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DRAFT ENVIRONMENTAL ASSESSMENT

Proposed Commercial Marina Facility Additions and Excavation and Fill for Parking Area
South Fork Holston River Mile 56.5, Right Bank, South Holston Reservoir,
Sullivan County, Tennessee

Laurel Marina and Yacht Club

File No. 2002-00017

Prepared By:
TENNESSEE VALLEY AUTHORITY
Environmental Stewardship and Policy
Holston-Cherokee-Douglas Watershed Team

And

U.S. ARMY CORPS OF ENGINEERS
Nashville District, Regulatory Branch

For further information, contact:

Anne Patrick
Land Use Representative
Tennessee Valley Authority
106 Tri-Cities Business Park Drive
Gray, Tennessee 37615
(423) 467-3809
awpatrick@tva.gov

Lisa Morris
Project Manager
U.S. Army Corps of Engineers
Regulatory Branch
3701 Bell Road
Nashville, Tennessee 37214
(615) 369-7504
Lisa.R.Morris@lrn02.usace.army.mil

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1.0 Proposed Activity

1.1. Background. Formerly known as Laurel Boat Dock, Laurel Marina and Yacht Club Inc., 191 Shady Ford Road, Bristol, TN 37620, is located along the right bank of the at South Fork Holston River Mile (SFHRM) 56.5, within a harbor (cove) on South Holston Reservoir, about 8 miles east of Bristol, in Sullivan County, Tennessee. Although the applicant owns a small piece of property, which is a part of the complex, the Cherokee National Forest surrounds the commercial marina to the water's edge and the U.S. Forest Service (USFS) is the single adjacent property owner. There are no private lands within a mile of the marina. Under review is the marina's application for an expansion of facilities and the deposit of fill material into a small cove in the King's Cove embayment area for additional needed parking space.

A commercial marina has been in existence at this location, in one form or another, since the 1950s. In 1988, Department of the Army (DA) and Tennessee Valley Authority (TVA) permits were issued to Laurel Boat Dock, Mr. Dalie Thomas owner, for the discharge of fill material into five small reservoir coves around the marina to construct safer access roads and a parking area. Copies of those permits with the associated environmental assessment (EA) are attached as Appendix K. Since that time, various other DA and TVA permits have been issued to Laurel Marina for miscellaneous facilities. Copies of these permits are on file with the federal permitting authorities. The marina currently houses approximately 505 boats (of which 120 are large navigable and nonnavigable boathouses). TVA licenses Mr. Thomas approximately 5,250 feet of shoreline for the marina within his current harbor limits. The harbor limits were established and approved in the late 1980s.

Recent Permit Application Background: In 2002, the applicant submitted a request to TVA and the U.S. Army Corps of Engineers (Corps) to expand the harbor limits and marina facilities. A part of this proposal included a request to the USFS for a special use permit to construct an additional road along with roadside parking on 3.07 acres of upland forested lands within the Cherokee National Forest, which surrounds the marina. On April 19, 2002, Joint Public Notice (PN) 02-12 was issued for the proposal. In November 2002, a public meeting was held by TVA and USFS in response to requests received during the PN comment period. However, in July 2003, the applicant withdrew his request because of public land usage issues with the USFS.

In December 2004, a modified application was submitted for the same harbor limits and marina facilities additions, but the parking lot would be constructed in a small cove, outside of the USFS lands. The fill material for the parking lot would be excavated from three sites along the shoreline reservoir bottom within the marina area and below normal summer pool (NSP) elevation 1,729 mean sea level (msl). The depth of these cuts is proposed to be down to normal winter pool (NWP) elevation 1,703 msl around the marina. The excavation would extend as far down as needed but would not be within 5 feet of the bedrock layer. The reservoir bed (bottom) substrate is generally sandy clay with cobble rock. The applicant is aware of the location of the bedrock layer and that fish spawning requires the presence of a gravelly bottom substrate for success. Fish attractor structures would be constructed on the gravelly soil excavated areas.

PN 05-14 was issued on March 16, 2005, to advertise this proposal. Comments both for and against the proposal were received. The agencies stated that the proposed project would not affect federally listed species or affect properties eligible for or listed on the National Register of Historic Places (NRHP). Main objections involved increased boat traffic and safety; harbor limits expansion into waters used by anglers, swimmers, skiers, and other boaters; water quality; and filling the reservoir for a parking lot.

To address public opposition, the applicant modified the request by reducing the number of boat slips proposed. The revised request also includes a lakeward extension of the existing harbor limits but no expansion of the TVA shoreline land licensed to Mr. Thomas. The September 19, 2005, PN 05-73 (Appendix B) advertised the revised scope of work (final proposal).

1.2. Decision Required. The following assessment is for the applicant's final proposal. An application was submitted for DA permits pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (CWA); and for a TVA permit pursuant to Section 26a of the TVA Act.

- Section 10 of the Rivers and Harbors Act prohibits the alteration or obstruction of any navigable waters of the U.S. unless authorized by the Secretary of the Army acting through the Chief of Engineers; SFHRM 56.5 is a navigable water of the U.S. as defined by 33 Code of Federal Regulations (CFR) Part 329.

- Section 301 of the CWA prohibits the discharge of fill material into waters of the U.S. unless authorized by the DA pursuant to Section 404 of the same act; South Fork Holston River is a water of the U.S. as defined by 33 CFR Part 328.

- Section 26a of the TVA Act prohibits the construction, operation, or maintenance of any obstruction in, on or along the Tennessee River System or its tributaries that affect navigation, flood control, or public lands or reservations until plans for such construction, operation, or maintenance have been approved by TVA. No new or additional land or landrights is being requested as a part of this final proposal.

Federal permits are required for the work; therefore, TVA and the Corps must decide on one of the following:

- Issuance of a permit for the proposal
- Issuance of a permit with modifications or conditions
- Denial of the permit

1.3. Other Approvals Required. Other federal, state, and local approvals are required for the proposed work. On May 23, 2006, a conditional water quality certification (WQC) (Appendix G) was issued by the Tennessee Department of Environment and Conservation (TDEC), pursuant to Section 401(a)(1) of the CWA, stating that applicable water quality standards would not be violated if the work were conducted in accordance with the conditions set forth in the certification. TDEC would require approval of detailed design features and plans for the parking lot prior to construction. The certification requires that temporary erosion and sedimentation control measures must be used throughout the construction period. Effective erosion control would be installed along the base of all fills and cuts on the downhill side of the work. Controls would be repaired and maintained as necessary. Measures would include, but not be limited to, the use of entrenched fabric filter fence, entrenched staked straw bales, berms, brush barriers, fiber mats, netting, gravel, mulches, grasses, and slope drains. Federal authorization would require adherence to conditions of the WQC.

2.0 Public Involvement Process. On April 19, 2002, PN 02-12 was issued for the original proposal that involved the use of USFS land. Two additional PNs were issued: one for a revised proposal (PN 05-14) and another for the final proposal (PN 05-73). Copies of these notices are attached to this document and included as Appendix A and Appendix B, respectively. The final proposal is evaluated in this Draft EA.

First Public Notice: On March 16, 2005, PN 05-14 was issued to advertise the increase in TVA licensed harbor limits from 5,250 linear feet (LF) to 6,000 LF, the construction of 213 new double pleasure boat slips, 66 large houseboat slips, and 14 small houseboat/sailboat slips. The proposal also includes the discharge of approximately 58,000 cubic yards of fill material into a small cove of the reservoir (0.9 acre below NSP elevation 1,729 msl) and 21,000 cubic yards of fill material between NSP and elevation 1,745 msl. The purpose of the fill is to build a 196-space marina parking lot (1.74 total surface acres). The fill material would be excavated in the dry during winter. This excavation would occur between NSP elevation 1,729 msl and NWP elevation 1,703 msl around the marina. This material would be transported overland to the proposed cove to construct a parking lot while being stabilized with riprap. The main purpose of the proposed excavation (over three separate areas totaling 3.66 acres) is to obtain fill material nearby and to offset flood storage loss.

A mitigation plan that increases shallow water habitat and establishes various fish habitat structures to attract fish along the excavated areas would be implemented (see Appendix F for other required mitigation and monitoring plans). Structures include spawning benches (10-foot-long slabs of oak attached to 8-inch or 12-inch cinder blocks laid on the shoreline, placed at various locations), brush piles (multiple trees anchored at the bottom to prevent dispersal, minimum 10 feet x 10 feet in size), flat areas (10 feet x 15 feet with suitable bedding substrate material), and boulder piles (8 feet long by 3 feet high). Hay bales would be used to control all runoff from the excavation areas. The hay bales would be set in trenches at least 2 inches deep; stakes would be set at an angle such that bales are drawn together and supported in the uphill direction. Upon completion of the excavation, the hay bales would remain in the reservoir providing nutrients that would attract fish. Silt fence sedimentation control devices would be installed across the embayment prior to commencement of filling activities.

Issues raised in the public comments are summarized below. Actual copies of the comments are on file with the federal permitting authorities.

In response to PN 05-14, 157 comments and petitions with 911 total signatures were received. Of the individual comments, 105 were opposed and 52 were in support. Including the petition comments, 488 called for a public meeting. Among other things, safety and increased boat traffic were the main concerns. Agencies commenting were the U.S. Fish and Wildlife Service (USFWS), the Tennessee Historical Commission (THC), and the Tennessee Wildlife Resources Agency (TWRA). Opinion leaders supporting the project include State Senator Ron Ramsey, State Representative Jason Mumpower, the Bristol Chamber of Commerce, and a Sullivan County commissioner. Opinion leaders opposed to the proposal include the League of Women Voters of Tennessee and the Cherokee Forest Voices. A summary of the most frequently mentioned issues is provided below. A listing of commenter names is included to this document as Appendix C.

Public Comments - Summary of the Most Frequently Mentioned Issues

Issues Supporting the Proposal

- Positive impact on the area economy
- Laurel Marina has demonstrated good environmental stewardship
- Expansion would provide additional docks that would allow the public more public access
- Expansion would increase fish habitat by measures proposed in the current application
- Availability of a sewage pumpout station would decrease the amount of pollution in the reservoir

- Expansion is not within view of the U.S. Highway (US) 421 bridge or public ramp

Issues Opposing the Proposal

- Overcrowding with boaters and safety concerns
- Public lands should not be licensed (i.e., lost), and public access to the reservoir should not be restricted for private gains
- Negative impact on shoreline aesthetics
- Negative impact on reservoir water quality
- Negative impact on biological and aquatic resources
- Negative impact on recreation
- Negative impact on traffic (US 421/421 bridge/public boat ramp)
- Approval would result in more trash and litter in the reservoir, dumping of more sewage and septic waste in the reservoir, and more erosion and sediment runoff
- Expansion is not needed and alternative sites should be considered

Agency Comments to PN 05-14 - Copies of the agency comments are attached to this document and included in Appendix A.

a. THC responded by letter dated March 22, 2005, stating that the undertaking would have no effect on NRHP listed or eligible properties.

b. USFWS responded by letter dated April 7, 2005, stating that based on its records, there are no federally listed or proposed endangered or threatened plant or animal species in the impact area of the project and that requirements of Section 7(c) of the Endangered Species Act of 1973, as amended, are fulfilled.

