

APPENDIX C

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COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

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INTRODUCTION

The public was invited to comment on the Draft Environmental Impact Statement (EIS) prepared as part of TVA's review of its lake and river operations beginning in January 1990. A notice was published in the Federal Register and people were informed of the availability of the Draft EIS through a newspaper summary sent to approximately 2,500 individuals, organizations, and agencies on the study's mailing list. Copies of the Draft EIS were sent to approximately half of these addresses, including public libraries throughout the Tennessee Valley. (Section 4 of the Final EIS contains the distribution list.)

Over 820 people responded, including 196 who spoke at one of the twelve public meetings on the Draft EIS and 627 who submitted written comments. These comments are grouped by subject matter and summarized in this document, along with TVA's response. Also included is a brief summary of the results of an opinion survey completed by 848 of the 1,183 people who registered at the public meetings. (Additional information on survey results is provided in a separate report, "Results of Public Meeting Opinion Survey, Draft Environmental Impact Statement, Tennessee River and Reservoir System Operation and Planning Review, February-March 1990.")

Transcripts from the public meetings and copies of all written comments on the Draft EIS are provided in separate documents, which can be obtained by writing to TVA.

OVERVIEW

The bulk of comments received on the Draft Environmental Impact Statement (EIS) prepared as part of TVA's review of its lake and river operations had to do with one of four subjects: tributary lake levels, water quality/aquatic life, funding for release and lake level improvements, and flood control (see table 1). Comments concerning these subjects are summarized briefly below, followed by a list of the principal changes made in the Final EIS as a result of comments on the January 1990 draft.

Tributary lake levels. About 150 people wrote to TVA or spoke at one of the public meetings in support of delayed drawdown on tributary lakes. Of those mentioning a specific drawdown date, 10 people favored August 1st, 26 favored Labor Day, 34 favored October 1, and 15 favored October 31. Very few of the people submitting oral or written comments objected to tributary lake level improvements, as long as changes in TVA's lake and river operations do not increase flood risk or result in higher power costs. However, the results of the opinion survey--completed by about 72 percent of those who attended the public meetings--showed that support for tributary lake level improvements decreases the farther people live from the river system. About half of the survey respondents who live outside the Tennessee Valley said they oppose extending tributary lake levels until August 1.

Water quality/aquatic life. Over 100 people wrote or spoke about issues related to water quality and other influences on aquatic life (e.g., the proposed release alternatives, minimum flows, aeration, pollution, fisheries, endangered species/mussels, shoreline development, erosion, and wetlands). Release alternative B (providing increased minimum flows, plus aeration to increase dissolved oxygen levels to 5 or 6 milligrams per liter, depending on the type of fishery) received widespread support both from people who offered written and oral comments and from people who filled out the opinion survey form at the public meetings. Improved pollution controls and stable water levels during fish spawning also were requested by many of the people submitting comments on the Draft EIS.

Funding. In distributing the Draft EIS, TVA asked specifically for comments on how to pay for improvements in releases and lake levels. About 160 people responded, including about 60 distributors and distributor groups who opposed the use of power funds for either purpose. Of the remaining 100 people who expressed an opinion on funding, most thought power funds, or power funds in combination with Congressional appropriations, should be used to fund the proposed improvements. Many suggested that TVA also collect user fees to help pay for extended tributary lake levels.

The opinion survey produced similar results. Shared funding was favored by more respondents than any other funding option--by 37 percent of survey respondents for release improvements and by 39 percent for lake level improvements. There was considerable variation in the responses, however, depending on where the respondents lived and the group with which they most identified. Outside the Tennessee Valley, survey respondents tended to favor Congressional funding for release improvements and either Congressional funding or user fees to pay for lake level improvements. Recreation users preferred power or shared funding, while power consumers supported appropriated funding.

Table 1
 Statistical Summary
 Of Comments on the Draft EIS

<u>Subject</u>	<u>No. of People Commenting</u>	<u>No. of Different Comments</u>
Releases	28	5
Minimum flows	16	13
Aeration	14	10
Tributary lake levels	148	23
Communication	15	4
Land and Water Forum	15	7
Pollution	32	11
Wetlands/wildlife	5	5
Fisheries	24	11
Endangered species/mussels	7	9
Aquatic plant/mosquito control	11	7
Navigation	22	9
Flood control	444*	15
Power	61	15
Air quality	7	5
Climate change	2	2
Mainstream lake recreation	27	13
Stream recreation	18	8
Erosion	27	4
Shoreline development	20	9
Cultural resources	5	5
Water supply	5	2
Funding sources	160	36
Legal issues	52	5
Economic evaluation of benefits	7	3

*Includes 369 form letters regarding flooding around Tennessee River Mile 121-124.

Flood control. More people commented on the flood control benefits provided by the Tennessee River system than any other subject. Most were opposed to any change in TVA's lake and river operations that could increase flood risk. The strongest opposition came from two groups: 38 distributors and distributor organizations who objected to decreasing flood control benefits to improve recreation, and 376 people concerned about the effects of higher levels in Kentucky Lake on flooding, principally around Tennessee River Miles 121 to 124 (369 of which submitted form letters).

Changes to the Draft EIS

Several changes were made in the Draft EIS based on comments received during the review process. The most important of these changes are as follows:

- o A third release alternative was added to address the environmental and cost effects of state actions to control pollution affecting tailwater areas. New alternative C has the same target DO levels as preferred alternative B. Unlike alternative B, however, TVA would aerate releases under alternative C to meet the 5 or 6 mg/l targets without state actions to control pollution.
- o Four lake level alternatives were added in response to public requests to extend the duration of higher levels on some lakes. Under each of these alternatives (labeled 1A through 1D), higher lake levels would be maintained on one of four groups of reservoirs until October 1 with sloping recreation target levels, while unrestricted drawdown on the other three groups would begin on August 1 as under alternative 1.
- o Further development of the implementation strategy during critical power supply situations, described in Chapter 4, showed that the 50 megawatts of replacement capacity included in the cost of the August 1 lake level alternative in the Draft EIS is not required to assure power system reliability; hence this cost was deleted from the Final EIS. The effects and benefits of this implementation strategy also have been factored into the evaluation of the other lake level alternatives.

Other changes are listed below.

- o The recommendations in Chapter 6 concerning tailwater safety, monitoring mainstream water quality and aquatic life, and monitoring shoreline development now are considered as environmental commitments. This means that TVA will take these actions if the recommended alternatives are adopted.
- o Chapter 4 shows how the dissolved oxygen improvements would be achieved at each of the affected dams under the three reservoir release alternatives using available aeration technologies.
- o The sloping recreation target levels described in Chapter 4 were modified to reduce drawdown during the fall months under the new lake level alternatives discussed previously.
- o The recommendation for promoting executive-level consensus on water resource policy, also in Chapter 6, was revised and incorporated into the recommendation on improving communication with lake users.
- o Chapter 5 was revised to recognize the disadvantages to fish of delaying drawdown through the fall.
- o Information on mining operations in the flood plain was added to Chapter 3; statements were added to Chapter 5 indicating no adverse impacts on mineral production from the proposed release and lake level improvements.
- o The discussion in Chapters 5 and 6 on recreation effects related to the proposed lake level improvements was expanded to include nuisance problems related to boating and soil erosion resulting from wave wash.

THE ALTERNATIVES AND SUPPORTING RECOMMENDATIONS

Releases

Summary of comments

Most of the people who commented on the proposed release improvements endorsed alternative B (providing increased minimum flows, plus aeration to increase dissolved oxygen levels in tailwater areas to a target of 5 or 6 mg/l, depending on the type of fishery). Water quality, fisheries, and recreation benefits were widely cited in support of this action. One person endorsed alternative A which specifies the same flows but sets a 4 mg/l aeration target. Another commented that TVA should provide the 5 or 6 mg/l dissolved oxygen levels regardless of state actions to control pollution. Seven people urged TVA to monitor tailwater quality in conjunction with release improvements. Monitoring was suggested to determine if the proposed minimum flows and dissolved oxygen levels are adequate to produce the expected benefits, to assess the impacts of pulsing, and to evaluate requests for increased industrial and municipal use.

Individuals who commented

William Allen, Steve Railsback, Tennessee Scenic Rivers Association
Noel Beck, Alabama Conservancy, Shoals Chapter
Daniel Boone, Tennessee Scenic Rivers Association
Albert H. Budlong, Moors Area Retirees Group
Wilson Burton, Heart's Desire Hunting Club
Keith J. Buttlemann, Virginia Council on the Environment
Wayne F. Canis, Shoals Sierra Club
Paul Y. Chinen, U.S. Army Corps of Engineers
William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources
Paul Davis, Tennessee Department of Health and Environment
Jonathan P. Deason, U.S. Department of Interior
Bruce Doll, Tennessee Valley Industrial Committee
Joe Frank Harris, Governor, State of Georgia
Paul Harris, Memphis Light, Gas, and Water Division
Frank Harrison
Margaret A. Lane, Elk River Development Agency
Leonard Ledbetter, Georgia Department of Natural Resources
David McKinney, Tennessee Wildlife Resources Agency
Zell Miller, Lieutenant Governor, State of Georgia
Jim Minesky, University of Tennessee Department of Zoology
Gary Myers, Tennessee Wildlife Resources Agency
Steve Porter
James F. Prewett, Save Our Lakes, Inc.
Frank M. Redmond, U.S. Environmental Protection Agency
Brenda Staggs
Ralph Twiggs, Georgia House of Representatives
Brad Weeks, Tennessee Council of Trout Unlimited
Carolyn Williams, League of Women Voters of Chattanooga

Specific comments

1. TVA should adopt the preferred reservoir release alternative (alternative B). (22 comments)

TVA response: No response necessary.

2. TVA should provide the dissolved oxygen levels specified under the preferred release alternative regardless of state actions to control nonpoint source pollution. (1 comment)

TVA response: In half of the tailwaters targeted for aeration improvements, significant nonpoint sources of pollution reduce ambient dissolved oxygen (DO) concentrations. The effects created by nonpoint sources of pollution into reservoirs can further reduce the DO content of reservoir releases into the tailwater areas. Aerating releases without correcting these problems removes the incentive to reduce these pollution sources and places an unfair burden on TVA to correct environmental problems it did not create.

A new reservoir release alternative has been added to the EIS to specifically address the environmental and cost effects of state actions to control pollution affecting tailwater areas. New alternative C has the same target DO levels as preferred alternative B; unlike alternative B, however, TVA will aerate releases under alternative C to meet the 5 or 6 mg/l targets without state actions to control pollution. Under alternative B, TVA will provide aeration at eight dams to improve DO to 4 mg/l in the tailwater, and state actions to control pollution are expected to raise DO levels to the 5 or 6 mg/l target. At the eight remaining dams, TVA will aerate to the 5 or 6 mg/l target level.

In addition, as outlined in Chapter 6, TVA will involve state agencies and other groups in evaluating each tailwater to determine the most appropriate management strategy. As part of this review, the extent to which DO in the tailwater is affected by pollution sources will be determined. The necessary controls on nonpoint sources will be identified and their effects evaluated using water quality modeling to assure that DO improvement will result.

3. TVA should adopt release alternative A; aeration above 4 mg/l should not be provided until all states have agreements with TVA to control nonpoint sources. (1 comment)

TVA response: As discussed in Chapter 6, alternative A is not recommended because dissolved oxygen levels higher than 4 mg/l are required to promote the growth and diversity of aquatic communities. Both alternatives B and C (see response to comment 2) would result in DO levels high enough to accomplish this goal, which would support the reestablishment of many benthic and fish species in areas which they formerly inhabited. Alternatives B and C differ, however, in how the higher DO levels would be achieved.

Under alternative B, the 5 and 6 mg/l targets would be achieved through a combination of aeration at TVA dams and state action to control pollution. Where nonpoint sources currently contribute to poor water quality (Fort Patrick Henry, Boone, Cherokee, Chatuge, Douglas, Fort Loudoun, Nottely, and Watts Bar), TVA would aerate only to 4 mg/l. State actions to control pollution would be expected to raise this level to the 5 or 6 mg/l target. Where upstream pollution is not a problem, TVA would aerate to the 5 or 6 mg/l target.

Under alternative C, DO improvements to 5 or 6 mg/l would be made solely by aerating releases through TVA dams. This would place financial responsibility for rectifying the effects of upstream pollution on TVA instead of on those responsible for the pollution source. As a result, the capital cost of achieving the 5 or 6 mg/l DO target would increase by \$10 million and the annual operating cost by \$1.5 million. Alternative C was rejected for these reasons.

To accelerate the pace of water quality improvements and promote effective implementation, Chapter 6 recommends that TVA seek agreements with Georgia, North Carolina, and Alabama for tailwater improvements, similar to the current agreement with Tennessee.

4. TVA should adopt the preferred reservoir release alternative, giving implementation priority to North Carolina reservoirs and consulting with state agencies to determine specific resource management objectives. (1 comment)

TVA response: Chapter 6 recommends that TVA continue and expand its strategy of involving state agencies and other groups in the detailed planning and implementation of minimum flows and DO levels based on individual evaluations of the conditions and needs in each tailwater. Dams with the worst DO deficit have received the highest priority for release improvements under TVA's Reservoir Release Improvement program. Other factors affecting priority include the difficulty in applying available technologies at each dam, and the stream uses affected by release improvements.

5. TVA should monitor tailwater quality to determine the long-term effects of higher flows, increased DO, and pulsing on aquatic life. (7 comments)

TVA response: TVA routinely cooperates with state agencies to monitor water quality and aquatic resources in the lakes and rivers of the Tennessee Valley. The effects of changes in minimum flows, aeration of releases, and pulsing on tailwater resources will be examined as part of this monitoring effort. A commitment to monitor the effects of the proposed biweekly minimum flow requirements at mainstream dams on water quality and aquatic life is recommended in the Final EIS.

Minimum FlowsSummary of comments

Comments about the proposed increases in minimum flows through TVA dams were generally positive. Several people questioned TVA's minimum flow recommendations for particular tailwaters, suggesting adjustments based on site-specific instream flow studies. Others addressed the problem of rapid fluctuations in tailwater flows, some proposing actions TVA could take to recover habitat in the first seven miles below the dam. Three people raised issues related to assimilative capacity; one questioned the safety of pulsing and another the safety and effect on scenery of reregulating weirs.

Individuals who commented

John E. Alcock, U.S.D.A. Forest Service
William Allen, Steve Railsback, Tennessee Scenic Rivers Association
William B. Armstrong
Charles H. Badger, Georgia State Clearinghouse
Rod Baird, North Carolina Trout Unlimited
Keith J. Buttlesman, Virginia Council on the Environment
William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources
Jonathan P. Deason, U.S. Department of Interior
H. A. Henderson
Charles R. Horn, Alabama Department of Environmental Management
Ronnie James, Southwestern North Carolina Planning and Economic Development
Commission
Roger A. Jenkins, Harvey Broome Chapter, Tennessee Sierra Club
Kirk Johnson
James G. Martin, Governor, State of North Carolina
Marilyn McNeil, McCaysville-Copperhill Business and Professional Association
Frank M. Redmond, U.S. Environmental Protection Agency

Specific comments

1. TVA should take steps to avoid rapid fluctuations in tailwater flows (e.g., weirs, siphon turbines, gate releases). (7 comments)

TVA response: Fluctuations in tailwater flows are a consequence of the design discharge rate from hydropower units at many dams, and the operation of hydropower units in the most cost-effective manner.

The total hydropower discharge rate at a dam is generally sized so that full generating capacity can be used about 25 percent of the time, even in a dry year. The discharge rate and number of units then is determined based on economic considerations. At the dams for which turbine pulsing is recommended for minimum flows, the magnitude of the flow during hydropower generation is normally greater than the average flow that occurred naturally in the river downstream of the dam.

Wide fluctuations in flow are unavoidable at these dams because when hydropower units are operating, flows in the river are much higher than average, and when the units are not operating, flows are much lower than average, even if minimum flows are provided. At half of the dams for which turbine pulsing is recommended for minimum flows, this fluctuation occurs even with only one unit in operation.

Wide fluctuations in flow also are unavoidable because hydropower is most often generated only during the periods of peak electricity demand during the day. Hydropower generation at other times is minimized, resulting in lower than average flows during these periods.

The preferred release alternative will increase minimum flows so that tailwater areas remain covered when hydroturbines are not operating, resulting in improvements in water quality and aquatic life in the tailwater. Turbine pulsing and reregulation weirs are recommended to avoid the high power costs that would result if minimum flows were provided by bypassing the turbines and releasing water through sluices. High power costs due to off-peak generation also are incurred if flows are spread more evenly throughout the day to reduce flow fluctuations. Units are seldom operated at reduced flow rates due to higher risk of damaging the units and increased maintenance costs.

2. Flow recommendations should be based on site-specific instream flow studies. (5 comments)

TVA response: Existing information and data were used as the basis for all evaluations conducted for this policy-level Environmental Impact Statement (EIS). Site-specific instream flow studies have not been conducted for most tailwater areas downstream of TVA dams. Hydraulic criteria based on TVA studies of instream flow needs below Norris Dam were used to size minimum flows at other dams.

As discussed in Chapter 6, detailed planning and implementation of improvements in minimum flows will be based on evaluations of the conditions and needs in each tailwater recognizing the individual physical and biological characteristics of each. State agencies and other groups will be involved in the planning and implementation process. Site-specific instream flow studies will be considered if already available, or if use of this approach is deemed necessary to determine the appropriate level of minimum flows. Significant differences from the recommended minimum flows, and the associated costs, are not expected.

3. The proposed flows for Nottely and Chatuge should be reevaluated. (2 comments)

TVA response: See response to previous comment.

4. TVA should consider installing small turbines to achieve higher flows. (1 comment)

TVA response: TVA considers small turbines for providing minimum flows at those dams where the facility layout offers the possibility of an economic installation. For example, TVA installed a small generating

unit at Tims Ford Dam in 1986 to provide minimum flows in the Elk River downstream from the dam. Small turbines at such dams can be justified economically for the hydropower they produce if installation costs are low and operation of the unit does not significantly reduce the performance of existing hydropower units at the dam. Where this is not the case, other methods for providing minimum flows are usually less expensive.

5. TVA should evaluate higher minimum flows based on increases in habitat for indigenous species; higher flows should not be rejected because of conflicts with higher summer lake levels. (1 comment)

TVA response: As noted in Chapter 4, TVA has not evaluated higher minimum flows from tributary dams in detail for two reasons: First, higher flows would not produce proportional fisheries benefits. TVA tributary dams create an artificial cold water habitat that is inconsistent with sustaining natural resident or seasonal warm water fisheries, regardless of flow rates. Second, the recommended flow rates allow for multipurpose use of tributary lakes and tailwaters. Higher flows would reduce, if not preclude, potential improvements in lake recreation.

Habitat for indigenous species, including those listed as endangered and threatened, will be one of several factors considered by TVA, state agencies, and other groups involved in detailed planning and implementation of release improvements in individual tailwaters (see release recommendations in Chapter 6). Higher minimum flows can be considered where significant fisheries benefits could result, but the effect of such flows on the probability of achieving higher lake levels also must be factored into the analysis. Significant differences from the recommended minimum flows are not expected.

6. TVA should increase the minimum flow at South Holston to 190 cfs, as proposed; the use of a reregulating weir is acceptable. (1 comment)

TVA response: Field studies conducted in coordination with the state of Tennessee and private interests show that significant improvement in tailwater conditions can be achieved with a minimum flow of 90 cfs. The additional improvement obtained by increasing the minimum flow from 90 cfs to 190 cfs, the level recommended in the Draft EIS, is not justified given the additional loss in hydropower value and in the amount of water available for lake level improvements. Table 19-B has been modified to show the change.

7. Targeted flows at Wilbur and Watauga should support efforts to improve the Watauga River as a trout stream. (2 comments)

TVA response: See response to comment no. 2 in this section.

8. The cutoff tailwater at Apalachia contains a smallmouth bass/redbreast sunfish fishery that could be improved. (1 comment)

TVA response: The smallmouth bass/redbreast sunfish fishery in the Hiwassee River below Apalachia Dam exists because flows in the Hiwassee River bypass this cutoff tailwater area, resulting in water temperatures favorable to these warm water species. If more flow was provided, water temperatures would be lowered below the optimal range for growth and reproduction for these species. Hence, providing minimum flows will not improve this fishery.

9. TVA should emphasize those tailwaters with enough upstream storage to provide a year-round cold water fishery (i.e., Hiwassee, South Holston, Chilhowee). (1 comment)

TVA response: Management of tailwater fisheries will be planned with the help of states and other groups who become involved in the detailed planning and implementation of improvements in minimum flows and dissolved oxygen. The emphasis that should be placed on managing for a year-round cold water fishery will be determined through this process.

10. The Final EIS should include an expanded discussion of the impacts of nonpoint sources on assimilative capacity, including alternatives to increasing flow and aeration to improve water quality on mainstream reservoirs (i.e., pollution controls). (2 comments)

TVA response: The effect of nonpoint sources of pollution on water quality in the Tennessee River system is discussed in Chapter 3. Tables 5 and 6 show where nonpoint sources are a concern and indicate the effect on various uses, including future development. This discussion is considered adequate because of TVA's limited role in pollution control. TVA is responsible for controlling pollution from its own lands, facilities, and power plants, and can influence the actions of others to improve water quality through technical assistance, demonstration projects, and other program activities. For instance, in the last few years, TVA has had a significant influence on the reduction of nonpoint source pollution from selected abandoned mine lands across the Valley. However, preventing pollutants from entering the water is primarily the responsibility of state and federal regulatory agencies.

Several options for strengthening TVA's authority to control pollution and other activities that adversely affect reservoir uses were considered as part of this EIS (i.e., expanding TVA's regulatory authority, using the doctrine of riparian water rights, and using deed restrictions on transferred lands), but none appear feasible for the reasons discussed in Chapter 4.

The importance of pollution control is reflected in the choice of the preferred release alternative. Alternative B was selected because DO improvements would be achieved through both aeration at TVA dams and state action to control upstream pollution. Alternative C was rejected because those responsible for pollution would be under less pressure to control pollution sources.

11. The effects on assimilative capacity below major discharges in Alabama should be evaluated before TVA implements biweekly average flows. (1 comment)

TVA response: An analysis of Tennessee River water quality below Chattanooga, an area with significant needs for assimilative capacity just upstream of where the Tennessee River enters Alabama, showed that there would be adequate levels of dissolved oxygen with biweekly average minimum flow requirements at TVA dams. In response to concern expressed during public review of the Draft EIS, however, the Final EIS recommends that TVA commit to monitoring the effects on water quality and aquatic life of the proposed flow requirements at mainstream dams. If a problem related to low flows is identified, daily releases would be raised until conditions improve, as specified in Chapter 5.

12. TVA should avoid pulsing because of safety considerations. (1 comment)

TVA response: TVA's analysis of the risk presented by turbine pulsing shows that it is small compared to the risks accepted by other water recreation users, such as boaters and swimmers in lake areas (see Chapter 5). The area of increased risk will be limited to the first two to five miles below the dam--the distance before the turbine pulses steady out sufficiently to provide minimum instantaneous flow.

