be needed to supply backup power to the system. The backup generator would emit GHGs but would be operated infrequently and typically for short periods. The backup generator would operate in compliance with all state regulations. The BAFF system uses compressed air from the site to generate the underwater bubble curtain and operation of this system would not emit GHGs. As for the CO_2 fish barrier, diffusion of CO_2 into water will produce bubbles which may emit CO_2 as they reach the surface. In addition, the operation of the CO_2 barrier would require repeat delivery of CO_2. Although the number of trucks needed to transport CO_2 is unknown, it is anticipated that the number of trucks delivering CO_2 would be limited and intermittent in nature. All trucks used to transport CO_2 would also be maintained in good working condition with current emission control technologies to minimize GHGs. Therefore, emissions of GHGs associated with operation of the fish barriers would be minor and would not impact global climate change.

Construction of the fish barrier systems would have a moderate and temporary adverse impact to recreational navigation at priority L&D locations with only one lock (i.e., Kentucky and Watts Bar). Temporary adverse impacts to commercial navigation would be large at these locations. Impacts would be mitigated through prior public notice and planning. At priority L&D locations with multiple locks (i.e., Pickwick, Wilson, and Guntersville), installation of fish barriers would be staggered to allow continued navigation through one lock. Temporary adverse impacts to recreational and commercial navigation would be minor at these locations. Short-term, intermittent, and localized disruption to recreational activities would also result from lock closures.

Long-term adverse impacts associated with Alternative G include minor impacts to recreation and to the movements of some migratory protected fish species. For example, there would be minor impacts to recreation due to slight reductions in fishing access at fish barriers at certain L&D sites. However, these potential restricted areas are small and located in the immediate vicinity of the dams. In general, they would not affect established fishing piers or bank fishing berms downstream of the dams. Minor adverse impacts to migrating protected fish species due to operation of the fish barrier systems are anticipated. These impacts could be mitigated through variable use of the fish barriers or adjustment to allow passage of native species.

Beneficial impacts under Alternative G include broad, moderate to large, long-term benefits to the existing aquatic ecology, surface water quality, recreation, and public health and safety due to the reduced impacts of invasive Asian carp throughout the Tennessee River system. Moderate, long-term benefits to existing fish, sportfish, and native mussels are anticipated due to the reduced impacts of invasive Asian carp throughout the Tennessee River system. Control of Asian carp populations would allow the continuation and possible improvement of recreational fishing and boating opportunities. Surface waters are anticipated to benefit

moderately due to the reduced impacts of invasive Asian carp on water quality throughout the Tennessee River system. Impacts to public health and safety would be moderately beneficial relative to the negative impacts of jumping silver carp to recreational users of the Tennessee River system under the No Action Alternative.

Economic impacts from construction and operation of the fish barrier systems on regional economies are anticipated to be positive, moderate, and long term. During construction, there would be short-term increases in employment, payroll, and tax payments, resulting in minor beneficial direct and indirect economic impacts. Long-term, local economies would benefit from the reduced impact of Asian carp on recreation, tourism, and property values under Alternative G relative to the lost value under the No Action Alternative.

Because no suitable habitat for protected plant or terrestrial wildlife species occurs within the proposed project areas, Alternative G would have no impact on federally listed plants or wildlife, designated critical habitat, or state-listed plants or wildlife species. Additionally, moderate and long-term benefits to threatened and endangered mussels are anticipated due to the reduced impacts of invasive Asian carp throughout the Tennessee River system.

TVA evaluated the undertaking's potential for physical and visual effects on Chickamauga, Guntersville, Kentucky, Nickajack, Pickwick Landing, Watts Bar, and Wilson dams, all of which are listed in the National Register of Historic Places (NRHP) as part of each site's hydroelectric facility. Due to the small scale and unobtrusive locations of the proposed compressor buildings associated with the BAFF and CO_2 systems, TVA has found that, while these would result in a visual effect on each of the seven hydroelectric facilities, the effects would not be adverse. TVA's analysis shows that the potential for intact archaeological sites in the project footprint at each of the seven L&D sites is either very low, or null. Therefore, TVA does not anticipate any effects on archaeological sites listed in, or eligible for listing in, the NRHP. The Alabama, Tennessee, and Kentucky SHPOs and the consulted federally-recognized Indian tribes have all agreed with this finding. Long-term impacts associated with Alternative G include the visual environment at the L&D sites. Installation of the support building(s) will have an effect at each of the seven L&Ds, but the effects would not be adverse. Fish barrier technologies would contribute to minor differences in the visual environment but would not change the overall scenic value class as the industrial character of the L&D sites would remain consistent.

The installation and operation of the fish barrier systems considered in the PEA would require minor, localized ground disturbance and construction activities. There would be no cumulative impacts to air quality, climate change, floodplains, solid and hazardous waste, noise, visual resources, navigation or public health and safety associated with any construction or ground disturbing activity. Accordingly, the potential for cumulative effects is largely driven by the change in recreation use and the associated economic impacts. Under Alternative G, controlling the invasion of Asian carp within the Tennessee River system due to installation of the fish barrier systems together with implementation of programs by other agencies to target and remove carp from the Tennessee River system would enhance recreational opportunities and associated economic benefits. As such cumulative impacts associated with implementation of Alternative G would have a beneficial impact to aquatic ecosystems, recreation, and associated industries.

Planned improvements at existing L&Ds within the Tennessee River system include the replacement of Chickamauga Lock and an addition of a new lock at Kentucky Dam. Because the current lock would remain open throughout construction of improvements planned at Kentucky Dam, cumulative impacts would be minimal. However, if closure of the Chickamauga

lock overlaps with construction of the fish barrier systems at other L&D sites, there could be a cumulative impact to recreation and navigation. This impact would be temporary and minimized with proper planning and construction scheduling designed to minimize interruptions in lock usage across the Tennessee River system, resulting in a minor, temporary impact to recreation and navigation.

