

**FORT LOUDOUN RESERVOIR - SECTION 26a APPROVAL FOR OPEN CHANNEL  
MAINTENANCE DREDGING, TENNESSEE RIVER NEAR POST OAK ISLAND, RIVER  
MILE 631.8 - ADOPTION OF THE ENVIRONMENTAL ASSESSMENT (EA)  
PREPARED BY THE UNITED STATES ARMY CORPS OF ENGINEERS (USACE)  
AND FINDING OF NO SIGNIFICANT IMPACT (FONSI)**

**Proposed Action and Need**

Under the terms of a Memorandum of Agreement between the Department of the Army (DA) and Tennessee Valley Authority (TVA) for Construction, Operation and Maintenance of Navigation Facilities on the Tennessee River and its tributaries, dated October 26, 1962, the DA is responsible for maintenance of the main navigation channel. Section 4(j) of the TVA Act requires the Corporation to provide and maintain a nine-foot channel in the Tennessee River from Knoxville to its mouth. The U.S. Army Corps of Engineers (USACE) [on behalf of DA], and TVA perform periodic inspections of the navigation channel. In addition, navigation tows provide reports of areas where the channel is becoming shallow. Through these inspections and reports, it was determined that fine sediments, course sand and gravel have accumulated within the authorized navigation channel at Tennessee River Mile (TRM) 631.8 near Post Oak Island. Dredged repeatedly in the past, and on 5 occasions since 1979, this section of the navigation channel has not been dredged since 1998. Fort Loudoun Reservoir is presently classified as not supporting designated uses due to PCB contamination.

The proposed dredging site is located about 16 miles downstream of downtown Knoxville and about 29 miles above Fort Loudoun Dam. River bottom sediment removal and open water disposal of this material between TRM 631.2 and TRM 632.2 is necessary to restore adequate navigation depths to this reach of the river. Dredging would occur to elevation 796.0-foot mean sea level (msl), which is 11 feet below Fort Loudoun Reservoir's normal minimum pool elevation of 807.0-foot msl. This would provide the minimum 9-foot navigation depth plus 2 feet of additional depth for safety and to allow a few years of sediment accumulation before dredging is needed again. This material, amounting to about 120,000 cubic yards, would be redistributed in the vicinity of TRM 631.2 where potential of further sediment movement by river scouring would be lower (i.e., low energy setting).

Because the proposal involves work in the Tennessee River, would assist TVA in carrying out its statutory obligation and is in furtherance of the TVA Act, TVA cooperated with the U.S. Army Corps of Engineers (USACE) in the preparation of an Environmental Assessment (EA) for this proposal. Because dredge material would be redistributed in the reservoir bottom and could constitute a permanent obstruction to flood control and navigation, TVA is also reviewing this dredge proposal for approval under Section 26a of the TVA Act.

**Alternatives**

The USACE EA considered 7 alternatives. However, because 5 alternative ways of accomplishing the project purpose and need were considered impractical at this time, only the potential affects of 2 alternatives, 1) No Action and 2) Open Channel Maintenance Dredging and Disposal were analyzed in detail. The other alternatives not considered in detail included 3) Upland Disposal, 4) Navigation Channel Relocation, 5) Changing Reservoir Operations to Raise Minimum Pool Elevation, 6) Open Water

Disposal at a Remote Site, and 7) Privatization of Channel Maintenance. Under Alternative 1, continued maintenance of the Tennessee River would not occur. This would eventually prevent about 500,000 to 600,000 tons of commodities from being moved upstream to Knoxville annually and negatively impact the regional economy and river's floodway. Under Alternative 2, approximately 120,000 cubic yards of material would be dredged to elevation 796.0-foot msl. Material would be dug up using a clamshell type dredge and transported by dump scow to a nearby in-reservoir disposal area, which is designated and assessed in the EA.

