
EXECUTIVE SUMMARY

Floating Houses Policy Review

DRAFT ENVIRONMENTAL IMPACT STATEMENT
JUNE 2015



TENNESSEE VALLEY AUTHORITY



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**FLOATING HOUSES POLICY REVIEW
DRAFT ENVIRONMENTAL IMPACT STATEMENT**
Tennessee River Valley: Alabama, Georgia, Kentucky, Mississippi, North
Carolina, Tennessee, and Virginia

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

June 2015

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COVER SHEET

Floating Houses Policy Review

Proposed action: The Tennessee Valley Authority (TVA) has prepared this Environmental Impact Statement to assess the impacts and address environmental, safety, and socioeconomic concerns associated with the proliferation of floating houses and nonnavigable houseboats on its reservoirs. TVA will decide which of six alternative policies will be used into the future to regulate and manage floating houses and nonnavigable structures on its reservoirs.

Type of document: Draft Environmental Impact Statement

Lead agency: Tennessee Valley Authority

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Abstract: The Tennessee Valley Authority (TVA) is reviewing its policy on floating houses and nonnavigable houseboats that are designed and used primarily for human habitation. TVA's review is in response to the increased mooring of floating houses (FHs) on its reservoirs, which has implications for navigation, public health and safety, the environment, and public recreation. TVA is considering five alternative policies and has prepared this Environmental Impact Statement (EIS) to assess the potential impacts of implementing each alternative. The alternative policies vary greatly, from allowing additional FHs (Alternative A) to requiring that all FHs be removed from TVA reservoirs (Alternative C). One alternative (Alternative B1) would allow existing, currently unpermitted FHs to remain if new minimum standards are met. Another alternative (Alternative B2) would allow the same, but FHs and nonnavigable houseboats would be removed after a 30-year period. These four alternatives would require TVA to amend its regulations under Section 26a of

the TVA Act. Under one alternative (Alternative D), TVA would enforce current regulations to address FHs. Under each of the action alternatives, TVA would increase enforcement of existing standards and/or establish new standards and requirements to address environmental and safety concerns. TVA also analyzed impacts associated with current management as the No Action Alternative. For most resources, the impacts would be greatest for the No Action Alternative because the increase in the numbers of FHs under this scenario would be greatest.

EXECUTIVE SUMMARY

ES 1. Introduction

The Tennessee Valley Authority (TVA) is a multi-purpose federal agency responsible for managing a range of programs for the use, conservation, and development of the natural resources in the Tennessee Valley including the Tennessee River. In carrying out this mission, TVA operates a system of dams and reservoirs on the Tennessee River and its tributaries—its water control system—in order to manage the water resources of the Tennessee River for the purposes of navigation, flood control, and power production (Figure ES 1). Consistent with those purposes, TVA uses the system to improve water quality and water supply, and to provide a wide range of public benefits including recreation

TVA has prepared this draft Environmental Impact Statement (EIS) to assess the impacts and address environmental, safety, and socioeconomic concerns associated with the proliferation of floating houses (FHs) and nonnavigable houseboats (NNs) on its reservoirs.

This Draft EIS was prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations (40 CFR Parts 1500–1508) and with TVA's procedures for NEPA implementation. The EIS process ensures that the public and other environmental and permitting agencies have opportunities to provide input to the decision that TVA must make about the growth of FHs and the FHs/NNs already located on its reservoirs. The Draft EIS identifies the alternatives TVA is considering, the current environment, and the potential impacts from each alternative.

ES 2. Purpose and Need for Action

TVA is considering how to respond to the increased mooring of FHs on its reservoirs. The increase in FHs has implications for navigation, public health and safety, the environment, and public recreation. Potential actions in response to the proliferation of FHs could include amending its regulations under Section 26a of the TVA Act (18 CFR Part 1304).¹

Since 1978, TVA has prohibited the mooring on its reservoirs of new NNs that are used primarily for habitation and not for water transportation. In 1971, TVA amended its regulations to prohibit the mooring or anchoring of new NNs on TVA reservoirs. Criteria were established to identify when a houseboat was considered "navigable" and the conditions under which existing NNs would be allowed to remain. Since 1971, TVA has made minor changes to its regulations affecting NNs, most notably in 1978, when TVA updated the prohibition of NNs except for those in existence on or before February 15, 1978. The navigability criteria, however, largely have remained unchanged. FHs are a modern version of the pre-1978 NNs that TVA addressed in its 1971 and 1978 regulatory actions. FHs do not have permits issued by TVA.

Absent taking action, TVA anticipates that the mooring of FHs on its reservoirs will continue to increase. Until now, TVA has discouraged the increased mooring of FHs without using the full scope of its regulatory authority under Section 26a of the TVA Act. TVA is

¹ The Tennessee Valley Authority Act is the legislation passed by Congress in 1933 that established TVA. Section 26a gives TVA jurisdiction to regulate obstructions that affect navigation, flood control, or public lands across, along, or in the Tennessee River or any of its tributaries. Accordingly, TVA's approval is required prior to the construction, operation, or maintenance any dam, appurtenant works, or other obstruction affecting navigation, flood control, or public lands or reservations.

considering the policy implications before deciding how to address the problem. The policy decision addresses the FHs/NNs that are now moored on some TVA reservoirs and would apply to all TVA reservoirs.