For years, TVA has posted signs, distributed pamphlets and advised callers requesting turbine operation schedules to warn users of the hazards of rapidly rising water in tailwater areas due to hydroturbine operations. A review of existing warning signs and a special education effort to inform the public of turbine pulsing operations and associated hazards to tailwater users was recommended in the Draft EIS. In the Final EIS, these actions are proposed as a commitment, if TVA implements the preferred release alternative.

13. Weirs degrade scenery and are a safety concern to floaters. (1 comment)

TVA response: Visual quality or aesthetics is highly subjective. Each individual perceives--and values--changes in scenic views differently. Reregulating weirs are part of providing minimum flows from some dams, which improve scenic views by covering tailwater areas normally exposed when hydroturbines are not operating. This improvement in scenic views should help to offset the detraction to visual quality some users associate with weirs.

TVA posts signs advising tailwater users that floating over reregulating weirs built for providing minimum flows is prohibited. Reregulating weirs are carefully designed to minimize life-threatening hazards to floaters who accidentally go over the weir during overflow periods. Careful observation of safety rules identified in educational materials provided by TVA and others should all but eliminate the safety concerns that weirs present to floaters.

Aeration

Summary of comments

Two topics dominated the list of comments concerning aeration. One was a request from a varied group of public and private interests in North Carolina for a 6 mg/l aeration target at Nottely and Chatuge. The other related to aeration technology. Some people felt that autoventing turbine technology could be developed and implemented within the proposed five-year deadline, while others either doubted the technology's viability or questioned whether TVA's research budget would permit its development within this time frame.

Individuals who commented

William Allen, Steve Railsback, Tennessee Scenic Rivers Association
Rod Baird, North Carolina Trout Unlimited
Robert Blanton, City of Knoxville
Willard L. Bowers, Alabama Power Company
Keith J. Buttlerman, Council on the Environment, State of Virginia
Wayne F. Canis, Shoals Sierra Club
Darin Christian
William W. Cobey, North Carolina Department of Environment, Health and Natural Resources
Jonathan P. Deason, U.S. Department of Interior
Gil Hargett, Hiwassee Stream Watch
Kirk Johnson
James G. Martin, Governor, State of North Carolina
Robert A. Schaller
Bruce Whitney

Specific comments

1. The aeration target for Chatuge and Nottely should be 6 mg/l to support the population of wild trout that exists in those tailwaters.
(5 comments)

TVA response: The 5 mg/l aeration target recommended for Chatuge and Nottely dams was determined based on the applicable water quality criteria for dissolved oxygen (DO) established by North Carolina and Georgia, respectively, for each dam. This target would be achieved under the preferred release alternative by aeration at TVA dams to 4 mg/l and state action to control pollution.

As recommended in Chapter 6, the states of North Carolina and Georgia, as well as other groups, would be involved in detailed planning and implementation of improvements in minimum flows and DO from these dams. Part of this planning would include evaluations of the conditions and needs in each tailwater, recognizing their unique physical and biological characteristics. Establishing a target of 6 mg/l for Chatuge and Nottely tailwaters can be considered as part of this evaluation process. If such

a target is established, the states of North Carolina and Georgia should formally recognize 6 mg/l as the DO criteria for these tailwaters to assure that state pollution control programs for point and nonpoint sources support the higher level.

2. A five-year implementation deadline is realistic; autoventing turbine technology is viable. (2 comments)

TVA response: Over two decades of TVA experience indicate that the goal of aerating the releases as defined under alternative B should be attainable in the proposed five-year period. The experiences of the U.S. Army Corps of Engineers and some private utilities, such as Alabama Power Company, who have installed equipment and facilities at selected dams to aerate releases, also support this conclusion. Table 20 of the Final EIS shows how the improvements can be achieved at each of the affected dams using available aeration technologies.

The most direct method to achieve 5 or 6 mg/l is to inject or draw air into the flow of water through the hydropower turbine. TVA is cooperating with a hydroturbine manufacturer to develop additional approaches to inducing the flow of air into the water passage through an autoventing turbine being designed for Norris Dam. Chapter 6 recommends that TVA pursue the development of autoventing turbine technology more vigorously so that this technology option can be considered if it proves applicable at other dams.

3. A five-year implementation deadline is not realistic; additional investments in autoventing turbine technology are unlikely to pay off. (2 comments)

TVA response: See response to previous question.

4. TVA should install aerating turbines as a normal capital expense if they improve efficiency as well as increase dissolved oxygen levels. (1 comment)

TVA response: Autoventing turbines are expected both to improve efficiency and increase DO levels. However, the capital cost of an autoventing turbine will be greater than a conventional turbine that could be purchased to replace existing equipment. In addition, the improvement in efficiency with an autoventing turbine is likely to be less than with a new conventional turbine. Hence, solely from the perspective of power economics, a conventional turbine replacement would be preferred over an autoventing turbine.

The added expense of purchasing an autoventing turbine over a conventional turbine can be reasonably estimated at the time of purchase. If a funding source other than power revenues were designated by the TVA Board of Directors, the added cost of an autoventing turbine would be charged to this source.

5. Will fish be harmed by higher dissolved nitrogen levels as a result of DO improvements? (1 comment)

TVA response: The effect on total dissolved gas concentration is an important consideration in selecting and implementing aeration methods for reservoir releases. Methods that would affect the downstream fishery with total dissolved gas supersaturation are avoided.

Using turbine aeration to increase DO levels results in slightly increased levels of total dissolved gases, including nitrogen. However, TVA's experience at Norris Dam shows that elevated nitrogen levels associated with turbine aeration are very unlikely to cause biological problems. In the eight years of aerating turbine releases from this dam, no detrimental fishery or benthic community impacts related to total dissolved gases have been observed. TVA also is testing oxygenation methods which do not supersaturate the water with other gases.

6. The effects of the proposed release improvements on fish production are not clear; the Final EIS should compare the location, frequency, and duration of low DO concentrations to the presence of juvenile life stages of fish. (1 comment)

TVA response: Because this is a policy-level Environmental Impact Statement, existing information and data were used to evaluate release alternatives. Comparing occurrences of low DO to the presence of juvenile life stages of fish would require site-specific instream flow studies for each of the affected tailwaters, few of which have been conducted.

Such studies will be considered, however, in the process of planning and implementing minimum flow improvements recommended in Chapter 6. This process will involve state agencies and other groups in evaluating the physical and biological characteristics and needs of each tailwater. The effects of the location, frequency, and duration of low DO concentrations on the juvenile life stages of fish species for which the tailwater will be managed can be considered as part of this evaluation.

7. Lack of oxygen in the water below TVA dams occasionally results in fish kills. (1 comment)

TVA response: The effects of low DO in the tailwaters below TVA dams is discussed in Chapter 3. Alternatives addressing this problem are formulated in Chapter 4 and evaluated in Chapter 5. Chapter 6 recommends that TVA improve minimum flows and aerate the releases from 16 dams to reduce the occurrences of low DO in tailwater areas.

8. The discussion of the causes of dissolved oxygen depletion during the summer in Chapter 3 overestimates the effect of spring inflow that is deoxygenated. (1 comment)

TVA response: The timing and extent of oxygen depletion in the hypolimnion and releases from storage reservoirs is closely related to how long it takes for cold, oxygenated winter inflow residing near the intakes to be withdrawn through turbine releases and replaced by overlying oxygen-depleted water. In deep storage reservoirs, the cold, oxygenated deep layer exists well into late summer, long after stratification has become established.

The overlying layer, which resides beneath the saturated surface layer, typically enlarges throughout the spring as a result of inflow. This layer becomes depleted in oxygen as a result of numerous oxygen demands, including organic sediments, algal respiration, and decaying organic matter in the water. Strongly stratified reservoirs exhibit effects of all these processes. The relative importance of each process varies considerably from one reservoir to the next, depending on reservoir geometry, hydrology, meteorology, inflow temperature, and inflow quality.

Numerous investigations have shown that a large component of oxygen depletion in most southeastern storage reservoirs is directly related to residence time of warm water (spring and summer inflows, for example) over organic sediments. This is particularly true in areas within a reservoir where the ratio of water volume to sediment area is small, such as in embayments and in the upstream part of the reservoir.

9. Low dissolved oxygen in reservoir releases is caused by the design of TVA dams (the low level of hydropower intakes) and not by pollution or other factors. (1 comment)

TVA response: The principal cause of low dissolved oxygen in the releases from TVA dams is reservoir impoundment and design of the dams to permit hydropower generation. As explained in Chapter 3, oxygen levels in the lower portion of deep tributary lakes decline during the spring because of surface heating and reduced streamflow. Hydroturbines at TVA dams withdraw water from this lower layer, resulting in tailwater releases that are low in DO. Pollution from upstream sources adds to the problem because pollutants use oxygen as they decompose. For this reason, the preferred release alternative counts on state action to control pollution in the affected reservoirs and tailwaters.

10. If possible, the pollution sources responsible for the 300 river miles of low dissolved oxygen should be aerated rather than aerating the releases at the dam. (1 comment)

TVA response: As discussed in the response to the previous comment, low DO in reservoir releases is caused by both reservoir impoundment and pollution from upstream sources. Release alternative B is recommended because DO improvements would be achieved through a combination of aeration at TVA dams and state action to control pollution. This is appropriate because aeration of releases would offset the effects of hydrogenation caused by reservoir impoundment, and state pollution controls would require those responsible for pollution to pay the cost of pollution control.

Tributary Lake Levels

Summary of comments

About 150 people commented on TVA's management of tributary lake levels. The overwhelming majority of these people favored delayed drawdown. Ten people expressed support for an August 1 drawdown (the preferred alternative); 26 people favored Labor Day; 34 people favored October 1; and 15 people favored October 31. An additional 56 people expressed support for higher lake levels, but did not mention a specific drawdown date.

The majority of people who spoke or wrote in support of extended lake levels were from North Carolina or Georgia. North Carolinians tended to favor an October 1 drawdown. Georgians were less likely to mention a specific drawdown date; but, of those who did, most favored Labor Day. Tourism, recreation, and economic development were cited repeatedly as reasons for delaying unrestricted drawdown of tributary lakes to flood control levels.

Other comments made by more than one person concerned winter levels on tributary lakes, the need for flexibility in lake operations, and the future management of Santeetlah lake levels.

Many people expressed concern about the effects of tributary lake level improvements on other system benefits. Their comments are listed in other sections of this report (see "flood control," "air quality," and "funding sources," in particular).

Individuals who commented

Mr. and Mrs. Mike Adkins
John E. Alcock, U.S.D.A. Forest Service
Katherine Anderson, Land-Of-Sky Regional Council
William Armstrong
Mercedeth Bacon, Swain County Board of Commissioners
Charles H. Badger, Georgia State Clearinghouse
W. Jerry and Stacy Bandy
Truman Barrett, Towns County Chamber of Commerce
George F. Beaston
Richard Bell
Nita Bennett
Percival Bennett, Town of Bryson City
George Berry, Georgia Department of Industry, Trade and Tourism
Jim Bishop, Western Office of the Governor, State of North Carolina
Wilda Bradley
Howard Brancell
Jack Broadrick
Robert Brobeck
Maynard Brooks, B & B Straight Creek Dock
Sherrie Brooks
Kenneth Brookshire
Max W. Brown

James T. Broyhill, North Carolina Department of Commerce
Donald Bunn
Tom Bush, Smokey View Camp Ground
Keith J. Buttlemann, Council on the Environment, State of Virginia
Curtis Caldwell, Georgia House of Representatives
Robert Carpenter, North Carolina State Senate
Darin Christian
J. C. Clark, Sullivan County Observation Knob Park, 421 Launching Ramp
James McClure Clark, U. S. House of Representatives, State of North Carolina
Bob Cloer, Fieldstone Inn
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
Ricky Collingsworth
Floyd A. Collins
Quinn Constantz, Southwestern North Carolina Resource Conservation
and Development Program
Jim Copeland
Sonny Cothran, Sonny's Lakeside Marine
Robert Cox, Boone Lake Property Owners Association and Friends
Amy C. Crawford
Chester Crisp, Graham County Board of Commissioners
Ralph Crisp, Graham County Chamber of Commerce
Douglas D. Cross
Bjorn Dahl, U.S.D.A. Forest Service
Sam F. Dayton, Georgia Mountains Regional Development Center
Ann Dennison, Ann's Place
Bud Denzel, Baneberry City Council
Jim Dobson, Blairsville Union County Chamber of Commerce
Jay Donovan
Linda Duxstad, Hiwassee Hideaway Marina
Lin Erdmann
David T. Flaherty, North Carolina Department of Human Resources
John E. Foster, John E. Foster Realty and Appraisal Company
Frederick D. Foy
Mr. and Mrs. Don Freiberg
James C. Gardner, Lieutenant Governor, State of North Carolina
Clarence H. and Dovie Goins
William Goins
Jack Grasty
Arthur Griffith, Town of Santeetlah
Jim Halloran, Clay County Chamber of Commerce
Jerry Hamby, Ocoee River Outfitters Association
Mr. and Mrs. Glenn Hamilton
Coe Hamling
C. W. Hardin, North Carolina State Senate
Gil Hargett, Hiwassee Stream Watch
Thomas Harrelson, North Carolina Department of Transportation
Joe Frank Harris, Governor, State of Georgia
Linda Hogue, Nonpartisan Citizens Against Wilderness in
Western North Carolina
Bishop Holder, Town of Robbinsville
Gary Holiway, Jefferson County Executive
Lance Holland, Fontana Village

Appendix C

Steve Holland, Towns County Chamber of Commerce, Towns County
Industrial Authority
Gary Hollingsworth
Charles R. Horn, Alabama Department of Environmental Management
George Howey
David Huskins, Smoky Mountain Host of North Carolina
Harry E. Ingram, Friends of Blue Ridge Lake Civic Association
Carolyn Ison
Douglas Ison
Ronnie James, Southwestern North Carolina Planning
and Economic Development Commission
Ed Jenkins, U. S. House of Representatives, State of Georgia
Elmer B. Johnson
Mildred Johnson, North Shore Cemetery Association
Richard Kammann, Jefferson County Chamber of Commerce
Tom Kammann, Baneberry Golf and Resorts
Norman Kaye, Fannin County Industrial Development Authority
Richard Kelley
Marty Kimsey, North Carolina House of Representatives
Carl and Carolyn Lakes, Cherokee Lake Resort
Charles H. Landrum
Leonard Ledbetter, Georgia Department of Natural Resources
Scott Lindsay, Cherokee County Board of Commissioners,
Murphy Town Board, Andrews Town Board
James Lofton, North Carolina Department of Administration
James G. Martin, Governor, State of North Carolina
C. A. Massengill
Jim McAfee, Northeast Georgia Board of Realtors
John McClain
Kay McClain
Ronnie McDonald, Tri-County Bass Club
Danny McLeod, Greasy Branch Marina
Marilyn McNeil, McCaysville-Copperhill Business and Professional Association
Lois Milhorn
Charles Miller
Zell Miller, Lieutenant Governor, State of Georgia
Jim Minesky, University of Tennessee Department of Zoology
Walter Mitchell, Jr.
David Monteith, Non-Partisan Citizens Against Wilderness
Bill Moore
Cloe Moore, Town of Murphy
James Moore, Clay County Commissioners
Robert H. Moseley, Great Smoky Mountains Heritage Festival
Frank Needham
Agnes D. Orrell
Bill Parker, Union County Board of Education
George Petty
Joe W. Powell, Jr.
Joe W. Powell, Sr.
Ray Powell
James H. Quillen, U. S. House of Representatives, State of Tennessee
Carolyn Reader
Ed Rebilagh

Bruce Z. Riddle, Bear Paw Realty, Shoal Creek Realty
Sara Robinson, Clerk of Superior Court
James and Margaret Rodeghero
Christian L. Rust
Mike Santella, Oak Ridge Rowing Association
Richard Schaddelee, Swain County Chamber of Commerce
Eric Schreiber
Mr. and Mrs. Charles Smith
Charles Ozwell Smith
Patricia H. Smith, Copper Basin-Fannin Chamber of Commerce
Carl H. Stapleton
Will S. Stapleton
Preble Staver, Kiwanis Club of Blue Ridge, Inc.
Gerald T. Stephen
Bruce E. Stewart, Union-Towns Home Builders Association
Marshall Studervant, Union County Bass Club
Marc Sudheimer, Morristown Area Chamber of Commerce
R. G. Sullivan
Jonathan L. Taylor, The Eastern Band of Cherokee Indians
Steve Troemel
Ralph Twiggs, Georgia House of Representatives
R. E. Westerman
Marguerite W. Williams
Tina Woodward
Walter O. Wunderlich
Frank Young

Specific comments

1. TVA should delay drawdown of tributary lakes to promote recreation, tourism, and economic development. (56 comments)

TVA response: The tradeoffs of different dates for beginning unrestricted drawdown of the ten principal tributary storage reservoirs in the eastern half of the Tennessee Valley are examined in this EIS. Delaying the start of unrestricted drawdown until August 1 is recommended to improve economic development in tributary areas based on tourism, recreation, second home development, and associated economic growth.

2. TVA should adopt the preferred lake level alternative (i.e., aggressive spring fill and August 1 drawdown). (10 comments)

TVA response: No response necessary.

3. TVA should be more flexible in its lake operations, allowing individual lakes to be managed differently. (6 comments)

TVA response: The feasibility of managing levels on individual lakes differently was acknowledged in Chapter 4 of the Draft EIS. Such options were not evaluated in detail, however, because they would require a change in TVA's practice of treating tributary lakes as uniformly as possible.

This decision was reconsidered, however, based on the tremendous interest expressed during the public review period in extending levels on certain lakes beyond August 1. As a result, four additional alternatives were developed to evaluate the effects of extending lake levels with sloping recreation target levels until October 1 on different groups of lakes. These alternatives represent modifications of alternative 1 in that unrestricted drawdown would still begin on most lakes on August 1. However, unrestricted drawdown would be delayed until October 1 on Knoxville area lakes (Norris, Cherokee, and Douglas) under alternative 1A, on Tri-Cities area lakes (South Holston and Watauga) under alternative 1B, on Fontana under alternative 1C, and on Hiwassee basin lakes (Blue Ridge, Hiwassee, Nottely, and Chatuge) under alternative 1D.

The evaluation of these alternatives in the Final EIS shows that, except under alternative 1A, the effects on other system operating purposes and on the environment would be acceptable; all four alternatives would involve higher power costs. However, choosing one of these alternatives would be viewed by some as preferential treatment and could result in strong opposition from people living around lakes subject to earlier drawdown. For this reason, the Final EIS continues to recommend the uniform treatment of all ten tributary reservoirs under alternative 1 (unrestricted drawdown delayed until August 1).

4. TVA should delay the drawdown of tributary lakes until Labor Day.
(26 comments)

TVA response: As discussed in Chapter 6, delaying the unrestricted drawdown of the ten principal tributary reservoirs in the eastern Valley until Labor Day is not recommended. Economic development benefits and improvements in scenery and reservoir fisheries are outweighed by power costs and environmental impacts. High power costs result from replacing lost hydropower with more expensive sources of electric generation. Environmental considerations include increased air emissions during the summer from increased coal-fired generation, the effects of decreased release temperatures on tailwater fisheries, and the interference of higher lake levels with state habitat management programs in the late summer and fall.

As noted in the response to the previous question, however, it is possible to delay unrestricted drawdown beyond August 1 on individual lakes. Public interest in this option led to the evaluation of four alternatives under which unrestricted drawdown would be delayed until October 1 on a few reservoirs and until August 1 on the others. Due to the higher power costs of these alternatives and equity considerations, the Final EIS continues to recommend that unrestricted drawdown of all ten tributary reservoirs begin on August 1.

5. TVA should delay the drawdown of tributary lakes until October 1.
(34 comments)

TVA response: The effects of delaying unrestricted drawdown of all ten tributary reservoirs until October 1 was not specifically addressed in the Draft EIS. Because an earlier (Labor Day) and later (October 31)

drawdown date for these reservoirs were evaluated and not recommended, a similar recommendation for an October 1 drawdown date of all reservoirs can be anticipated. The reasons for rejecting the Labor Day and October 31 alternatives are discussed in Chapter 6 and in the response to comments 4 and 6 in this section.

As noted in the response to the comment 3, however, it is possible to delay unrestricted drawdown to October 1 on individual lakes. Public interest in this option led to the evaluation of four alternatives under which unrestricted drawdown would be delayed until October 1 on a few reservoirs and until August 1 on the others. Due to the higher power costs of these alternatives and equity considerations, the Final EIS continues to recommend that unrestricted drawdown of all ten tributary reservoirs begin on August 1.

6. TVA should delay the drawdown of tributary lakes until October 31.
(15 comments)

TVA response: As discussed in Chapter 6, delaying the unrestricted drawdown of all ten tributary reservoirs until October 31 is not recommended. The reasons are similar to those precluding the Labor Day alternative (see response to comment 4, above). Improvements in scenery, reservoir fisheries, recreation, tourism, residential development and associated economic growth around the affected lakes are outweighed by power costs and environmental impacts. In addition, the October 31 alternative was rejected because it impacts flood control and navigation on the lower Ohio and Mississippi rivers.

As noted above, however, it is possible to delay unrestricted drawdown beyond August 1 on individual lakes. Public interest in this option led to the evaluation of four alternatives under which unrestricted drawdown would be delayed until October 1 on a few reservoirs and until August 1 on the others. Due to the higher power costs of these alternatives and equity considerations, the Final EIS continues to recommend that unrestricted drawdown of all ten tributary reservoirs begin on August 1.

7. TVA should improve winter levels on tributary lakes. (14 comments, including 10 letters specifically requesting that Norris Lake be maintained at an elevation of 985 feet during the winter.)

TVA response: Raising winter levels in tributary reservoirs was not considered in detail, as discussed in Chapter 4. To increase the recreation benefits to tributary areas appreciably, winter flood guide curves on all lakes would have to be raised to a point that the risk of flooding downstream at Chattanooga would be increased to an unacceptable level. Changes to flood guide curves on a few lakes can be considered while not significantly changing the risk of Chattanooga flooding. Such changes have been implemented on Fontana and are being evaluated for Norris as part of TVA's ongoing effort to maximize reservoir system benefits within the framework of existing policies.

8. Any future agreements between TVA and Tapoco should include lake level improvements on Santeetlah. (4 comments)

TVA response: Santeetlah Dam is owned and operated for hydropower production purposes by Tapoco, Inc., a subsidiary of Aluminum Corporation of America. In June 1990, Tapoco took over scheduling of power operations at Santeetlah from TVA under terms of a revised power supply contract with TVA. In its control of Santeetlah power operations, Tapoco now influences lake levels.

9. An aggressive fill policy is desirable, but further study is needed to avoid impacts on tailwater fisheries and lake spawning conditions. (1 comment)

TVA response: For a policy level EIS, TVA does not see a need for additional study. An aggressive fill policy for tributary lakes would not impact tailwater fisheries because of the recommended minimum flow requirements, described in Chapter 4. These minimum flows would recover over 180 miles of fishery habitat now lost because of intermittent drying of the river bed below TVA tributary dams. State agencies and other groups will be involved in site specific studies to implement minimum flows, taking into account the conditions and needs of each tailwater (see Chapter 6).