Under Alternative 3, material would be placed using a suction dredge into a contained disposal facility (CDF) for containment on upland property in the vicinity of the site. Construction of CDF would require purchase of potentially valuable property in the area. Also, construction of CDF on Post Oak Island would be too difficult and costly for the action presently proposed. USACE recognizes that this alternative could provide environmental benefits. Therefore, if practicable, USACE will attempt to obtain funding for creating a CDF in time for the next dredge cycle. Alternative 4 would involve relocation of the navigation channel to the non-navigable, back side of Post Oak Island. This alternative would also be too expensive. Alternative 5 would only be a temporary measure and greatly impact TVA's ability to control flood levels at Knoxville. Under Alternative 6, material would be clamshell dredged, as described in Alternative 2, and then transported to a remote location several miles downstream. Added costs also make this alternative impractical. Under Alternative 7, commercial towing companies would employ private dredging companies to perform channel maintenance work on the Tennessee River.

Because of the need to maintain navigation to the upper reaches of the Tennessee River; added costs associated Alternatives 3, 4, and 6; potential impacts to TVA flood control responsibilities associated with Alternative 5; and potential impacts on USACE authority and responsibility associated with Alternative 7, as well as its ability to do the work, TVA prefers implementation of Alternative 2. This alternative involves USACE conducting the needed open channel maintenance dredging and nearby in-reservoir dredged material disposal. Figure 2 of the attached EA shows the relative locations of the dredge and disposal areas at TRM 631.4, approximately 0.4-mile downstream.

### **Impacts Assessment and TVA Review**

Under Alternative 1, No Action, gradual formation of shoals in the river would curtail commercial and eventual recreational boat traffic in this reach and upstream to Knoxville. This would have potentially far-reaching, negative impacts on the local, regional, and national economy. An increasingly restricted floodway and increased upstream flood risks could eventually result without some remedy. Implementation of Alternative 2, Open Channel Maintenance Dredging and Disposal, would maintain the status quo and allow movement of river traffic to continue positively contributing to the regional and nation economy.

On April 23, 2003, sediment was collected at the proposed dredge and disposal sites. Upon review of the data presented in the subsequent EA, U.S. Environmental Protection Agency (USEPA) suggested the need for additional testing to enable comparison of sampling results with effects concentrations standard. Threshold effects concentration (TEC) represents a level of contamination below which adverse effects to sediment living organisms would not be expected, while probable effects concentration (PEC)

represents the level of contamination above which adverse effects to sediment living organisms would be likely to occur.

On April 21, 2004, additional bottom sediment samples were taken for the dredge and disposal sites as well as an upstream control site. STL Knoxville performed most analytical procedures according to techniques already agreed upon in advance in order to provide the best assurance of providing meaningful data. Samples for polycyclic aromatic hydrocarbons (PAHs) were analyzed by STL Pittsburgh. Samples were analyzed for a number of semi-volatile organic compounds, organic volatile compounds, pesticides, metals, and PCBs.

In general, results from the vicinity of Post Oak Island show elevated concentrations of four metals, one PAH, one pesticide and all PCB congeners measured. Analytical results of the material proposed for dredging indicated cadmium, copper, lead and zinc concentrations above their respective TEC. Only zinc was measured above its PEC. Studies have shown that regional soils have elevated zinc concentrations. The disposal area showed levels of cadmium, lead and zinc above TEC thresholds but below PEC thresholds. In general PAHs were below the TEC levels in both dredge and disposal areas with the exception of dibenzo (a,h) anthracene that was measured right at the TEC concentration. DDE concentrations in the dredged material occurred above its TEC but below its PEC. Detections of elevated PCB arochlors occurred in the Post Oak Island dredge material, however, the Post Oak Island disposal site appeared to be relatively free of PCB contamination. The ND 180 value for Naphthalene at the control site was reanalyzed due to interference and a new value of ND 150 was reported, well below the PEC (see Table 1 and the September 27, 2004, Memorandum For Record (MFR) in Appendix F, Sediment Sampling and Reassessment in the attached EA).