TVA already decided in 1971 that the impacts and risks of NNs outweighed their public value. At this time, TVA's preference is to continue to allow NNs with current permits and to permit (i.e., grandfather) the mooring of existing, currently unpermitted FHs on TVA reservoirs but only if the FHs comply with new minimum standards and requirements under development by TVA. Noncompliant FHs/NNs would be removed from TVA reservoirs. Thus, TVA is inclined to select either Alternative B1 or B2 as its final decision but will consider the stakeholders' and public's input on which alternative best meets the agency's purpose and need.

ES 3. Alternatives

NEPA requires that TVA evaluate a reasonable range of alternatives and the alternative of taking no action. With its purpose and need to address the increased mooring of FHs on its reservoirs providing context, TVA began by identifying a broad set of possible management actions (e.g., new standards, enforcement, updating rules and regulations, removal of noncompliant structures, permitting or not permitting new FHs) that could be combined into policy alternatives. This process included consideration of ways to manage existing currently permitted NNs, as well as options for addressing the existence of hundreds of currently unpermitted FHs.

In developing the alternatives, TVA consulted a number of internal resources and TVA staff familiar with FH/NN issues and management of the reservoirs, in addition to resource specialists familiar with the conditions at the marinas with FHs/NNs and their ongoing impacts. TVA also considered comments received in recent years from the public, marina owners, recreationists, landowners, and others who have communicated about FHs/NNs, in addition to comments received during the scoping process.

TVA then identified a set of five policy alternatives to evaluate in detail, in addition to the No Action Alternative. The resulting alternatives range from the complete removal of all NNs and FHs to the continued management of existing NNs and establishment of a permit program for development of existing and/or new FHs.

The identified alternatives include grandfathering existing FHs (permitting them to remain on the reservoirs), removing them after a 30-year sunset period, and immediately removing them. TVA considered varying sunset periods for removal of existing FHs/NNs (e.g., 10, 15, or 20 years) before deciding that limiting the evaluation to immediate removal and removal after a 30-year period would provide the TVA decision maker and the public a sufficient understanding of the consequences of removal over shorter time periods.

The six alternatives are described below. Table ES 1 identifies the six alternatives selected to be carried forward for detailed analysis.

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Table ES 1. Summary and Comparison of Alternatives

| Alternative | Description |
|-----------------------|--|
| No Action Alternative | Current Management |
| Alternative A | Allow Existing and New Floating Houses |
| Alternative B1 | Grandfather Existing and Prohibit New |
| Alternative B2 | Grandfather but Sunset Existing and Prohibit New |
| Alternative C | Prohibit New and Remove Unpermitted |
| Alternative D | Enforce Current Regulations and Manage through Marinas and Permits |

ES 3.1 No Action Alternative – Current Management

For the purposes of NEPA and the environmental analysis in this EIS, the No Action Alternative is the baseline against which all action alternatives are compared. Under the No Action Alternative, TVA would continue to use discretion in enforcing its Section 26a regulations and would address specific problems caused by FHs/NNs on a case-by-case basis.

ES 3.2 Alternative A – Allow Existing and New Floating Houses

Under Alternative A, TVA would approve and issue permits for the mooring of existing and new FHs that meet new minimum standards within permitted marina harbor limits. Noncompliant FHs would need to be removed from the reservoir. TVA would change its regulations to set minimum standards for safety and wastewater issues, and TVA would increase its enforcement of these standards. Existing permits issued to NNs would remain valid if the NN complies with its permit conditions. Permitted NNs would not be subject to new standards if they comply with their current permits.

ES 3.3 Alternative B1 – Grandfather Existing and Prohibit New

Under Alternative B1, TVA would approve and issue permits for the mooring of existing FHs that meet new minimum standards within permitted marina harbor limits. Permitted NNs in compliance with their permits would continue to be allowed. TVA would prohibit new FHs and update its regulations to clarify that FHs are deemed nonnavigable and not allowed.

ES 3.4 Alternative B2 – Grandfather but Sunset Existing and Prohibit New

Under Alternative B2, TVA would approve existing FHs that meet new minimum standards and allow mooring within permitted marina harbor limits but would establish a sunset date by which time all FHs must be removed from TVA reservoirs. TVA would prohibit new FHs and update its regulations to clarify that new FHs are prohibited and would establish a date by which existing approved FHs must be removed. For purposes of analysis and this alternative, TVA uses 30 years as the sunset date, but that date could be earlier. TVA would continue to allow existing permitted NNs that are compliant with their permit conditions but would require that they also be removed from TVA reservoirs by the sunset date.