More aggressive spring filling of tributary reservoirs would benefit fish spawning by reducing the risk of decreases in pool levels during this critical period. Decreases in pool levels are more harmful than increases because decreases can strand eggs on the bank before hatching. Increases during flood control operations are unavoidable without increasing the likelihood of flood damages downstream, principally at Chattanooga.

10. Intergovernmental cooperation is necessary to make the best use of TVA lake areas. (1 comment)

TVA response: Comments from key interest groups involved in the QUEST process (described in the Introduction to the EIS) identified intergovernmental coordination as an issue and called for better cooperation among states, TVA, and other federal agencies involved in water resource management. Towards this end, an annual meeting between TVA and the governors of the seven Valley states is proposed in Chapter 6 as part of the recommendation to improve communication with lake users. This would be an opportunity for TVA to discuss its water resource policies and plans and to receive state input.

11. TVA should maintain a five-foot minimum level during the period of lake stabilization. (1 comment)

TVA response: Recreation target levels are proposed for each of the ten principal tributary reservoirs in the eastern half of the Valley in Chapter 4. These target levels were chosen because they could be reached in about 90 percent of the years and because they would provide significant improvements in lake levels and resulting benefits. Reaching these recreation target levels cannot be guaranteed due to natural

variations in rainfall and runoff. In addition, water must be released to provide minimum flows for water quality and aquatic life downstream or to meet critical power system needs (see Chapter 4). Establishing a minimum level on a tributary lake for the summer which cannot be violated is impractical when this level cannot be reached in about 10 percent of the years because rainfall is low. The proposed recreation target levels were devised to accommodate circumstances when targets cannot be reached or maintained.

12. Fontana drawdown should be restricted to a maximum of 60 feet for tourism-based economic development. (1 comment)

TVA response: With a maximum height of 480 feet, Fontana is the highest dam east of the Mississippi River. The height of the dam is advantageous for meeting the original purposes for constructing the dam: providing flood storage capacity during the winter and spring, storing water to meet navigation and power needs during the spring and summer, and generating greater power from the dam's hydroturbines. Reducing the annual drawdown from summer to winter flood guide levels would require reducing the amount of flood storage capacity provided by Fontana. Because this would significantly increase the risks of flooding at downstream locations, particularly the city of Chattanooga, significant changes to flood guides at Fontana and other reservoirs were rejected, as discussed in Chapter 4.

13. TVA is responsible for lack of access on Fontana Lake; without better access, Fontana's recreation potential is limited. (1 comment)

TVA response: As discussed in Chapter 4, TVA's policy is aimed at encouraging the private sector and other public agencies that manage lands around TVA lakes to develop appropriate recreation facilities, including lake access sites. TVA supplements these efforts by providing basic recreation facilities on selected TVA lands to help meet public needs. Because over 90 percent of the land around Fontana is owned by the National Park Service and the U.S. Forest Service in the Department of Agriculture, these agencies have a primary role in providing public recreation opportunities on this lake. However, over the last several years, TVA and the North Carolina Wildlife Resources Commission have worked with the Forest Service to develop boat access sites on Fontana at Flat Branch and Cable Cove. Also, TVA owns land immediately surrounding Fontana Dam and has developed recreation facilities at this site.

14. TVA should maintain higher lake levels on Fontana through October to improve access to cemeteries on the north shore. (1 comment)

TVA response: Chapter 6 shows that August 1 is the latest that unrestricted drawdown of all ten tributary reservoirs can begin to avoid unacceptable impacts to the environment and other system operating purposes. However, it is feasible to maintain higher levels on Fontana through October to improve cemetery access and for other benefits, while beginning unrestricted drawdown of the other reservoirs on August 1 (see response to comment 3). Due to the higher cost of this alternative and equity considerations, chapter 6 recommends that unrestricted drawdown of all ten tributary reservoirs begin on August 1.

15. There is no place on Hiwassee Lake to go swimming. (1 comment)

TVA response: Although TVA has limited land resources on Hiwassee, there is a site at Micken Branch suitable for a swimming beach, especially with extended summer lake levels. However, at this time, funds are not available for developing a beach at this location.

16. TVA seems to spend more on recreation facilities in Tennessee than it spends in North Carolina. (1 comment)

TVA response: While attempting to encourage other public agencies and the private sector to develop recreation and lake access areas, TVA has built recreation facilities on most of its lakes to supplement the efforts of others. TVA's investment in such facilities is roughly proportional to the number of lakes and the amount of shorelands TVA owns in each state. Because there are more lakes and more TVA-owned shorelands in Tennessee, TVA recreation facility investment in Tennessee is higher than in North Carolina.

17. With a sloping drawdown, the August 1 and Labor Day alternatives are the same. (1 comment)

TVA response: Sloping target levels were chosen to evaluate the August 1 alternative because this helped minimize power costs without affecting recreation benefits. (The difference between sloping and flat target levels was minimal around August 1.) Flat target levels were used to evaluate the Labor Day and October 31 alternatives, however, because these levels were higher after August 1 than sloping target levels and, thus, result in higher recreation benefits.

As an illustration, the table below (based on tables 21 and 22 in Chapter 4 of the Draft EIS) shows the expected elevation of Cherokee Lake on different dates if TVA continues its current drawdown policy (the no action alternative) or if unrestricted drawdown begins on August 1 with sloping recreation targets (alternative 1), on Labor Day with flat recreation targets (alternative 2), or on Labor Day with sloping recreation targets.

Average pool elevation (feet) on each date

<u>Alternative</u>	<u>Mem. Day</u>	<u>Aug. 1</u>	<u>Labor Day</u>	<u>Oct. 31</u>
No Action	1059	1053	1043	1034
August 1	1066	1062	1049	1035
Labor Day (sloping)	1066	1062	1056	1038
Labor Day (flat)	1067	1067	1067	1043

This comparison shows that when unrestricted drawdown is delayed with sloping recreation targets, the elevation on Labor Day is slightly less than midway between alternatives 1 and 2. All three alternatives show improved average lake levels on Labor Day compared to the no action alternative.

As noted in the response to comment 6, sloping recreation targets were used to evaluate four new alternatives in which lake levels are extended until October 1 on different groups of lakes while unrestricted drawdown would still begin on most lakes on August 1. The sloping targets shown in table 22 of the Final EIS are modified from those discussed in the Draft EIS to decrease the drawdown during September and October. They will, however, have about the same effect on Labor Day elevations, as illustrated in the above example.

18. TVA should consider economic development and the land/water relationship in managing Cherokee Lake levels; rapid changes in levels should be avoided. (1 comment)

TVA response: Changes to TVA's existing practice of unrestricted drawdown of tributary lakes such as Cherokee starting after Memorial Day were considered and recommended to improve economic development in these areas based on tourism, recreation, residential development, and associated economic growth. Changes to land/water relationships and the effects of rapid changes in levels were considered as part of this evaluation. Rapid changes in levels cannot always be avoided due to flood control operations, turbine operations, and factors beyond human control, such as storms.

19. The proposed actions should not affect rowing activities or shoreline development on the upper end of Melton Hill Lake. (1 comment)

TVA response: No effects on rowing activities or shoreline development on the upper end of Melton Hill Lake were identified.

20. Filling Lake Watauga to the brim such as occurred in 1989 would hurt recreational use. (1 comment)

TVA response: The average elevation at the beginning of the summer on Watauga under the preferred lake level alternative is projected to be about elevation 1955 feet, as shown in Appendix B. This exceeds the recreation target for that date by about 5 feet, but is lower than the top of the unvegetated zone by 2 to 3 feet.

During the first half of the summer of 1989, the elevation of Watauga equalled or exceeded elevation 1960 feet most of the time. This elevation is about 2 to 3 feet above the top of the unvegetated zone. Many recreation areas were flooded or rendered unusable due to the high rainfall and resulting lake levels on Watauga. Under more normal conditions, these areas would remain usable, and increased lake levels would improve recreation opportunities on Watauga.

21. The effects of lower summer flows on assimilative capacity in mainstream reservoirs in Alabama should be better evaluated before implementing tributary lake level improvements. (1 comment)

TVA response: As discussed in Chapter 5, releases through both tributary and mainstream dams would be reduced from the beginning of the spring filling period until the start of unrestricted drawdown to flood control

levels. On mainstream reservoirs, reduced flow during all or part of the summer months would resemble flows during dry years with the accompanying reduction of dissolved oxygen (DO). This reduction would be offset, to some extent, by maintaining biweekly minimum flows at selected mainstream dams under the release alternatives, which would reduce the frequency of occurrence of DO concentrations of less than 4 mg/l in the releases from mainstream dams.

The effects of the biweekly average minimum flow requirement on assimilative capacity are discussed in response to comment 11, under "Minimum Flows." No significant impacts are expected. However, in response to concern expressed during public review of the Draft EIS, the Final EIS recommends that TVA commit to monitoring the effects of the proposed flow requirements at mainstream dams on water quality and aquatic life. If a problem related to low flows is identified, daily releases would be raised until conditions improve, as specified in Chapter 5.

22. Separate waters on TVA lakes should be designated for skiers and fishing. (1 comment)

TVA response: Legal authority for establishing boating laws and regulations affecting Tennessee Valley lakes and rivers resides with the seven Valley states and U.S. Coast Guard. TVA shares responsibility with the U.S. Army Corps of Engineers and Valley states in authorizing placement of special water use facilities (e.g., slalom courses, ski jumps, fish attractors, docks, and ramps) through Section 26a of the TVA Act; however, this authorization does not allow TVA to designate "zones" for specific water use activities, nor to regulate boating activities.

23. Is TVA spending money allocated for maintenance at Wilbur and Watauga at other TVA lakes? (1 comment)

TVA response: Each year, TVA allocates available maintenance funds to Wilbur, Watauga, and other dams based on several factors, such as the number of annual and seasonal employees required to maintain each project at an acceptable level, the size of the dam reservation, the number and type of visitor facilities, and the number of visitors expected. Unexpected maintenance problems or use situations may cause expenditures to vary somewhat annually, requiring some funds to be reallocated among projects. However, actual expenses at each project are usually near the amount allocated.

Nonroutine maintenance or "cyclic" needs, such as roadway repaving, building renovation, roof replacements, and heating and air conditioning repair or replacement, are handled in a similar manner. In recent years, however, appropriated funds have been inadequate to cover all the cyclic maintenance needs identified at each project. As a result, cyclic funds are allocated according to the priority of needs identified, and can be shifted from one project to another as necessary to handle unexpected maintenance problems.

CommunicationSummary of comments

Most of the people who wrote or spoke in favor of better communication between TVA and lake users would like TVA to provide advance information about lake level fluctuations and release schedules. Others urged TVA to be more responsive to inquiries from lake users and to involve the public in solving problems and reviewing lake operating policies.

Individuals who commented

Rod Baird, North Carolina Trout Unlimited
Robert Bennett, Arrowhead Resort
Albert H. Budlong, Moors Area Retirees Group
Keith J. Buttlemann, Council on the Environment, State of Virginia
Wayne F. Canis, Shoals Sierra Club
William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources
Linda Duxstad, Hiwassee Hideaway Marina
Lin Erdmann
Thomas Joe Grissom, Saltillo Marina
Marshall Jones, West Tennessee Sportsman Association
Margaret A. Lane, Elk River Development Agency
James G. Martin, Governor, State of North Carolina
Gerald McLemore, West Tennessee Sportsman Association
Claude R. Norris
John E. Williams

Specific comments

1. TVA should take steps to improve day-to-day communication with lake users (e.g., use the media to inform lake users about changes in lake levels, implement a telephone system for inquiries about lake conditions, consider reinstituting daily river bulletins, train personnel at TVA dams to handle inquiries). (11 comments)

TVA response: Such actions are proposed in Chapter 6 as part of a recommendation to improve communication with lake users. The TVA Board already has approved several actions to improve communication regarding routine reservoir operations and to increase public understanding of TVA lake and river operations. These include authorizing lake recreation maps which will be made available free to the public; an 800-number voice response telephone system which will provide up-to-date information about streamflows, lake levels, and generation schedules; and a pilot newsletter for targeted tributary lakes. Other items are being prepared for Board consideration to meet these goals, such as performance measures for monitoring the benefits provided by the river system, and spring and summer bulletins explaining current and expected reservoir levels.

2. TVA should involve local recreation and resource groups in implementing changes and solving problems. (2 comments)

TVA response: Many such groups have participated in TVA's current review of its lake and river operations and their continued involvement will be important to the successful implementation of the resulting recommendations. Improving communication with these groups is the aim of the recommendation in Chapter 6, discussed above. In addition, local involvement in system planning and operation is recommended specifically to implement flow and dissolved oxygen improvements in individual tailwaters.

3. Accurately projecting generation schedules 48 to 72 hours in advance would allow communities to get more economic benefit from their potential trout fisheries. (1 comment)

TVA response: Generation schedules are revised frequently as weather conditions and power needs change. The TVA Board has recently approved a toll-free voice response telephone system to make updated schedules more accessible to interested users. This system will provide up-to-date information on hydrogeneration schedules, streamflows, lake levels, and 3-day reservoir forecasts. Computer access to this information also will be provided to TVA employees who respond to public inquiries. In addition, TVA frequently schedules releases to accommodate advance requests by communities planning water-related events (e.g., river festivals, boat races, raft trips, and fishing contests).

4. The TVA Congressional delegation should appoint a citizens board, including farmers, to oversee TVA's flood control policies. (1 comment)

TVA response: Concerned citizens can influence TVA's flood control policies by contacting their Congressional representatives who provide oversight through the annual appropriations process, special hearings, and direct communication with members of the TVA Board. TVA Board members and TVA senior managers also are readily accessible to the public. Additional opportunities for public involvement are proposed as part of the recommendation in Chapter 6 of this EIS to improve communication with lake users.

Land and Water ForumSummary of comments

Thirteen people expressed support for the proposed Tennessee Valley Land and Water Forum as a way to improve regional cooperation on water resource issues, including several people who felt that the Forum should be in place before changes are implemented. Two people were uncertain about the incentives for state participation in the Forum and one questioned whether such an organization was necessary given the coordination mechanisms already in place.

Individuals who commented

Randal J. Braker, Duck River Utility Commission
Wayne F. Canis, Shoals Sierra Club
William W. Cobey, North Carolina Department of Environment, Health, and Natural Resources
Joe Frank Harris, Governor, State of Georgia
H. A. Henderson
Margaret A. Lane, Elk River Development Agency
Ray Mabus, Governor, State of Mississippi
James G. Martin, Governor, State of North Carolina
James F. Prewett, Save Our Lakes, Inc.
Frank M. Redmond, U.S. Environmental Protection Agency
Pat Ross, Tennessee-Tombigbee Waterway Development Authority
David P. Rumbarger, Alabama Department of Economic and Community Affairs
G. Trivedi, LWD, Inc.
L. Douglas Wilder, Governor, State of Virginia
Carolyn Williams, League of Women Voters of Chattanooga, Hamilton County

Specific comments

1. The Tennessee Valley Land and Water Forum is a good idea; cooperation will be essential to resolving the region's water-related problems.
(13 comments)

TVA response: The success of the proposed Forum would depend on the active participation of TVA, the seven Valley states, and appropriate federal agencies. Because this idea did not receive a strong endorsement from the prospective members, it has been reformulated. As part of the recommendation to improve communication with lake users outlined in Chapter 6, an annual meeting now is proposed between the TVA Board and the governors to exchange information on water resource policies and plans. This change is intended to reduce the bureaucracy associated with the Forum, as originally proposed, while still promoting increased regional cooperation in water resource decision making.

2. The Forum should build on Land and Water 201. (2 comments)

TVA response: See response to previous comment.

3. The Land and Water Forum is unlikely to be successful without a commitment from TVA to stabilize lake levels and aerate releases. (1 comment)

TVA response: This recommendation is no longer included in the EIS. See the response to comment no. 1 above.

4. The proposed structure of the Land and Water Forum is too bureaucratic. (1 comment)

TVA response: This recommendation is no longer included in the EIS. See the response to comment no. 1 above.

5. The Land and Water Forum is unnecessary; the mechanisms are already in place for coordination on water resource issues. (1 comment)

TVA response: This recommendation is no longer included in the EIS. See the response to comment no. 1 above.

6. The states are unlikely to participate in the proposed Land and Water Forum. (1 comment)

TVA response: This recommendation is no longer included in the EIS. See the response to comment no. 1 above.

7. Local governments, private interest groups, and lake user organizations should be included in the Forum. (1 comment)

TVA response: The Land and Water Forum is not recommended in the Final EIS for the reasons outlined in the response to comment no. 1 above. However, local governments, private interest groups, and lake user organizations would receive more information about TVA lake and river operations and be offered more opportunities for input if the recommendation in Chapter 6 concerning improved communication with lake users is adopted.

ENVIRONMENTAL AND SOCIOECONOMIC IMPACTSPollutionSummary of comments

Water pollution concerns were raised by people throughout the Tennessee River system, but most frequently by residents around Kentucky, Douglas, and Boone lakes. Industrial waste, sewer outfalls, and pesticide and herbicide use were mentioned as particular problems. Most people talked generally about the adverse effects on aquatic life and recreational use of the lakes. A few proposed solutions, including more active involvement by TVA; better cooperation among government agencies, private interests, and lake users; higher lake levels; and reductions in TVA's use of pesticides and herbicides.

Individuals who commented

Cecil Anderson
Steve Blazier, Muscle Shoals Sailing Club
Robert Brobeck
Wilson Burton, Heart's Desire Hunting Club
Robert Carpenter, North Carolina State Senate
Paul Y. Chinen, U.S. Army Corps of Engineers
Darin Christian
Ken Cline, West Tennessee Sportsman Association
Robert Cox, Boone Lake Property Owners Association and Friends
Bud Denzel, Baneberry City Council
Charles Dow, Harmon Creek Boat Dock
Tommy J. Doyle
Lynberg Estep
Jesse Gilliam, Saltillo Marina
R. V. and Betty J. Gilmer
Kenneth Goff
Richard Guy, Sunburst Adventures
C. W. Hardin, North Carolina State Senate
H. A. Henderson
William Horne, Friends of Lake Chatuge
Marshall Jones, West Tennessee Sportsman Association
Gerald McLemore, West Tennessee Sportsman Association
Robert G. Osborne
G. Patrick
James F. Prewett, Save Our Lakes, Inc.
Ralph Roark
Robert Smailes
Eugene Stowers, Izaak Walton League, Fort Loudoun-Tellico Chapter
Don Sundquist, U.S. House of Representatives, State of Tennessee
Willie Taylor
Dewey Tucker
Carolyn Williams, League of Women Voters of Chattanooga-Hamilton County

Specific comments

1. Pollutants in the Tennessee River system are adversely affecting aquatic life and recreational use. (23 comments)

TVA response: Chapter 3 documents the principal water quality concerns in Tennessee Valley watersheds and reservoirs, and shows that point and nonpoint pollution is one of the major water quality problems affecting the Tennessee River system. As discussed in Chapters 4 and 6, state agencies have the authority to control point and nonpoint sources of pollution; TVA's role in pollution control is quite limited. TVA can influence the actions of others to improve water quality through technical assistance, demonstration projects, and other program activities. But primarily TVA is responsible for controlling pollution from its own lands, facilities, and power plants.

The other major water quality problem affecting the system--low dissolved oxygen (DO) levels in stream reaches below TVA dams--is addressed by this EIS. Minimum flows affecting all dams and aeration of releases to increase DO levels to 5 or 6 mg/l at 14 tributary dams and the upper two dams on the Tennessee River are recommended to improve water quality and aquatic habitat. These levels would be achieved through a combination of aeration at TVA dams and state action to control upstream pollution.

2. TVA should take a more active role in controlling water pollution. (8 comments)

TVA response: As discussed in the response to the previous comment, states have the authority to control point and nonpoint sources of pollution. TVA's role in pollution control is quite limited, and principally oriented to controlling pollution from its own lands, facilities, and power plants.

Chapter 4 discusses three suggestions for strengthening TVA's authority to control activities that adversely affect reservoir uses, such as water pollution. These suggestions were judged infeasible or ineffective and were not evaluated in detail. No other suggestions have been raised during the public review process.

Chapter 6 recommends that the TVA Board meet annually with the governors of the seven Valley states to promote cooperative action on solving problems such as this. Reducing pollution will require the cooperative effort of TVA, the states, local governments, and other federal agencies because no single government agency has the authority, responsibility, or the resources to address water quality problems adequately.

3. TVA's use of pesticides and herbicides contributes to pollution in the Tennessee River system. (4 comments)

TVA response: TVA complies with applicable federal and state regulations in using chemical treatment to control mosquitos and aquatic vegetation and routinely monitors these applications. Because of environmental and cost considerations, pesticide and herbicide use is limited to areas

where mosquitos and excessive plant growth affect lake use most severely. TVA relies primarily on water level fluctuation, which has proven to be a more effective and environmentally sound means of controlling mosquitos and aquatic plants.

4. TVA should provide higher levels on Boone Lake to improve water quality. (3 comments)

TVA response: Providing higher lake levels would have only a marginal effect on diluting the effluents from point and nonpoint sources of pollution entering Boone Lake. Improvements in water quality in Boone Lake will come principally from further reduction in the flow of pollution into the lake. See the response to comments 1 and 2 in this section for a discussion of appropriate actions to control pollution.

Improvements in minimum flows and dissolved oxygen (DO) in the releases from South Holston, Watauga, and Wilbur dams are recommended in Chapter 6 and should improve conditions in the upper reaches of Boone Lake. However, these improvements only address the impacts of low DO in the releases from these dams.

5. TVA needs to do a better job of clearing logs and debris from the waterway and cleaning the shoreline. (1 comment)

TVA response: Large quantities of debris and trash floating on the surface of TVA reservoirs and accumulating along shorelines and behind dams is a major concern to TVA. TVA recently changed its approach to this problem by reversing its practice of passing accumulated debris at TVA dams downstream. Once all equipment is purchased, TVA will remove debris and trash accumulated behind dams. In addition, TVA is planning to clean up accumulated debris and trash from TVA lands and increase inspection of shorelines to identify and correct potential problems.

6. Shoreline property owners should be responsible for controlling runoff and cleaning the shoreline. (1 comment)

There are no regulations governing responsibility for debris and trash on TVA reservoirs. In TVA's view, it is the responsibility of TVA and all lake users to promote litter-free lands, streams, and reservoirs. To assist state and local governments and citizen cleanup efforts on TVA reservoirs, TVA will cooperate with Valley states on educational programs to change public attitudes about trash disposal, and it will facilitate and support citizen cleanup efforts by establishing a coordination center, supplying trash bags to citizen groups, conducting special reservoir operations to strand trash and debris, encouraging TVA employee participation in such efforts, and establishing award programs to recognize cleanup efforts.