There were notable differences in the degree of contamination between the dredge and disposal site. This may be due differences in sediment depositional patterns. At Post Oak Island the dredge and disposal sites are on opposite sides of the river with the disposal site probably having slightly greater flow rates than the proposed dredge site. This area forms the first wide section of the Tennessee River and is downstream from the junction of the Little River, a known source of contaminants. This is the first area where river velocities drop and contaminated sediments are able to settle. The sediment was not assessed in the lab for exact grain size; however, a visual inspection of the material revealed both sites to be essentially identical. The sediment was fine silty clay containing large amounts of organic debris. Based on historical data provided by TVA, inputs of contaminants from Little River probably account for the differences observed in sediment quality at the "cleaner" Looney Island compared to Post Oak Island sites (see the September 27, 2004, MFR in Appendix F, Sediment Sampling and Reassessment in the attached EA). These data confirm a long history of high PCB and metals concentrations. Finer grained soil and sediment materials prevalent at Post Oak Island probably also accounts for a greater propensity to bind contaminants.

Results of tests using sediments analyzed from the control site provide the point of comparison (reference point) to which benthic effects of dredged material are compared. As described above, when corrected for the background levels provided by the control site located upstream and corroborated by the TVA collections downstream, most of the components tested below the TEC and all but zinc were below the PEC. Based on these results USACE and USEPA concluded that maintenance dredging is expected to

**Table 1 - Post Oak Island Vicinity and Control Site Sediment Sample Results (April 2004)**

Analyte	TEC	PEC	TAG # 77853	TAG # 77855	TAG # 77856	TAG # 77854	
			Upstream Control TRM 644.0L (approx)	Post Oak I. Dredge	Post Oak I. Dredge	Dredge Average	Post Oak I. Disposal
<b>Metals mg/kg</b>							
Arsenic	9.79	33	3.4	5.6	6.3	5.95	5.3
Cadmium	.99	4.98	1.6	3.2	3.5	3.35	1.9
Chromium	43.4	111	14.9	20.5	23.8	22.15	18.7
Copper	31.6	149	14.6	35.5	42.1	38.8	25.1
Nickel	35.8	128	10.7	14.8	17.7	16.25	15.6
Lead	22.7	48.6	14.8	32.3	38.7	35.5	24.5
Mercury	0.18	1.06	0.047	0.16	0.16	0.16	0.11
Zinc	121	459	255	587	655	621	307
<b>PAHs ug/kg</b>							
Anthracene	57.2	845	15 J	5.2 J	11	8.1	7.2 J
Fluorene	77.4	536	ND 37	4.8 J	4.8 J, PG	4.8	ND 7.6
Naphthalene	176	561	ND 150	13 J	30 J	21.5	12 J, PG
Phenanthrene	204	1170	96	40	87	63.5	58
Benzo(a)anthracene	108	1050	92	30	58	44	62
Benzo(a)pyrene	150	1450	130	52	100	76	110
Chrysene	166	1290	110	31	66	48.5	80
Dibenzo(a,h)anthracene	33.0		24 J, PG	16 PG	33 PG	24.5	34 PG
Fluoranthene	423	2230	230	66	120	93	150
Pyrene	195	1520	230	52 PG	110 PG	81	120
<b>Pesticides ug/kg</b>							
Chlordane (technical)	3.24	17.6	ND 14	ND 15	ND 16	15.5	ND (19)
Dieldrin	1.90	61.8	.55 J, COL	.61 J, COL	.44 J, COL	0.525	.55 J
4,4'-DDD	4.88	28.0	ND 1.4	2.5 COL	2.5 COL	2.5	ND 1.9
4,4'-DDE	3.16	31.3	ND 1.4	5.1	5.0	5.05	1.1 J
4,4'-DDT	4.16	62.9	ND 1.4	ND 1.5	ND 1.6	1.55	ND 1.9
Endrin	2.22	207	ND 1.4	1.4 J	1.0 J	1.20	ND 1.9
Heptachlor epoxide	2.47	16.0	ND 1.4	ND 1.5	ND 1.6	1.55	ND 1.9
gamma-BHC (Lindane)	2.37	4.99	ND 1.4	ND 1.5	ND 1.6	1.55	ND 1.9
<b>PCBs ug/kg</b>							
	59.8 Total	676 Total					
Arochlor 1016			ND 28	G, ND 66	G, ND 53	59.50	I, ND 37
Arochlor 1221			I, ND 28	G, ND 80	G, ND 44	62.00	I, ND 37
Arochlor 1232			I, ND 28	G, ND 140	G, ND 120	130.00	I, ND 37
Arochlor 1242			ND 28	G, ND 110	G, ND 91	100.50	I, ND 37
Arochlor 1248			I, ND 28	210	190	200.00	21 J
Arochlor 1254			I, ND 28	150	150	150.00	20 J
Arochlor 1260			ND 28	G, ND 90	G, ND 85	87.50	I, ND 37

J=Estimated value. Result below reporting limit.