ES 3.5 Alternative C – Prohibit New and Remove Unpermitted

Under Alternative C, TVA would prohibit new and existing FHs. TVA would continue to allow permitted NNs that comply with their current permit conditions. TVA would require removal of all unpermitted FHs and permitted NNs that are noncompliant with their permit conditions within 18 months. TVA would amend its regulations to clarify its navigability criteria. TVA would not issue new standards.

ES 3.6 Alternative D – Enforce Current Regulations and Manage through Marinas and Permits

Under Alternative D, TVA would use its existing Section 26a regulations and property rights to remove existing FHs and noncompliant NNs, and to stop the mooring of new FHs on its reservoirs. TVA also would use the conditions and covenants in its land use agreements with marina operators to implement this approach.

ES 4. Affected Environment

The EIS includes baseline information for understanding the potential environmental, socioeconomic, and recreation impacts associated with the FH/NN policy alternatives under consideration by TVA. It describes the setting and existing conditions of natural, social, and economic resource areas that would be affected by the policy alternatives. The discussion of the affected environment also includes a description of the study area boundaries, current TVA planning policy, and the temporary scope of the EIS.

The following 12 resource areas are discussed in detail:

- Socioeconomics and Environmental Justice
- Recreation
- Public Safety
- Navigation
- Solid and Hazardous Wastes
- Visual Resources
- Land Use
- Cultural Resources
- Water Quality
- Ecological Resources
- Threatened and Endangered Species
- Floodplains

Although the geographic scope of this environmental review is the entire Tennessee River Watershed, specifically TVA's reservoir system and adjacent shoreline and land, particular attention is given to reservoirs with existing commercial marinas, as well as those reservoirs with a reasonable potential to support commercial marinas in the future. The EIS addresses the 29 reservoirs that currently house FHs and NNs or are likely to have additional FHs in the future if current trends continue. In addition to the 29 reservoirs described above, 21 reservoirs currently have no marinas and have low estimates of potential FH development. These reservoirs are identified in Section 1.4.1 and are not discussed further in the EIS. Table ES 2 identifies the 29 reservoirs addressed in the EIS.

Table ES 2. Reservoirs with Marinas or Potential for Future Commercial Marinas in the Study Area

| Reservoir | Estimated Current Number of Floating Houses and Nonnavigable Houseboats | Number of Marinas | Existing Marina Footprint (acres) |
|--------------------|--|--------------------------|--|
| Bear Creek | 0 | 0 | 0.0 |
| Blue Ridge | 12 | 1 | 23.7 |
| Boone | 133 | 7 | 51.6 |
| Cedar Creek | 0 | 0 | 0.0 |
| Chatuge | 0 | 4 | 39.2 |
| Cherokee | 2 | 11 | 130.2 |
| Chickamauga | 20 | 14 | 172.1 |
| Douglas | 0 | 10 | 69.0 |
| Fontana | 357 | 6 | 997.1 |
| Fort Loudoun | 100 | 10 | 101.8 |
| Fort Patrick Henry | 6 | 1 | 5.4 |
| Guntersville | 12 | 19 | 464.3 |
| Hiwassee | 30 | 4 | 45.2 |
| Kentucky | 55 | 61 | 658.1 |
| Little Bear Creek | 0 | 0 | 0.0 |
| Melton Hill | 0 | 1 | 2.0 |
| Nickajack | 30 | 3 | 45.5 |
| Normandy | 0 | 0 | 0.0 |
| Norris | 921 | 24 | 644.4 |
| Nottely | 0 | 1 | 4.1 |
| Parksville | 0 | 1 | 13.5 |
| Pickwick | 2 | 7 | 112.0 |
| South Holston | 117 | 6 | 144.9 |
| Tellico | 0 | 4 | 67.3 |
| Tims Ford | 0 | 1 | 23.7 |
| Watauga | 37 | 7 | 109.8 |
| Watts Bar | 2 | 13 | 148.6 |
| Wheeler | 0 | 5 | 70.6 |
| Wilson | 0 | 5 | 14.6 |
| Total | 1,836 | 226 | 4,159 |

TVA customized the study area for each resource area to address the potential effects of the FH/NN policy alternatives on that resource area. The analysis in the EIS also includes considerations of the existing reservoir land planning process. This process allocates land to seven land use zones defined in TVA’s *Natural Resource Plan* (TVA 2011a). The zones identify the land use of the reservoirs for purposes including recreational, industrial, sensitive resource management, and natural resource conservation. The zones provide a baseline for current conditions as well as planned uses that could be affected by the policy decisions in each alternative.

The temporal scope of the environmental analysis in the EIS extends at least 30 years into the future. This period was selected because it is a typical period used for planning TVA management actions and policies. However, projects beyond 5 to 10 years become increasingly uncertain and speculative.

ES 5. Environmental Consequences

The EIS describes the direct and indirect environmental impacts of the six alternatives as they affect the 12 resource areas.