However, the USFWS stated concerns regarding the aquatic habitat mitigation proposal, the cumulative impacts from marinas that fill lakes (public resources) to obtain additional land for private development purposes, and compliance of the proposal with the 404(b)(1) guidelines. The USFWS recommended that an alternatives analysis be conducted to determine other options that may exist in the area. USFWS stated that the proposed mitigation is deficient and that the proposed fish habitat structures would all occur within the harbor limits of what would appear to be a very crowded marina, and the proposed mitigation measures would likely offer little in the way of fish usage and/or public fishing because of the boat traffic in and out of a marina this size. USFWS recommended that additional mitigation occur outside of the proposed harbor limits to facilitate increased fish usage and fishing opportunities to the general public. Finally, USFWS stated that if the applicant modifies the proposal to exclude fill being placed within waters of the U.S., they would likely not oppose the project, but otherwise recommended denial.

c. TWRA responded by letter dated April 21, 2005, stating objections to the mitigation plan, to filling public waters for the purpose of creating a parking lot for private commercial use, and to excavation of the shoreline to obtain fill material. TWRA stated that the area proposed for fill was between marginal and satisfactory spawning habitat for black bass and that the area proposed for excavation is slightly above marginal. TWRA was concerned that the additional shoreline harbor limits would violate TVA's maintain-and-gain commitment of the Shoreline Management Policy.

Application Modification: In response to public comments regarding safety concerns due to increases in boat traffic, the applicant reduced the number of requested slips to 181 double boat slips and 30 houseboat slips. Under the modified plan, harbor limits would be extended lakeward

and no additional shoreline would be licensed from TVA. The applicant agreed to monitor, maintain, and refurbish the fish habitat enhancement and spawning structures (including those outside harbor limits) for a reasonable amount (i.e., nine years) of time. Other aspects of the application were unchanged.

Second Public Notice: On September 19, 2005, PN 05-73 was issued to advertise the modified scope of work. A copy of the notice and agency comments received is attached to this document and included as Appendix B. In response to this notice, there were fewer commenters in opposition, while an increased number of individuals commented in support of the project. There were 39 requests for a public hearing. Agency responses came from the USFWS, TWRA, and THC. No new public or agency concerns were presented.

Agency Comments to PN 05-73 - A summary of the agency comments on PN 05-73 is as follows:

a. USFWS responded by letter dated October 18, 2005, stating that proposed project remains unchanged from the previous notice and that none of the concerns outlined in their April 2005 letter were addressed by the applicant. USFWS stated that they were not opposed to the construction of any particular number of boat slips, but strongly opposed the placement of fill within waters of the U.S. without an alternatives analysis being conducted. They reiterated that the mitigation proposal is inadequate. Therefore, USFWS staff continues to recommend denial of the permit and that an alternatives analysis would need to be conducted to determine other options that may exist in the area.

b. By letter dated October 12, 2006, TWRA responded with the same comments as previously, however added that in a meeting between TWRA and the applicant on June 3, 2005, the applicant said that the proposed excavation would not be conducted to durable rock but to substrate similar to what currently exists at the project area. TWRA requested a statement from a geologist affirming that this was possible; according to TWRA, the affirmation was not received. TWRA staff request that the permit be held in abeyance until the applicant addresses their concerns.

c. By letter dated September 29, 2006, THC repeated its no affect to historical or archaeological properties finding.

TDEC Public Hearing – In August 2005, TDEC issued a notice for Public Hearing 2005-012. On September 20, 2005, a public hearing was held by TDEC, Division of Water Pollution Control on the marina expansion proposal and parking lot construction (Appendix J). See “Responses to Public Comments on Water Quality from the TDEC Hearing (Section 3.2) and “Consideration of Comments” (Section 5.1) for discussions about the results of that hearing.

Applicant Rebuttal: In response to the second PN, two letters were received: one from the applicant and one from his engineer. The letters were forwarded to USFWS and TWRA.

a. By letter dated December 15, 2005, the applicant’s consultant, S&ME, provided information regarding the potential presence of pyritic shale within the proposed expansion area. A copy of the letter is in Appendix D. To reduce the potential for any water quality effects, Mr. Thomas agreed to stop excavation within 5 feet of the bedrock layer, if encountered. The letter describes the composition of the excavation areas as three zones of grading. Area 1 is predominantly sandy clay with some cobble rock with one seam of highly weathered shale in the reservoir bottom below NSP. Area 2 has indentured shale exposures in the reservoir bottom below NSP. Area 3 is predominantly sandy clay with some cobble rock. Samples were taken

from several locations and tested for pyritic content and neutralization potential. The results of the laboratory show minimal amounts (0.02 percent) of pyritic content.

In addition, the letter addresses the benefits of the applicant's mitigation plan and states that the development of the marina roads to the reservoir has been a benefit to the public. Without the availability of the road system developed by Laurel Marina and Yacht Club, access to this section of the reservoir by the general public would be available only by overland hiking through private land. There are no restrictions on the use of the road for bikers, hikers, walkers, runners, anglers, or hunters (Appendix D) for access to back-lying USFS public land.

b. By letter dated July 19, 2006, the applicant provided the following alternatives analysis, specifically regarding the construction of the parking lot and the impact that the expansion would have on the surrounding shallow water habitat, and some comments on mitigation.

Alternatives Analysis: Parking Lot Fill

Alternative 1: Utilize Private Land for Parking, Relocate Parking Lot, or Build Parking Structure

- There is no private land with road access within 1 mile of the proposed expansion area. The private land currently owned by Laurel Marina and Yacht Club is approximately 1 mile from the proposed slip expansion and is too far away to provide ready access for slip holders.

- The existing parking lot is at capacity due to the current customer base of Laurel Marina and Yacht Club.

- USFS would not permit any cut, fill, or excavation above the 1,747-foot elevation msl nor would it permit the building of permanent structures such as a parking garage on USFS land.

- Construction of a parking garage on the existing parking lot (previously permitted in 1988) is not economically feasible because the current lot was created by fill and would require significant reinforcement below the 1,747-foot elevation msl to bear the weight of such a structure. Additionally, a parking garage would impede accessibility to the dealership for sales and service and would restrict traffic flow.

- A parking garage structure would degrade the aesthetic quality of the reservoir.

Alternative 2: Utilize Fill Material from Another Location

- USFS and TVA would not allow additional fill to be brought in from outside the current harbor limits due to loss of flood and power storage.

- USFS would not permit any cut, fill, or excavation above the 1,747-foot elevation msl.

Alternative 3: Utilize a Sea Wall to Reduce Fill for Parking Lot

- Construction of a sea wall is not TVA's preferred method of stabilization.

- Natural material stabilization, such as riprap, promotes aquatic habitat enhancement.

Alternative 4: Reduce the Size of the New Parking Lot

- While the number of proposed slips requested in the expansion was reduced from 306 to 211, Laurel Marina and Yacht Club requested no reduction in the size of the parking lot

because 181 of the 211 remaining slips are designated as double-occupancy slips, which would accommodate 362 boats plus 30 single-occupancy slips, for a total of 392 boats. At an average of two cars per boat, the maximum potential parking space would be capable of accommodating 784 cars. If only 25 percent of these cars are likely to be occupied at peak use, 196 parking spaces (the size of the proposed parking lot), would be required.

Applicant's Conclusion: Generally, because of local topography, the method for constructing the proposed parking lot (fill) is the same as is utilized for parking lot construction in other locations on the reservoir. The reason the fill for the parking lot has been chosen as the preferred alternative is because relocating the lot to private land, building a structure on USFS land, constructing a sea wall, or reducing the size of the parking lot are not practicable based on geographic, economic, or regulatory restraints. Based on previous approvals (Appendix K), knowledge of the area, review of the final proposal, and an examination of the Laurel Marina in the context of its surroundings, TVA and the Corps concur in this alternative analysis.

SHALLOW WATER HABITAT MITIGATION

Applicant's Statement Regarding Mitigation: Before any mitigation was proposed, the proposed parking lot area was evaluated for alternatives, including minimization and avoidance. The applicant maintains that construction of a new parking lot to accommodate the growth that would accompany the expansion of Laurel Marina and Yacht Club must be done on site because it is the only justifiable alternative. The following is a summary of the applicant's proposed mitigation procedures:

1. The mitigation site chosen is in an area lacking in shallow water and structural habitat for fish and wildlife. Mitigation would stimulate the creation of a shallow water habitat.

2. The total reservoir surface area would be reduced by approximately 0.9 acre or less during the full pool period of May through August. The reduction would be offset by a net gain of 2.14 additional acres of shallow water habitat during the remaining eight months, when fishing is considered at its best on the reservoir.

3. The proposed area for the parking lot is a small cove that is narrow and shallow. Boathouses are currently moored to the banks year-round, making the area less accessible and desirable to the public for fishing.
4. The proposed mitigation would create a shallow water habitat area that is more than double the size of the area being filled.

5. The proposed area has been within the marina harbor limits since 1988. The applicant has seen the reservoir level more than 10 feet below the proposed cut area. Soil and rock tests by a licensed engineering firm have confirmed that there is minimal solid rock (hard pan) in this proposed excavation area. The bottom of the three excavated areas would be 5 feet or more above the natural bedrock bottom and be composed of the natural sandy clay, bottom reservoir material that would be covered over with more silt as construction operations cease.

6. Natural rock and natural rock with riprap would be used for a stabilization wall, and if rock is not available, gabion baskets would be used where needed. Construction of a sea wall is not TVA's preferred method of stabilization. The use of gabion baskets and

natural rock would promote a more natural area that is conducive to the aquatic habitat enhancement.

7. The proposed area of expansion is a problem area where wave action erosion has occurred in the past. The process of stabilization would help prevent further erosion. The front of the new slips would create an underwater wave breaker for additional erosion control, further protecting this area of shoreline.

8. During construction, hay bales, which are stronger than silt fences, would be used to prevent the flow of sediment into the reservoir. Upon completion of the excavation, the hay bales would remain in the reservoir, providing nutrients that would attract fish.

9. Long-term habitat enhancements would consist of constructing eight anchored brush piles, 11 [eleven] 10-foot x 15-foot flats, 10 boulder piles, and 11 smallmouth spawning benches. (Please refer to attached site plan for placement and spacing included in Appendix F.)

10. Mitigation measures were extended outside the current harbor limits to compensate for any loss of shallow habitat and to improve and expand accessibility to the public.

Applicant's Conclusion: The mitigation measures represent a commitment by Laurel Marina and Yacht Club to protect and enhance the shallow water habitats and shoreline on South Holston Reservoir while simultaneously maximizing availability and access of public recreation use of the reservoir.

Agencies' comments on applicant's final proposal and mitigation plans: Copies of the applicant's rebuttal and alternatives analysis letters were forwarded to TWRA and USFWS, and in response, the agencies submitted the following:

a. By letter dated July 21, 2006, TWRA stated that mitigation should be required for the fill and the excavation areas. Shallow water habitat provides functions such as nursery and spawning areas for several fish species. It has been the policy of TWRA to view mitigation such as that proposed by the applicant as enhancement, since it neither restores nor creates shallow water habitat but enhances the functions of existing habitat. TWRA recommends that the applicant mitigate at a 4:1 ratio by acreage (i.e., 8 structures, spawning benches, or rock piles would mitigate for 0.25-acre of impact at a 4:1 ratio). For the fill action, TWRA recommends 30 structures (0.9 acre impact x 4 [4:1 ratio] x 8 structures). For the excavation, TWRA recommends 117 structures (3.66 acres impact x 4 x 8 structures). The effectiveness of these structures in mitigating for the loss of functions provided by shallow water habitat is greatly dependent upon the location, substrate, and elevation in which these structures are placed. TWRA requests that the applicant coordinate with TWRA regional fisheries and habitat personnel to ensure the structures are placed in a location and manner that would be effective. As far as monitoring the success of the proposed mitigation measure, electrofishing of the habitat structures would determine utilization by spawning adult fish, both female in egg-bearing condition and males guarding the nests from predators. Larval fish tows near the structures could provide information on how the structures would enhance nursery functions. Three years of data would probably be sufficient to account for variability in this situation.

b. By letter dated July 27, 2006, USFWS stated they have reviewed the alternatives analysis for the proposed Laurel Marina and Yacht Club expansion project, but continued to state opposition to the placement of fill into public waters for private development projects and

requested denial of the permit. USFWS understands that the applicant currently has harbor limits within this cove; however, USFWS would rather see the expansion take place at another location that would not adversely impact natural resources to the point this project would. Assuming this project does get permitted, USFWS requests that the fish structures be placed outside the proposed harbor limits. TWRA has offered their assistance, and should be involved in the placement of these structures. Although the amount of structures proposed by TWRA may seem excessive, the materials needed to make these structures are very inexpensive and easy to build and install.