ND=Not detected at reporting limit.

PG=The percent difference between the original and confirmation analyses is greater than 40%.

COL=More than 40% RPD between primary and confirmation column results. The lower of the two results is reported.

I=Matrix interference.

G=Elevated reporting limit. The reporting limit is elevated due to matrix interference.

temporarily impact water quality, but long-term impacts on water quality and aquatic habitat would be minor and insignificant. Some disturbance and displacement of aquatic life including bottom-dwelling organisms would occur. A number of benthic organisms were observed in the bottom sediment extracted for testing (see the September 27, 2004, MFR in Appendix F, Sediment Sampling and Reassessment in the attached EA). Because the dredge site is adjacent to the disposal site and subject to the same sources of contaminants, and materials at the two sites are substantially similar, effects on aquatic life are expected to be temporary and populations would recover quickly. Cleaner areas would still have high zinc loading and it is believed that common native species have adapted to these habitat conditions. Reasonable precautions would also be taken to prevent the contaminants from spreading beyond the immediate disposal area and affecting aquatic biota. Such precautionary measures would include dredging during low flow conditions and during the cooler months of the year, and the avoidance of dredging during the fish-spawning season. The project would have no effects on wetlands, endangered or threatened species, parklands, prime farmland, wild and scenic rivers, ecologically critical or other sensitive areas or sites. No effects on recreation, aesthetics or historic properties is expected. Because work would be done in late fall or early winter, small numbers of migratory waterfowl and water birds would likely be in the area; however, disturbance would be minimal. No terrestrial wildlife would be affected.

TVA has independently and critically reviewed the impacts assessed in the USACE EA and confirmed its findings. Because there would be no net increase in reservoir bottom material, there would be no increase in stream flood elevations. TVA has determined that the proposal would not directly or indirectly promote development in the floodplain and that there is no practicable alternative to conducting this work in the floodplain. TVA has determined that the impacts of channel maintenance dredging at this location are adequately addressed in the January 2004 USACE EA, which TVA adopts as its own. Based on additional sediment sampling and analysis, USACE prepared a MFR dated September 27, 2004, reasserting its findings and conclusions and finalized its FONSI on September 28, 2004.

### **Cumulative Effects**

Resources potentially cumulatively affected by the dredge are water quality and aquatic life in Fort Loudoun Reservoir. Other actions which could influence these resources are ongoing development and road construction in the area. Contaminants like those known to occur in the reservoir were likely introduced through sediments by industrial land uses in the Little River watershed and historical zinc mining upstream of Knoxville. Because these activities no longer contribute contaminants to the Tennessee River, the future potential for them to add to the contaminants at the dredge site is minimized. Further, TVA and Tennessee Department of Environment and Conservation (TDEC) test results suggest that, in recent years, there has been a gradual decline in PCBs in the flesh of fish from Fort Loudoun Reservoir.

Development, particularly commercial, business and residential, along Fort Loudoun Reservoir south and west of Knoxville (in Knox and Blount Counties) has increased rapidly to a substantial level in the last three decades. Along the north side of the Tennessee River residential development in west Knoxville, including the Town of Farragut and Rocky Hill, Westland and Blue Grass Communities as well as Gettysvue Golf Community in the Ebenezer Road area, has converted thousands of rural residential, farm, and woodlot acres to suburban landscapes. Development is likely to increase along the I-140 corridor, which connects I-40/75 in west Knoxville to SR 115

(Alcoa Highway) and McGhee Tyson Airport in the Alcoa and Maryville Communities. I-140 crosses the river just south of the proposed Post Oak Island dredge site. South of the Tennessee River, development has been less intense and the area, including the Rockford, Singleton, Mimosa Heights, Lakemont, and Louisville Communities, has largely maintained their scattered rural residential and farmland character.