To complete the environmental analysis, TVA estimated the future number of FHs/NNs under each of the alternatives. As shown in Table ES 3 and discussed in Section 4.1.1 of the Draft EIS, the largest predicted increase in the number of FHs would occur under the No Action Alternative. The second highest increase in the number of FHs on TVA reservoirs over a 30-year period would be under Alternative A. The largest predicted decrease in the number of FHs/NNs would occur under Alternative B2 at the end of the 30-year period. Under Alternative C, permitted NNs would be allowed and all existing FHs would be removed within 18 months from TVA reservoirs, with no further reduction over the 30-year period. Under Alternative B1, approximately 25 percent of the existing FHs/NNs would be removed from TVA reservoirs within the first 18 months, with no further reduction over the remainder of the 30-year period. Under Alternative D, approximately 25 percent of FHs that do not comply with the current regulations would be modified to meet the regulations’ criteria for navigation, allowing the modified FHs to remain and new structures to be built (that meet navigation criteria, but with primary design and purpose of habitation) at the same rate assumed under the No Action Alternative, based on marina harbor area capacity.

Table ES 3 Projected Number of Floating Houses and Nonnavigable Houseboats by Alternative

| Year | Alternative | | | | | |
|---------|-------------|-------|-------|-------|-------|-------|
| | No Action | A | B1 | B2 | C | D |
| Current | 1,836 | 1,836 | 1,836 | 1,836 | 1,836 | 1,836 |
| 2021 | 2,365 | 1,906 | 1,377 | 1,377 | 918 | 1,337 |
| 2045 | 3,692 | 3,233 | 1,377 | 0 | 918 | 2,016 |

The impacts of each alternative were characterized by one of three impact levels: positive, neutral, or negative. The extent, duration, and intensity of the impact determined the overall level assigned to the impact.

Each of the policy alternatives TVA is considering for management of FHs/NNs has potential positive and negative impacts for all of the resource areas. Many of the alternatives would

provide some benefits even if the overall impact of the alternative on the resource area is negative. For example, under Alternative A, the increased number of FHs would affect surface water recreators, but the new standards would result in fewer impacts on water quality experienced by this group of recreators. The full range of impacts is identified in Table ES 4, at the close of this section.

ES 5.1 Temporary and Indirect Impacts

Actions associated with some alternatives would indirectly and/or temporarily affect a number of different resources areas. For example, demolition and removal of unapproved structures associated with Alternatives A, B1, B2, C, and D could indirectly and temporarily affect multiple resource areas—including recreation, solid and hazardous wastes, visual resources, cultural resources, water quality, ecological resources, and threatened and endangered species—due to the use of heavy equipment. Alternatives that involve removal of unapproved structures and prohibition of new structures (Alternatives B1, B2, and C) would result in an overall decrease in FHs/NNs and associated environmental impacts.

ES 5.2 Long-Term Impacts

Under all of the alternatives, the long-term impacts for many of the resource areas—including public safety, navigation, solid and hazardous wastes, land use and farmland, visual resources, ecological resources, threatened and endangered species, and floodplains—would be minor. In general, the alternatives that would result in increased numbers of FHs (No Action Alternative, Alternative A, and Alternative D) would result in negative impacts on these resource areas. The current safety issues from improper mooring and anchoring practices that create recreation boating hazards could increase under these alternatives, but these may be manageable. Similarly, increased number of FHs would degrade the scenic quality of the reservoirs; however, the presence of FHs/NNs is part of the existing conditions and in many cases would be limited to small portions of the reservoir in the vicinity of the marinas.

While there would be positive impacts from the alternatives that result in fewer numbers of FHs/NNs (Alternatives B1, B2, and C), the benefits are expected to minor. For example, minor beneficial impacts on threatened, endangered, or special concern (TES) species would be expected due to fewer FHs/NNs, better management and compliance with existing and new regulations, and expected increases in water quality. This may prove to be beneficial to TES species that use the aquatic environment near marinas. Similarly, there would be beneficial impacts on terrestrial resources along the shoreline due to fewer FHs and improved management under Alternatives B1, B2, and C. However, the potential for change in land use would be minor and may be offset by the areas being redeveloped for other uses.

The following discussion provides additional information related to impacts on socioeconomics, recreation, cultural resources, and water quality; impacts related to these resources under the various alternatives would be more substantial. This discussion is organized by alternatives when the types and magnitude of the impact would be similar.

ES 5.2.1 No Action Alternative, Alternative A, and Alternative D

Different socioeconomics groups would be affected by these alternatives in different ways. FH/NN owners and renters, marinas, and other industries that derive income from FHs/NNs would experience positive impacts from the additional FHs that would be allowed under these alternatives. FH/NN owners would benefit from the increased market value of their FH or increased rental income. Marina owners and associated industries would benefit from increased revenues from expanded visitation and associated demand for services. Under Alternatives A and D, no negative impacts would result to FH owners from requirements to

upgrade FHs to meet the new standards. Shoreline property owners, recreational users, and the general public would experience negative impacts from additional FHs allowed under these alternatives. The continued growth of the FH market could depress the value of shoreline property. Increased visual impacts and reductions in water quality and safety would affect recreational users and the owners of shoreline property.