7. It is doubtful whether releases from the Champion paper mill have caused adverse environmental and economic effects downstream; cleanup, however, would result in serious economic losses in North Carolina. (2 comments)

TVA response: As noted in Chapter 3, two of the principal water quality concerns in Douglas reservoir and the French Broad River watershed are color and dioxin, respectively. These concerns originate with the effluents from the Champion paper mill on the Pigeon River, a tributary of the French Broad River, in Canton, North Carolina. Resolution of this pollution problem is the responsibility of Champion Paper, and is subject to limitations and controls imposed by the U.S. Environmental Protection Agency, and the states of North Carolina and Tennessee, who have jurisdiction over this matter.

8. The discussion in the EIS about agricultural use of water is inadequate.
(1 comment)

TVA response: The use of surface water supplies in the Tennessee Valley for irrigation and other agricultural water uses is very small and is not projected to grow, as discussed in Chapter 3. Nonpoint source pollution from agricultural uses is shown in Chapter 3 as a major cause of water quality concerns in TVA reservoirs and Valley watersheds. TVA's options for increasing the pace of nonpoint pollution control efforts are discussed in Chapter 4, and recommendations for TVA action are presented in Chapter 6. See the response to comments 1 and 2 in this section for additional discussion.

9. Lake Chatuge could be polluted by the sewer treatment plant proposed for the Sunnyside site; TVA should help prevent selection of this site.
(1 comment)

TVA response: TVA is not involved in the selection of the Sunnyside site because no TVA lands are involved and no discharge to the reservoir has been proposed.

However, like all sewage treatment plants, the plant proposed for the Sunnyside site must meet water quality criteria established by the state. In cases where a discharge is proposed, TVA provides information and analyses on request to the state and municipality seeking to build and operate a plant to assist in the evaluation of the discharge permit application; however, TVA does not have the regulatory authority to approve or deny a discharge permit application.

As discussed in Chapter 4, municipalities also must seek a Section 26a permit from TVA if the discharge pipe or other structures of the plant would obstruct navigation or affect flood control, public lands, or reservations. In deciding to grant 26a approval, TVA is responsible under the National Environmental Policy Act for considering site-specific uses (e.g., recreation, fish and aquatic life, drinking water, assimilative capacity) and ensuring that its decisions are environmentally sound. For this reason, TVA requires that applicants obtain appropriate water quality certification from state pollution control agencies as part of the Section 26a approval process.

10. How will siting a landfill next to Browns Ferry Nuclear Plant affect the waterway? (1 comment)

TVA response: A permit application for a sanitary landfill located next to Browns Ferry Nuclear Plant was submitted to the state of Alabama earlier this year by a private party. To date, the state has not taken any action on this application, nor is it expected to take action until after May 1991 when the current moratorium on new landfills expires.

The permit application must address any effects on surface and groundwaters. Potential effects must be mitigated before a permit to construct/operate is issued.

TVA does not have the authority to regulate non-TVA operations. However, like any other party, TVA can provide information and comments on solid waste permit applications to the state during the review process.

11. Given recent fish consumption advisories for Wilson Reservoir, should PCB levels in fish flesh be listed as an affected use for this reservoir in Table 5, Chapter 3? (1 comment)

TVA response: As a result of reductions in PCBs in fish samples collected in 1985 and 1986, the Northwest Alabama Regional Health Department notified retail markets in 1987 that they could resume selling catfish from Wilson Reservoir. Additional sampling in 1987 confirmed the reductions observed in 1985 and 1986.

Wetlands/Wildlife

Summary of comments

Five people raised concerns regarding wildlife and wetlands. Most related to the effect of release and lake level improvements on riparian plant and animal communities.

Individuals who commented

Paul Y. Chinen, U. S. Army Corps of Engineers
H. A. Henderson
Jerry S. Lee, U.S.D.A. Soil Conservation Service
Louis Milhorn
Gary Myers, Tennessee Wildlife Resources Agency

Specific comments

1. TVA's drawdown policy on tributary lakes has a significant effect on wildlife and wetlands; more elaboration on this effect would be helpful.
(3 comments)

TVA response: Current conditions related to wetlands and wildlife are described in Chapter 3. The effects of continuing TVA's current operation and the effects of alternate drawdown dates are assessed in Chapter 5. The recommended lake level alternative would have a limited, but positive effect on wildlife and wetland resources.

2. TVA should avoid adverse impacts on waterfowl in designing/timing releases; if adverse impacts can not be avoided, they should be identified in the Final EIS. (1 comment)

TVA response: No adverse impacts on waterfowl have been identified. To the extent that improvements in flow and dissolved oxygen result in increased tailwater habitat and aquatic productivity (i.e., an expanded prey base), waterfowl will benefit.

3. The Final EIS should indicate whether release and lake level improvements will jeopardize agricultural operations on Kentucky Lake wildlife management areas. (1 comment)

TVA response: As noted in Chapters 5 and 6, higher water levels in the late summer and fall could interfere with state habitat management activities on Douglas Lake. However, agricultural operations on Kentucky and other mainstream lakes will not be affected by the proposed changes in TVA's lake and river operations.

4. TVA's waterfowl management subimpoundments and dewatering areas should meet the objectives of the North American Waterfowl Management Plan.
(1 comment)

TVA response: The objectives of the North American Waterfowl Management Plan (North American Plan) are an integral part of management activities and strategies for TVA's waterfowl subimpoundments and dewatering areas. The waterfowl habitat provided by TVA subimpoundments and dewatering areas is considered within the implementation plan currently being developed by the Tennessee Wildlife Resources Agency (TWRA) as an extension of the North American Plan. TVA, as part of its enhanced land stewardship initiative, has pledged support and assistance to TWRA in planning and implementing joint venture waterfowl and wetland conservation projects within budgetary and operational limitations.

The Tennessee Valley has been nominated as a joint venture area for planning in 1990 and budgeting in 1995 under the North American Plan by the Regional Director of the U. S. Fish and Wildlife Service (FWS) in Atlanta, Georgia. This nomination was based on the amount of existing waterfowl habitat located within the Tennessee Valley drainage area and the estimated 500,000 ducks and geese that overwinter in the area annually. FWS considers TVA subimpoundments and dewatering areas an essential component of the wintering waterfowl habitat base in the Tennessee Valley drainage area.

5. How will the proposed changes affect surface and groundwater drainage patterns? (1 comment)

TVA response: Delaying unrestricted drawdown of tributary lakes an additional two months will not have a significant effect on the interaction of surface and ground waters. Wetlands and well water supplies, for example, are much more likely to be affected by changes in drainage patterns occurring naturally as a result of annual variations in rainfall.

As noted in Chapter 5, while no expansion of wetland area is expected under the August 1 alternative, existing wetlands in tributary areas could benefit from being flooded an additional two months. Wetlands on mainstream lakes will not be affected because the recommended lake level changes only apply to tributary reservoirs.

Fisheries

Summary of comments

Most of the comments about fisheries related to spawning conditions. The largest number of people were concerned about the effect of water level fluctuations on reproductive success. Several people were critical of TVA's current lake level management, particularly drawdowns soon after the spring spawn. Most supported the lake level changes under consideration, noting the benefits of an earlier fill, higher levels, and delayed drawdown to aquatic habitat, fish populations, and angler use. There was some concern, however, about whether an aggressive fill policy would result in significant increases in water levels during spawning.

Individuals who commented

John E. Alcock, U.S.D.A. Forest Service
Charles H. Badger, Georgia State Clearinghouse
Rod Baird, North Carolina Trout Unlimited
David Bishop, Tennessee Wildlife Resources Agency
Robert Brobeck
Maynard Brooks, B & B Straight Creek Dock
Michael Cairnes, Pigeon Valley Bass Masters
Robert Carpenter, North Carolina State Senate
Darin Christian
Bob Cloer, Fieldstone Inn
William W. Cobey, North Carolina Department of Environment, Health, and Natural Resources
Jim DeVillez, Tarryon Resort
Fred R. Harders, Alabama Fish and Game Division
C. W. Hardin, North Carolina State Senate
Jerry Hooper, Alabama Fish and Game Division
Hampton Horner
Mr. and Mrs. Harold Horner
Louis Milhorn
Walter Mitchell, Jr.
Gary Myers, Tennessee Wildlife Resources Agency
Mr. and Mrs. Robert J. O'Brien
Jon Stern, Rohm and Haas Fishing Club
James Wood
Charles T. Woods, Mansard Island Resort and Marina

Specific comments

1. Stable water levels are critical during fish spawning; extreme fluctuations under current TVA policy have hurt fish reproduction; an aggressive fill policy would benefit spawning by restricting drawdown, but could increase the risk of significant increases in water levels.
(16 comments)

TVA response: Reservoir operations to stabilize lake levels during the fish spawning season are conducted under TVA's current policy, as discussed in Chapters 2 and 4. Flood control operations take priority, however, and can cause rapid changes in pool levels. This constraint, combined with changes in levels due to turbine operation and factors beyond human control such as storms, make it difficult to provide more stability for spawning than TVA already provides.

Aggressive filling of reservoirs to improve recreational summer pool levels could result in more increases in pool levels during fish spawning. However, these increases should not affect, and may even benefit, reproductive success. Decreases in pool levels, which are detrimental to spawning, would be less likely.

2. Filling TVA lakes earlier would improve fisheries and result in economic benefits. (4 comments)

TVA response: These benefits are discussed in Chapters 5 and 6.

3. Delaying drawdown would benefit fish habitat, reproduction, and young-of-year fish growth, and would increase angler use; the longer drawdown is delayed the greater the benefits. The effects of different drawdown schemes on aquatic habitat and fisheries should be evaluated.
(7 comments)

TVA response: Maintenance of high pool levels through late spring and summer will provide expanded, stable, shallow-water habitat and thus would enhance the survival and growth of young fish and increase fish populations in tributary reservoirs, as discussed in Chapter 5. These benefits would be expected even with unrestricted drawdown being delayed until Labor Day with flat recreation target levels or until October 1 with sloping recreation target levels, but not if unrestricted drawdown is delayed much longer.

This is because fall drawdowns are beneficial to fish populations. Predator fish are concentrated with available prey, resulting in increased spawning by these forage species the following spring. This in turn, increases the availability of small forage fish for the following year's small and medium size predator fish. The rationale for this conclusion has been added to the discussion of the effects of lake level alternatives on fish in Chapter 5. This conclusion does not change the negative effects of delayed drawdown on tailwater fisheries due to reduced release temperatures.

4. Contrary to the EIS, holding lake levels until Labor Day or beyond would probably benefit trout populations by reducing tailwater temperatures during the late summer and fall. Late summer and fall temperatures in several tributary reservoir tailwaters are currently well above optimal for trout growth and reproduction. (1 comment)

TVA response: Reduced late summer and early fall temperatures may occur at several tributary tailwaters due to holding lake levels higher longer. These temperature reductions may enhance conditions for trout in

several TVA tailwaters which reach temperatures above the optimal ranges for trout reproduction and growth. However, at other TVA tributary tailwaters that do not approach these upper limits, temperatures could be reduced below the optimal ranges for the trout species present and thus reduce growth rates. The relative benefit/detriment derived from reduced temperatures would depend upon which lake level alternative was adopted, the specific tailwater, the magnitude of temperature reduction, and the trout species present. Of all the alternatives, the August 1 alternative, or alternatives 1A through 1D which use sloping recreation target levels until October 1, would yield the least temperature modification from present conditions. The text of the EIS has been edited to clarify these temperature effects.

5. Higher winter lake levels would hurt fishing; extreme winter drawdowns would improve water quality. (2 comments)

TVA response: These statements are generally regarded as true. This EIS did not consider either of these changes--increasing winter lake levels or extreme winter drawdowns--in detail, however, for the reasons discussed in Chapter 4. Increasing the elevation of winter pool levels would significantly reduce flood control benefits. Extreme winter drawdowns would disrupt lake recreation and hydropower generation, and could impact water supplies in some reservoirs.

6. Fish stocking and access facilities will not limit increased use of improved tailwaters; they will be provided as self-sustaining fish populations develop. (1 comment)

TVA response: Establishment and maintenance of self-sustaining cold water fish populations is not a specific goal of the minimum flow and DO improvements under consideration. Increased flows and DO will improve environmental conditions and quantities of acceptable habitat for cold water fish in the Chatuge and Nottely tailwaters, for example, but do not assure self-sustaining cold water fish populations.

Self-sustaining populations may be attainable goals at particular tailwaters and this concern should be addressed in site-specific investigations. However, increased fishing in these tailwaters likely would depend more on public and state interest in expanded, more intensively managed, fish stocking programs; concurrent development of improved access to tailwater stream reaches; and water quality improvements than on the development of self-sustaining fish populations. This has been the experience in the Norris tailwater where dramatic improvements have been accomplished through inter-agency (TVA, USFWS, TWRA) and public cooperation.

7. TVA should assist in providing facilities for bank fishing, developing boat access areas, and opening up silted-in boat access channels. (1 comment)

TVA response: TVA's policy of encouraging private sector development of lake access areas is discussed in Chapter 4. Alternatives to this approach were not considered because costs would be prohibitive.

8. How would the proposed alternatives affect Alabama fisheries?
(2 comments)

TVA response: The recommended release alternative would improve water quality throughout the Tennessee River system, resulting in benefits to aquatic life. Fish species in mainstream reservoirs that use tailwaters for spawning or as nursery areas would benefit from increased DO and, where these species use tributary tailwaters, from more stable flow regimes. Also, the proposal in Chapter 6 to seek agreements with the states of Georgia, North Carolina, and Alabama similar to the current agreement between TVA and the state of Tennessee should help to further improve fishery conditions.

In addition, the Final EIS recommends that TVA commit to monitoring the effects of the proposed biweekly average summer flow requirements at mainstream dams on water quality and aquatic life. If a problem related to low flows is identified, daily releases would be raised until conditions improve, as specified in Chapter 5.

9. Tennessee fisheries biologists have located a naturally reproducing population of brown trout in the Watauga River downstream from Wilbur Dam. (1 comment)

TVA response: Table 8 indicates both stocked and resident fisheries in the Wilbur tailwater. The principal species found are rainbow and brown trout and sunfish.

10. Chapter 3 does not recognize the loss of the fisheries resources which existed prior to dam construction. (1 comment)

TVA response: The purpose of this EIS is to document current conditions affected by possible changes in TVA's lake and river operations, and to assess the effects of the proposed alternatives on these existing conditions. It is not intended to document the effects of the construction of the reservoir system.

The effects of the construction of the reservoir system on aquatic and other resources are discussed in Chapter 3 to explain the current conditions and habitat affecting these resources. The tremendous effect of reservoir system construction on the number and diversity of aquatic resources is acknowledged in this chapter.

11. Why are changes in water levels due to turbine operations listed as a factor beyond human control? (1 comment)

TVA response: The flow rate capacity of most turbines at TVA dams is too large to sustain continuous operation; therefore, the turbines must be periodically turned on or shut off to control the release of water from the dam for various purposes. The startup or shutdown of a turbine will cause unavoidable fluctuations in water level at upstream reservoir locations. Chapter 4 has been edited to clarify this point.

Endangered Species/Mussels

Summary of comments

Most of the comments on endangered species dealt with mussel recovery. Those people who wrote or spoke on this subject were unanimous in their support for higher flows and increased dissolved oxygen. Some urged additional actions to restore mussel habitat, including a mussel recovery program, exploring ways to restore historical temperature and river flow patterns, and disseminating information on successful mussel recovery efforts.

Individuals who commented

Paul Y. Chinen, U.S. Army Corps of Engineers
William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources
Jonathan P. Deason, U.S. Department of Interior
Byron Hale, Clinton Utilities Board
Roger A. Jenkins, Harvey Broome Chapter, Tennessee Sierra Club
Debra Mitchell
Frank M. Redmond, U.S. Environmental Protection Agency

Specific comments

1. Changes in TVA's current policy are necessary to protect endangered mussel species; release improvements are a start, but TVA also should undertake a program to reestablish mussel populations. (5 comments)

TVA response: TVA recently initiated a long-term project aimed at restoring populations of freshwater mussels, including endangered species, to a large river segment where they occurred historically. The proposed increases in minimum flows and aeration of releases through TVA dams will support the goals of this project by recovering 180 miles of river habitat suitable for mussels.

2. Recovery of endangered species is the most important benefit that could result from the proposed changes in TVA's lake and river operations. (2 comments)

TVA response: No response necessary.

3. In addition to release improvements, TVA should study the possibility of restoring historically normal water temperatures and flow patterns to further restore large river habitat. (1 comment)

TVA response: Restoring historically normal water temperatures below TVA dams to recover more large river habitat was not considered due to conflicts with cold water fishery management and costs. Restoring normal flow patterns is discussed in the response to comment 5 under "Minimum Flows."

Construction and operation of the reservoir system created artificial cold water habitats below most tributary dams, as indicated in Chapter 3. This has led to the development of stocked and, in a few cases, resident cold water fisheries which are highly valued by fishing enthusiasts. Using spillways or surface pumps to increase water temperature could compromise the health or existence of these fisheries. In addition, the costs of spilling water are high because of the total loss of hydropower output from the water spilled.

4. Lake drawdown should not be delayed; delay would counteract the effects of release improvements on the recovery and expansion of habitat for endangered aquatic species. (1 comment)

TVA response: The effect of reduced release temperatures on tailwater habitat and aquatic life is one of the factors discussed in Chapter 6 for avoiding the use of flat recreation target levels while delaying unrestricted drawdown of all tributary lakes until Labor Day or beyond (alternatives 2 or 3). The reduced temperatures resulting from the preferred alternative will not have significant negative effects; endangered aquatic species that could be reestablished in large river habitats under current conditions can still be restored. The improvements in minimum flow and dissolved oxygen recommended in Chapter 6 will further support restoration of these species.

5. The EIS should include a more extensive discussion of biological resources (endangered aquatic species, in particular). The potential biological effects of increased DO and higher flows should be analyzed for the tailwater of each dam. (2 comments)

TVA response: A more extensive discussion of biological resources is contained in the report, "Aquatic Biological Background Information" (listed in the Environmental Effects section of the References). Evaluations of the effects of the alternatives for each tailwater will be conducted in the detailed planning and implementation of release improvements, as discussed in the recommendations in Chapter 6.

6. TVA should evaluate, document, and disseminate information on successful efforts to recover endangered species through flow and DO improvements. (1 comment)

TVA response: TVA staff is not aware of any such efforts to date, but believe that successful recovery of some endangered species through flow and DO improvements is feasible. Improving the suitability of aquatic habitats to support increased diversity, including endangered species, is a substantial focus of current TVA reservoir release activities and this EIS. TVA will disseminate the results of these activities as they become available.

7. A summary of the status of consultations between TVA and the U.S. Fish and Wildlife Service on any federally listed species should be provided. (1 comment)

TVA response: Two consultations between TVA and the U.S. Fish and Wildlife Service (FWS) are in progress. The first concerns the proposed Tennessee River navigational channel widening project immediately below Pickwick Landing Dam. Consultation involves six federally listed mussel species. FWS issued a draft opinion in July 1990 and a final, "no-jeopardy" opinion in September 1990. The final opinion included reasonable and prudent measures to be taken by TVA to minimize incidental take. TVA and FWS also are in the early stages of consultation regarding the green pitcher plant, a federally listed species occurring on lands on which TVA has a flowage easement.

TVA and FWS are in the first stages of a conference regarding the leafy prairie-clover, a plant species which was proposed as endangered in March 1990. Leafy prairie-clover occurs on TVA-owned land in the proposed Columbia Dam project area. A public hearing on the listing proposal was conducted in October 1990; FWS is expected to announce its final decision on the proposed listing by March 1991.

8. The information on federally listed species should include species which have historic ranges in the Valley even though they are no longer found in the region. (1 comment)

TVA response: The EIS includes information on all federally listed species that occur in areas that may be affected by present or modified lake and river operations.

9. It is believed that the boulder darter once inhabited some Alabama portions of the Tennessee River; the only population that still persists is in the Elk River downstream of Tims Ford reservoir. (1 comment)

TVA response: Table 9 in Chapter 3 shows that the remaining population of the boulder darter is found in regulated and free-flowing streams. The EIS acknowledges that listed species may have been found in other locations in the Tennessee Valley. Providing a list of these locations is not necessary to evaluate the alternatives and adds too much detail for a policy-level EIS.

Aquatic Plant and Mosquito ControlSummary of comments

Eleven people commented on TVA's efforts to control aquatic plants and mosquitos. Four opposed the use of herbicides and pesticides, citing water quality effects; one supported continued lake level fluctuations for this purpose. Some felt that delayed drawdown would reduce the need for aquatic plant and mosquito control. Others felt that it could aggravate the problem, in which case TVA should pay for increased control costs.

Individuals who commented

Robert Carpenter, North Carolina State Senate
Paul Y. Chinen, U. S. Army Corps of Engineers
Ken Cline, West Tennessee Sportsman Association
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
C. W. Hardin, North Carolina State Senate
Marshall Jones, West Tennessee Sportsman Association
Gerald McLemore, West Tennessee Sportsman Association
Robert G. Osborne
Marc Slaff, North Carolina Department of Environment, Health, and Natural
Resources, Division of Environmental Health, Public Health Pest Management
Mr. and Mrs. Spencer Thomas
Carolyn Williams, League of Women Voters of Chattanooga, Hamilton County

Specific comments

1. TVA's use of pesticides and herbicides contributes to the pollution of the Tennessee River system. (4 comments)

TVA response: TVA complies with applicable federal regulations in using chemical treatment to control mosquitos and aquatic vegetation and routinely monitors these applications. Because of environmental and cost considerations, however, pesticide and herbicide use is limited to areas where mosquitos and excessive plant growth affect lake use most severely. TVA relies primarily on water level fluctuation, which has proven to be a more effective and environmentally sound means of controlling mosquitos and aquatic plants.

2. TVA should continue fluctuating lake levels to control mosquitos. (1 comment)

TVA response: TVA plans to continue fluctuating water levels to control mosquitos in the TVA region. These fluctuations have proven to be an effective and environmentally acceptable control technique. If water level fluctuations were discontinued, the use of insecticides would need to be increased to provide adequate mosquito control.

3. Early drawdown leaves stagnant pools which breed mosquitos and promote undesirable weeds. (2 comments)

TVA response: Summer drawdown of tributary lakes actually helps control aquatic plant growth and mosquito habitat by dewatering vegetation. Maintaining higher water levels through August 1 is not expected to affect plant and mosquito production significantly. If higher lake levels were maintained through the fall with flat recreation target levels, there is some concern that plant growth could become a more serious problem in tributary lakes.

4. TVA should bear responsibility if higher lake levels increase mosquito control costs in tributary areas. (2 comments)

TVA response: Mosquito habitat in tributary lakes is limited by several factors: steep banks with limited shallow shore area, rocky substrate, and summer drawdowns which dewater vegetation. Mosquito populations could increase if water levels were stabilized at a higher level through the fall, but will not be affected by the recommended drawdown schedule.

5. TVA should do more to control milfoil and other aquatic plants on mainstream lakes (e.g., Watts Bar, Kentucky). (2 comments)

TVA response: In managing aquatic vegetation in mainstream lakes, TVA tries to balance the conflicting demands of boaters, shoreline property owners, fishing enthusiasts, and state fishery management agencies. Environmental and budget constraints also affect the level of TVA's aquatic plant management activities.