Applicant's Final rebuttal: In rebuttal, the applicant increased the number of structures to 40, moved most of the structures outside of the harbor limits, and resubmitted the mitigation plan. Long-term habitat enhancements would consist of 8 anchored brush piles (outside of the harbor), 11 10-foot x 15-foot flats (4 in the harbor, 7 out outside the harbor), 10 boulder piles (5 in the harbor, 5 out outside the harbor) and 11 smallmouth spawning benches (2 in the harbor, 9 out outside the harbor). The applicant would monitor and maintain/refurbish the fish habitat enhancement and spawning structures (including those outside his harbor limits) as needed. As a requirement of any permit issued for the work, the applicant would submit a monitoring report to the Corps and TVA every three years for a period of nine years.

3.0 Environmental and Public Interest Factors Considered

3.1. Introduction. According to 33 CFR 320.4(a), the decision whether to issue a permit would be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. All factors that may be relevant to the proposal must be considered. The PNs listed factors that may be relevant to the proposal. The following sections identify factors that are relevant to this proposal, and if relevant, provide a concise description of the impacts.

3.2. Physical/Chemical Characteristics and Anticipated Changes. The relevant blocks are marked with an "x" and include a description of the impacts. Photographs of the site showing existing conditions of the immediate environs are included in Appendix I.

(**x**) lake pools. South Holston Reservoir is an impoundment of the South Fork Holston River in northeast Tennessee and southwest Virginia. South Holston Dam is located at SFHRM 49.8. At full pool, South Holston Reservoir has a surface area of 7,580 acres and 160 miles of shoreline. South Holston Reservoir extends 23.7 miles upstream at normal maximum pool elevation and drains an area of about 703 square miles. The annual reservoir drawdown is approximately 54-foot vertical drawdown to elevation 1,675 msl, rising back to NWP elevation 1,703 msl. A full summer pool (elevation 1,729 msl) is typically held for about six to eight weeks. At the proposed project area, the reservoir is characteristic of those set in mountainous environs, in that shorelines are steep. No shallow water shelf areas that would be considered highly productive exist at or near the marina, including the cove area proposed to be filled for parking (Appendix I).

(**x**) substrate. The reservoir bottom substrate consists primarily of sandy clay with cobble rock utilized by fish, amphibians, snails, mussels, and microorganisms and other aquatic life during the spawning process. The gradient is gently to steeply sloping. The proposed work consists of filling a 0.9-acre area of substrate and excavating a steep 3.1-acre shoreline substrate down to sandy clay with cobble rock substrate below NSP. The excavation would extend as far down as possible but would not be within 5 feet of the bedrock layer. The proposed action would result in a net gain of 2.2 acres of shallow water habitat substrate similar to the reservoir bottom composition below NSP. The applicant is aware of the location of the bedrock layer and that fish spawning requires the presence of a gravelly bottom substrate for success. Fish attractor structures would be constructed on the gravely soil excavated areas. In addition, since adequate water depths exist at all pool operating levels, the construction of the proposed new slips would have minimal impact on the reservoir bottom substrate.

(**x**) currents, circulation, or drainage patterns. The proposed activity would not have an adverse effect on the existing drainage patterns and runoff from the adjoining mountainous and forested terrain of the Cherokee National Forest. The facilities would be located within a relatively large embayment positioned alongside a peninsula in a natural drainageway, and the addition of docks in the embayment and cove fill would not have an impact on currents, circulation, or drainage.

(**x**) storm, wave, and erosion buffers; shore erosion; and accretion patterns. The changes in the marina would concentrate additional boat traffic, which could increase local wave energy levels. The higher concentration of boats may contribute to a small, but insignificant, acceleration of erosion of surrounding areas of unprotected shoreline, which would diminish with increasing distance from the marina. However, the front of the new slips would create an underwater wave breaker that would reduce the effects of wave energy and erosion on the shore. Natural rock with riprap would be used to stabilize the fill material placed for the parking lot, and if rock is not available, gabion baskets would be used where needed.

(**x**) suspended particulates, turbidity. Construction of the docks would result in some minor but localized turbidity of short-term duration. Performing the cut-and-fill activities during winter low-pool elevations would minimize turbidity compared to performing the work when reservoir pool elevations are higher. During the filling activity, silt curtains would be installed across the embayment prior to filling the cove for a parking lot. During the excavation activities, hay bales, which are stronger than silt fences, would be placed along the shoreline in the dry and used to control the flow of sediment into the reservoir. Upon completion, the hay bales would remain in the

reservoir providing nutrients that would attract fish. In any case, turbidity would be minimal and would be quickly dissipated by normal currents.

( ) baseflow. No issues.

(**x**) water quality (temperature, color, odor, nutrients). TDEC issued a WQC for the final proposal on May 23, 2006. The certification provides assurance that water quality standards would not be violated if the work were conducted in accordance with the conditions set forth in the certification. A copy of the WQC is included in this document (Appendix G). Any federal authorization would also require adherence to conditions of the WQC.

The proposed level of construction is similar to several other existing and proposed developmental projects throughout the Tennessee River system. Laurel Marina would require construction activities along the shoreline, including construction of the parking lot fill. The docks are expected to be placed by barge-mounted crane. The cut-and-fill activities would occur in the dry during winter pool drawdown. During the construction phase, turbidity levels would be contained; yet, elevated levels within a turbidity curtain could occur. This curtain would be placed around the mouth of the cove and maintained during construction. Hay bales would be placed along the shoreline below the excavation activity. The applicant would be required by TDEC to obtain prior approval of parking lot design features and plans and implement best management practices (BMPs). In addition to the WQC, project approval would require use of other sound management practices discussed and described below. The proposed marina expansion activities are not expected to have direct long-term negative effect on water quality. Following construction activities, turbidity levels and sedimentation into the reservoir originating from the marina site are expected to return to preconstruction levels.

However, usage of the facilities may result in minor secondary impacts upon the aquatic environment from boating fuel spills, storm water runoff, oils being carried from normal vehicular/road use, and associated pollution generated from human consumption. Use of proper management of storm water runoff from roads, parking areas, the fuel storage area, and roofs is expected to result in insignificant impacts to reservoir water quality. Minimizing soil erosion, sedimentation, and storm water runoff from such sites includes adequate preconstruction planning and properly selecting, installing, and maintaining specific BMPs in accordance with conditions of the WQC. TDEC would be responsible for enforcement of state standards for construction sites and storm water runoff.

Inadequate facilities for the collection, treatment, and disposal of domestic wastewater have the potential to result in adverse impacts to water quality and aquatic life. An authorized contractor would collect and dispose of waste from the Laurel Marina holding tanks in accordance with TDEC regulations. Wastewater collection, holding tanks, and septic systems that are not properly designed, operated, and maintained can result in accidental spills, pipe leakage, surface breakout, sewage runoff, or seepage through the soil into the reservoir. The Laurel Marina project includes bathrooms and a pumpout facility on the floating walkway between the large houseboat slips and the covered slips. The pumpout system would remove wastewater from boat holding tanks into a double-walled enclosed holding tank housed in the floating utility/bathroom building attached to the main walkway. Also, grinder pumps in the utility building would pump the wastewater through a force main to sealed concrete holding tanks buried and anchored in the proposed new parking lot. Alarm meters in the holding tanks would warn of potential overflow conditions.

Wastewater collection, management, and disposal in compliance with permit conditions, state regulatory, and local requirements would reduce potential impacts from sewage and other liquid

wastes. Proper design, construction, and operation of the proposed marina development are not expected to result in a significant increase in reservoir pollutant, nutrient, or fecal coliform bacteria levels.

Responses to Public Comments on Water Quality from the TDEC Hearing. Public concerns and questions regarding water quality issues related to the Laurel Marina proposal that were received by TDEC and addressed prior to issuing the WQC were considered in this evaluation. These issues were gathered through TDEC's public participation process, including a TDEC public hearing. TDEC held a hearing in Bristol, Tennessee, on September 20, 2005. Comments were received at the public hearing and during the public comment period. Comments relating to substantive water quality issues were addressed. The public's concerns and questions, together with TDEC's responses, are included in Appendix G.

Geology and Water Quality. TVA foundation studies for the South Holston Dam identified four geologic formations. Of these, the Athens Shale (Middle Ordovician Age) was encountered and identified as being of variable thickness, black, fissile, pyrite-bearing, and containing graptolites. If the construction area at the Laurel Marina site encounters zones of pyritic rock, disturbance of this rock could potentially result in the formation of localized acidic runoff or acidic groundwater from infiltrating surface water. The fill material for the parking lot would be excavated from three sites along the shoreline reservoir bottom within the marina area. The depth of these cuts is proposed to be down to NWP elevation 1,703 msl. However, to reduce the potential for any water quality effects, the applicant agreed that the excavation would extend as far down as needed but not be within 5 feet of the bedrock layer, if encountered. Furthermore, the applicant's consultant, S&ME, provided information and analysis regarding the potential presence of pyritic shale within the proposed expansion area (see Appendix D). The information describes the composition of rock and soil material in the areas proposed for excavation. Samples taken from several locations were tested for pyrite content and neutralization potential. The results of the laboratory tests concluded that only minimal amounts (0.02 percent) of pyrite content were found. Since this approach would eliminate pyrite minerals from the parking lot fill and not expose them in the areas proposed to be cut, there would be no water quality or aquatic ecological impacts.

South Holston Reservoir General Water Quality Data

South Holston Reservoir is classified by TDEC for domestic and industrial water supply, fish and aquatic life, recreation, livestock watering and wildlife, and irrigation. Reservoir turbidity is normally less than 12 Jackson Turbidity Units (JTU). Median values range from 2 JTU to 5 JTU with the lower values closer to the dam. The average annual discharge is approximately 970 cubic feet per second, providing an average hydraulic retention time of about 260 days.
TVA initiated a Vital Signs Monitoring Program in 1990 to monitor the ecological conditions of mainstream and tributary reservoirs systematically by using indicator parameters to judge overall "ecological health." Parameters used as indicators are dissolved oxygen, chlorophyll, fish, bottom life, and sediment quality (sediment chemical analyses include heavy metals, pesticides, and polychlorinated biphenyls or PCBs). The reservoir was monitored annually from 1991 through 1994 to establish a baseline and is now monitored every other year (see Table 1). Samples were taken from the forebay (SFHRM 51.0) and midreservoir (SFHRM 62.5). Other components of the program include monitoring of toxic contaminants in fish flesh to determine their suitability for consumption and sampling of bacteriological concentrations at recreational areas to evaluate their suitability for water contact recreation.