The No Action Alternative, Alternative A, and Alternative D also would affect recreators differently, depending on how they use the reservoirs. FH users would benefit the most from the policies implemented under these alternatives, which would generally result in increased opportunities for recreation. However, the quality of the recreation experience for current FH/NN users may decline based on congestion in the marinas. Surface water and shoreline recreation both would be negatively affected by the increased numbers of FHs and associated impacts on water quality, obstructed views, and limits to the shoreline from expanded marina boundaries.

Many of the activities associated with the No Action Alternative, Alternative A, and Alternative D could adversely affect historic properties in the Area of Potential Effects (APE). Adverse effects could result from damage from increased numbers of FHs sitting on the shoreline during drawdown and increased erosion. Increased FHs may adversely affect known and unknown archaeological sites and architectural resources along the shoreline. Once the preferred alternative is identified by TVA, Section 106 consultation will occur regarding the impacts and possible mitigation associated with the selected alternative.

The No Action Alternative would result in the most substantial negative impacts on water quality because it does not affirmatively address current wastewater discharge issues. An increase in the number of FHs is expected to exacerbate water pollution problems, adding to the cumulative wastewater loading to surface waters. Alternative A would result in neutral to beneficial impacts because the new standards would address the wastewater issues. However, some benefits could be offset by the expected increase in the number of FHs. Alternative D would probably result in some adverse impacts on surface water quality because of a lack of new standards coupled with a probable increase in the number of FHs. Alternative D would also probably cause adverse indirect impacts on surface water quality because the growth in FH numbers would increase the amount of pump-out wastewater. This increase in pump-out wastewater would increase loading on local municipal or onsite wastewater treatment systems; in turn, their discharges to surface water would probably increase.

ES 5.2.2 Alternative B1, Alternative B2, and Alternative C

The impacts under Alternatives B1, B2, and C would vary by socioeconomic group. In general, FH/NN owners and renters, marinas, and other industries that derive income from FHs/NNs would experience negative impacts from requirements for reducing FHs/NNs. Under Alternative C, owners of unapproved FHs would experience loss of equity or rental income and would incur costs to remove the structures. Under Alternative C, owners of permitted NNs would benefit due to increased market values and rental prices from the reduced supply of FHs under this alternative. Shoreline property owners, other recreational users, and the general public would experience positive impacts from the reduced numbers of FHs/NNs allowed under Alternatives B1, B2, and C.

The impacts on recreation would also vary by user group. Surface water recreation would improve from the amount of available space, improved water quality, and unobstructed views. Shoreline recreation would also benefit from increased shoreline access in areas where FHs were once moored and from improved views. Under Alternatives B1 and B2, water quality

would improve once the new standards are in place. FH recreation would significantly decrease under all of these alternatives, but the quality of recreation could improve for the NNs that are allowed to remain because of less congestion.

The impacts on cultural resources would vary by the location of the resource. Alternatives B1, B2, and C would likely decrease the number of FHs on the TVA reservoirs. This decrease would likely reduce damage from FHs sitting on the shoreline during drawdown and shoreline erosion within the APE, which could reduce the likelihood of adverse effects to inundated historic properties. Once the preferred alternative is identified, Section 106 consultation will occur regarding the impacts and possible mitigation associated with the selected alternative.

Alternatives B1, B2, and C would result in beneficial impacts on surface water quality, with Alternative B1 slightly beneficial, Alternative B2 beneficial in 30 years, and Alternative C beneficial sooner than 30 years. Alternatives B1, B2, and C would cause beneficial indirect impacts on surface water quality because the reduction in FH/NN numbers would reduce the amount of pump-out wastewater. The reduction in pump-out wastewater would reduce loading on local municipal or onsite wastewater treatment systems; in turn, their discharges to surface water might decrease.

ES 6. Potential Standards and Management Actions under Consideration

If TVA selects a future management alternative to allow and permit FHs, this change in policy will require revised or new standards to alleviate and minimize potential environmental and safety issues. Three of the alternatives being considered (Alternatives A, B1, and B2) could involve development of updated standards. The following is a general summary of potential standards and requirements that could be considered.

- Provide ground fault protection (ground fault circuit interrupter [GFCI]) not exceeding 100 milliamperes on any and all power sources. Utility-supplied sources should have GFCI protection at main marina feeder circuit, branch circuits, structure, or individual circuits. All electrical cables that enter the water or otherwise supply FHs shall have GFCI protection at their source. Generators or other non-utility sources should have GFCI protection as close as possible to the power source. The GFCI protection shall disconnect all circuits supplied by the power source.
- Protect exposed electrical cables where feasible by trenching or placing in cable trays or conduit. Underwater cables in shallow water areas that are subject to physical damage by contact with watercraft or propellers shall be protected by conduit or burial, or marked by buoys as appropriate.
- Comply with National Fire Protection Association (NFPA) 70 (National Electric Code) standards for marinas, boatyards, and floating buildings.
- Prohibit unencased Styrofoam flotation on FHs and NNs, and require removal of any existing within a certain time period (i.e., within 18 months).
- Prohibit grey water and black water discharge from FHs on No Discharge reservoirs.
- Treat grey water and black water through a marine sanitation device (MSD) on Discharge reservoirs.