TVA is aware of two highway projects with the potential to cumulatively affect resources in the general vicinity of the Post Oak Island dredge site. In 2001, TVA participated as a cooperator in development of an EA with the Federal Highway Administration and Tennessee Department of Transportation (TDOT) which evaluated the affects of improvements along a 3.4-mile section of Interstate 40/75 from west of North Winston Road to east of Papermill Road. These improvements, currently underway, could affect water quality in the Fourth Creek watershed. This drainage is confluent to the Tennessee River at TRM 640, upstream of Post Oak Island. Substantial earth disturbance has occurred and best management practices (BMPs) are being implemented.

TVA is also cooperating in a development of an environmental assessment for widening State Route 115 (U.S. 129, Alcoa Highway) from I-40 (Pellissippi Parkway) to north of the Cherokee Trail Interchange in Blount and Knox Counties. Based on a prior separate environmental review, parallel bridges over Little River at the Blount/Knox County line are presently under construction. The planned improvement project begins just north of North Park Boulevard at Pellissippi Parkway. Planned improvements, including additional bridge replacements and culvert extensions, would likely occur over the next couple years. Based on past and projected growth patterns, an increase in residential, commercial, and industrial development is envisioned whether or not the "Build Alternative" is chosen. Other road improvements in the vicinity of downtown Knoxville and University of Tennessee areas would likely continue with potential for water quality affects in the First, Second, and Third Creek drainages. This would likely include foreseeable future improvements to I-40 from I-40/275 Interchange east to Cherry Street.

As it relates to SR 115, Tennessee Department of Environment and Conservation (TDEC), USACE and TVA would impose mitigation measures needed to minimize water quality impacts at nine stream crossings, including Little River/Knob Creek, De Armoud Spring Branch, Spring Creek and several unnamed tributaries, confluent to the Tennessee River. At a minimum, mitigative measures would include those outlined in the FHWA's Best Management Practices for Erosion (1995) and TDOT's Standard Specifications for Road and Bridge Construction (1995). These included onsite measures such as sediment retention basins, silt fences, staked hay bales, and tree planting, as well as payment to Tennessee in-lieu fee stream and wetlands mitigation programs. Successful implementation of these mitigation measures will reduce the potential for cumulative water quality impacts from both the Post Oak Island dredge project and the highway construction projects. Similar mitigation measures would be imposed during implementation of I-40/75, U.S. 129, Alcoa Highway, I-40/275 Interchange east to Cherry Street and other future improvements. A recent proposal by the University of Tennessee-Knoxville (UT-K) to develop a new golf course complex on land along the left bank at about TRM 644.5 is on hold. This UT-K proposal would affect land about ½-mile upstream of Looney Island and about 12 miles upstream from Post Oak Island. The UT-K proposal would also likely involve an exchange of TVA land along with development of a portion of the UT-K Cherokee Farm.

Other than these proposals, neither USACE nor TVA anticipates the occurrence of additional actions in the area that would further affect water quality, fish and aquatic life, aquatic habitat, recreation, terrestrial ecology, endangered species, floodplains or wetlands in the area of the proposed Post Oak Island dredge. These highway and development projects are not in areas of high zinc soils, and therefore, they are not expected to contribute to zinc loading problems in the sediment. Furthermore, at this time, there does not appear to be other proposed actions that would cumulatively affect environmental resources in the vicinity of Post Oak Island or this portion of the Fort Loudoun Reservoir. With the use of standard practices and the additional mitigation measures proposed, the Post Oak Island dredge project, in combination with past, present, and reasonably foreseeable future actions, would not cause or contribute to significant degradation of water quality or other natural or cultural resources on Fort Loudoun Reservoir or the surrounding area. Because of environmental protection commitments and mitigation requirements that are normally placed on TVA and TDEC permit approvals, cumulative effects to resources in the watershed are substantially reduced and are anticipated to be minor.

See Section 4.13 in the attached USACE EA for further assessment of the cumulative effects of the proposed Post Oak Island dredge on aquatic resources and navigation.