TVA prepared an Environmental Impact Statement on these activities in 1972, which it will supplement in the near future. Public comment on TVA's current aquatic plant management efforts will be sought as part of this review process.

6. The Final EIS should address the future use of lake level manipulations to control aquatic plants; addressing this issue in a separate EIS obscures the cumulative effects. (1 comment)

TVA response: This study focuses on improving releases through TVA dams and delaying drawdown of tributary lakes. The recommended alternatives do not affect the fluctuation of summer levels in mainstream lakes or other aspects of TVA's aquatic plant control program. Reviewing these activities in a supplement to a separate EIS, as planned, will help ensure that TVA's current methods and practices for managing aquatic vegetation are thoroughly evaluated and facilitate public comment.

7. Aquatic macrophytes should be discussed in the aquatic resources section of Chapter 3; 1989 plant acreages should be provided in Appendix A. (1 comment)

TVA response: Aquatic macrophytes in TVA lakes are discussed in Chapter 3. Appendix A includes the most recent information available on plant acreages (see "Macrophytes" under "Water Resources" section for each reservoir).

NavigationSummary of comments

Twenty-two people wrote or spoke concerning the importance of the navigation benefits provided by the Tennessee River system. One group, including both navigation and recreation interests, urged improvements in navigation depths, particularly during the winter. Another group requested capital improvements, including lock and channel modifications, to modernize the Tennessee River system. Others cited the need for flexibility to meet navigation needs, especially during low flows, and encouraged TVA to evaluate carefully the effects of any changes on interconnected water transportation systems. Four individuals discussed boating safety issues related to TVA's lake and river operations.

Individuals who commented

Delbert Aden, Jonathan Creek-Aurora Action Committee, Kentucky
Lodging Association
Ralph Ainsworth, Alabama Department of Economic and Community Affairs
Maynard Brooks, B & B Straight Creek Dock
Albert H. Budlong, Moors Area Retirees Association
Jack L. Buri, U. S. Coast Guard
Paul Y. Chinen, U. S. Army Corps of Engineers
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
Jonathan P. Deason, U. S. Department of the Interior
Jim DeVillez, Tarryon Resort
William H. Dyer, Tennessee Cumberland Waterways Council
Brian R. Frennea, Inland Rivers, Ports and Terminals, Inc.
Joey L. Hendren, Burkhart Enterprises, Inc.
Jack Herbert, Herbert Sand and Gravel Company
D. C. Johnson
Janice L. Jones, Tennessee River Valley Association
P. J. Kopcsak, Ingram Materials Company
Donald McCrory, Memphis-Shelby County Port Commission
Pat Ross, Tenn-Tom Waterway Development Authority
David P. Rumbarger, Alabama Department of Economic and Community Affairs
Eric Schreiver
James L. Walker, U. S. Coast Guard
Charles T. Woods, Mansard Island Resort and Marina

Specific comments

1. Improving navigation depths in the winter would benefit shippers and receivers and support local economic development. (8 comments)

TVA response: Winter minimum pool levels on mainstream reservoirs are a major concern of shippers along the waterway. Especially during dry winters like those experienced recently, delays, damages to equipment,

and loss of cargo can result where low water levels contribute to marginal port depths or cause barges that stray outside the navigation channel to scrape bottom or run aground.

As a result, navigation interests would like TVA to fill mainstream lakes earlier and increase winter levels. These changes are not recommended, however, because flood storage space on mainstream lakes is so small. These lakes provide storage space for only about two inches of runoff in their respective watersheds. As discussed in Chapter 4, filling them before the end of the flood season or maintaining higher winter levels would compromise TVA's ability to control heavy rains and runoff, increasing the risk of flood damages at Chattanooga and other locations on the Tennessee River.

2. TVA should seek funding from Congress for capital improvements to modernize the Tennessee River water transportation system (e.g., new Kentucky lock, Pickwick channel modification, Chickamauga and Watts Bar lock improvements). (4 comments)

TVA response: Such actions are proposed in Chapter 6 as part of the recommendation to reassert TVA's leadership in navigation development.

3. TVA must be flexible in its future lake operations to adjust to drought and other emergency conditions. (4 comments)

TVA response: This EIS is focused on the long-term policies that will guide TVA's future lake and river operations. TVA recognizes, however, that flexibility invariably is required to respond to extreme weather conditions. Lack of rainfall in 1988, for example, prompted TVA to take steps to ensure that water quality, water supply, and navigation needs continued to be met. The TVA Board would have the same latitude if the proposed release and lake level improvements are implemented.

4. The Tennessee River is part of a national inland waterway system; before TVA changes its lake and river operations, the effects on connecting waterways must be fully evaluated. (4 comments)

TVA response: The effects of changes in TVA's operation of the Tennessee River system on connecting waterways have been carefully considered in this EIS. These effects are one reason why the October 31 lake level alternative was not recommended. As noted in Chapter 6, delaying unrestricted drawdown of tributary lakes until October 31 would interfere with flood control operations by the U.S. Army Corps of Engineers on the lower Ohio and Mississippi rivers. It also could impair navigation on these rivers during September and October, especially in dry years.

The preferred alternative, on the other hand, would increase navigation benefits on the lower Ohio and Mississippi rivers. Flows from the Tennessee and Cumberland rivers during September and October would be increased compared to existing policies. The resulting increased water depth in the lower Ohio and Mississippi rivers would aid commercial navigation during this low flow period on those rivers, particularly during a dry year.

5. TVA should take steps to improve boating safety (e.g., improved lake levels, boater safety education, and better maintenance of secondary channel buoys). (4 comments)

TVA response: One of the benefits of the preferred lake level alternative would be higher lake levels through the primary boating season. With increased lake levels, many of the boating hazards (rock outcrops, stumps, etc.) typically exposed in late June and July will be well below the surface. Additionally, when unrestricted drawdown does begin, lake levels should be at a higher elevation than in years past, providing a deeper pool for late summer boating.

The Valley states and the U.S. Coast Guard have primary responsibility for providing boating safety education programs. TVA supports their efforts by providing information on the availability of boating safety courses and including water safety information on recreational brochures and maps. In addition, TVA provides financial support to outside agencies, such as Bicentennial Volunteers, Inc. for their Water Safety Outreach Program, and the National Center for Aquatic Safety Education for boating safety education and information programs.

The condition of secondary channel buoys is affected by several factors, including ice floes, floods, and vandalism. Buoys are generally inspected twice a year with off-station buoys being repositioned and damaged buoys replaced. A better grade of anchoring cable is now being used, and a higher intensity reflective tape will be used on new buoys for better visibility at night.

6. The EIS should examine the effect of TVA's operations for navigation on tributary lake levels (i.e., the effects during dry years of improving navigation on the Ohio and Mississippi rivers, of providing an interbasin water transfer through the Tenn-Tom, and of discharging water to lock through main river pleasure boats). (1 comment)

TVA response: The effects of improving navigation on the lower Ohio and Mississippi rivers on tributary lake levels are discussed in Chapters 4, 5, and 6. Delaying unrestricted drawdown of tributary lake levels as late as Labor Day could benefit navigation on the lower Ohio and Mississippi rivers, especially during dry years. These objectives conflict only under the October 31 alternative. This is because delaying unrestricted drawdown of tributary lakes until the end of October would reduce flows from the Tennessee and Cumberland rivers during September and October when water levels on the lower Ohio and Mississippi already are likely to be low. This effect on navigation, combined with power cost and environmental considerations, weighs against the October 31 alternative.

The effects on tributary lake levels of providing water from the Tennessee River for navigation through the Tennessee-Tombigbee Waterway are minor. As discussed in Chapter 3, about 235 million gallons of water a day are currently used for this purpose. This is less than one percent of the average annual flow of the Tennessee River at Pickwick Dam. At maximum capacity, the Tenn-Tom would use only about two percent of the river flow at Pickwick.

Similarly, discharges to lock through main river pleasure boats do not have a measurable effect on upstream lake levels. Such lockages are few in number and involve relatively little flow.

7. The U.S. Coast Guard has no objections to any of the alternatives, as long as a 9-foot channel is maintained, and supports any changes that will improve water depths on the lower Ohio and Mississippi rivers during low flows. (1 comment)

TVA response: No response necessary.

8. The August 1 lake level alternative is preferable because it increases recreation and tourism benefits concurrent with increased support of navigation. (1 comment)

TVA response: No response necessary.

9. The Final EIS should inventory and evaluate the effects of the proposed changes on mineral resources and mining operations in the floodplain. (1 comment)

TVA response: No impacts related to mineral resources were identified in preparing the EIS or during public review. Recognizing that mineral production occurs in the floodplain, however, a description of these operations has been added to Chapter 3 and a statement indicating no adverse impacts has been added to Chapter 5.

Flood ControlSummary of comments

Most of the people commenting on the flood control benefits provided by the Tennessee River system were opposed to any changes in TVA's lake and river operations that could increase flood risk. The strongest opposition came from two groups: distributors and distributor organizations who objected to decreasing flood control benefits to improve recreation, and people concerned about the effects of higher levels in Kentucky Lake on flooding, principally around Tennessee River Miles 121 to 124. Form letters were received from 369 people on Kentucky Lake advocating the current winter elevation of 354 feet and summer elevation of 359 feet. These were in response to an incorrect report that TVA was proposing to increase summer levels on Kentucky Lake from 359 feet to 360 feet to promote recreation. Several people complained about current flooding below Pickwick Dam.

About 16 people wrote or spoke concerning flood storage capacity above Chattanooga, including five people who felt that existing capacity should be maintained or expanded, four who felt that TVA does not need to provide as much storage capacity as it now does, and five who requested higher winter levels on individual tributary lakes.

Individuals who commented

Ralph Ainsworth, Alabama Department of Economic and Community Affairs
Richard Bell
Wayne Bowman, Lexington Electric System
Wilson Burton, Heart's Desire Hunting Club
Michael Cairnes, Pigeon Valley Bass Masters
Paul Y. Chinen, U. S. Army Corps of Engineers
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
Bill Collins, Friends of Lake Blue Ridge
Sonny Cothran, Sonny's Lakeside Marine
C. C. Courtney
Jay Donovan
Charles Dow, Harmon Creek Boat Dock
Mike Edwards, Perry Memorial Hospital, Perry County Chamber of Commerce
Frederick D. Foy
Jesse Gilliam, Saltillo Marina
James Holcomb
Gary Hollingsworth
Ronald Horner
Kirk Johnson
Joe W. McCaleb, Sierra Club, Tennessee Chapter
Linda McCay, Cypress Creek Marina
Gerald McLemore, West Tennessee Sportsman Association
Howard Miller
Delphine Operle, City of Paducah
James Quinn

Appendix C

Gene Roberts, Mayor of Chattanooga
David Robertson
Jim Runnion
Albert Seals
Carlos Smith, Counsel, Tennessee Valley Public Power Association
Gerald T. Stephen
Don Sundquist, U. S. House of Representatives, State of Tennessee
Steve Warren, Chattanooga-Hamilton County Regional Planning Commission
Carolyn Williams, League of Women Voters of Chattanooga, Hamilton County
Johnny Williams
David Willis, Mayor of Saltillo
Linda Woodall

38 distributors or distributor groups (list available on request)
369 form letters regarding flooding on Kentucky Lake (list provided in
Section Four of Final EIS)

Specific comments

1. TVA's obligation to control flooding should not be diminished to improve recreation. (40 comments, including 38 distributors or distributor groups)

TVA response: None of the lake level alternatives under consideration would have a significant effect on expected annual flood damages in the Tennessee Valley. As discussed in Chapters 1, 2, and 4, winter levels must remain low to provide detention capacity for heavy rainfall and runoff from storms occurring between December and April which can cover the entire Valley for several days. Summer storms, on the other hand, usually affect only a portion of the region at one time. Studies show that summer levels on tributary lakes can be increased, as long as they do not exceed normal maximum pool, without significantly increasing expected annual flood damages at communities along the Tennessee River and its tributaries or threatening dam and nuclear plant safety.

2. Increasing Kentucky Lake levels would adversely affect flood control. (369 form letters, plus 7 other comments)

TVA response: Increasing Kentucky Lake levels has not been considered because of the effects on flood control. Kentucky Lake levels are lowered to elevation 354 feet from December through March to provide over 4 million acre-feet of storage to minimize flooding on the lower Ohio and Mississippi rivers. Kentucky Lake levels could rise to elevation 375 feet during a major flood to provide this storage, causing flood damages to agricultural lands and recreation interests in the upstream half of the lake. Raising normal winter pool elevations would increase the risk of flood damages in upstream areas.

Kentucky Lake is allowed to fill to a maximum elevation of 365 feet during the months of June through November because the severe floods for which the lake was built do not occur during these months. Due to its volume and length, Kentucky Lake levels can vary by several feet from one

end of the lake to another. Operations at Kentucky Dam that assure an elevation of 365 feet in the downstream half of the lake could still result in elevations exceeding 365 feet in the upstream half of the lake, causing flood damages to crops and recreation facilities. Raising the normal summer pool level of 359 feet would increase the risk that flooding would occur in these upstream areas.

3. TVA needs to address the problem of flooding below Pickwick (e.g., purchase flowage easements, pay crop insurance premiums). (5 comments)

TVA response: As discussed in Chapter 4, when each reservoir was constructed, TVA purchased easements on land where increased flooding due to TVA activities was expected. Backwater profiles (the water level during floods) for both pre-dam and post-dam conditions were compared, and easements were purchased on land where the post-dam or regulated backwater profile was higher. Flooding still occurs above the elevation where easements were purchased, but no more (and usually less) often than would occur naturally without the dams.

TVA reservoir operations have not increased the occurrence of flooding on these naturally flood-prone lands; nor will the proposed lake level alternatives have any significant impact. Purchasing additional easements or paying crop insurance premiums to landowners below Pickwick was not considered for this reason. Such actions would amount to a federal subsidy of these landowners and would be extremely expensive.

4. TVA should not make any changes in tributary lake levels that would reduce flood storage capacity above Chattanooga. (4 comments)

TVA response: The lake level alternatives under consideration would not affect flood storage capacity above Chattanooga. (See TVA's response to comment no. 1, above.)

5. TVA should reserve more flood storage space in its lakes in case of catastrophic summer flooding (as does the U. S. Army Corps of Engineers). (1 comment)

TVA response: Previous assessments by TVA show that existing flood storage capacities in TVA reservoirs in combination with existing spillway capacities is adequate to route the maximum summer floods safely through each project and through the system. The lake level alternatives under consideration would extend the duration of summer pool levels, but would not alter the normal maximum elevations currently in effect on tributary lakes. The safety of the system, therefore, would not be compromised.

6. TVA now provides more flood control storage above Chattanooga than necessary. (4 comments)

TVA response: As a result of reevaluating flood control needs in 1971, TVA was able to raise normal minimum levels an average of about 50 feet on nine tributary reservoirs--some as much as 100 feet. Flood guide levels were raised during the month of January an average of about six feet on eight reservoirs, the greatest increase being 10 feet.

From a system-wide perspective, these changes effectively used up the flexibility that then existed in winter operations of the reservoir system. Further decreases in winter flood detention capacity--large enough to increase recreation benefits appreciably--would expose the city of Chattanooga to an unacceptable flood risk and greatly reduce the flexibility of hydropower operations during winter months.

7. TVA should provide higher winter levels on individual tributary lakes (i.e., Douglas, Cherokee, Boone, Nottely). (5 comments)

TVA response: As discussed above, raising winter flood guide curves on all tributary lakes would increase the risk of flooding at Chattanooga to an unacceptable level. It is possible, however, to change flood guide curves on a few lakes without significantly changing the risk of downstream flooding. Such changes have been implemented at Fontana and are being evaluated for Norris and Nottely as part of TVA's ongoing effort to maximize reservoir system benefits within the framework of existing policies. Of course, system constraints limit the number of such requests that can be accommodated.

8. If TVA raises lake levels, it could be liable for increased flood damages; TVA power consumers should not be expected to bear these costs. (2 comments)

TVA response: None of the lake level alternatives under consideration would increase expected annual flood damages to communities along the Tennessee River and its tributaries. It is important to note, however, that the TVA reservoir system was constructed to reduce flooding, not to eliminate it. Flood control storage built on both the main river and tributary dams upstream of Chattanooga is not sufficient to eliminate flooding in that city.

9. Why was TVA unable to control flooding at Copperhill and McCaysville in February 1990? Why was Blue Ridge generating at capacity? (2 comments)

TVA response: The flash flooding at Copperhill and McCaysville in February 1990 was caused by unusually heavy rainfall concentrated in an area between Blue Ridge Dam and the two downstream communities. Such flooding was uncontrolled; because of heavy rain and runoff in a concentrated area below Blue Ridge Dam, there was no physical way to reduce or alleviate the flooding directly caused by the rainfall and runoff. While the dam does not have reserved flood storage capacity and generally cannot be depended upon to reduce potential flooding downstream, substantial flood reduction was achieved nevertheless. Although TVA generated power at Blue Ridge Dam for about 3-1/2 hours on the morning of February 16, neither the timing of this discharge nor the volume of water released adversely affected the time or severity of the flood crest. In fact, Blue Ridge reservoir was filling in the hours before the worst of the flooding, keeping the stored water from passing through the dam. The flood peak was thus reduced by an estimated 3-1/2 feet.

10. The Final EIS should show the effects of early storage in tributary lakes on the daily inflows to Kentucky reservoir during May and June flood control operations. (1 comment)

TVA response: The preferred lake level alternative is not expected to have a significant effect on inflows to Kentucky reservoir. This is because there would be no change in the operation of the mainstream lakes and dams which control flows through two-thirds of the watershed that drains into Kentucky. The remaining third of the drainage area--the part that lies in tributary areas--would be impacted, but the effects on Kentucky inflows would be negligible because existing flood guide levels on tributary lakes would remain the same. Tributary pool levels are expected to approach the current flood guide levels more often under the proposed aggressive spring fill policy, but sufficient storage space would be reserved to prevent any increase in flood risk.

11. The Final EIS should include more information on the effects of changes in tributary lake levels on Mississippi River basin flood control. (1 comment)

TVA response: The effects of tributary lake level management on flood control operations on the lower Ohio and Mississippi rivers are discussed in Chapters 5 and 6. Extending summer pool levels until October 31 could increase flooding on these rivers. More rapid drawdown of tributary lakes to meet winter flood control levels would result in increased flows from the Tennessee and Cumberland rivers during November and December. This could interfere with flood control operations by the U.S. Army Corps of Engineers, which depend on flood control storage space in Kentucky and Barkley lakes to store Tennessee and Cumberland river flows and thereby reduce river stages at Cairo, Illinois, and other locations. Flood control on the lower Ohio and Mississippi rivers is not as great a concern under the Labor Day alternative, although some impact is possible. No significant impact is expected for the August 1 alternative.

Mississippi River basin flood control impacts have not been analyzed in more detail because this is a policy-level Environmental Impact Statement. Sufficient information has been presented to evaluate the policy options under consideration.

12. Increasing winter levels on tributary lakes would increase the chance of reaching the tree line in summer. (1 comment)

TVA response: Raising winter levels on tributary lakes is not recommended because of the effect on TVA's ability to control floods in the Tennessee Valley, as discussed in Chapter 4. However, the lake level alternatives under consideration would likely improve scenic quality on tributary lakes during the summer. The affected lakes could be filled to the treeline in about 20 to 30 percent of the years for all alternatives, compared to about 10 to 20 percent of the years under current operations. About 36 percent of the average summer drawdown zone would be covered by keeping lake levels higher through August 1, compared to 67 percent under the Labor Day and October 31 alternatives.

13. If Chattanooga had built levees, there would be less need for flood storage; this would allow TVA to fill tributary lakes earlier in the spring. (1 comment)

TVA response: TVA's reservoir system was not intended to eliminate flooding in the city of Chattanooga. The original design called for Chattanooga to construct a system of levees to provide the additional protection to prevent extreme floods from damaging the city. Instead, Chattanooga chose to assume the risk of flood damages that cannot be prevented by TVA flood control operations. Land that is subject to flooding has been identified, and property owners can purchase flood insurance, if eligible.

If Chattanooga had built levees, more of the city would be protected from local flooding and flood insurance costs would be lower. However, TVA still would have to provide the same amount of flood control storage space upstream of Chattanooga.

If levees had been built, raising them even further to reduce the amount of flood storage needed upstream might be an option. However, this alternative was not considered in detail because it is extremely unlikely that Chattanooga would decide to build levees now, given the expense, potential environmental impacts, and existing development in the construction area.

14. As an alternative to levees in Chattanooga, TVA should explore the feasibility of government purchase of homes in the floodplain. (1 comment)

TVA response: Not only would such an action be likely to encounter local opposition, it would require massive federal spending, which is extremely unlikely given current and expected future budget constraints.

15. Why are water levels so high at Paducah, Kentucky, when the lakes upstream are not nearly at capacity? (1 comment)

TVA response: The primary flood control function of Kentucky and Barkley reservoirs is to provide for reductions in flood crests at points downstream on the Ohio and Mississippi rivers. Upstream tributary projects in the eastern end of the Tennessee Valley are operated primarily for flood control at Chattanooga during flood periods, which often provides additional flow regulation downstream. High stages occurred at Paducah in February 1990, during a time of heavy flows on the Tennessee River system. Levels immediately upstream of Kentucky and Barkley dams were about two feet higher than normal. However, the levels further upstream in the Savannah, Tennessee, area were around 20 feet above normal, causing serious flooding. This flooding would have been worse had the headwater pool levels been raised to reduce discharges from Kentucky and Barkley reservoirs.

PowerSummary of comments

About 36 distributors and distributor groups submitted comments concerning the importance of low-cost power to the region's economic future. Most supported the proposed release and lake level improvements, but were opposed to the use of power funds to improve recreation and expressed concern about potential impacts on flood control. (These comments are summarized under the "Flood Control" and "Funding" sections of this report.)

Other comments concerning power (summarized here) fell into three principal categories: power costs and their calculation, the construction of replacement capacity for lost hydro generation, and the potential effect of the proposed changes on national, regional, and local energy consumers.

Ten people questioned the power costs associated with the lake level alternatives. Some argued that delaying drawdown and providing minimum flows simply would shift the time when water was available for hydro generation, but not increase its average annual cost. Others noted that keeping lake levels up would result in a higher head, increasing the hydroelectric potential of tributary lakes and offsetting any increased costs.

To reduce costs and increase support for lake level improvements, five people suggested alternatives to building new capacity to replace lost hydro generation. These included pumped storage, purchased power, increased use of TVA's existing coal and nuclear capacity, and conservation.

The remaining comments dealt primarily with the effects of the alternatives on national and regional energy supplies and on specific groups of power consumers.