- All FHs and NNs without direct utility connections must be equipped with a holding tank or an approved MSD by an established date to enable proper handling and treatment of black and grey water.
- Allow no expansion of existing structures unless TVA deems that it is essential for compliance with standards (such as additional holding tank capacity).
- If new FHs are allowed (Alternative A), maximum size could be 1,000 square feet and one story, moored in a marina slip with all utilities connected to the slip.
- Minimum separation and spacing requirements within marina harbor limits would be established.
- TVA may consider the exchange and retirement of one or more permitted NNs for a new FH meeting standards, with an equal footprint but no more than 1,000 square feet, including decks and walkways.
- FH owners may be required to pay an annual management fee to TVA or approved marina operators; a security assurance fee or cleanup deposit may also be required.
- Marinas/FH owners must certify that an initial inspection is completed, and then every 5 years document an inspection by TVA or a qualified person that certifies compliance with electrical, sanitary, water supply, flotation, and mooring standards.
- Marinas/FH owners must certify yearly that the structure meets required standards.
- At TVA's request, marinas or structure owners must provide records to document that holding tanks on No Discharge reservoirs are being pumped regularly and that waste is properly disposed of and treated. Detailed records should contain pumping dates and volumes removed during each pump-out service for each FH and NN.
- NNs must be in compliance with current TVA permit conditions. If not, the structure must comply with all new standards and rules for FHs or be removed from the reservoir.

Table ES 4. Summary of Resource Impacts by Alternative

| Resource | Alternative | | | | | |
|---|-----------------------|--|---|---|---|--|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Socioeconomics | | | | | | |
| Total market value of FH | Doubles in 30 years | Slight initial decrease as FHs are removed that are not upgraded to meet new standards; then an increase over 30 years | 25-percent reduction in short period | Elimination of FH market value after 30 years | Major loss of market value over short period; FHs prohibited | Major loss of market value over short period; then an increase over 30 years |
| FH owner loss of use | No change | Reduced by number of FHs not upgraded to meet new standards | Reduced by number of FHs not upgraded to meet new standards | Greatest loss of use over 30-year period | Major loss of use in short time period | Loss of use for those NNs and FH not compliant with current permit and 26a rules |
| FH or NN owner costs of upgrading structure to meet standards | No change | Increase in costs | Increase in costs | Greatest increase in costs; then removing all FHs and NNs | Increase in costs for removing all unpermitted FHs and noncompliant NNs | Large increase in costs over short period for removal or upgrading FHs to meet current navigation criteria |
| Marina owner revenue and employment from FHs and NNs | Increased revenues | Increased revenue over 30 years | Moderate reduction in income over 30 years | Greatest reduction in income over 30 years | Largest reduction in income in shortest period | Reduction in income over short period; then an increase over 30 years |

| Resource | Alternative | | | | | |
|-----------------------------------|---|---|---|--|---|--|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Socioeconomics (Continued) | | | | | | |
| FH owner rental income | Supply of rentals increases and rental price stays constant or slightly decreases | Slight reduction in rental market and increase in rental price | Reduction in rental income | Gradual reduction over time to 0 | Greatest loss over short period | Slight to moderate loss over short period |
| Renters of FHs and NNs | More options and slightly reduced rental prices | Slightly fewer options and slightly reduced rental prices | Reduced options and slightly higher rental prices | Loss of FH and NN rental options after 30 years | Greatest loss of FH rental opportunities over a short period and likely higher rental prices for remaining NNs | Moderate loss of rental options and likely higher rental prices for remaining NNs |
| Shoreline property owners | Reduced shoreline property values and reduced enjoyment | Reduced shoreline property values and reduced enjoyment, but impacts primarily near marinas | Slight improvement in shoreline property values and increased enjoyment | Greater improvement in shoreline property values after 30 years and greatest increase in enjoyment | Greatest positive impact on shoreline property owners within 6 months | Moderate positive impact on shoreline property owners in short period |
| TVA costs | Slight increase in costs for management | Greater costs for management of new standards and removing abandoned structures | Greater costs for management of new standards and removing abandoned structures | Greatest potential costs for removing abandoned structures, spread over 30 years | Increased costs for removing abandoned structures, concentrated in a short period, and increased management costs | Moderate potential cost increase for removing abandoned structures, concentrated in a short period, and increased management costs |