### **Mitigation**

The USACE will utilize routine measures to protect water quality and aquatic habitat during dredging operations. This includes use of BMPs, as appropriate, for any land based activities. Work will be conducted in fall (October to November) or early winter to avoid the fish spawning season and when activity of the overall aquatic biological community is slow. Work in the vicinity of Post Oak Island would be conducted so as to avoid disturbance to resident or migratory (wintering) waterfowl or water birds, which may use this reach of the Tennessee River. Work will be conducted during relatively low flows using a clamshell dredge and split-hull barge to minimize the downstream dispersal of any fine-grained dredged material. Because of the minimal likelihood of aquatic biological affects from sediment contaminants, use of a silt curtain would not required. Mitigation measures to minimize impacts to water quality have also been specified in the Section 401 Water Quality Certification (Aquatic Resources Alteration Permit (ARAP)) issued by TDEC, Division of Water Pollution Control, on December 4, 2003.

### **Public and Intergovernmental Review**

In response to a February 28, 2003, scoping letter announcing its intent to prepare an EA, USACE received comments from Tennessee *RiverKeeper*, a private organization; Tennessee Wildlife Resources Agency (TWRA), Tennessee Department of Environment and Conservation (TDEC) and Tennessee Historical Commission (THC). The letter from *RiverKeeper* suggested that periodic dredging in the river channel is really an issue of poor land stewardship and unbridled land disturbance, including activities of riparian landowners and road projects, in the Knoxville area. In its response, dated April 7, 2003, USACE explained its mandate to maintain a navigation channel and its lack of authority to regulate sources of this sediment on the landscape. Further, USACE explained the rationale for the alternative ways under consideration to address the problem while minimizing impacts. TWRA, in its letter of March 10, 2003, asked that the USACE EA thoroughly evaluate optional sites for the dredge spoil and address the impacts of all options on aquatic life. TVA believes that the USACE EA thoroughly evaluates a

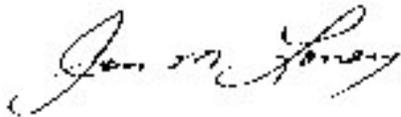
reasonable range of alternatives and the assessment of impacts on aquatic life is adequate. In its letter of March 18, 2003, THC stated that the proposal would have no effect upon National Register of Historic Places (HRHP) listed or eligible properties.

The proposed Post Oak Island dredge was announced through Public Notice No. 99-32, dated August 26, 2003. In a second letter dated September 3, 2003, the THC reiterated its previous finding that there would be no NRHP listed or eligible properties affected by the undertaking. In a letter dated October 21, 2003, U.S. Environmental Protection Agency (USEPA) suggested that the sediment testing results did not support the conclusions presented in the draft EA as they relate to the potential for dredging and open water disposal to adversely impact aquatic biota. Therefore, USEPA recommended that additional sediment quality testing be conducted. This additional testing occurred in April 2004 and results of those analyses are included in Impacts Assessment and TVA Review above. USACE further addressed its disposition with USEPA in a MFR dated September 27, 2004.

In response to USACE correspondence dated August 26, 2003, transmitting a public notice, statement of findings, finding of no significant impact, environmental evaluation and 404(b)(1) evaluation on the proposal, by letter dated October 7, 2003, the U.S. Fish and Wildlife Service (FWS) concluded that no wetlands would be affected. FWS also indicated that the requirements of Section 7 of the Endangered Species Act were fulfilled. By letter to USACE, dated December 4, 2003, TDEC issued a Clean Water Certification (ARAP) for the project under Section 401 of the Clean Water Act indicating that applicable water quality standards would not be violated.

### **Conclusion and Findings**

TVA has critically and independently reviewed the USACE EA and determined that the scope, alternatives considered, and content of the EA are adequate. TVA has added additional analysis to this FONSI to further verify its independent review. TVA has decided to adopt the USACE EA which is attached and incorporated by reference. Based on the EA, we conclude that Section 26a approval for maintenance dredging of the Tennessee River between TRM 631.2 and 632.2 and redeposit of the sediments in the vicinity of TRM 631.2 would not be a major federal action significantly affecting the environment. Accordingly, an environmental impact statement is not required.



October 25, 2004

---

Jon M. Loney, Manager  
NEPA Administration  
Environmental Policy and Planning  
Tennessee Valley Authority

---

Date Signed