The overall ecological conditions in South Holston Reservoir rated "fair" in 2004. This is comparable to 1993 and 1994 results, and is a substantial improvement over the poor ratings in 1996, 1998,

2000, and 2002. This was the result of several indicators concurrently scoring at the upper end of their historical range rather than a substantial change in any indicator(s). As in previous years, dissolved oxygen rated "poor" at both monitoring locations. Low dissolved oxygen concentrations occurred in the lower water column from August through October in the forebay and July through October at the midreservoir site.

Table 1. Rating for Ecological Health Indicators for South Holston Reservoir, 1994-2004

	Monitoring Years					
	1994	**1996**	**1998**	**2000**	**2002**	**2004**
South Holston Forebay						
Dissolved Oxygen	Poor	Poor	Poor	Poor	Poor	Poor
Chlorophyll	Fair	Good	Good	Good	Good	Good
Sediment	Good	Fair	Fair	Good	Fair	Good
Fish	Good	Good	Good	Fair	Fair	Fair
Bottom Life	Fair	Poor	Poor	Poor	Poor	Poor
South Holston Midreservoir						
Dissolved Oxygen	Poor	Poor	Poor	Poor	Poor	Poor
Chlorophyll	Good	Good	Fair	Poor	Fair	Good
Sediment	Good	Fair	Fair	Fair	Fair	Good
Fish	Fair	Fair	Good	Fair	Fair	Good
Bottom Life	Poor	Poor	Poor	Poor	Poor	Poor

Chlorophyll concentrations in 2004 were within the expected range at both locations and rated "good." Chlorophyll has rated "good" at the forebay in all years except 1994, when the rating was a "high fair." Chlorophyll concentrations have fluctuated at the midreservoir site, rating "good" from 1991 through 1996, "fair" or "poor" from 1998 through 2002, and "good" in 2004. Overall, mean summer chlorophyll concentrations at the midreservoir site have shown a trend of increasing since 1991. In 2004, the fish community rated "fair" at the forebay and "good" at the midreservoir site. At both sites, species diversity was "fair" and catch rates were slightly lower than expected. Through time, the fish assemblage has consistently rated "good" or a "high fair" at both locations. Ratings for bottom life were "poor" at both monitoring locations in 2004 (TVA 2004a). Some samples contained no animals at all, and the animals that were collected were either short-lived species or species able to tolerate poor conditions. Sediment quality rated "good" because no PCBs or

pesticides were detected, and all medal concentrations were within the expected range. Sediment ratings have fluctuated between "good" and "fair" at both locations depending on whether chlordane was detected. The presence or absence of chlordane is probably more due to sampling variability rather than an actual increase because of its historical, rather than current, use. Chlordane is a pesticide previously used to control termites and crop pests and is no longer manufactured.

There are no state advisories against swimming or fish consumption for South Holston Reservoir. TVA sampled Laurel Marina 10 times for escherichia coli bacteria in 2000, 2002, and 2004. All samples met the state of Tennessee bacteriological water quality criteria for water contact recreation. TVA most recently collected fish from the reservoir for tissue analysis in the autumn of 2004. All contaminant levels were either below detectable levels or below the levels used by the state of Tennessee to issue fish consumption advisories (TVA 2004a).

Eroded soil or sediment is the most prevalent pollutant associated with construction activities. The erosion process begins with the dislodgment of soil particles. These particles are then transported as sediment to areas of deposition. Free-falling raindrops impact the soil with much greater energy than does an equal amount of flowing water. If land surfaces have no vegetative cover or other protective debris to cushion the impact, the total energy of falling rain is expended on dislodging soil particles. Loose particles are easily moved and, under certain conditions, carried away by overland water flow. The volume of overland flow that develops from a given rainstorm is related to a soil's physical factors that influence the infiltration and movement of water through the soil. In reservoir shoreline settings this process is accelerated. As the energy in the water (waves, generated by wind, watercraft, etc.) comes in contact with the shoreline, the erosion process begins. In shoreline erosion and associated bank failure, however, the sediment is immediately deposited in the reservoir, where it can adversely impact water quality, aquatic organisms, and detract from the natural appearance and value of shoreline properties.

Many factors influence the rate and amount of soil loss. In general terms, areas with highly erodible soils, sparse vegetation, steep topography, and occasional intense storms would exhibit the highest erosion levels. Human activity can frequently intensify or accelerate erosion rates particularly if they entail vegetation removal, grading, concentrating runoff, or soil disturbance. In reservoir areas available to recreational boating, the shoreline is also vulnerable to higher wave energy levels associated with propeller wash.

The applicant would be required by TDEC to obtain prior approval of parking lot design features and plans and use sound engineering and construction BMPs. These BMPs would be specifically designed and chosen ways to minimize soil erosion and prevent or control water pollution resulting from land disturbances such as construction sites. BMPs would help protect the quality of receiving waters by keeping the sediment on site. BMPs would be tailored to the Laurel Marina site and modified if necessary as the project progresses. The following are provided as guidance for the Laurel Marina project:

- Preconstruction plan that outlines soil erosion and sediment control measures
- Timing of construction (season or weather) as well as phased construction
- Structural control such as sediment traps, silt fence, straw bale barriers, etc.
- Vegetative controls (i.e., minimizing clearing, maintaining existing vegetation, establishing buffers, timely reseeding of disturbed areas with both temporary and permanent vegetative cover)

With BMPs and other conditions included in any federal or state project approval, it is expected that water quality impacts from this project would be minor.

3.3. Biological Characteristics and Anticipated Changes. The relevant blocks are marked with an "x" and include a description of the impacts.

( ) special aquatic sites (wetlands, pool/riffle areas, sanctuaries, refuges). No issues.

(**x**) habitat for fish and other aquatic organisms. The proposed action would be located in King's Cove, a relatively large embayment. For many years, land use in the surrounding area has primarily been associated with public recreation. Aquatic habitat in the area has been disturbed by the presence of the marina and activities associated with it. The deposit of fill into 0.9 acre of a small cove within this embayment would permanently eliminate reservoir bottom substrate and habitat used by fish and aquatic organisms for feeding and spawning. However, excavation of the shoreline would net an increase of 2.14 acres of cobble-clay substrate of the same composition as the reservoir bottom substrate. Fish habitat structures, mainly outside of the limits of the marina harbor limits, would be constructed atop the new substrate areas to attract fish or other aquatic organisms further to the new substrate. In addition, the natural rock riprap placed along the front of the parking lot area would provide habitat for macroinvertebrate species to colonize both on the reservoir bottom and within the voids of the riprap located below the water level. During construction, hay bales would be used to control the flow of sediment into the reservoir. Upon completion, the hay bales would remain in the reservoir, providing nutrients that would temporarily attract fish. Performing the parking lot excavation and fill activities in the dry and during winter pool elevations (nonspawning periods of the year) would cause little or no disturbance to the fish species in the area. The new boat docks would provide shading, which would be a positive benefit to fish and aquatic habitat. Construction of the parking lot and boat slips would have a temporary minor impact on aquatic organisms until the area has returned to preconstruction conditions, and these impacts would be offset by the applicant's mitigation plan once implemented.

South Holston Reservoir General Fish Data

TVA examined data on the sport fish species samples taken between 1993 and 2004 (TVA 2004b). In total, there were 27 species collected from the South Holston Reservoir between 1993 and 2004. Table 2, on the following page, lists the 27 species collected from South Holston Reservoir, as well as the number of each, for years that such data are available. Fish communities in TVA reservoirs are assessed primarily on fish community structure and function using a metric known as the Reservoir Fish Assemblage Index (RFAI). Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number or fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc.

Table 2. Fish Species Collected From Electrofishing and Gill Netting Samples at Two Sites (SFHRM 51 and SFHRM 62.5) in the Vicinity of King's Cove, South Holston Reservoir, From 2000 to 2004

Scientific Name	Common Name	2000		2002		2004	
		SFHRM 51	SFHRM 62.5	SFHRM 51	SFHRM 62.5	SFHRM 51	SFHRM 62.5
Ambloplited rupestris	Rock Bass	17	0	8	0	16	1
Aplodinotus grunniens	Freshwater Drum	0	0	0	0	1	0
Carpiodes carpio	River Carpsucker	0	4	0	0	1	0
Carpiodes cyprinus	Quillback	5	12	10	17	0	20
Cyprinella spiloptera	Spotfin Shiner	44	80	214	132	63	98
Cyprinus carpio	Common Carp	11	21	16	19	43	29
Dorosoma cepedianum	Gizzard Shad	44	113	190	110	53	96
Dorosoma petenense	Threadfin Shad	0	1	0	0	0	0
Esox masquinongy	Muskellunge	0	0	0	0	0	1
Hypentelium nigricans	Northern Hog Sucker	1	4	0	1	2	5
Ictalurus punctatus	Channel Catfish	3	6	4	5	0	6
Lepomis cyanellus	Green Sunfish	0	0	0	0	0	1
Lepomis gulosus	Warmouth	3	2	0	1	0	3
Lepomis macrochirus	Bluegill	128	119	554	467	367	177
Micropterus dolomieu	Smallmouth Bass	39	39	10	15	25	7
Micropterus salmoides	Largemouth Bass	1	9	6	28	5	16
Morone saxatilis	White Bass	2	1	0	1	1	1
Morone sp.	Hybrid Stripe x White Bass	0	0	1	0	0	0
Moxostoma carinatum	River Redhorse	4	9	2	3	2	4
Moxostoma duquesnei	Black Redhorse	0	4	0	2	0	13
Moxostoma erythrurum	Golden Redhorse	0	1	0	4	0	6
Notropis photogensis	Silver Shiner	0	7	0	0	0	0
Percina caprodes	Logperch	0	0	1	0	0	0
Pimephales notatus	Bluntnose Minnow	6	0	2	1	25	0
Polydictis olivaris	Flathead Catfish	6	8	2	3	7	2
Pomoxis nigromaculatus	Black Crappie	4	4	17	25	6	3
Sander vitreus	Walleye	48	67	94	99	25	140
	Total	366	511	1131	933	642	629

(TVA 1999a). The fish community in the South Holston Reservoir has consistently rated in the "fair" to "good" range at both the forebay and the midreservoir sampling stations; although in 1993, the forebay was rated as "excellent" (Table 3).

A Sport Fishing Index (SFI) has been developed to measure sport fishing quality for various species in Tennessee and Cumberland Valley Reservoirs. The SFI is based on the results of fish population sampling by TVA and state resources agencies and (when available) results of angler success as measured by state resource agencies (i.e., bass tournament results and creel surveys). South Holston Reservoir provides some opportunities for sport anglers, particularly those interested in black bass (Hickman 1999). In 2003 South Holston Reservoir rated average for largemouth bass, and well above average for smallmouth bass (Table 4) when compared to other Tennessee Valley reservoirs.