| Resource | Alternative | | | | | |
|--|--|---|--|---|---|--|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Recreation | | | | | | |
| FH and NN users | Greatest increase in number of recreation days | Large increase in number of recreation days | Decrease in number of recreation days | Number of recreation days reduced to 0 after 30 years | Large decrease in number of recreation days over a short period | Moderate or slight increase in number of recreation days after initial reduction |
| General public using shorelines and open water | Reduced enjoyment and access, and increased congestion | Reduced enjoyment and access, and increased congestion, primarily in marina areas | Slight improvement in access and reduced congestion, primarily in marina areas | Largest positive impact for public over 30 years | Greatest positive impact for public recognized in shortest period | Moderate positive impact for public in short period |
| Recreational boating and fishing | Greatest reduction in reservoir surface area, access to shoreline, and quality of recreation | Large reduction in reservoir surface area, shoreline access, and quality of recreation; impacts focused in marina areas | Moderate increase in reservoir surface area, shoreline access, and quality of recreation as unpermitted structures are removed | Moderate increase in reservoir surface area, shoreline access, and quality of recreation as unpermitted structures are removed; greater increase after 30 years | Greatest increase in reservoir surface area, shoreline access, and quality of recreation in shortest period | Neutral to slight increase in reservoir surface area, shoreline access, and quality of recreation (depending on number of FHs removed) |

| Resource | Alternative | | | | | |
|---|---|---|---|---|--|---|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Recreation (Continued) | | | | | | |
| Shoreline recreation access and quality of recreation | Greatest reduction in access to shoreline areas and quality of recreation | Large reduction in access and quality near marinas | Moderate increase in access and quality as unpermitted structures are removed | Moderate increase in access and quality as unpermitted structures are removed; greater increase after 30 years | Greatest increase in access and quality in shortest period | Neutral to slight increase in access and quality (depending on number of FHs removed) |
| Public Safety | | | | | | |
| Shoreline user and swimmer exposure to electric hazards | No reduction in hazards | Reduced exposure to electrical hazards with enforcement of new safety standards and removal of unpermitted structures | Reduced exposure to electrical hazards with enforcement of new safety standards and removal of unpermitted structures | Reduced exposure to electrical hazards with enforcement of new safety standards and removal of unpermitted structures; greater reduction after 30 years | Greatest reduced exposure to electrical hazards in shortest period with enforcement of new safety standards and removal of unpermitted and noncompliant structures | Reduced exposure to electrical hazards due to removal of unpermitted structures; however, hazards may persist under current regulations |
| Hazards associated with structural integrity | No reduction in hazards | Reduced hazards due to enforcement of new safety standards | Reduced hazards due to enforcement of new safety standards | Reduced hazards due to enforcement of new safety standards; greater reduction after 30 years | Reduced hazards due to removal of unpermitted and noncompliant structures | Reduction in hazards due to removal of unpermitted structures |

| Resource | Alternative | | | | | |
|---|--|--|--|--|---|---|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Public Safety (Continued) | | | | | | |
| Safety hazards from unsafe mooring practices | Increase in safety hazards associated with ropes and cables and poorly secured FHs (similar to current conditions) | Reduced hazards with enforcement of new safety standards | Reduced hazards with enforcement of new safety standards | Reduced hazards with enforcement of new safety standards | Reduced hazards with removal of unpermitted and noncompliant structures | Reduction in safety hazards associated with ropes and cables and poorly secured FHs due to removal of unpermitted structures and enforcement of current mooring regulations |
| Safety hazards from FHs/NNs dislodging and drifting into commercial navigation channels | No reduction in hazards (similar to current conditions) | No reduction in hazards (similar to current conditions) | Reduced hazards as unpermitted structures are removed | Reductions over time leading to elimination of hazards as all FHs and NNs are removed after 30 years | Reduced hazards as unpermitted and noncompliant structures are removed | Reduced hazards as unpermitted structures are removed |
| Solid and Hazardous Wastes | | | | | | |
| Amount of solid and hazardous waste material generated for handling and disposal | No reduction in amount (similar to current conditions) | Moderate increase in quantity generated due to demolition activities | Moderate increase in quantity generated due to demolition activities | Greatest long-term increase in quantity generated due to demolition activities | Greatest short-term increase in quantity generated due to demolition activities | Short-term increase in quantity generated due to demolition activities |