Individuals who commented

36 distributors and distributor groups

J. E. Adams, Tapoco, Inc.

Ralph Ainsworth, Alabama Department of Economic and Community Affairs

Noel Beck, Alabama Conservancy, Shoals Chapter

Richard Bell

Willard L. Bowers, Alabama Power Company

Waldo Boyce, Watts Bar Lake Association

Wayne F. Canis, Shoals Sierra Club

Paul Y. Chinen, U. S. Army Corps of Engineers

William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources

Jim Copeland

Jim DeVillez, Tarryon Resort

Bruce Doll, Tennessee Valley Industrial Committee

Carrol Ford

David Grossvenor

Carl and Carolyn Lakes, Cherokee Lakes Resort

Edwin Manchester
John R. Moller
Bill Parker, Union County Board of Education
Steve Parks, Upper Duck River Development Agency
Samuel Rudder, Izaak Walton League
David P. Rumbarger, Alabama Department of Economic and Community Affairs
Robert A. Schaller
Marc Sudheimer, Morristown Area Chamber of Commerce
Dewey Tucker
Candler Willis, North Carolina Environmental Commission

Specific comments

1. The availability of low-cost electric power is essential to the economic well-being of the TVA region. (36 comments)

TVA response: The importance of competitive power rates to economic development in the region was a key consideration in evaluating changes in TVA's lake and river operations. The Labor Day and October 31 lake level alternatives were rejected in part because of the high power costs that would result from replacing shifted hydropower with more expensive electrical generation. In addition, the proposed changes in TVA's lake level policy include an implementation strategy which would ensure that low-cost hydropower is available to respond to critical power system needs (see Chapter 4).

2. TVA should not make any changes in its lake and river operations that would compromise the long-term reliability of the region's energy supply. (2 comments)

TVA response: To maintain the reliability of TVA's power system, an implementation strategy, described in Chapter 4, has been developed to assure that hydropower is still available to respond to critical power system needs. Detailed planning of this implementation strategy conducted since the publication of the Draft EIS shows that it will safeguard system reliability. However, it also shows that the 50 megawatts of replacement capacity required for the August 1 lake level alternative in the Draft EIS is not necessary to assure power system reliability; hence this cost has been removed from the Final EIS for alternative 1. The effects and benefits of the implementation strategy in Chapter 4 have also been factored into the evaluation of the other lake level alternatives.

3. The power costs of the lake level alternatives are questionable since the net flow of water through the turbines would not change. Saving the water might result in higher generating costs during the summer, but these costs would be offset by lower costs in the fall and winter. (6 comments)

TVA response: Delaying unrestricted drawdown on tributary lakes until later in the summer would not change the total amount of hydropower generation (i.e., water power would not be wasted), but it would affect

its value. This is because the value of hydropower varies with power demand. Hydropower generated during the summer or winter peak season is worth more than hydropower generated in the spring and fall.

This is why the Labor Day and October 31 alternatives are so costly. Over 1.3 billion kilowatthours would be shifted into the fall when its value would be less. In comparison, under the preferred alternative, a significant amount of the shifted hydropower generation could still be used during the last half of the summer when the highest weekly power demands are most likely to occur.

In addition, TVA must maintain the current level of system reliability. This means that new capacity would have to be built to ensure that TVA can meet summer peak power demands if hydropower use is restricted. The greatest replacement capacity is needed with flat recreation target levels through Labor Day or later (\$560 million for 750 mw under the Labor Day and October 31 alternatives). Sloping target levels for a shorter period, together with a flexible implementation strategy, can significantly reduce and in some cases eliminate the need for replacement capacity (see response to comment 2).

4. Higher headwater/tailwater combinations will reduce the cost of keeping tributary lakes up by improving generating efficiencies. (3 comments)

TVA response: This benefit has been recognized and taken into account in evaluating the lake level alternatives. It is small, however, in comparison to the energy and capacity costs associated with delaying unrestricted drawdown on tributary lakes.

5. If higher minimum flows go through the turbines, generation is just time-shifted, not lost. (1 comment)

TVA response: True, because increased flows would be provided by turbine pulsing under the recommended release alternative, hydrogeneration is not lost. However, more hydropower will have to be generated during offpeak hours--in the evenings and on weekends--when it is less valuable to the power system. This will require TVA to use other, more expensive generating sources during peak hours, resulting in higher costs.

6. TVA could recover the costs of the lake level improvements on tributary lakes by avoiding spilling on mainstream lakes. (1 comment)

TVA response: Under normal streamflow conditions, the releases through tributary dams are scheduled to avoid producing more flow on the Tennessee River than mainstream hydro plants can convert to hydroelectric power. Spilling cannot always be avoided on mainstream lakes, however, for two reasons. First, large storms cannot be forecast with sufficient accuracy and, second, the rainfall and runoff may be so heavy that the resulting flows exceed turbine capacity. For these reasons, lake level drawdown schedules on mainstream lakes are based on seasonal average flows and physical constraints.

7. The Final EIS should explain the power cost calculations in more detail (e.g., do the costs represent a worst case or normal operating situation?). (2 comments)

TVA response: Power cost calculations are described in Chapter 5 and explained in more detail in the TVA report, "Power Cost and Implementation Strategy for the Reservoir Operation and Planning Review," listed in the reference section of the EIS.

Average annual energy cost estimates are based on expected rainfall and runoff. A range of costs, reflecting variation in rainfall and runoff, is shown in table 28 of the EIS.

8. TVA should explore other alternatives (i.e., nuclear, purchased power, coal, pumped storage, conservation) to lessen the demand on hydropower and minimize the replacement cost under the preferred lake level alternative. (5 comments)

TVA response: TVA operates the river system for maximum hydroelectric benefit for several reasons. Hydroelectric power is by far the most economical form of electricity available on the TVA system. It offers versatility and dependability that cannot be equaled by any other type of capacity and is far more efficient than any other form of generation.

Alternate generating sources are likely to be expensive to install, more expensive to operate, less flexible in supplying peaking power and coping with system emergencies, and would require more back-up capacity. Purchases of power from interconnected power systems are an option, but the supply of this interchange power is decreasing as the region moves toward tighter power supply conditions.

Replacement costs for the lake level alternatives in the EIS were calculated based on combustion turbines and medium-sized thermal plants. If capacity were actually replaced, the full range of alternatives (including pumped storage and conservation) will be considered along with costs and potential environmental impacts.

9. TVA has extra capacity in the summer; the amount of lost hydro generation from the proposed changes would not justify adding capacity. (1 comment)

TVA response: TVA has sufficient power capacity to meet industry accepted standards for system reliability. The amount of capacity needed to maintain this standard is calculated for each alternative (see response to comment 2).

10. An aggressive fill policy would reduce total TVA hydro generation by approximately eight percent; this represents a substantial loss of an ideal and low-cost power source. (1 comment)

TVA response: Hydrogeneration would not be lost under the proposed fill policy; it would be shifted from the spring and early summer to the late summer and fall. More hydropower would be available to meet peak demand later in the summer, offsetting some of the cost of this proposed change in TVA's lake level policy.

11. Delaying the drawdown of Fontana Lake beyond Memorial Day will result in a significant loss of generation at the three Tapoco dams downstream. (1 comment)

TVA response: The same amount of hydropower would be generated at the Tapoco dams under the August 1 lake level alternative, but the timing of generation would change. As at TVA dams, hydrogeneration would be shifted from the spring and early summer to the late summer and fall.

12. The drawdown of tributary lakes should be delayed until August 1, but no longer because of the potential effect on TVA's Economy Surplus Power (ESP) customers. (2 comments)

TVA response: As noted in Chapter 6, power system costs are a key factor precluding the choice of lake level alternatives in which unrestricted drawdown of all ten tributary lakes is delayed using flat recreation target levels for extended periods (the Labor Day and October 31 alternatives). Power costs can be significantly reduced by using sloping recreation target levels or reducing the duration of higher lake levels. The preferred lake level alternative will not have a significant effect on TVA's ESP customers.

13. TVA should maintain its hydropower production given a national energy strategy calling for increased energy efficiency through expanded hydro use. (1 comment)

TVA response: Recognizing hydropower's unique operating characteristics, TVA will continue to produce as much electric energy as possible from the water nature provides. Only the timing of hydrogeneration will be affected. For the preferred lake level alternative, hydropower that currently is produced in the spring and early summer will be produced, instead, in the late summer and early fall. For the preferred release alternative, some of the hydropower that is currently produced during weekdays will be shifted to evenings and weekends. This affects the value of hydrogeneration--it is worth most when power demand is the highest--but it will not have a significant effect on TVA's total hydrogeneration.

If any hydropower is lost, it will be during a wet year when heavy rainfall and runoff force TVA to pass more excess water through spillways and sluiceways than it would have if more storage space were available in tributary lakes. Because hydropower production will be above average in such years, the effect on national and regional energy supplies will be inconsequential.

14. The Final EIS should specify that any hydropower losses resulting from the proposed changes will not be made up by the Cumberland River projects. (1 comment)

TVA response: The alternatives considered would not affect generation at the Cumberland River dams from which TVA receives power under arrangements with the U.S. Army Corps of Engineers and the Southeastern Power Administration. This is specified in Chapters 4 and 5.

15. A clearer description of the power system approach during periods of critical system needs, including a better definition of equivalently priced interchange power, is needed. (1 comment)

TVA response: The discussion of critical power system needs in Chapter 4 applies when lake levels do not increase at the desired rate in the spring or cannot be maintained above the recreation target levels in the summer due to low rainfall or high power demand. Under such circumstances, TVA would produce only enough hydropower to maintain minimum flows. However, to meet the peak load on a day when high cost power generating plants are likely to be used or the service to some power system customers may be interrupted, the power system will be able to use additional hydropower generation if two conditions are met. First, all available coal-fired and nuclear generating plants and TVA's Raccoon Mountain Pumped Storage plant must be fully committed and, second, TVA must have purchased all available power from other utilities up to a price level which exceeds the cost of Raccoon Mountain or the most expensive coal-fired unit, but would not require TVA to run combustion turbines or drop interruptible loads. In addition, extra hydro generation would be provided for frequency regulation and transmission reliability, if needed. Lake levels would not be affected significantly by these operations because of the small amount of water used, and the infrequent occurrence of such needs.

Air QualitySummary of comments

Seven people submitted comments specifically related to air quality. The most common concern was that losses in hydropower generation associated with lake level improvements would result in increased emissions from TVA's coal-fired plants. This concern prompted some individuals to oppose delaying tributary lake drawdown beyond August 1. Other suggestions included measures to mitigate adverse impacts to air quality and studies to assess the cumulative impact of increased fossil-fueled generation to replace hydropower.

Individuals who commented

Ralph Ainsworth, Alabama Department of Economic and Community Affairs
Wayne Bowman, Lexington Electric System
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
Roger A. Jenkins, Harvey Broome Chapter, Tennessee Sierra Club
David P. Rumbarger, Alabama Department of Economic and Community Affairs
Marc Sudheimer, Morristown Area Chamber of Commerce
Clinton A. Vince, Sherry A. Quirk, Counsel, Southeastern Federal Power
Customers Group

Specific comments

1. TVA should ensure that changes in its lake and river operations limit damage to air quality from increased fossil fuel emissions. (4 comments)

TVA response: Air quality impacts were important to TVA's evaluation of lake level policy alternatives. The Labor Day and October 31 lake level alternatives were not recommended, in large part, because a significant increase in TVA's use of coal-fired facilities would be required during the summer when dispersion conditions are worst. The August 1 alternative, on the other hand, would have a minor effect on TVA's use of coal-fired plants. This is because more hydropower would be generated during the late summer under this alternative.

2. TVA should study the cumulative impact on the region of increased use of fossil fuels to replace hydropower generation. (2 comments)

TVA response: Such potential cumulative effects were studied carefully in evaluating lake level policy alternatives. The August 1 alternative would have a minor effect on air quality. Hydropower generation would be shifted into the late summer, minimizing the use of coal-fired generation when dispersion conditions are worst.

In comparison, under the Labor Day and October 31 alternatives, TVA would have to increase use of its coal-fired facilities throughout the summer. For the October 31 alternative, the average increases in emissions would

Appendix C

be about six percent of current summer levels, ranging as high as eight to 10 percent in a worst-case year. The Labor Day alternative would have a similar effect on air quality, although slightly lower increases in emissions would be expected.

3. If lake level improvements are implemented, TVA should take steps to mitigate adverse impacts to air quality (e.g., use of cleaner fossil plants or purchases from other utilities). (1 comment)

TVA response: These measures would not be necessary in conjunction with the recommended lake level alternative because the effects on air quality would not be significant. As noted in Chapter 5, while additional coal-fired generation might be required in June and July, this effect would be offset by greater hydropower generation during the late summer when dispersion conditions are often worse.

4. The Final EIS should present ambient modeling that projects the actual increase in ambient concentrations due to increased emissions in June and July. (1 comment)

TVA response: TVA can not and will not make any changes in its lake and river operations that would result in violation of national ambient air quality standards. Ambient modeling, performed for all TVA power plants, shows that TVA does not exceed ambient air quality standards at the permitted level of emissions. Because in practice TVA plants operate below the permitted level, small changes in emissions, such as those associated with lake level alternatives under consideration, could be accommodated without violating ambient standards.

Projected increases in summer emissions are provided in Chapter 5. For the October 31 alternative, the average increases in emissions would be about six percent of current summer levels, ranging as high as eight to 10 percent in a worst-case year. The Labor Day alternative would have a similar effect on air quality, although slightly lower increases in emissions would be expected. Total summer emissions would remain at about the current level under the August 1 alternative because more hydropower would be generated during the late summer than under the Labor Day or October 31 alternatives.

5. TVA's conclusion in the Summary that there are significant adverse impacts on air quality due to alternatives 2 and 3 is not supported in Chapters 5 and 6 by the statement that there would be small increases in acid deposition, ambient air pollution concentrations, and the burden of pollutants in the environment due to these alternatives. (1 comment)

TVA response: The word "significant" has been deleted from the Summary. Alternatives 2 and 3 would result in an increase in total summer emissions, as noted in Chapter 5, but this increase would be allowable under existing national air quality standards.

Climate ChangeSummary of comments

Only two comments were received related to climate change. One supported the recommendation that TVA undertake monitoring and studies to adapt to climate change, and the other argued that expenditures for such work should be minimal until a real need is established.

Individuals who commented

William Allen, Steve Railsback, Tennessee Scenic Rivers Association
G. Trivedi, LWD, Inc.

Specific comments

1. TVA should improve its ability to detect and adapt its lake and river operations to climate change, as recommended. (1 comment)

TVA response: No response necessary.

2. TVA should make only minimal expenditures to keep abreast of climate changes until national research establishes a real need for further work; gradual climate changes are unlikely to create any immediate crisis for TVA's lake and river operations.

TVA response: The research recommended in Chapter 6 would allow TVA to keep abreast of changes in climate and plan for potential system impacts. This recommendation could be implemented by shifting program priorities, reallocating staff time, and working cooperatively with other federal agencies having climate change research funds. Work on specific action plans is not recommended at this time because of the uncertainty about the timing, characteristics, and magnitude of local changes in temperature and rainfall.

Mainstream Lake Recreation

Summary of comments

A number of comments on the EIS assumed incorrectly that the proposed lake level improvements would apply to mainstream TVA lakes. Many of those who realized that only tributary lakes would be affected urged TVA to include mainstream lakes in its lake improvement plan. About 23 people wrote or spoke in favor of holding mainstream lakes at a higher level longer to benefit tourism, recreation, and navigation. Most of these people were Kentucky Lake users. Five people (all on Kentucky Lake) specifically endorsed an August 1 drawdown date.

On Kentucky Lake, however, there was considerable concern about the effects of increased lake levels on flood control. These comments are reported in the "flood control" section of this appendix.

Individuals who commented

Ralph Ainsworth, Alabama Dept. of Economic and Community Affairs
Delbert Aden, Jonathan Creek-Aurora Action Committee, Kentucky Lodging Assn.
Vernon R. Anderson
Robert Bennett, Arrowhead Resort
Waldo Boyce, Watts Bar Lake Assn.
Albert H. Budlong, Moors Area Retirees Group
Wilson Burton, Heart's Desire Hunting Club
Lola R. Chappell
Sharon Clark-Brown, Paris-Henry County Chamber of Commerce
Jim DeVillez, Tarryon Resort
Tommy J. Doyle
Tom Dozier
R. V. and Betty J. Gilmer
Robert R. Graham
Ed Higgins
Don R. McCormick, Kentucky Dept. of Fish and Wildlife Resources
John R. Moller
L. S. Myatt
Beatrice Newell
Claude R. Norris
Mr. and Mrs. Robert J. O'Brien
Robert A. Qualls, Marshall County Chamber of Commerce
Robert A. Schaller
D. Tracy Slemmer, Paradise Resort
Willie Taylor
Jack Wallis
Charles T. Woods, Mansard Island Resort and Marina

Specific comments

1. TVA should delay summer drawdown on Kentucky Lake for tourism and recreation. (14 comments)

TVA response: Improvements in tributary lake levels are proposed because benefits can be obtained with minimal costs or other disadvantages. But delaying the drawdown of Kentucky Lake would result in more serious problems and a smaller improvement in lake levels. A drawdown delay for Kentucky would require more rapid drawdown and higher flows through the dam later in the year to reach the lake's flood guide levels by December 1. The higher discharge rates required at the dam could exceed the flow capacity of the hydroturbines, resulting in more frequent and greater occurrences of spill and lost hydropower. In addition, the later in the year that drawdown is delayed, the greater the chance that these larger discharges could conflict with U.S. Army Corps of Engineers flood control operations on the lower Ohio and Mississippi rivers.

Delaying drawdown also conflicts with mosquito and plant control activities performed on Kentucky Lake after drawdown begins. Later drawdown would interfere with these activities, reducing their effectiveness and increasing the occurrence of mosquito and nuisance plant populations in the lake.

Despite the fact that Kentucky Lake is the largest reservoir in the TVA system, the difference between normal summer and winter pool elevations is only five feet (compared to 64 feet for Fontana Lake). Increases in tourism and recreation resulting from delaying drawdown are unlikely to outweigh the potential damages due to increased flood risks downstream, hydropower losses due to spilling, and problems caused by excessive mosquito and plant populations. A proposal to draw Kentucky Lake down in stages has been made by lake interests and is being considered by TVA (see response to comment 3, below).

2. TVA should raise the summer level of Kentucky Lake for tourism and recreation. (7 comments)

TVA response: Raising the summer level of Kentucky Lake will increase the risk of flooding and resulting flood damages in the upstream half of the lake. Requests for increased summer lake levels on Kentucky come mostly from recreation interests in the downstream half of the lake in southwest Kentucky and northwest Tennessee. Recreation, agricultural, and wildlife interests in the upstream half of Kentucky Lake oppose increased lake levels due to increased risk of flooding to boat docks, marinas, farmland, and other shoreline areas (see response to next comment).

In addition, shoreland property owners have designed and constructed shoreline facilities and improvements to operate within the constraints of the normal summer pool elevation of 359 feet. Changing the normal summer pool elevation could require these property owners to modify their facilities, resulting in considerable expense and inconvenience.

3. TVA should draw Kentucky Lake down in stages. (1 comment)

TVA response: This option currently is being considered as part of TVA's ongoing effort to maximize reservoir system benefits within the framework of existing policies. Evaluations are being conducted by TVA to

determine the effects on flood control, navigation, power production, mosquito and plant control, fisheries, recreation and other purposes. Results of the evaluation will be made public before a determination is made whether a staged drawdown of Kentucky Lake could be implemented on either an experimental or permanent basis.

4. Improved Kentucky lake levels would adversely affect power production and waterfowl management activities. (2 comments)

TVA response: See response to comments 1 and 2 in this section.

5. TVA should delay drawdown on other mainstream lakes. (7 comments)

TVA response: Delaying drawdown on mainstream lakes is not recommended because it would result in hydropower losses and reduce the effectiveness of aquatic plant control efforts. Most mainstream lakes are gradually lowered beginning in July; as shown in table 13 in Chapter 3, the amount of annual drawdown is no greater than seven feet. If the lakes are not lowered gradually to flood control levels in December, water would have to be spilled more frequently and in greater amounts, resulting in lost hydropower. In addition, delaying drawdown also prevents reducing lake levels during the summer to help control the proliferation of aquatic plants on some lakes. Excessive growth of aquatic plants interferes with recreational boating and lake access.

6. TVA should start to fill mainstream lakes earlier. (6 comments)

TVA response: As discussed in Chapter 2, mainstream lakes provide storage space for only about two inches of runoff in their respective watersheds. Late winter rains can often cause runoff that uses most of this mainstream lake storage capacity. Filling mainstream lakes earlier would compromise TVA's ability to control runoff from late winter rains, resulting in higher expected flood damages at Chattanooga and other mainstream lake locations.

7. TVA should increase the winter level of mainstream lakes for navigation and recreation. (6 comments)

TVA response: The reasons for not increasing the winter level of mainstream lakes are basically the same as the reasons for not filling mainstream lakes earlier, as discussed in the response to the previous comment. Reducing available flood storage capacity on mainstream lakes will increase the risk of flood damages at Chattanooga and other locations on the Tennessee River.

8. Does favoritism play a part in lake level control? (E.g., Why are Chickamauga and Watts Bar drawn down more than Nickajack? During the summer of 1989, were flood control levels maintained on Watts Bar to benefit the Chattanooga Riverfest and Boat Races?) (1 comment)

TVA response: Favoritism does not play a part in lake level control. Nickajack reservoir has so little storage in its two feet of available fluctuation that it is not routinely lowered for flood control purposes

during the winter months. The level of Nickajack will vary by two feet in as short a period as a day in response to operations at Raccoon Mountain Pumped Storage Plant, or in conjunction with reservoir operations to control flooding. During the summer of 1989, flood control levels were not maintained on Watts Bar to benefit the Chattanooga Riverfest and boat races.

9. How will the lake improvement plan impact the Poplar Creek area on Wheeler Lake? (1 comment)

TVA response: No change in lake level policies is proposed for Wheeler Lake; therefore the Poplar Creek area will not be affected.

10. The significant recreation benefits currently provided by TVA lakes in Alabama should be maintained at the existing level. (1 comment)

TVA response: No changes in lake level policies on TVA lakes in Alabama are anticipated that would affect current recreation benefits.

11. TVA's waterfront licensing plan is unfair to small lakefront resort owners. (1 comment)

TVA response: TVA's current policy on recovery of fees for commercial use of TVA reservoir property was established in January 1984. This policy provides for recovery of certain standard fees for commercial use of TVA land when the adjacent property owner does not own the necessary landrights. The determination of whether to charge for commercial use depends on whether specific rights to construct TVA-approved water use facilities were conveyed or implied in applicable deeds when TVA sold the abutting land. All commercial operations existing at the time this policy was implemented were "grandfathered" until such a time as the license is assigned to another owner. TVA's property management staff in Athens, Tennessee, has recently begun providing no-charge licenses to the existing grandfathered commercial recreation operators. Current licensees have been informed that a charge will be implemented when the operation changes ownership.

12. Something should be done about speeding boats, litter, and drug and alcohol use at J.P. Coleman Park at Iuka. (1 comment)

TVA response: This comment was forwarded to the Mississippi Department of Wildlife, Fisheries and Parks, which has jurisdiction over J.P. Coleman Park.