Table 3. Recent (1993-2004) RFAI Scores* Collected as Part of the Vital Signs Monitoring Program Upstream and Downstream of King's Cove, South Holston Reservoir

Station	SFHRM	1993	1994	1996	1998	2000	2002	2004
Forebay	51	51	44	39	47	39	41	41
Midreservoir	62.5	44	43	42	40	40	42	45

*RFAI Score	12-21	22-31	32-40	41-50	51-60
Community Condition	Very Poor	Poor	Fair	Good	Excellent

Table 4. SFI Scores for Selected Sport Fish Species in South Holston Reservoir, 2003

Fish Species	2003 Score	2003 Valleywide Average
Black Bass	38	36
Largemouth Bass	32	32
Smallmouth Bass	42	32

(**x**) wildlife habitat. The land surrounding the marina is the Cherokee National Forest. Lands above the elevation 1,729-msl contour are heavily forested with hardwoods and pines. Construction of the parking lot within the small cove and boat slip additions would not contribute to the loss of any forested wild lands. The USFS will not allow construction on or alteration of the forests on its land above elevation 1,747 msl, and there are no known plans for developments within the forest. The proposed action would be located in King's Cove embayment where, for the past 15 years, land use in the area has primarily been associated with public recreation. Wildlife habitat in the area has been disturbed by the presence of the marina and activities associated with it. Wildlife habitat on the specific project site and immediate surroundings is minimal under present conditions. It consists mainly of disturbed dirt and graveled areas along the lake with scattered trees and shrubs (Carter 2000). During winter drawdown, terrestrial habitat along the reservoir consists of a nonvegetated, rocky soil shoreline that has little value to terrestrial wildlife. Waterfowl and water birds likely use the shoreline and harbor, especially during fall and winter (off-recreational seasons), for perching, resting, and in the pursuit of prey. The overall impact of construction and operation of the Laurel Marina facility on wildlife would be minimal. No unique, uncommon, or

important terrestrial habitat would be disturbed during the construction of the proposed boat slips or parking lot.

Fourteen caves are known to occur in Sullivan County. None of these caves or any species that may use or occupy them are close enough to the proposed marina expansion project site to be impacted by the expansion and use of the marina.

(**x**) endangered or threatened species. By letters dated April 6, 2005, and October 18, 2005, the USFWS states that no federally listed or proposed endangered or threatened species occur within the specific project area.

South Holston Reservoir General Threatened and Endangered Species Data

A review of the TVA Natural Heritage database indicated that 10 listed terrestrial animal species have been reported from Sullivan County. Four additional species known to occur in this county are considered "uncommon" by the Tennessee Natural Heritage Program, but these species do not have official status in the state of Tennessee. The following listed species are reported from Sullivan County: common raven (*Corvus corax*), Swainson's warbler (*Limnothlypis swainsonii*), bald eagle (*Haliaeetus leucocephalus*), gray bat (*Myotis grisescens*), hairy-tailed mole (*Parascalops breweri*), smoky shrew (*Sorex fumeus*), southeastern shrew (*Sorex longirostris*), southern bog lemming (*Synaptomys cooperi*), common barn owl (*Tyto alba*), and meadow jumping mouse (*Zapus hudsonius*). Those species considered "uncommon" but given no official status include: a land snail (*Helicodiscus notius specus*), least weasel (*Mustela nivalis*), osprey (*Pandion haliaetus*), and Virginia rail (*Rallus limicola*).

Because of the lack of suitable habitat, all listed species from Sullivan County would not occur within the impact area. Although no nesting has been recorded for bald eagles on South Holston Reservoir, eagles do winter in the area, and transient birds may be found year-round. Potential nesting habitat is marginal in the vicinity of the marina due to the constant human activity. The proposed project is not expected to impact this species or its habitat. Gray bat habitat associated with caves would not be disturbed or impacted by Laurel Marina expansion and use. Foraging gray bats may use the area; however, because the project would affect a very small amount of overwater habitat compared to the amount of such habitat available, the project is not expected to impact this species or its habitat. Indiana bats are not known from Sullivan County but have been recorded in surrounding counties. Since there would be no loss of forest habitat, Indiana bat maternity and foraging habitat are not expected to be impacted by the proposed expansion. For these reasons, TVA and Corps have determined that the project, as proposed, would have no effect on any state or federally listed species.

(**x**) biological availability of possible contaminants in dredged or fill material. Only clean materials, free of possible contaminates would be used for the proposed work.

3.4 Human-Use Characteristics and Anticipated Impacts. The relevant blocks are marked with an "x" and include a description of the impacts.

( ) existing and potential water supplies; water conservation. No issues.

(**x**) air quality. It has been determined that the proposed activity would not exceed de minimus levels of direct emissions of a criteria pollutant or its precursors as specified in 40 CFR Part 93.153 (See Section 5.2). Since emissions would be below these de minimus thresholds, impacts on air quality would be insignificant.

(**x**) navigation. The final proposal involves construction of additional dock facilities in association with the parking lot construction in a South Holston Reservoir embayment locally known as King's Cove. A marina has existed at this location since the 1950s. The King's Cove embayment is adjacent to but does not front the main navigation channel (the preimpoundment riverbed). No through boat traffic would be impeded by this facility and new dock additions would not extend more than one-third of the way across the embayment; therefore, the facility would not hinder boat traffic, fishing, skiing, or water-related uses of the embayment (see water-related recreation below). As a result, the proposed new harbor limits would have no impact on navigation in the vicinity of the expansion, including King's Cove or the river channel.

The harbor has sufficient water depths for safe year-round navigation. Although construction of the new docks may temporarily create obstacles in the embayment, the cut-and-fill activities would occur during the winter months when recreational uses are not at their peak. Three of the proposed new docks (see Appendix B and Structures 1, 2, and 3 in PN 05-73) are to be constructed within previously established harbor limits. An additional dock structure, Structure 4, would be outside the existing harbor limits, and the applicant is requesting that the limits be moved lakeward. No new shoreline (land) limits would be required. The work would be largely for the benefit of those renting slips at the commercial marina. However, food, fuel, boat, and other marina-related sales and services would continue to be available to the general public.

Structure 4 would extend an additional 342 feet lakeward from the existing harbor limits forming a "T." This structure would house the sewage pumpout facility on the base of the "T" 30-foot x 100-foot houseboat slips on the interior side of the top of the "T" and 31-foot x 30-foot slips on the exterior side of the "T" (facing the embayment). Total lakeward extent of the marina from the back of the cove would be 948 feet. The exterior slips would be open to the King's Cove embayment and subject to unimpeded wind and wave action as well as wave wash from passing vessels. All floating structures would be securely fastened so that they do not float free in the event of flood or strong winds. The applicant is proposing harbor limits on the sides of the new structure (Structure 4) that are perpendicular from the tract boundaries. At the end of the structure (the top of the "T"), the harbor limits would extend 50 feet beyond the slips.

(**x**) traffic/transportation patterns. The construction of new docks would slightly increase highway (land) traffic on US 421 near the marina. Because this increase is expected to be small compared to existing conditions, impacts would be insignificant. Anticipated impacts on water-related transportation (recreational boating) on the King's Cove embayment are presented below.

(**x**) water-related recreation. There is no commercial barge traffic on South Holston Reservoir. A marina has existed at this site since the 1950s. The general purpose of the proposed increase in boat slips is water-related recreation. As proposed, the additional slips at Laurel Marina would result in increased recreation access, use, and boating traffic and would probably affect the quality of the recreation experience for some users of South Holston Reservoir. Increased boating use could possibly increase the risk of boating accidents, especially at times of high use (i.e., summertime holidays and weekends). To reduce the safety and environmental risks of the proposed Laurel Marina expansion from increased recreational boating, the applicant has a current "no wake" zone to the area surrounding the boundary of the harbor limits. This zone would be expanded to accommodate the newly established limits.

The proposed area for the parking lot is a small, narrow cove. Boathouses are currently moored to the banks year-round, making the area less accessible and desirable to the public for fishing. The parking lot area and new boat slips would eliminate a small amount of seasonal reservoir habitat

that the general public could use for fishing purposes. The proposed fill, which would extend the land to increase parking, would eliminate about 0.9-acre of seasonal aquatic habitat. This area is directly behind and adjacent to the marina's main dock facility. Because of its location, this area is likely not utilized for fishing purposes but rather for temporary anchoring of floating docks and boats. The increase in available parking for patrons of the marina, including those that access the national forest, would result in a slight increase in public recreational benefits.

South Holston Reservoir General Information on Recreation Demand

Recreation demand is driven by population growth and demographics. The populations of Sullivan County, Tennessee, and Washington County and Bristol City, Virginia, are projected to continue to grow from 224,500 in 2005 to 228,600 in 2010 and 232,600 in 2015 or around 8,000 individuals in 10 years for a growth rate of 3.6 percent. South Holston Reservoir also is a recreation destination for residents of the seven Virginia coalfield counties. Residents of Buchanan, Dickenson, and Russell Counties visit South Holston Reservoir in large numbers for recreation opportunities because the existing road network makes it more accessible than closer alternatives. This unique visitor pattern results in South Holston Reservoir being more of a regional recreation area that draws on an additional 70,000 to 72,000 area residents from outside the metropolitan statistical area.

The trend data from the National Survey on Recreation and the Environment (1982-2001) places boating in the second fastest-growing group of sports with a growth rate of 62 percent for that period. Boating in Tennessee has a participation rate of 23 to 24 percent of the population and ranks 6th in water-based recreation activities with an estimated 1.05 million participants. In Virginia, boating has a participation rate of 21.3 percent and ranks 7th in water-based recreation activities with an estimated 1.3 million participants. Tennessee ranks 18th in numbers of registered boats with around 262,000 in 2003, and Virginia ranks 19th with around 242,000. In Tennessee, boating registrations peaked at 314,624 in 1999 and declined during the recession of 2000-2003 with an increase for 2004 to 264,000; while Virginia's boating registrations peaked at 243,590 in 2002, seemingly unaffected by the recession until 2003 when they declined to 241,993.

Density levels for the entire reservoir falls in the middle of the "urban" category. For SFHRMs 56-60, density levels fall on the high end of the "urban" level (see Table 6). At these density levels, it is assumed that South Holston Reservoir is probably not used to a great extent by many users with a low tolerance for perceived crowding. Therefore, the proposed Laurel Marina expansion is not expected to substantially displace existing users. TVA believes that low-tolerance users have probably been impacted at some point in the past and no longer make up a substantial part of the user group at South Holston Reservoir, particularly on predictable high-use days. Because the magnitude of expansion is sufficiently small (maximum of 362 pleasure boats and 30 large houseboats), no significant impacts on medium- or high-tolerance users is expected. The medium- and high-tolerance user would probably be affected to some degree, but would likely utilize rationalization and product-shift coping behavior. Increased mobility and general ability of these user groups to escape perceived crowding situations effectively aids in maintaining satisfactory recreational experiences compared to the low-tolerance group. To reduce the effects of the proposed Laurel Marina expansion on recreational boating, the applicant would be required to extend the current "no wake" zone to the area surrounding the boundary of the new harbor limits.

An increase in water-related recreational use from any marina, or public and private access points, would affect the recreational experience over the entire reservoir. For purposes of this analysis, the recreation environment considers two levels, analyzed separately: South Holston Reservoir in its entirety and South Fork Holston River from SFHRMs 56 to 60. SFHRMs 56-60 act as the staging

area for recreational boating likely to originate from Laurel Marina or the opposite bank public access sites, and, therefore, serve as a "microenvironment" in which recreation impacts would probably occur. People who begin their recreation activity in this 4-mile reach would be affected to some degree by increased density even if they plan to travel outside this area to complete their recreation activity. Obviously, the proposed additions to Laurel Marina would occur within this 4-river-mile corridor. Perceived crowding is higher in more accessible or convenient locations and during traditional peak-use periods (Manning 1999). The potential impacts are discussed below.

Increased use and quality of the recreation experience. Crowding in recreation settings is dependent on the perceptions of the user. Use level increase does not necessarily mean an increase in the user's negative perception of crowding and subsequently a decrease in satisfaction. Earlier models proposed a simple cause-and-effect relationship, which suggested that after some threshold level is reached; additions of more users in and of itself decreased the satisfaction of the group (Alldredge 1973). More recently, research showed this simple cause-and-effect relationship to be incorrect (Manning 1999).