| Resource | Alternative | | | | | |
|---|--|--|---|---|--|--|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Solid and Hazardous Wastes (Continued) | | | | | | |
| Release of solid and hazardous wastes into the environment due to deterioration of aging structures | No reduced potential as structures continue to deteriorate over time (similar to current conditions) | Reduced potential as unpermitted structures are removed | Reduced potential as unpermitted structures are removed | Greatest long-term reduced potential as unpermitted structures are removed; greater reduction after sunset period | Greatest short-term reduced potential as unpermitted and noncompliant structures are removed | Reduced short-term potential as noncompliant FH structures are removed initially |
| Visual Resources | | | | | | |
| Scenic integrity of reservoirs | Reduced as number of FHs increases | Reduced as number of FHs increases, primarily near marinas | Slightly enhanced as unpermitted structures are removed | Slightly enhanced as unpermitted structures are removed; significant enhancement after 30 years | Enhanced in shortest period | Neutral to slightly enhanced (depending on number of FHs removed) |
| Scenic quality of reservoirs | Reduced as number of FHs increases | Reduced as number of FHs increases, primarily near marinas | Slightly enhanced as unpermitted structures are removed | Slightly enhanced as unpermitted structures are removed; significant enhancement after 30 years | Enhanced in shortest period | Neutral to slightly enhanced (depending on number of FHs removed) |
| Viewshed | Reduced as number of FHs increases | Reduced as number of FHs increases, primarily near marinas | Slightly enhanced as unpermitted structures are removed | Slightly enhanced as unpermitted structures are removed; significant enhancement after 30 years | Enhanced in shortest period | Neutral impact or slightly enhanced (depending on number of FHs removed) |

| Resource | Alternative | | | | | |
|--|--|--|--|--|---|--|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Land Use | | | | | | |
| Direct land use change associated with recreational area expansions to accommodate FHs | Increased potential | Increased potential | Slightly reduced potential | Slightly reduced potential | Reduced potential | Slightly reduced potential (depending on number of FHs removed) |
| Cultural Resources | | | | | | |
| Disturbance of benthic or shoreline archaeological sites | Increased potential as number of FHs increases | Increased potential, primarily near marinas | Reduced potential with prohibition of new structures | Reduced potential with prohibition of new structures | Reduced potential with prohibition of new structures | Reduced potential |
| Incompatibility with historic structures | Increased potential as number of FHs increases | Increased potential, primarily near marinas | Reduced potential with prohibition of new structures | Reduced potential with prohibition of new structures | Reduced potential with prohibition of new structures | Reduced potential with historic structures initially |
| Water Quality | | | | | | |
| Nutrient enrichment of reservoirs | Increased potential | Reduced potential with enforcement of new wastewater standards | Reduced potential with enforcement of new wastewater standards | Reduced potential with enforcement of new wastewater standards | Reduced potential with removal of unpermitted FHs or noncompliant NN structures | Slightly reduced potential with removal of noncompliant structures and rules enforcement |

| Resource | Alternative | | | | | |
|---|---|--|--|---|--|--|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Water Quality (Continued) | | | | | | |
| Recreational user exposure to human pathogens | Increased potential without enforcement of new wastewater standards | Reduced potential with enforcement of new wastewater standards | Reduced potential with enforcement of new wastewater standards | Reduced potential with enforcement of new wastewater standards | Reduced potential from removal of unpermitted or noncompliant structures | Slightly reduced potential from removal of noncompliant structures and rules enforcement |
| Ecological Resources | | | | | | |
| Terrestrial resources adjacent to shorelines | Minor adverse impacts | Minor adverse impacts | Minor beneficial impacts | Minor beneficial impacts | Minor beneficial impacts | Minor adverse impacts |
| Waterfowl and shorebirds | Minor to negligible adverse impacts | Minor to negligible adverse impacts | Minor to negligible beneficial impacts | Minor to negligible beneficial impacts | Minor to negligible beneficial impacts | Minor to negligible adverse impacts |
| Aquatic resources and aquatic ecological health in and around marinas | Minor to moderate adverse impacts on aquatic habitats | Minor to moderate adverse impacts on aquatic habitats | Minor beneficial impacts on aquatic habitats | Greatest but still minor beneficial impacts on aquatic habitats over time | Minor beneficial impacts on aquatic habitats | Minor to moderate adverse impacts on aquatic habitats |
| Establishment and spread of invasive terrestrial animals or plant species | Little effect | Little effect | Little effect | Little effect | Little effect | Little effect |
| Wetlands | Minimal impacts due to resource protection and regulations | Minimal impacts due to resource protection and regulations | Minimal impacts due to resource protection and regulations | Minimal impacts due to resource protection and regulations | Minimal impacts due to resource protection and regulations | Minimal impacts due to resource protection and regulations |

| Resource | Alternative | | | | | |
|--|--------------------------------------|--------------------------------------|--|--|--|---|
| | No Action Alternative | Alternative A | Alternative B1 | Alternative B2 | Alternative C | Alternative D |
| Threatened and Endangered Species | | | | | | |
| Threatened, endangered, or special concern species | Minor potential negative effects | Minor potential negative effects | Minor potential beneficial impacts | Minor potential beneficial impacts | Minor potential beneficial impacts | Minor potential negative effects |
| Critical habitat | No impacts | No impacts | No impacts | No impacts | No impacts | No impacts |
| Floodplains | | | | | | |
| Floodplains and flood risk | Minor adverse impacts on floodplains | Minor adverse impacts on floodplains | Neutral to minor beneficial impacts on floodplains | Neutral to minor beneficial impacts on floodplains | Neutral to minor beneficial impacts on floodplains | Neutral to minor adverse impacts on floodplains |

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