Public and Intergovernmental Review

The draft PEA was released for a 30-day public comment period on July 7, 2021 and was posted on TVA's project website (https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/asian-carp-mitigation).The availability of the draft PEA was announced in a news release and in newspapers that service the study area. TVA's interagency involvement included circulation of the notice of the draft PEA to local, state, and federal agencies for comments. Comments were accepted from July 7 through August 5, 2021, via mail, e-mail, telephone, and online. During the public comment period, TVA conducted a virtual public information session that was attended by approximately 90 members of the public. A recording of the virtual public information session was made available on the TVA website.

Comments were collected from the general public, local, state, and federal stakeholders. TVA received 766 comment submissions by email, letter, and the online comment system. nine comment submissions were from government agencies, seven were from local governments, 22 were from nongovernmental organizations, and the remainder were from private citizens. Federal, state, and interagency comments were received from US Fish and Wildlife Service, Tennessee Department of Environment and Conservation, Alabama Department of Conservation and Natural Resources, Kentucky Department of Environmental Protection, Mississippi Department of Wildlife, Fisheries, and Parks, Tennessee Wildlife Resources Agency, and Mississippi Interstate Cooperative Resource Association. Local government comments were received from US Representative Tim Burchett (TN-02), Rhea County Commission, Loudon County Commission, City of Guntersville, Alabama, and State of Tennessee Department of Tourist Development. Comments were also submitted on behalf of the following groups: Tennessee Wildlife Federation, Congressional Sportmen's Foundation, America's Boating Club, Watts Bar Yacht Club, Maury County Visitors Bureau, Rhea Economic and Tourism Council, Watts Bar Ecology and Fishery Council, Roane Tourism, American Sportfishing Association, Melton Hill Lake Users Association, Tennessee River Sportsman Association, Tellico Village Property Owners Association, Tellico Cruising Club, Watts Bar Lake Forum & Fishing Reports, Conservative Club of Tellico Village, Tellico Community Foundation, Boone Lake Association, Rarity Bay Homeowners Association, Fishermen Against Asian Carp, Tellico Village Fishing Club, Tennessee Striped Bass Association, and the Watershed Association of the Tellico Reservoir.

Mitigation

TVA would implement the following environmental commitments, mitigation measures, and BMPs described in the PEA to avoid or reduce the potential for adverse environmental effects during the construction, operation, and maintenance of the proposed Asian carp fish barriers at L&D sites. Additionally, based on the completion of site-specific designs, TVA will review each project location to ensure that the bounding attributes and resource characteristics at each location are consistent with the bounding values contained in Tables 2-5 and 2-6 in the PEA. Should site-specific conditions and potential effects exceed the bounding values, TVA will perform a site-specific NEPA review as needed to encompass the additional scope.

TVA has identified the following mitigation measures and BMPs that would be used to minimize impacts and restore areas disturbed during proposed project activities:

- Public notice of lock closures, including estimated length of construction, would be provided to the public prior to closure.

- At locations with multiple locks (i.e., Pickwick, Wilson, Guntersville, and Wheeler), installation of fish barriers would be staggered to allow continued navigation.

- During construction at Kentucky Lock, vessels could bypass the Kentucky Lock through Lake Barkley by way of a canal connecting the two adjacent waterbodies.

- A Storm Water Pollution Prevention Plan would be implemented to minimize erosion during site preparation using appropriate site-specific BMPs.

- TVA would use turbidity curtains or other protective measures during dredging and installation of fish barriers to minimize transport of sediment downstream.

- Dredged material would be properly disposed at a location above the 500-year flood elevation, graded for proper drainage, and re-vegetated to prevent future erosion.

- Construction would include customary industrial safety standards, applicable BMPs, and job-site safety plans to maintain worker and public safety. Site safety plans would codify steps to ensure specific water-safety procedures are followed.

- Equipment refueling and maintenance operations would be carried out at designated locations using applicable BMPs.

- Appropriate spill prevention, containment, and disposal requirements for hazardous wastes would be implemented to protect construction workers, the public, and the environment in accordance with applicable state and federal regulations.

- TVA would manage all solid wastes generated in accordance with applicable state regulations and following procedures outlined in TVA's current Environmental Procedures and applicable BMPs.

- Components of the fish barrier systems would be adjusted to best target more sound- and CO_2-sensitive Asian carp and maintain passage of some native fish species.

- Land-based support systems would be located outside the 100-year floodplain; or made floodable; or elevated at least to one foot above the 100-year flood elevation or two feet above the 500-year flood elevation; and not located in the 100-year floodway.

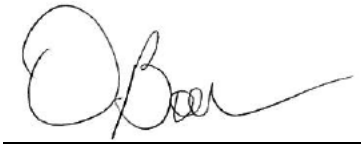
- All facilities would be consistent with local floodplain regulations.

- Laydown areas would be located outside the 100-year floodplain.

- A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the U.S. Fish and Wildlife Service on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect gray bats, northern long-eared bat, Indiana bat, and Virginia big-eared bat, TVA committed to implementing specific conservation measures. Once the specific design has been identified at each L&D site, relevant conservation measures will be identified and implemented as part of the project.

Conclusion and Findings

Based on the findings in the PEA, TVA concludes that implementing Alternative G – Install a Combined System of Fish Barriers (i.e., BAFF and CO_2) at Multiple L&D sites within the Tennessee River system would not be a major federal action significantly affecting the environment. Accordingly, an environmental impact statement is not required.



12/01/2021

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Date Signed