Further research suggests that use level is not interpreted negatively as crowding until it is perceived to interfere with or disrupt the user's objectives or values (Manning 1999). This means that perceived crowding increases when users experience an inability to realize the recreation experience fully based on preconceived notions they bring to the recreation area and the motivations for that recreation outing. These motivations can differ greatly between user groups and, therefore, different user groups can be affected in different ways and to different degrees. Generally, people pick a specific area to recreate and a purpose for being there. Their expectations of the experience are predicated on their perceptions of crowding.

Current recreation research literature suggests that the degree of solitude sought by users affects their sensitivity to perceived crowding. Users who rank the motivations of "stress release/solitude" and "self awareness" as high tend to be sensitive to perceived crowding (Roggenbuck and Schreyer 1977). Using this construct, users of South Holston Reservoir could be divided into three groups based on activity type and, consequently, the degree of solitude the corresponding activity type typically requires. These groups of individual are as follows:

- Low tolerance for perceived crowding: These activity types include users of human-powered or very small motorized-powered boat (e.g. canoe, fishing boat with trolling motor).

- Medium tolerance for perceived crowding: These activity types typically include users of relatively small powerboats where the engaged activity is dependent on the absence of other users (e.g. anglers, wildlife viewers).

- High tolerance for perceived crowding: These activity types typically include users of powerboats where the engaged activity is not dependent, and in some instances enhanced, by the presence of other similar recreationists (e.g., pleasure cruising, social "partying").

Recreation responses to increased perceived crowding. When levels of perceived crowding exceed the intrinsic recreation benefits felt by the users, it is widely hypothesized that outdoor recreationists utilize three primary forms of coping behavior: displacement, rationalization, and product shift (Manning 1999).

- Displacement. Displacement occurs when a recreationist alters his/her normal pattern of recreation behavior. This could take on many forms. For example, a person may decide to fish primarily during the week to avoid the typically more crowded weekends. Robertson and Regula (1994) found that 31 percent of motor boaters on Lake Red Rock in Iowa were actively exhibiting some form of displacement-coping behavior.

- Rationalization. Recreationists sometimes rationalize their experience to be satisfactory regardless of conditions because of the substantial investment of resources (i.e., monetary and time) associated with the pursuit of their chosen recreational activity.

- Product shift. Product shift involves people changing the way they regard the resource (i.e., South Holston Reservoir). For example, if a recreationist perceives crowding to be above the level that they associate with the resource opportunity, they may change the way they see the resource and the associated opportunity it provides.

Based on recent recreation research literature, assumptions considered regarding individuals exhibiting these forms of coping behavior are: (1) Recreationists with a low tolerance of perceived crowding would tend to exhibit displacement as they are less able to retreat to other areas quickly; and (2) Recreationists with either a low or a high tolerance of perceived crowding are more likely to exhibit rationalization or product shift because they have an increased ability to escape crowding with their chosen recreational craft.

Existing density levels for South Holston Reservoir and SHRMs 56 to 60. Expected boating density levels, surface acres of reservoir per access (defined as a possible access point, e.g., slip at a marina), for both the reservoir and the area between SFHRMs 56 and 60 were calculated for existing and potential recreational boating access (see Table 5). There are presently 4.95 surface acres of reservoir (at NSP elevation, 1,729 msl) for each access unit on the entire reservoir. Reservoir access from private ramps on South Holston Reservoir was not calculated and, therefore, estimates derived and included in Table 5 are conservative. Estimates for use levels based on time of year and day of week are not available so these values represent the anticipated “worst case” scenario.

Table 5. Existing and Potential Boater Access Density Estimated in Surface Acres of Reservoir Per Boat at Full Summer Pool Elevation

	Estimated Density - Reservoir wide (existing)	Reservoir plus proposed Laurel Marina additions	Estimated Density - SFHRMs 56-60	SFHRMs 56-60 plus proposed Laurel Marina additions
Density	4.95 surface acres/access	4.17 surface acres/access	2.06 surface acres/access	1.59 surface acres/access

Water Recreation Opportunity Spectrum (WROS). Diversity in recreation experiences is important to every level of recreation provider to ensure the satisfaction of users with differing needs and expectations (e.g., tolerance level based on activity). The WROS is a tool that categorizes recreation experiences based on many variables. Categories range from urban (high use) to primitive (low use). Based on density, the range for a reservoir to be classified as "urban" is 1-10 acres per boat (see Table 6).

Safety of Recreational Users. Boating accident rates from 2004 for all TVA managed reservoirs in the area (Boone, Cherokee, Douglas, Fort Patrick Henry, Nolichucky, South Holston, and Watauga) were compared to the relative density rates on these reservoirs through linear regression analysis. Density accounted for 17 percent of the variance in the accident rates. As density increases on these reservoirs, accidents do not necessarily increase to the same degree. Presently, it is unknown which variables are responsible for the increase in actual reservoir accidents. It is expected that the increase in the number of boaters on South Holston Reservoir could decrease the perceived level of safety to some users. Density does play a part in actual safety; however, because of the ways people sometimes respond to perceived crowding, a significant decrease in safety is not expected on South Holston Reservoir or in the vicinity of Laurel Marina. In order to address concerns for boater safety, the TWRA initiated mandatory statewide boater operator training in January 1, 2005.

Table 6. Water Recreation Opportunity Spectrum Classes Based on Density

WROS Class	Range of Boating Coefficients	
	Low end of Range	***High end of Range***
Urban	1 acre/boat	10 acres/boat
Suburban	10 acres/boat	20 acres/boat
Rural Developed	20 acres/boat	50 acres/boat
Rural Natural	50 acres/boat	110 acres/boat
Semiprimitive	110 acres/boat	480 acres/boat
Primitive	480 acres/boat	3,200 acres/boat

(**x**) aesthetics. The physical, biological, and cultural features of an area combine to make the visual landscape character both identifiable and unique. Scenic integrity indicates the degree of unity or wholeness of the visual character. Scenic attractiveness is the evaluation of outstanding or unique natural features, scenic variety, seasonal change, and strategic location. Where and how the landscape is viewed would affect the more subjective perceptions of its aesthetic quality and sense of place. Views of a landscape are described in terms of what is seen in foreground, middleground, and background distances. In the foreground, an area within 0.5 mile of the observer, details of objects are easily distinguished in the landscape. In the middleground, normally between 1 and 4 miles from the observer, objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernible unless they are especially large and standing alone. The impressions of an area's visual character can have a significant influence on how it is appreciated, used, and protected. The general landscape character of the study area and additional details are described below.

Visual impacts are examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty, and the aesthetic sense of place. Scenic value class is determined by combining the levels of scenic attractiveness, scenic integrity, and visibility, and is ranked as excellent, good, fair, or poor. The foreground, middleground, and background viewing distances are described above.

The proposed expansion area for Laurel Marina and Yacht Club is located along the right bank at approximate SFHRM 56.5 in King's Cove embayment. It is surrounded by a tract of USFS land allocated to management prescription 7B, Scenic Corridor/Sensitive Viewshed in the land and resource management plan (USFS 2004). Land access to the cove is through USFS land from US 421 over a private road owned by the marina. The proposed expansion is just south of the existing marina facilities.

Views of the embayment are primarily from the main channel of South Holston Reservoir by recreation users. The small cove, proposed to be filled, is surrounded by USFS land. Topography is steep beginning at the shoreline, culminating to the north along the ridgelines of "The Knobs." The slopes, ranging from approximate elevation 1,750-foot msl to the peaks at elevation 2,100-foot msl, are heavily vegetated with a mixture of deciduous and evergreen trees, with mostly scrub-type understory conditions. The cove is natural appearing with the exception of the boathouses that are moored along the shoreline. For this reason, scenic attractiveness is common and scenic integrity is moderate.

Views from the cove include the waters that comprise the cove, brief views of the main channel of South Holston Reservoir, and Cherokee National Forest land in the background to the east. These views are panoramic and are unaltered by human activity. Visual congestion occurs along the main channel when numerous boats are seen in the foreground from the cove. This is seasonal, occurring mainly during the warmer months of the year.

Docks exist within the embayment, so the additions would not be out of the ordinary for this type of setting. In the late 1980s, the applicant was authorized to place fill material in adjacent small coves for construction of additional parking lot space needed at that time. Filling coves is out of character with the existing background conditions and soil types typical of reservoir shore.

Expanding Laurel Marina in King's Cove would add to the number of discordantly contrasting elements seen in the landscape along South Holston Reservoir. Additional boats on the reservoir would contribute to an increase in visual congestion. Fill soil for the new parking lot, new dock structures, and additional boats would combine to reduce the existing scenic value class to fair. However, with mitigation (see Section 5.5), the expansion of this existing marina development would not reduce scenic class by two levels or more so expected impacts would be insignificance (TVA 2003).

Views from the cove of the main channel of South Holston Reservoir would likely be slightly altered during periods of increased boating activity. An increase in the number of boats seen would contribute to additional visual clutter, adding to the number of discordantly contrasting elements seen in the landscape. However, these views would be similar to other areas near marinas along this section of the reservoir. Therefore, these visual impacts would be seasonal and greatest during the summer.

Minor impacts from lighting for the new parking lot and covered slips would be further reduced if the mitigation measures were implemented. This would include fully shielding all lights and providing low-glare optics that do not emit light above the horizontal plane. All lights would be low-pressure sodium, with poles not exceeding 40 feet in height. Structures, including covered boat slips, would be seen from the main channel. The potential negative visual impacts of these new structures would be minimized by use of colors compatible with natural background colors including dark roofs. Colors within this range merge into broader patterns within the middleground distances, and details are not as discernible. Therefore, visual impacts would be minimized.

Operation, construction, and maintenance of the proposed marina expansion would be visually insignificant if the mitigation measures cited above were implemented. There may be some minor visual discord during the construction period due to an increase in personnel and equipment and the use of laydown and materials storage areas. These minor visual obtrusions would be temporary until all disturbed areas have been restored through the use of TVA standard BMPs (Muncy 1999). A copy of these BMPs would be provided to the applicant. Although there would be a deduction in the existing scenic value class, this impact is expected to be minor and insignificant (TVA 2003).

( ) energy consumption or generation. No issues.

(x) noise. Environmental noise is the total noise present and projected from all man-made and natural sources including current background noise. This also contains potentially intrusive noise from human activities including new or additional development. The significance of the potential intruding noise comes from the incremental increase it adds to the present environmental noise level. Whether an incremental noise increase is significant is subjective and based on the backgrounds and attitudes of the receptor population at or near the site. This is especially true for episodic noise, such as an airplane flight taking off over a residential area or motorized boating on reservoirs. People who work at the airport might not mind the intruding noise, but other people who live in the flight path could strongly object to it. Likewise, people who enjoy boating are generally not bothered by their own engine noise, but intruding engine noise from others could bother them when they want a quiet time.

There are no standards or laws regulating noise in rural Tennessee or Virginia. In the 1970s, the U.S. Environmental Protection Agency (USEPA) was active in developing noise-related regulation under the Noise Control Act of 1972. For various reasons since that time, USEPA has curtailed its

efforts, and there is no federal noise regulation. USEPA issued a guidance document in 1974 that is still used, but it is directed toward industrial and not recreational application.

There are marinas, docks, and campgrounds on the reservoir between SFHRMs 51.3 and 64.6 and have an estimated 1,488 wet slips and 44 dry slips for boat moorage. Additionally, there are 11 public and private ramp locations for boat launching between SFHRMs 51.3 and 70.8. The land adjacent to Laurel Marina is primarily USFS land, some private undeveloped land, and a few scattered residences. There are also a few residences on the opposite bank from the marina. A large amount of the land surrounding South Holston Reservoir, owned by the USFS, offers public access and multiuse recreation opportunities. The reservoir waterfront, in general, is sparsely developed with residences. There are about 60 nonnavigable, boathouses currently docked at the marina in the vicinity of the cove fill to accommodate the proposed parking lot. The current noise sources in the area are primarily recreational related, including boat engines, vehicles to and from the marina, boathouse air conditioners, and other outdoor recreational activities. These activities peak in June through August.