13. Keeping Kentucky Lake levels up from the spring through the fall would generate enough money to avoid any increase in TVA electric rates. (1 comment)

TVA response: This operation would result in significant adverse impacts to flood control, power production, and navigation (see TVA's response to comment 1 in this section). Moreover, while local economic benefits could result, there is no direct way for TVA to recover power system costs.

Stream Recreation

Summary of comments

Eighteen people wrote or spoke in favor of TVA providing additional releases for whitewater recreation. Their comments generally focused on the importance of whitewater recreation to local economic development or concerned funding. Two people expressed concern about the effect of such releases on tributary lake levels.

Individuals who commented

John E. Alcock, U. S. Forest Service
William Allen, Steve Railsback, Tennessee Scenic Rivers Association
Daniel Boone, Tennessee Scenic Rivers Association
Wayne F. Canis, Shoals Sierra Club
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
John E. Foster, John E. Foster Realty and Appraisal Company
Daniell R. Gilbert, Whitewater Express
Richard Guy, Sunburst Adventures
Jerry Hamby, Ocoee River Outfitters Association
Genie Hawkins
Marc Hunt, Nantahala Outdoor Center
J. T. Lemmons, Ocoee River Outfitters Association
Jim Parham, Sunburst Adventures, Ocoee River Outfitters Association
Steve Porter
Mae Scheib, Shoals Sierra Club
Jeff Stalys
Jenetta Waddell
Brad Weeks, Tennessee Council of Trout Unlimited

1. Whitewater recreation provides significant regional and local economic benefits. (5 comments)

TVA response: Chapter 3 shows that four of the 18 major whitewater rivers of the eastern U.S. are in the Tennessee Valley, including two of the three most visited. This is an indication that whitewater recreation brings economic benefits to communities along at least four rivers in the eastern half of the Valley.

2. If lake users are not charged for lake level improvements, whitewater users should not have to pay for recreational releases. (5 comments)

TVA response: When TVA sacrifices power production on a particular stream for whitewater recreation, there are practical ways to collect reimbursement for the cost to power consumers from those who benefit directly. This review looked at ways to get beneficiaries to pay for improved lake levels (see Chapter 7), but found no realistic way to reimburse power users for the full cost.

There are several reasons why it is more difficult to recover the costs of lake level improvements through user fees. First, improved lake levels would benefit a much wider part of the public. Boat dock and marina operators, shoreline property owners, the boating and fishing public, swimmers and hikers--all these and other groups would benefit, but in different ways and to different degrees. Moreover, users are spread across a 21-county area in four different states, much of which is economically disadvantaged. These factors would make it difficult to devise an equitable fee system and would make fee collection difficult and expensive.

3. The Bear Creek Floatway in Alabama should be included in the revised lake improvement plan. (5 comments)

TVA response: The Bear Creek Floatway is not included in the release improvement recommendations in Chapter 6 because recreational releases are already provided for the floatway. This is because recreational floating is one of the Congressionally authorized purposes of the project. A release of 140 cfs is provided from 6 a.m. Saturday until 4 p.m. Sunday on all weekends from May through October. This schedule was established in 1980 and was followed until 1984 when the floatway was closed because of bacteria contamination. The bacteria contamination problem has been resolved, and the floatway reopened in August 1990, and operates according to this schedule.

TVA is evaluating the feasibility and desirability of providing 250 cfs releases as part of its ongoing effort to maximize reservoir system benefits within the framework of existing policies. Public input will be requested during this evaluation.

4. Can TVA provide substantial whitewater releases without impacting lake levels? (2 comments)

TVA response: Whitewater releases are not provided by releasing extra water from upstream dams, which would impact lake levels. Whitewater releases are provided by changing how and when water is released which would otherwise be used for producing hydropower in the most efficient manner.

At Ocoee No. 2 Dam, water that ordinarily would flow through hydro-turbines is released into a portion of the tailwater that is cut off from flow by power operations. This situation also would be true of proposed recreational floating releases at Ocoee No. 3 Dam. For the proposed recreational floating releases at Apalachia and Wilbur hydroplants, water is released through turbines during weekends and evenings when the turbines would otherwise not be operating. Power production at other times when the turbines would ordinarily be operating would be curtailed.

5. TVA should provide trial releases on the upper Ocoee for 1990. (1 comment)

TVA response: TVA provided trial releases from South Holston, Chatuge, Norris, Wilbur, and Tims Ford dams in 1990 to determine how much interest

there is in recreation releases from these dams. Releases from Ocoee No. 3 Dam were not included because the demand for releases for whitewater recreation from this dam has already been demonstrated.

6. Trout fishing enthusiasts and whitewater recreation interests should both be included in discussions about increased flows for whitewater recreation since their interests often conflict. (1 comment)

TVA response: TVA recognizes the need for broad public involvement in such decisions. In reviewing the EIS prepared for recreational floating releases from Ocoee No. 2, for example, TVA sought public comment from all interested groups and individuals. A similar process would be followed for whitewater releases from other dams if significant adverse environmental impacts are anticipated or the proposal is controversial with the public.

7. TVA should consider spilling water from Apalachia Dam to extend the Hiwassee River trout fishery and provide for backcountry river recreation. (1 comment)

TVA response: Providing minimum flows to extend the trout fishery in the cutoff tailwater between the Apalachia Dam and powerhouse has not been recommended because the costs of providing the flows is too large. Providing added flows requires that water be spilled over the dam rather than passed through hydroturbines with 440 feet of gross head. The annual costs of lost hydropower range from \$0.5 to \$1.5 million for a trout fishery in the first three miles of tailwater, and from \$2 to \$3 million for a trout fishery throughout the 12-mile tailwater. Costs for recreational releases would be even higher because greater flows are needed for floating than to maintain appropriate temperatures for trout.

8. The EIS should provide more specific information on the minimum flows that are proposed so that the degree of difficulty for paddlers and the revenue potential for whitewater rafting can be assessed. (1 comment)

TVA response: The minimum flows recommended under the preferred release alternative are given in table 19 in Chapter 4. The recreational floating releases for which the cost of hydropower losses were estimated in table 31 in Chapter 6 were provided by Eastern Professional River Outfitters. At Ocoee No. 3 Dam, about 1,200 cubic feet per second (cfs) flow would be provided on roughly the same schedule as releases are provided at Ocoee No. 2 Dam: eight hours on weekend days from March to May and from September to November, and six hours on weekdays and eight to ten hours on weekend days during the summer. At Apalachia powerhouse, about 2,600 cfs would be provided for four hours on weekend days in April, May, September, and October, and six hours on weekdays and eight hours on weekend days during the summer. At Wilbur Dam, about 1,400 cfs would be provided for six hours on weekdays and weekend days during the summer.

ErosionSummary of comments

Most of the people who commented on soil erosion were concerned about the loss of land, bank slumping, and sedimentation already occurring under TVA's current lake and river operations. Others feared that release and lake level improvements could aggravate existing erosion problems.

Individuals who commented

William Allen, Steve Railsback, Tennessee Scenic Rivers Association
Robert T. Baldrige
Steve Blazier, Muscle Shoals Sailing Club
Bruce Brown
Wilson Burton, Heart's Desire Hunting Club
Keith J. Buttleman, Council on the Environment, State of Virginia
Steve Carter
Paul Y. Chinen, U. S. Army Corps of Engineers
Clinton Cook
C. C. Courtney
Bill Diehl
Jimmy L. Grissom, Beech River Watershed Board of Directors
Paul Harris, Memphis, Light, Gas, and Water Division
Harold Hopper, Henderson County Executive
E. Keith Johnson
Jerry S. Lee, U.S.D.A. Soil Conservation Service
Lewis E. Lietner
Gordon Meadows
Jim Menesky, University of Tennessee Department of Zoology
Charles Miller
Douie Nelson
Frank Nicely, House of Representatives, State of Tennessee
Frank M. Redmond, U. S. Environmental Protection Agency
David Robertson
Jane Stoval, Carl Thomas
Stan Veltcamp, Swann's Marina
David Willis, Mayor of Saltillo

Specific comments

1. TVA should take steps to control bank erosion resulting from its current lake and river operations (e.g., avoid drastic changes in stream flow, sow grass, develop a plan to reduce sedimentation). (18 comments)

TVA response: By controlling major flooding, TVA's reservoir system has contributed to a substantial reduction in soil erosion. However, erosion continues to occur as a result of many factors--wave action due to wind, pleasure boats, and navigation traffic; mismanagement of agricultural, forest, and urban lands; destruction or removal of shoreline vegetation; poor mining practices; and changes in the rate of streamflow.

Changes in streamflow, the only factor over which TVA has direct control, are an inevitable consequence of flood control and hydropower operations. As discussed in Chapter 3, TVA has tried in the past to mitigate the resulting environmental impacts through revegetation efforts in selected areas, and by working cooperatively with the U.S. Department of Agriculture and local landowners to demonstrate low-cost erosion control methods. Because of limited funds, these demonstration projects were small in size and short in duration. TVA now offers technical assistance and aid in obtaining the necessary permits for streambank control projects.

2. TVA should examine the effects of release improvements on bank erosion and consider initiating a bank stabilization program prior to implementation. (2 comments)

TVA response: Bank erosion, an inevitable consequence of water flow, will continue to occur at about the same rate under the preferred release alternative. If pulsing is used to provide minimum flows, some additional slumping and wave erosion could occur on banks in tailwater areas, but these effects are not expected to be significant. Important archeological sites will be monitored and protection efforts undertaken as necessary.

While bank stabilization can benefit local landowners, such efforts are expensive and can cause significant adverse impacts, including damage to riparian habitat, loss of archaeological resources, and erosion or sedimentation problems at other locations. TVA continues to experiment with other protection schemes through its cultural resources program. Technical assistance and aid in obtaining the necessary permits for streambank erosion control projects also are available.

3. The lake level alternatives could increase soil erosion and bank slumping as a result of increased shoreline development and wave wash from recreational boating; this should be thoroughly addressed in the Final EIS. (6 comments)

TVA response: As noted in Chapters 5 and 6, the preferred lake level alternative will relieve a constraint to shoreline development in tributary areas and should result in an 21-percent increase in recreational use. However, because unrestricted drawdown will only be delayed until August 1, these effects are not expected to have a significant impact on the existing rate and pattern of erosion. With state and local controls on shoreline development, problems can be avoided even in high growth areas.

The effects of shoreline development on erosion are acknowledged in the EIS (see Chapters 3, 5, and 6). Minor additions have been made to Chapters 5 and 6 to acknowledge the effects of increased recreational use as a result of lake level improvements not only on erosion, but on other problems related to boating.

4. Maintaining higher lake levels could reduce sedimentation by covering mudflats that are now exposed; this effect should be mentioned in the Final EIS. (1 comment)

TVA response: The lake level alternatives are not expected to affect sedimentation. Deposition may occur at different times, but the volume is likely to remain the same because lakes will be lowered to the same winter flood control levels.

Shoreline Development

Summary of comments

Twenty people made comments concerning shoreline development and TVA land management efforts. The bulk of these comments focused on the need for TVA to play a stronger role in reservoir lands management given the increased development pressure likely to result from lake level improvements. Several people expressed support for the recommendations in the EIS concerning accelerated lands planning. Other suggestions included more active participation in the state of Tennessee's Section 404/Section 26a permit program, preparation of a model zoning plan for reservoir areas, and better enforcement of land management plans.

Individuals who commented

William Allen, Steve Railsback, Tennessee Scenic Rivers Association
Daniel Boone, Tennessee Scenic Rivers Association
Randal J. Braker, Duck River Development Agency
Albert H. Budlong, Moors Area Retirees Group
Wilson Burton, Heart's Desire Hunting Club
Wayne F. Canis, Shoals Sierra Club
Paul Y. Chinen, U. S. Army Corps of Engineers
William W. Cobey, North Carolina Department of Environment, Health,
and Natural Resources
Jonathan P. Deason, U. S. Department of the Interior
Judge Richard Ford
James Gilson
H. A. Henderson
David H. Irwin, Jr.
Robert Jones, Development Authority of Union County
Gary Myers, Tennessee Wildlife Resources Agency
Nelson Ross, Izaak Walton League
David P. Rumbarger, Alabama Department of Economic and Community Affairs
John Sherman, Tennessee Environmental Council
Carolyn Williams, League of Women Voters of Chattanooga, Hamilton County
David Willis, Mayor of Saltillo

Specific comments

1. Lake level improvements will increase shoreline development pressure, with resulting impacts on water quality and aesthetics; TVA must increase its land management efforts in response. (9 comments)

TVA response: As noted in Chapter 5, improving lake levels will relieve a constraint to growth in tributary areas, but whether growth actually occurs will depend on other factors, including demographic variables, land ownership, and accessibility from population centers. Without controls by federal, state, and local governments, adverse environmental impacts could occur in local areas experiencing high growth. However,

the cumulative effects of shoreline development under the recommended lake level alternative are not expected to be significantly different than under current TVA policy.

A commitment to monitoring shoreline development and improvements in how TVA manages its own shorelands are recommended in Chapter 6 because development around TVA lakes is increasing even under TVA's current lake level policy. The proposed monitoring effort should help to ensure that problems can be identified early enough to be addressed effectively. The proposed land management improvements are intended to increase TVA's effectiveness in influencing the management of private lake property by establishing TVA as a model land manager. They include placing higher priority on completing and implementing reservoir land management plans; improving the data base for land management decisions; and extending the planning process to include "marginal strip" land.

2. TVA should implement the land management recommendations in Chapter 6. (8 comments, including 3 comments specifically supporting the inclusion of marginal strip lands in TVA's lands planning process and 2 comments concerning plan enforcement)

TVA response: No response necessary.

3. TVA should use its Section 26a permit authority to control the proliferation of shoreline development activities occurring throughout the river system. (1 comment)

TVA response: Because TVA lakes are intended to serve a variety of purposes, TVA believes that some level of private development is both appropriate and desirable. However, TVA is concerned about increasing development pressure and resulting environmental impacts. This concern has prompted several actions, including TVA's current review of the list of facilities or uses it permits on marginal strip property, and stronger actions to prevent and resolve encroachments of TVA land rights and violations of Section 26a. Chapter 6 of the Final EIS also includes a recommendation to include marginal strip property in TVA's reservoir land management planning process.

4. TVA should prepare a model zoning plan for consideration by counties surrounding TVA lakes (e.g., Douglas, Cherokee). (1 comment)

TVA response: TVA strongly supports county-level land use planning, and favors the development of zoning requirements to prevent degradation of the shoreline, water quality, and private property. If requested, TVA could offer technical advice on measures such as Best Management Practices and septic tank criteria to protect water quality, or identify available model land development ordinances. However, state agencies and local governments have primary responsibilities for community land use planning and zoning and have considerably more resources to devote to identifying or preparing model zoning plans or other land development ordinances than does TVA.

5. TVA should evaluate the effect of its land management efforts on the region. (1 comment)

TVA response: TVA has not conducted such a study, but recognizes the influence of its land management decisions on backlying lands. On occasion, TVA has participated actively in local land use decisions, but generally seeks to influence adjacent land use through the example it sets in managing its own lands. The actions recommended in Chapter 6 to promote a balanced use of reservoir shorelines is aimed at expanding this influence by making TVA a model land manager.

6. Development should be discouraged in some areas along the river system. (3 comments)

TVA response: TVA agrees with this comment. In fact, TVA land management plans reserve many tracts from development and specifically allocate them to wildlife management, forest management, recreation, or natural areas protection. TVA also restricts the degree of development permitted when it sells land or easements over land. Finally, whenever TVA land would be involved in development of backlying land, TVA reviews the environmental impacts of the entire development proposal and can grant conditional approval or even deny use of the TVA land for the project, if the environmental impacts of any portion of the project are unacceptable. However, TVA's control is limited in many locations, and in certain cases the developer may be able to proceed even without the TVA land.

7. TVA ownership of land along the river near Saltillo hurts local economic development. (1 comment)

TVA response: Approximately 1,617 acres of land near Saltillo were purchased in 1974 as an inventory site for a future TVA power plant. TVA recently completed an internal review of the long-term need for retention of the site. The site is in a strategic location to meet future expected power generation needs with minimum transmission losses and is deemed suitable for several different types of power generating facilities. For these reasons, it is still considered a desirable power plant site which TVA needs to retain. In the interim of any power generation project at the site, 832 acres are available to the public to be used for agricultural purposes.

Industrial expansion and job creation are among TVA's highest priorities, and TVA personnel are actively working with Saltillo community leaders to identify means to enhance economic development opportunities in this area.

8. TVA should release some of the land it gave the Forest Service to promote development in Union County, Georgia. (1 comment)

TVA response: TVA transferred most of its landholdings on Nottely reservoir to the U. S. Forest Service for inclusion in the Chattahoochee Purchase Unit or Nantahala National Forest. The Forest Service administers these lands according to their management philosophy and

would have to initiate actions for exchange or disposal involving any of the former TVA lands under its control. However, none of these lands can be sold, exchanged, or opened to entry except as agreed upon by the Forest Service and TVA. Also, in the event that any portion of the transferred lands cease to be administered, then all interest rights transferred to the Forest Service automatically revert to TVA.

Presently, the Forest Service has asked TVA to review 33 of the tracts conveyed to them for management on Nottely, Blue Ridge, and Chatuge reservoirs in relation to continued public ownership and the appropriate managing agency. Preliminary conclusions are that the majority of the tracts should remain in public ownership with about 20 tracts being reconveyed to TVA for future management. Twenty-six of the 33 tracts are located on Nottely reservoir in Union County. Should the Forest Service allow any of the land to revert to TVA, TVA would review the tracts for their best potential use in relation to overall reservoir management and public benefit.

9. TVA should sell small isolated tracts of land and use the money to buy and develop public access areas. (1 comment)

TVA response: This idea has merit and is currently under consideration. As noted in Chapter 4, current TVA policy permits the acquisition of key tracts of land to help meet specific needs under a "willing seller" approach. However, such purchases are limited by funding. Selling small isolated tracts of TVA land could provide a solution, but such sales must be carefully evaluated to ensure that TVA retains an adequate land base to meet future needs for water-related public uses.

Cultural Resources

Summary of comments

Opinions about the effect of the proposed release and lake level improvements on cultural resources varied. Several people thought the changes could have an adverse impact on particular historic sites; one felt that additional protection from higher tributary levels would be offset by losses, especially on the main river; and one expected the changes to benefit archaeological resources. Several people urged TVA to monitor the effects of the changes on cultural resources and to implement additional protection schemes.

Individuals who commented

John E. Alcock, U.S.D.A. Forest Service
David Brook, North Carolina Department of Cultural Resources
Herbert L. Harper, Tennessee Historical Commission
Valerie A. Hudson, Natural Resources and Environmental Protection Cabinet,
State of Kentucky
Robert M. Thorne, Center of Archaeological Research, University of Mississippi

Specific comments

1. Release and lake level improvements could affect several historic sites; TVA should identify these sites and develop a plan to mitigate any adverse impacts (e.g., Spikebuck Town in North Carolina and Jonathan Creek Site in Mississippi). (2 comments)

TVA response: Potential adverse impacts of the proposed release and lake level policies on historic properties along the Tennessee River and its tributaries have not been identified. However, TVA will monitor affected areas for any evidence of an increased rate of erosion should these policies be implemented. If increased bank slumping is observed, appropriate action will be taken in consultation with state and federal historic preservation agencies, as required under the National Historic Preservation Act and implementing regulations.

2. TVA should establish a monitoring program to determine the effect of pulsing on archaeological resources. (1 comment)

TVA response: Using turbine pulsing to provide increased flows would minimize the effects on power generation. However, it would increase the number of turbine starts and shutdowns each year and could potentially affect slumping and wave erosion on banks in tailwater areas. More archaeological sites could be exposed and thus be subject to looting and vandalism.

If the TVA Board approves the preferred release alternative and pulsing is used to provide minimum flows, the effects on archaeological resources will be studied further as release improvements are implemented.

3. Proven protection schemes are available to protect archaeological sites in tailwater areas; the cost of implementing such techniques should be included in the cost of the proposed release improvements. (1 comment)

TVA response: TVA monitors archaeological sites in tailwater areas to determine the need for protection measures. Bank stabilization projects are undertaken as necessary to protect significant sites. This practice would continue under the proposed release alternative. The cost of implementation would be covered either in release improvements budgets or through site protection funds.

4. Construction of the TVA lake system resulted in cultural resource losses that continue today as a result of level fluctuations; the preferred lake level alternative will have little effect on current trends. Additional protection from higher levels on tributary lakes will be offset by losses resulting from moving wave activity to a higher vertical level along the shoreline of tributary lakes and from making a large number of main Tennessee River sites directly accessible by boat for a longer period of time. (1 comment)

TVA response: The potential for cultural resource losses from reservoir operations was recognized and considered at the time the reservoirs originally were constructed and has been considered in evaluating the proposed operations. These losses continue in varying degrees in fluctuation zones of tributary and mainstream projects. However, moving the wave activity to a higher level as proposed under the preferred lake level alternative will not necessarily increase the susceptibility of these resources. In large part, it depends on the density and type of sites located in the new wave activity zone. TVA is inventorying its property to determine site significance on a reservoir-by-reservoir basis and plans to stabilize appropriate sites. If site stabilization is not possible, sites will be evaluated and documented when practicable.

5. The longer lake levels are kept up during the recreation season, the more archaeological resources will be protected. (1 comment)

TVA response: As noted in Chapters 5 and 6, leaving tributary lake levels higher during the summer and fall periods would alleviate certain looting problems because some archaeological sites located below the maximum shoreline contour would be covered by water for an extended period. These gains, however, could be offset by the effects of increased shoreline development and recreation visitation, without protective action.

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Water Supply

Summary of comments

Five people questioned whether the effects of the proposed actions on future water supply needs have been adequately considered.

Individuals who commented

Ralph Ainsworth, Alabama Department of Economic and Community Affairs
Robert Brobeck
Keith J. Buttleman, Council on the Environment, State of Virginia
Paul Y. Chinen, U. S. Army Corps of Engineers
Steve Parks, Upper Duck River Development Agency

Specific comments

1. The Final EIS should address the effects of the proposed actions on potential requests for water supply to support future growth in downstream areas. (4 comments)

TVA response: The supply of water available for municipal, industrial, agricultural, and other uses in the Tennessee Valley is not discussed in detail in this EIS for two reasons. First, it would not be affected by the proposed release and lake level improvements and, second, it should be more than adequate to meet future needs. As noted in Chapter 3, the amount of water withdrawn from surface sources for these purposes is small; moreover, over 75 percent is returned to a river, stream, or lake after use.

While the Valley will enjoy ample water supplies, however, water quality is a growing concern. The proposed release improvements address this issue, but appropriate state actions to control pollution also will be necessary to ensure that future water supplies are of adequate quality to support growth.

2. More rapid filling and longer holding times should benefit water supply from the South Holston reservoir to Washington County, Virginia; these effects should be assessed in the Final EIS. (1 comment)

TVA response: The preferred lake level alternative is not expected to affect water supply from the South Holston reservoir.