Potential noise impacts from the Laurel Marina expansion would primarily result from construction and the increase in boating activities. Work would be performed during daylight hours. Construction noise would be from the dredging, filling, site preparation, and paving for the proposed parking lot. There would be a limited amount of noise from construction of the docks and from truck delivery of materials. Increased noise from construction generally occurs during daylight hours and usually on business weekdays. The heavy equipment used for these activities would generate noise more likely to be heard clearly near the marina and across the reservoir. Most people understand that construction noise is short-term, and because of the limited scope of construction at the proposed marina expansion, the use of heavy equipment would be for a short period. This short construction period along with construction activities taking place during usual business hours reduces the noise impacts to an insignificant level. Over the life of the project, additional lesser amounts of noise would be generated by visitors and users of the marina as well as by operation of their equipment, including powerboats. The expansion of the marina would add 181 pleasure boat wet slips and 30 large houseboat slips.

A survey of boat usage at six marina owners/managers was conducted in support of another environmental review for a new marina on the Tennessee River (TVA 1999b). According to this survey, during the peak boating season, it was estimated that 25 to 50 percent (33 percent average) of boats in wet slips are used on the busiest weekend days, such as July 4th. Other estimates were 10 to 40 percent usage (20 percent average) for typical weekend days and 5 to 10 percent use (7 percent average) for weekdays. Applying these average usage rates to the proposed 362 pleasure boat capacity increase suggests an additional 60 boats would likely be in use on the busiest weekend days, 36 more on typical weekend days, and 13 per day during the weekday. This worst-case scenario assumes all slips are leased and all have boats in them. Fewer boats would be used during nonpeak season months, and large houseboats are taken out of their slips less frequently than typical pleasure boats.

Compared to the current number of wet and dry slips on South Holston Reservoir, the maximum potential impact of the marina expansion is expected to result in a 14 percent increase in boat use and resulting noise. Most boating takes place during daylight hours and most people who might experience this increase in noise also participate in the same type of boating activities. For these reasons, the potential environmental noise impact of the proposed marina expansion is insignificant.

In conclusion, the proposed project involves expansion of the existing Laurel Marina. It is currently used to moor small to moderate-size boats and nonnavigable boathouses. It lies adjacent to USFS multiuse public access recreation land. There is sparse shoreline residential development on the South Holston Reservoir. Present noise sources are predominately from powered boats associated with the existing Laurel Marina, four other marinas, and 11 boat launch ramps on the reservoir. Construction noise for the dredging, filling, and paving of the parking lot would be noticeable for a short time. There would be a small increase in total noise from powered boats similar to the noise currently produced on the reservoir. There are no private residences within 1 mile of the facility and the people who might experience this increase are likely to be participating in the same powered boating activities. For these reasons, the environmental noise impacts of the proposed marina expansion are expected to be insignificant.

(**x**) historic properties and cultural values. East Tennessee has been an area of human occupation for the last 12,000 years. Human occupation of the area is generally described in five broad cultural periods: Paleo-Indian (11,000-8000 BC), Archaic (8000-1600 BC), Woodland (1600 BC-AD 1000), Mississippian (AD 1000-1700), and Historic (AD 1700- to present). Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on floodplains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. European interactions with Native Americans associated with the fur trading industry in this area began in the 17th and 18th centuries. European-American settlement increased in the early 19th century as the Cherokee were forced to give up their land. Sullivan County was established in 1780 (Semmer 1998).

In regard to the Laurel Marina site, TVA defined the area of potential effects to be the additional slips and new parking area. The Laurel Marina Phase I Archaeological Survey identified one archaeological site. Site W116-1, a remnant barn associated with a historic homestead, was flooded by South Holston Reservoir. The homestead dated to the period of occupation prior to TVA acquisition in 1942 and occurs adjacent to the site but not within the area affected by the harbor limits expansion. The site is considered potentially eligible for listing on the NRHP. Because the area of the proposed harbor limits was modified by the applicant and is farther removed from the potentially eligible structure, the Corps and TVA determined that the proposed marina expansion would have no effect on the site.

By letter dated March 22, 2005, the THC stated that there are no NRHP listed and/or eligible for listing properties to be affected by the proposal, and that TVA and the Corps have complied with the requirements of Section 106 of the National Historic Preservation Act.

(**x**) floodplain values and storage. TVA and the Corps have determined that the proposal would cause no impacts to the floodplain of the area. The 100-year floodplain at the subject location would be the area lying below elevation 1,738.0-foot msl. The 500-year (or critical action) floodplain at SFHRM 56.5 would be the area below elevation 1,742.0-foot msl. To ensure that potential adverse floodplain impacts would be further minimized, Laurel Marina and Yacht Club would implement the following conditions. Otherwise, impacts on flood control, flood storage, power storage, and floodplain values are not expected to differ from the impacts of the No Action Alternative.

To ensure that potential adverse floodplain impacts are minimized, Laurel Marina agrees to anchor all floating facilities securely to prevent them from floating free during major floods. Any future facilities or equipment subject to flood damage are located above or flood-proofed to the 500-year flood elevation 1,742.0 msl. Any future development proposed within the limits of the 100-year floodplain, elevation 1,738.0 msl, is consistent with the requirements of Executive Order 11988. All

future development is consistent with the requirements of TVA's Flood Control Storage Loss Guideline. Laurel Marina also understands that TVA retains the right to flood this area and that TVA would not be liable for damages resulting from flooding.

The proposed expansion of Laurel Marina involves the construction of floating boat slips, excavation of the reservoir bottom, and the placement of fill for a parking lot within the 100-year floodplain. Consistent with Executive Order 11988 (Floodplain Management), floating boat slips and excavation are considered repetitive actions in the floodplain that would result in minor impacts. The proposed fill for the parking lot would involve relocating material within the 100-year floodplain and flood control storage zone. The applicant's alternatives analysis confirms that there is no practicable alternative to siting the parking lot in the 100-year floodplain. This portion of the project would be consistent with Executive Order 11988 and the TVA Flood Control Storage Loss Guideline because no outside fill would be placed within the 100-year floodplain and flood control storage zone, and there would be no loss of flood control storage.

(**x**) land-use classification. TVA presently licenses the applicant, Mr. Thomas, about 5,250 feet of shoreline for the marina within his current harbor limits. The current harbor limits were established and implemented in the late 1980s. The proposed action would not require additional shoreline land or landrights to expand the requested harbor limits. As previously mentioned, the surrounding land is in the Cherokee National Forest and is allocated to management prescription 7B, Scenic Corridor/Sensitive Viewshed, in the land and resource management plan (USFS 2004). Other than the small piece of land owned by the applicant that is already a part of the marina site, there are no private lands within 1 mile of the proposed action. This land-use classification would not change as a result of the proposed work.

( ) conservation or mineral needs. No issues.

(**x**) economics. According to the applicant, the proposed work would result in a $32 million economic impact on the region. The work would also result in economic benefits to the applicant. The work may attract new interest in the area, which would also have a positive benefit to economy. The applicant provided a summary describing the individual items of economic impact from increased tax base, utilities, insurance, advertising, wireless Internet access, employment, and rentals to the construction/excavation costs (see Appendix D).

( ) general environmental concerns. No issues.

( ) food and fiber production. No issues.

( ) consideration of private property. Other than the small piece of land owned by the applicant that is already a part of the marina site, there are no private lands within 1 mile of the proposed action.

(**x**) environmental justice. The project was reviewed with respect to environmental justice, and it has been determined that there are no minority or low-income persons within the vicinity of the project site. Therefore, there would be no disproportionate effect on minority or low-income populations.

3.5 Cumulative and Secondary Impacts. An important aspect of environmental review is consideration of how actions by others (including those actions completely unrelated to the proposed project) have in the past and would in the future affect the same resources. Cumulative environmental effects for the proposed facilities were assessed in accordance with guidance provided by the President's Council on Environmental Quality (USEPA 1999). This guidance provides a process for identifying and evaluating cumulative effects under the National Environmental Policy Act. For purposes of cumulative impact assessment, the spatial boundary has been broadened to consider effects of the work along with similar activities what could affect the same resources in the area. In this case, a subjective five-year focus period for reasonably foreseeable future actions includes:

- Further excavation of the shoreline
- Future requests to fill another cove for parking by the applicant or others
- Increases and additional changes in boat docks and harbor limits
- Adjacent existing and/or proposed marina or public requesting similar works
- Increases and/or improvement to the area roads
- Change of existing land-use patterns in the area

Virtually, all the land surrounding and within 1 mile of Laurel Marina is public land included in Sullivan County Park or the Cherokee National Forest. This land is being managed in accordance with the recently completed land and resource management plan (USFS 2004). There are 6 other marinas or commercial boat docks on South Holston Reservoir. No new marina development is anticipated in the next 5 years and no additional planned expansions are known or underway at this time. Future work requiring federal approval or private development that may be proposed in the vicinity would determine the magnitude and significance of any cumulative effects. Overall, while there would be minor permanent impacts on the Laurel Marina tract itself and adjoining waters of South Holston Reservoir; given the relatively small area of impact and the relatively low physical and biological functions present in the impact area, the proposal is not expected to have cumulative or secondary effect upon the existing environment and the sustainability of important resources would not be affected. Plans for monitoring and adaptive management could be addressed on a case-by-case basis. Any similar projects approved in the near future would be modified, as needed, to avoid, minimize, or mitigate effects.

Furthermore, at this time, there does not appear to be other proposed actions in the area that would cumulatively affect environmental resources in the vicinity of Laurel Marina or this portion of the South Holston Reservoir. With the use of standard practices, including BMPs and the additional mitigation measures proposed, the Laurel Marina Expansion project, in combination with past, present, and reasonably foreseeable future actions, would not cause or contribute to significant degradation of water quality, aquatic life, or other natural or cultural resources on South Holston Reservoir or the surrounding area. Because of environmental protection commitments and mitigation requirements that are normally placed on TVA, Corps, and TDEC permit approvals, cumulative effects to resources in the watershed are substantially reduced and are anticipated to be minor.

4.0 Alternatives

4.1. Introduction. This section discusses alternatives as required by 33 CFR 320.4(a)(2) and 40 CFR 230.10. The relevant environmental issues identified in Chapter 3.0 were used to formulate the alternatives. The alternatives that were given detailed consideration are listed in the following section.

4.2. Description of Alternatives.

a. No Action. This alternative is one that results in no construction or work requiring DA or TVA permits. This alternative would result in denial or withdrawal of the applicant's request to make changes to the existing marina facilities along the shoreline at the subject location.

b. The Final Proposed Action. The proposed work consists of expanding the existing commercial marina facilities in King's Cove embayment along SFHRM 56.5, as described and shown in plans in PN 05-73, Appendix B. Mitigation would correspond with the proposal submitted by the applicant as described in the mitigation plan (Appendix F). The proposed action includes the construction of 181 double boat slips, 30 houseboat slips, and the discharge of approximately 58,000 cubic yards of fill material into a small cove of the reservoir (0.9 acre below NSP elevation 1,729 msl) and 21,000 cubic yards of fill material between NSP and elevation 1,745 msl. The purpose of the fill is to construct a 196-space marina parking lot (total 1.74 surface acres). The fill material would be excavated around the marina in the dry during winter when the water level is between elevations 1,729 msl and 1,703 msl. This material would be transported overland to the proposed cove to construct the parking lot. The parking lot construction fill would be stabilized with riprap. Staked hay bales (around excavation site) and silt curtains (around fill site) would be utilized during construction. While the main purpose of the proposed excavation is to obtain fill material from an area nearby in order to offset flood storage loss, the action would increase the shallow water shoreline in the vicinity of the NWP by 2.14 net surface acres.

c. Appropriate Mitigation to Proposed Action. In addition to the issuance of the permit as proposed by the applicant and described by 4.2.b. above, there would be special conditions placed in the permit. In accordance with CFR 320.4(r), the mitigation measures (Section 5.5) specified in the Section 26a and DA permits would reduce environmental impacts of the proposed action.

4.3. Comparison of Alternatives.

a. No Action. With this alternative, the applicant would not make the proposed changes to the shoreline at the subject location. The applicant's need for expanding the marina would not be met. There would be no excavation or filling or expansion of the marina rental slips facilities; therefore, so there would be no direct impacts (as described in Section 3) to the reservoir aquatic habitat, substrate, water quality, water-related recreation, and recreational navigation. There would be no marina growth and, therefore, no such services available for clients and the general public. Slips for larger boats would not be available in the area. There would be no increase in current levels of economic benefit.

b. The Applicant's Final Proposed Action. This alternative would allow for the proposed commercial marina facility additions and the excavation and fill for the parking lot as described in Section 1.1. The applicant would mitigate for the actions by creating 2.14 net acres of cobble-sandy-clay substrate and construct fish attractor structures. This alternative would have economic benefits to the applicant and is expected to result in substantial economic impact on the region. A benefit of the proposal is to the marina's clients, visitors, and its overall recreational value to the

public. The proposed action may increase the property values and, with mitigation, have beneficial impacts on recreation and aquatic organisms. The work meets the desired needs of the applicant. No properties listed on or eligible for the NRHP would be affected. No state- or federally listed species would be impacted. This alternative would have minor adverse impacts on aquatic environment due to the displacement of bottom substrate. This alternative would potentially have environmental and socioeconomic effects listed in Section 3.

c. The Applicant's Final Proposed Action with Special Conditions. This alternative would result in similar impacts and benefits to the alternative described in Section 4.3.b. above. Special conditions were developed and recommended (Section 5.5) for the purpose of affording appropriate and practicable environmental protection. Several of these conditions are largely a result of agencies' concerns and responses to the PN. The USFWS requested that the fish habitat structures be moved outside of the harbor limits. TWRA expressed concerns over the loss of gravelly cobble soils in the excavation activity. A member of the commenting public expressed concerns over pyrites in the bedrock layer that could affect water quality. Testing revealed a low percent of such material (see water quality in Section 3.2). No excavation would be allowed within 5 feet of the bedrock layer. Gravelly cobble-clay-sandy soils must be left as the excavated reservoir bottom layer. The applicant would monitor fish habitat mitigative structures constructed at the site and submit a report to the Corps and TVA every three years for a period of nine years.

The Corps and TVA have concluded that the final mitigation plan is sufficient to mitigate for the impacts of the proposal. This alternative would meet the applicant's stated purpose and need and have less adverse impacts compared to the applicant's original proposal. If mitigation measures in Section 5.5 below are implemented, impacts to the environment would be minimized.

5.0 Findings

5.1 Consideration of Comments. There were numerous public comments received in response to the final two PNs. The comments have been addressed in detail by the applicant and in this document. The final notice generated comments from 975 individuals who were opposed to the project, 275 in favor, and a petition in opposition to the proposal with 259 signatures. There were 39 requests for a public hearing. Issues identified were: recreation, navigation/congestion, boating safety, water quality, traffic/roads, terrestrial ecology, solid waste disposal, visual impacts, noise, security, property access, property values, land use, and shallow water habitat. Four agencies commented to the notice. TDEC responded by issuance of a WQC. The proposed project would not affect federally listed species. USFWS focused on the appropriateness of the mitigation and stated opposition to filling in a reservoir cove to create usable land for commercial establishments. TWRA stated similar concerns. THC stated that there would be no historic properties affected by the project.

During the public interest review, there were requests for a public hearing. On September 20, 2005, a public hearing was held by the Tennessee Division of Water Pollution Control on the subject activity. The Corps and TVA participated. The meeting was held near the proposed marina in Bristol, Tennessee. The public hearing was held to discuss the proposal with the public and in response to the requests for a hearing during the public interest review comment period and because the activity required a WQC from the state. Persons commented at the hearing and during the comment period (up to 10 days) following the hearing. Thirty-five people registered to speak at the hearing, and the number of proponents and opponents were about equal. Based on comments at the meeting and those received during the comment period, no new issues arose that had not

been raised in response to the previous notices. See Appendix G for a summary of the comments received at the hearing.

The public has had ample opportunity to express its views and opinions regarding this application through the PN process and at the TDEC public hearing. Federal and state agencies' responses, along with the research conducted by TVA and the Corps, have served to develop fully the pertinent issues. There is a substantial amount of information in the record addressing the issues. All public comments have been considered and addressed.

5.2 Clean Air Act General Conformity Rule Review**.** The proposed project has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act, and it has been determined that the activities proposed under this permit would not exceed de minimus levels of direct emissions of a criteria pollutant or its precursors as specified in 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' or TVA's continuing program responsibility and cannot be practicably controlled by the Corps or TVA, and, for these reasons, a conformity determination is not required for a permit.

5.3 Water Quality Certification. On May 23, 2006, the Tennessee Division of Water Pollution Control issued a conditional WQC for the work in accordance with Section 401(a)(1) of the CWA. The certification provides assurance that water quality standards would not be violated if the work is conducted in accordance with the conditions set forth in the certification. A copy of the WQC is included in this document as Appendix G. The certification and conditions would be made a part of any federal permits issued for the proposed work.

5.4 Compliance with 404 (b)(1) Guidelines

General: The purpose of Section 404(b)(1) of the CWA is to restore and maintain the chemical, physical, and biological integrity of the waters of the U.S. through the control of discharges of dredged or fill material. Controls are established through restrictions placed on the discharges in guidelines published in 40 CFR 230.

Restrictions on the Discharge: Section 230.10 requires that the discharge meet certain restrictions in order to be authorized. The project is to be evaluated and would must meet with the following restrictions: (a) there would be no other practicable alternatives to the proposal that would have less adverse impacts on the aquatic environment, (b) the discharge would not adversely impact water quality; violate state water quality standards or toxic effluent standards; or jeopardize the continued existence of a threatened or endangered species as identified under the Endangered Species Act, (c) the discharge would not cause or contribute to the significant degradation of waters of the U.S., and (d) the project would be designed in such a manner as to minimize to the extent possible the adverse impacts on the aquatic environment. An evaluation of the guidelines is attached to this document as Appendix H.

Factual Determination: Based on the probable impacts addressed above, compliance with the restrictions, and all other information concerning the fill materials to be used, the proposed work complies with the guidelines and the intent of Section 404(b)(1) of the CWA.

5.5 Recommended Special Conditions. The following conditions would be included in DA and TVA permits, and are necessary to comply with federal law, while affording appropriate and practicable environmental protection.

- The work would be in accordance with any plans included in this document and the Corps and TVA permits. The applicant would have a copy of the Corps permit available on the site and would ensure all contractors are aware of its conditions and abide by them. *Justification: Ensure compliance.*

- Applicant's use of the permitted activity would not interfere with the public's right to free navigation on all navigable waters of the U.S. *Justification: 33 CFR 325, Appendix A.*

- The structures permitted would be subject to damage by wave wash from passing vessels. Laurel Marina would take all proper steps to ensure the integrity of the structures and the safety of boats moored thereto from damage by wave wash and the permittee would not hold the U.S. liable for any such damage. All floating structures would be securely fastened so that they would not float free in the event of flooding. *Justification: 33 CFR 325, Appendix A.*

- The work would be performed during winter pool elevation of South Holston Reservoir when the fill material could be placed in the dry and the shoreline could be excavated in the dry. *Justification: To reduce impacts to water quality and recreational users of the river.*

- During the filling activity, silt curtains would be installed across the embayment prior to the commencement of filling the cove for a parking lot. During the excavation activities, hay bales, which are stronger than silt fences, would be placed along the shoreline in the dry and used to control the flow of sediment into the reservoir. Upon completion of the excavation, these hay bales would remain in the reservoir providing nutrients that would attract fish. *Justification: Environmental protection.*

- Excavation of Areas 1, 2, and 3 to obtain fill material for the parking lot construction would occur down to within 5 feet of the bedrock layer. Pyritic bedrock would not be disturbed during this excavation. There would be no unconsolidated materials piled along the shoreline. *Justification: The shallow water habitat at the excavation site must be composed of similar clay-cobble substrate as the reservoir bottom, to count as mitigation. Further, there is a concern regarding pyrite exposure in the bedrock layer. Fish habitat and water quality protection.*

- Riprap stone used to armor the fill material placed below NSP elevation 1,729.0 msl would be a minimum of 16 inches in diameter or larger. *Justification: To maximize the benefit to aquatic life.*

- Disturbed upland areas would be stabilized by straw or other mulch material and seeded when work is completed to prevent sediment from entering the reservoir. *Justification: Environmental Protection – To prevent erosion back into the reservoir and to reduce impacts to the floodplain.*

- All work performed would be in accordance with the TDEC WQC issued May 23, 2006, for the permitted activity. *Justification: Environmental protection.*

- Mitigation and monitoring work would be conducted in accordance with the attached mitigation plans (Appendix F). As such, Laurel Marina would monitor the mitigation area and guarantee its success for nine consecutive years. The 40 structures would be constructed where indicated on the map in Appendix F, including on the excavated areas,

and be completed prior to the reservoir returning to NSP elevation. Monitoring reports would be submitted to the Corps and TVA every third year accompanied by the data from the approved monitoring plan. The reports should also contain information regarding any remedial action necessary to correct any deficiencies. *Justification: Environmental protection.*

- All lights used (including headlights and pole-mounted, equipment-mounted, or structure-mounted floodlights) would be fully shielded or have internal low-glare optics, such that no light would be emitted from the fixture at angles above the horizon. For construction, this would require temporarily retrofitting headlights, floodlights, and other fixtures with external visors and side shields. Shielded low -pressure sodium would be used during the construction and operational phases. Area lighting and parking lot poles would be no taller than 40 feet, unless they were lighting objects taller than 40 feet. In such cases, pole heights would be minimized. *Justification: Reduce visual effects of new construction and environmental protection.*

- All color schemes for building exteriors would be visually compatible with natural background colors and provide dark roofs on all structures. *Justification: Reduce visual effects of new construction and environmental protection.*

- Laurel Marina and Yacht Club would establish a “no wake” zone around the boundary of the new harbor limits. *Justification: Environmental protection.*

- A turbidity curtain would be placed around the mouth of the cove and maintained during construction of the parking lot fill. *Justification: Environmental protection.*

- Laurel Marina and Yacht Club would use TVA standard BMPs (Muncy 1999) during project planning and implementation and to restore disturbed areas. *Justification: Environmental protection.*

- The harbor limits would not extend farther than Structure 4, as delineated in the King’s Cove II drawing in the application. *Justification: Provide for safe navigation.*

- The maximum lakeward extent of Structure 4 would be no more 444 feet from the access walkway, as delineated in the King’s Cove II drawing in the application. Justification: Provide for safe navigation.

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