FUNDINGFunding SourcesSummary of comments

Distributors and distributor groups generally opposed using power funds to pay for the proposed release and lake level improvements; however, most supported the changes if ratepayers were compensated for hydropower losses from other sources. Of the remaining commentors, most supported either using power funds alone or in conjunction with Congressional appropriations. A large number of commentors suggested that TVA also collect user fees to pay for lake level improvements. A few people said that the proposed changes should not be implemented because the cost is too high. Various equity issues were mentioned, and several funding options not included in the Draft EIS were suggested for consideration. One comment addressed the effect of the President's budget request for TVA on the cost of the proposed changes.

Individuals who commented

61 distributors or distributor groups

J. E. Adams, Tapoco, Inc.

Ralph Ainsworth, Alabama Department of Economic and Community Affairs
anonymous

Hunt Archer

Truman Barrett, Towns County Chamber of Commerce

Noel Beck, Shoals Chapter of Alabama Conservancy

Richard Bell

Mark Benko, Tennessee Conservation League

Robert Bennett, Arrowhead Resort

George Berry, Department of Industry, Trade and Tourism

Willard L. Bowers, Alabama Power Company

Randall J. Braker, Duck River Utility Commission

Robert Brobeck

Bruce Brown

Albert H. Budlong, Moors Area Retirees Representative

Tom Bush, Smokey View Camp Ground

Wayne F. Canis, Shoals Sierra Club

Charlie Chmeilewski, Trout Unlimited

William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources

Hester Cope, Shoals Chapter of Alabama Conservancy

Robert Cox, Boone Lake Property Owners Association and Friends

Bruce Doll, TVIC

Tom Dozier

Lin Erdmann

J. Hammond Eve

Frederick D. Foy

Bob Gann

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Frank L. Gass
Jesse Gilliam, Saltillo Marina
Kenneth Goff
David Grossvenor
Richard Guy, Sunburst Adventures
Jim Halloran, Clay County Chamber of Commerce
Frank Harrison
Ed Higgins, Lake Barkley Resort Association, Kentucky Marina Association
Joe Frank Harris, Governor of Georgia
H. A. Henderson
Gary Holiway, Jefferson County Executive
George Howey
Diana Humphries
David Huskins, Smoky Mountain Host of North Carolina
Richard Hutton
Ronnie James, Southwestern North Carolina Planning and Economic Development
Roger A. Jenkins, Harvey Broome Chapter, Tennessee Sierra Club
E. Keith Johnson
Kirk Johnson
Marshall Jones, West Tennessee Sportsman Association
Richard Kammann, Jefferson County Chamber of Commerce
Tom Kammann, Baneberry Golf and Resorts
Marty Kimsey, North Carolina House of Representatives
Leslie L. Kirk, Trout Unlimited
Margaret A. Lane, Elk River Development Agency
James G. Martin, Governor of North Carolina
John McClain
John McDonald
David McKinney, Tennessee Wildlife Resources Agency
Gerald McLemore, West Tennessee Sportsman Association
Louis Milhorn
Howard Miller
Zell Miller, Lieutenant Governor of Georgia
Jim Minesky, UT Department of Zoology
Debra Mitchell
John R. Moller
Bill Moore
Cloe Moore, Town of Murphy
James Moore, Clay County Commissioners
Bill Murray
Frank S. Niceley, Tennessee House of Representatives
Robert G. Osborne
James F. Prewett, Save Our Lakes, Inc.
Hollis Quarles
James H. Quillen
Daniel Ray
Richard E. Ray, Alcoa
David P. Rumbarger, Alabama Department of Economic and Community Affairs
Jim Runnion
Hugh T. Russell
Robert A. Schaller
Herb Schumaker, Associated Valley Industries
John Sherman, Tennessee Environmental Council

Bernice B. Shipley
 David C. Smith
 Robert J. Smith
 Jon Stern, Rohm and Haas Fishing Club
 Eugene Stowers, Fort Loudoun-Tellico Chapter of the Izaak Walton League
 Marc Sudheimer, Morristown Area Chamber of Commerce
 Charles Taylor, North Carolina Parks and Recreation Council
 G. Trivedi, LWD, Inc.
 Ralph Twiggs, Georgia House of Representatives
 Mike Underwood
 Brad Weeks, Tennessee Council of Trout Unlimited
 R. E. Westerman
 Bruce Whitney
 Jim Wilbanks, Tennessee Conservation League
 Carolyn Williams, League of Women Voters of Chattanooga, Hamilton County
 Gary Williams, The Appalachian Chapter of Trout Unlimited
 John E. Williams
 Charles Wollmer
 Walter O. Wunderlich

Specific comments

1. To fund release improvements, TVA should:
 - a. not use power funds. (56 comments)
 - b. use power funds only. (18 comments)
 - c. use power funds for operating expenses only. (1 comment)
 - d. use power funds if there isn't a rate increase. (1 comment)
 - e. use power funds only or with other sources. (1 comment)
 - f. use Congressional appropriations only. (5 comments)
 - g. use shared Congressional and power funding. (9 comments)
 - h. collect user fees. (5 comments)
 - i. use power funds and collect user fees. (1 comment)
 - j. use shared funding and collect user fees. (4 comments)

2. To fund lake level improvements, TVA should:
 - a. not use power funds. (58 comments)
 - b. use power funds only. (26 comments)
 - c. use revenues from increased power sales due to lake level improvements. (2 comments)
 - d. use power funds if economic development funds are administered evenly throughout the power service area. (1 comment)
 - e. use power funds if there isn't a rate increase. (2 comments)
 - f. use power funds only or with other sources. (1 comment)
 - g. use Congressional appropriations only. (7 comments)
 - h. use shared Congressional and power funding. (11 comments)
 - i. collect a user fee. (16 comments)
 - j. collect a combination of user fees. (1 comment)
 - k. use power funds and collect user fees. (2 comments)
 - l. use shared funding and collect user fees. (4 comments)
 - m. use some combination of power funds, Congressional appropriations and user fees. (2 comments)

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3. It is inequitable for:
 - a. TVA to promote economic development in one part of the region at the expense of power customers in other parts of the region. (35 comments)
 - b. TVA power customers to be subsidized by not having to pay for unacceptable lake drawdowns, intermittently dry streambeds, and/or low dissolved oxygen below dams. (10 comments)
 - c. recreation interests to pay user fees when navigation interests do not pay their fair share of the costs of operating the locks. (3 comments)
 - d. Congressional appropriations to be used to improve water quality and recreational uses of TVA's reservoirs. (1 comment)
 - e. downstream lake users to pay any more than their proportionate share of the benefits from the recommended release and lake level alternatives. (1 comment)
 - f. North Carolina not to received benefits for providing water for navigation on the Tennessee, Ohio, and Mississippi rivers, and on the Tennessee-Tombigbee Waterway. (1 comment);
4. TVA should not change release and/or lake level policies because the cost is too high. (5 comments)
5. TVA should not sell its land to fund the proposed changes. (2 comments)
6. TVA should not raise residential power rates to fund the proposed changes as an excuse to lower the power bills of a few industrial power customers. (1 comment)

TVA response to comments 1-6:

Chapter 7 of the Final EIS recommends that power revenues be used to pay for release improvements and that Congressional appropriations be used to pay for lake level improvements. As discussed in this chapter, TVA's power program should pay for the proposed release improvements because these improvements would mitigate the environmental impact which results from designing and using TVA dams to generate hydropower--particularly, the effects of low DO levels in tailwater areas associated with turbine releases in late summer and fall. It would also benefit from the improved business climate that would result.

Lake level improvements, on the other hand, are aimed at enhancing recreation and economic development in tributary lake areas, which include some of the poorest counties in the Tennessee Valley region. Congressional appropriations should be used to cover these costs, as they are used to pay for other TVA economic development programs.

Other comments related to funding:

7. TVA should consider using fines for pollution from point and nonpoint sources, navigation user fees, and selling some of its land as sources of funding for the proposed changes. (3 comments)

TVA response: TVA does not have the authority to impose fines for pollution or fees for use of locks or the registration of commercial navigation vessels, nor is it likely that TVA could obtain the authority

or cooperation needed to assess such fines or fees. TVA owns a relatively small amount of land above the maximum shoreline contour, and all of it is allocated for various public uses. There is little public support for selling any of TVA's remaining public land inventory, with the possible exception of small isolated tracts.

8. The President's proposals to Congress to cut TVA's appropriated budget could affect the costs of the alternatives; TVA should be clear about the consequences. (1 comment)

TVA response: The President's proposals to Congress to cut the TVA appropriated budget do not affect the cost of the alternatives, which are based on estimates of capital costs and operating expenses necessary to implement the alternatives. The position of the President, as well as the Congress, will affect whether appropriations can be used to pay for release and lake level improvements, if changes are made in TVA's lake and river operations that result in added costs.

9. Since Cherokee, Douglas, and Boone dams do not generate electricity, there is no hydropower lost if lake levels are improved, or if TVA chooses to generate electricity through these dams to offset power losses. (2 comments)

TVA response: Cherokee, Douglas and Boone dams generate electricity. The effects of minimum flow and lake level recommendations at these dams have been included in the cost of the alternatives.

10. Only 2.5 percent of TVA's gross power revenues are paid to state and local governments in lieu of taxes on TVA facilities, of which North Carolina receives a small portion (see last page of Chapter 7). (1 comment)

TVA response: TVA's aggregate tax equivalent payment to all states represents five percent of gross revenues derived from its sale of power in the preceding fiscal year, excluding sales to federal agencies. For 1990, states and counties will divide about \$233 million (five percent of \$4.65 billion--the amount of TVA's FY 1989 power revenues subject to tax equivalent payments). One-half of the payment to each state is based on a ratio of prior year book value of power property and reservoir property allocated to power within that state to TVA's total book value of property. The other one-half of the payment is allocated on the basis of a ratio of TVA's prior year power revenue from that state to TVA's total power revenue in all states.

North Carolina's FY 1989 book value of power and reservoir property allocated to power amounts to approximately \$42.5 million and consists primarily of three multipurpose dams (of which 42 percent of the net book value is allocated to power) and one single purpose dam, fifteen substations, and various transmission lines (designated 100 percent power property). Based on the ratio of this \$42.5 million book value amount for North Carolina to TVA's total power property of \$20.6 billion, the state's percentage is .206. North Carolina's FY 1989 percentage of

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revenue is .411. Therefore, by averaging North Carolina's percentages of power property and power revenue (.3085 percent), the state's FY 1990 tax equivalent payment will be about \$719 thousand.

The payment allocation for each state government is reduced by the amount of TVA's direct payment to designated counties in each state. To these affected counties, TVA pays amounts equivalent to the two-year average of former county and district ad valorem taxes levied on property operated for power purposes at the time of its acquisition by TVA, and the portion of reservoir lands allocated to power operation. During FY 1990, about \$7 thousand will be paid directly to North Carolina counties by TVA to replace the former taxes on the reservoir and power properties. The balance (approximately \$712 thousand) will be paid to North Carolina state government.

Legal IssuesSummary of comments

Distributors and distributor groups generally questioned the legality of using power funds to pay for the proposed release and lake level improvements; however, most supported the changes if ratepayers are compensated for hydropower losses. A few individuals doubted the legality of placing recreation above power and flood control, regardless of compensation. Others argued that the TVA Act, as well as TVA and FERC precedent, supports the use of power funds for such purposes.

Individuals who commented

43 distributors or distributor groups

Ralph Ainsworth, Alabama Department of Economic and Community Affairs
William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources
Hester Cope, Alabama Conservancy, Shoals Chapter
John Crowder
Frank McGinley
David P. Rumbarger, Alabama Department of Economic and Community Affairs
Carlos Smith, Counsel, Tennessee Valley Public Power Association
Clinton A. Vince, Sherry A. Quirk, Counsel, S.E. Federal Power Customers Group
Walter O. Wunderlich

Specific comments

1. Using power funds to pay for the proposed improvements would violate the TVA Act; hydropower customers must be reimbursed for any losses incurred from changes unrelated to flood control or navigation. (45 comments, including 43 distributors and distributor groups)
2. The proposed changes would violate the TVA Act by placing recreation above power and flood control in system operating priority. (3 comments)
3. The alternatives address environmental impacts resulting from TVA power operations; therefore, power funding is permissible under the TVA Act and Basic Bond Resolution. (2 comments)
4. The TVA Board is not required under the TVA Act to allocate any water not needed for navigation and flood control to hydropower; the Act supports water management policies for socially desirable operating goals such as regional development and environmental quality. (2 comments)
5. Private power companies are required to give fish and wildlife, recreation, environmental quality, and energy conservation the same consideration as power production during FERC relicensing; TVA should do the same in reviewing its lake and river operations. (1 comment)

TVA response to comments on legal issues

The recommendations in the Final EIS are fully consistent with the TVA Act and other applicable legal authorities. Power funds should be used to pay for release improvements because the proposed improvements would mitigate the environmental effects of hydropower operations. TVA's power program could also benefit from improvements in the region's economy resulting from improved water quality in the Tennessee River system. Lake level improvements, on the other hand, would support recreation and tourism development in tributary areas; thus, they should be funded using Congressional appropriations, like other TVA economic development programs. These issues are discussed in more detail in Chapter 7.

Economic Evaluation of BenefitsSummary of comments

Seven people felt that the economic benefits of the proposed lake level and release improvements should be quantified to permit comparison with the power costs. Most of these felt strongly that an economic analysis of the benefits would justify the capital and annual expense. Two people requested a cost/benefit analysis but speculated that the benefits to the TVA system as a whole would not offset the costs associated with a marginal increase in visitation to tributary lakes.

Individuals who commented

John E. Alcock, U.S.D.A. Forest Service
Willard L. Bowers, Alabama Power Company
Wayne Bowman, Lexington Electric System
William W. Cobey, North Carolina Department of Environment, Health, and
Natural Resources
H. A. Henderson
Don R. McCormick, Kentucky Department of Fish and Wildlife Resources
Ronnie E. Rowland, Prentiss County Electric Power Association

Specific comments

1. Power costs are quantified in the EIS, but recreation benefits are not; the EIS should compare the costs of release and lake level improvements to the total economic benefits, both direct and indirect. (7 comments)

TVA response: Reaching agreement on the dollar value of the benefits that would result from improved lake levels is extremely difficult. Such a calculation depends on the importance that people attach to environmental quality, new jobs, recreation, and other benefits. Instead of relying on TVA staff judgement about these values, the expected benefits of the release and lake level alternatives were identified and described in detail in the EIS so that the public review process could focus on the tradeoffs among different operating purposes, rather than on the accuracy of the dollar estimates.

In addition, quantitative comparisons of benefits and costs can not account for equity concerns--for example, whether TVA should change its lake operations to benefit lake users in tributary areas at the expense of power customers across the Valley.

Finally, from an accounting standpoint, benefits and costs in this case are not strictly comparable. Recreation benefits represent hypothetical cash flows to state and local governments and to private business owners, while power system costs are "real" cash flows to TVA. Revenues resulting from local economic development would be difficult for TVA to tap to offset power costs.

2. The environmental burden caused by increased lake use should be estimated in projecting the cost of improved lake levels. (1 comment)

TVA response: As noted in Chapter 5, improving lake levels will relieve a constraint to growth in tributary areas, but whether growth actually occurs will depend on other factors, including land ownership and accessibility from population centers. Without controls by federal, state, and local governments, adverse environmental impacts could occur in local areas experiencing high growth. However, the cumulative effects of shoreline development under the recommended lake level alternative are not expected to be significantly different than under current TVA policy.

3. Benefits are potential, not guaranteed; if benefits result, they will be enjoyed only by those areas of the TVA region immediately adjacent to the Tennessee River and its tributaries. (1 comment)

TVA response: Benefit estimates under the preferred release and lake level alternatives are based on detailed analysis and careful review. Most of the people who commented on the Draft EIS were confident that these benefits would occur; many said they expect actual benefits to exceed those projected. Actual benefit levels, however, can not be guaranteed. Recreation benefits, for example, will depend on adequate facilities, transportation access, land ownership, demographic variables, and other factors, as noted in Chapter 5.

It also is true that the benefits would not be evenly distributed across the TVA region. However, a large number of Valley residents would be affected. Water quality improvements, especially increases in minimum flow rates, would result in benefits throughout the Tennessee River system. Lake level improvements would benefit close to three-quarters of a million people in an economically disadvantaged 21-county area.

MiscellaneousSummary of comments

Miscellaneous comments addressed the format of the EIS, the role of TVA contributors to the report, and periodic reevaluation of policies and policy changes.

Individuals who commented

William Allen, Steve Railsback, Tennessee Scenic Rivers Association
William W. Cobey, North Carolina Department of Environment, Health, and Natural Resources
H. A. Henderson
David P. Rumbarger, Alabama Department of Economic and Community Affairs

Specific comments

1. The discussion of environmental consequences in Chapter 5 would be enhanced and clarified if the consequences of each alternative were given in separate sections. The EIS should cite references and supporting literature or provide all necessary details so that the reader can thoroughly evaluate the decisions and recommendations. (2 comments)

TVA response: Federal regulations (40 CFR 1502.8) require that the EIS "be written in plain language...so that decisionmakers and the public can readily understand them." Adding subsections in Chapter 5 for each alternative and citing other reports and literature would complicate the EIS unnecessarily and make it difficult to read. Supporting references are listed in Section 4 and copies are available at no charge if the reader wishes to conduct a more extensive evaluation of the report.

2. The report fails to identify the work of each TVA contributor listed in Section 4 and how management modified their contributions; there were no contributors for agricultural inputs, and socioeconomics was analyzed by only one person without a degree in either economic development or sociology. (1 comment)

TVA response: The text of the EIS was extensively reviewed by TVA management and all TVA contributors; differences of opinion were resolved during the course of this review on all substantive issues. TVA contributors have sufficient education and experience to address the issues in the EIS.

3. The EIS should recommend both short-term and long-term milestones for evaluating the effects of recommended policy changes and/or reevaluating policies to assure that they continue to meet social and environmental needs. (2 comments)

TVA response: TVA collects extensive data and observes and evaluates trends in the use of the lakes as part of its regular river management responsibilities. This information is routinely presented to the TVA Board of Directors during regular program reviews. The Board identifies the need for policy reviews and authorizes them as needed. This EIS is an example of such an action. No change in procedures is necessary to assure that reviews of lake management policies or the recommended policy changes are conducted in a timely manner.

4. Lawrence County, Tennessee, should be included in the list of counties affected by the alternatives on the cover sheet. (1 comment)

TVA response: The release and lake level alternatives directly affect those counties adjacent to TVA reservoirs. Lawrence County, Tennessee, is not included in the list because there are no reservoirs in the county; it is listed with other counties in the Tennessee River Valley which may be affected indirectly by whichever alternative is chosen by the TVA Board of Directors.

EDITS MADE IN RESPONSE TO PUBLIC COMMENTSPage*

- ii Whitfield County is misspelled.
- xiii Delete the word "significant" in the fourth line of the second full paragraph.
- xiii Revise the third paragraph to acknowledge the fisheries benefits of reducing water temperatures in those tailwaters where temperatures now exceed the ranges for optimal trout reproduction and growth. (See also page 112, second and third paragraphs; and page 136, second paragraph.)
- 15 Reword last sentence, third paragraph: "The purpose of this floodway, which has been used only once, is to prevent overtopping levees and floodwalls along the Mississippi and Lower Ohio rivers within the immediate vicinity and upstream."
- 26 The shoreline miles in table 4 under private ownership on Ocoee No. 1 are incorrect. (See also pages 54, A-6, and A-48.)
- 33 In the fourth paragraph under "Water temperature," note that Chatuge supports a self-sustaining wild trout population.
- 37 Delete Nantahala from table 8.
- 37 Walleye and white bass are as important as the trout resources in Nottely and Chatuge; their seasonal spawning runs should be added to the tailwater information for these lakes in table 8.
- 37 Hiwassee and Nottely tailwaters do not support stocked rainbow trout fisheries, as indicated in table 8.
- 41 Ospreys are not a federally listed species and should be discussed in the wildlife section; delete discussion on page 43.
- 51 Population figures for Graham and Swain counties are reversed.
- 73 Revise the description of lake level alternatives to specify more clearly that no changes are proposed in TVA's current policy for filling and drawing down mainstream reservoirs.
- 83 Revise first section of second paragraph to read: "During normal and wet winters, these problems are not significant because river flows and water depths in tailwater areas are high."
- 177 Tellico Lake: Change "Recreation Area" to "Campground" for Lotterdale Cove and Notchy Creek and to "Day Use Area" for Toqua (also "TRD" should be "TRDA").
- 180 Change Larry Colaw's title to "Executive Director, Tellico Reservoir Development Agency."
- A-35 Revise the first full paragraph to read: "There are now...and three planned residential complexes on Tellico; two other industries are building facilities.
- A-51 White bass should be added as one of the principal predator species in Lake Blue Ridge.
- A-51 Fifth paragraph: Toccoa River is misspelled.

*Refers to page on which edit was made in the Final Environmental Impact Statement.

SUMMARY OF OPINION SURVEY RESULTS

Opinion surveys were completed by over 70 percent of the nearly 1200 registrants at the twelve public meetings held in February and March 1990 to receive comments on the Draft Environmental Impact Statement prepared as part of TVA's review of its lake and river operations. Registrants were asked questions about their interests in the river system and their opinions about the recommendations in the Draft EIS, and questions describing themselves.

About half of the respondents live on a lake or river, or own shoreline property. Most of those who came to meetings in tributary and mainstream areas had family incomes between \$15,000 and \$50,000; identified themselves most frequently as recreation users or environmentalists; and visited the lake more than four times during an average summer, usually to boat, swim, or water-ski. Most of those who came to meetings held outside the Tennessee Valley in the TVA power service area had family incomes above \$50,000; identified themselves most frequently as power consumers; and visited the lakes less than once during an average summer, primarily to swim, water-ski, or sightsee.

Respondents from tributary areas weighted lake recreation and environmental protection as the most important considerations affecting operation of TVA lakes. Mainstream respondents ranked flood control the highest, followed by lake recreation, environmental protection, and hydropower. Those outside the Valley ranked hydropower as the most important consideration, followed by flood control. Commercial navigation, stream recreation, and protecting archaeological sites were consistently given low priority.

Respondents favored the recommended release improvements by a margin of about 4 to 1. Tributary respondents favored improved lake levels by a margin of over 3 to 1. A majority of mainstream area respondents favored improved tributary lake levels, but those outside the Valley were almost evenly divided on the question.

None of the funding options (electric rates, federal taxes, or a combination of electric rates and federal taxes) were favored by a majority of the respondents (i.e., more than 50 percent) for either releases or lake levels. Tributary and mainstream area respondents favored a combination of funding sources, although mainstream areas were almost evenly divided between federal taxes and combined funding for lake levels. Respondents from outside the Valley favored federal taxes for releases, and federal taxes, combined funding, or other beneficiary payment options for lake levels. Electric rates were generally the least favored funding source.

Most respondents from mainstream areas and outside the Valley would not be willing to voluntarily contribute on their monthly electric bill for lake level improvements. In tributary areas, a majority of respondents would be willing to contribute, but only by a small margin. The 30 percent of respondents in tributary areas who indicated the amount they would be willing to voluntarily contribute indicated they would pay an average of \$4 per month on their electric bills.