PHILPOTT DAM AND LAKE, VIRGINIA
(SECTION 216 STUDY)
SECTION 905(b) (WRDA 1986) ANALYSIS

AUGUST 2004

US Army Corps
of Engineers
Wilmington District

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1. Study Authority

This Section 905(b) of the Water Resources Development Act (WRDA) 1986 Analysis was prepared as an initial response to provisions of Section 216 of Public Law 91-611, the River and Harbor and Flood Control Act of 1970, which states:

> *"The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest."*

Funds in the amount of $100,000 were appropriated in Fiscal Year (FY) 2004 to conduct the reconnaissance phase of the study.

2. Study Purpose

The purpose of this study is to identify whether there is a Federal interest in modifying the structures or the operation at the Philpott Dam and Lake (hereafter referred to as Philpott Lake), for the purposes of improving the quality of the environment in the overall public interest. The study will determine whether to proceed into a feasibility study, based on a preliminary appraisal of the Federal interest and the consistency of potential solutions with current policies and budgetary priorities.

3. Location of Study, Non-Federal Sponsor and Congressional Districts

Philpott Lake, which takes its name from the nearby downstream village in Henry County, Virginia, is located on the Smith River, Virginia, 44.3 miles above its junction with the Dan River near Eden, North Carolina, and 35 miles from the Virginia-North Carolina State line. At spillway elevation, the reservoir extends upstream about 16 miles. The overall project covers 10,000 acres in Franklin, Henry, and Patrick Counties, Virginia.

The non-Federal sponsor for the feasibility phase of the Study is the Commonwealth of Virginia. The Virginia point of contact for this Study is the Virginia Natural Resources' Deputy Regional Director of the Department of Environmental Quality.

Philpott Lake is located in Virginia's 5th Congressional District, represented by Congressman Virgil H. Goode, and Virginia's 9th Congressional District, represented by Congressman Rick Boucher. Construction of Philpott Lake began in 1948 and flood control was provided in 1951. The project went into full operation in 1953, when all three generators in the powerhouse were completed. Project

purposes include: recreation (PL 78-534), low flow augmentation (PL 78-534), water supply (PL 85-500), flood control (PL 78-534), hydroelectric power (PL 78-534), and fish/wildlife (PL 85-624).

Construction of Philpott Lake was authorized by the Flood Control Act of 1944 (PL 534, 78th Congress) as part of the development plan of the Roanoke River Basin, Virginia and North Carolina. The development of public recreation facilities was authorized by The Flood Control Act (FCA) of 1944, Section 4 of the FCA of 1946, Section 209 of the FCA of 1954, Section 207 of the FCA of 1962, and by the Water Conservation Fund Act of 1965, as amended. The original authorized purposes for construction of Philpott were flood control and generation of hydroelectric power. Other purposes resulting from general legislation were water supply and recreation. Construction commenced in 1948; flood control was provided in 1951 and completion and full operation waS reached in 1953. Philpott Lake contains conservation pool storage between elevations 920 and 974 feet mean sea level (msl). The conservation pool is reserved for power generation and low flow augmentation. Potential water supply reallocation of storage is limited to 15% of the total conservation pool. Philpott Lake has an area of 2,880 acres at the top of the conservation pool. One of the Primary purposes of Philpott Lake, controlled flood storage, is provided between elevations 974 and 985 feet, msl. Surcharge, or uncontrolled flood storage is provided above the crest of the spillway, elevation 985 feet, msl. Philpott Dam is a concrete gravity dam, with a crest elevation of 1016 feet, msl and a length of 920 feet.

4. Discussion of Prior Studies, Reports, and Existing Water Projects

Reports Prepared by The U.S. Army Corps of Engineers

Reports Documenting Development of Philpott Lake*:* The Philpott Project first appeared in 1934 as part of a Section 308 Report in the House of Representatives Document Number 65 of the 74th Congress, 1st Session. This recommendation contained a comprehensive plan for the development of the Roanoke River and its tributaries and was initially deemed economically unjustifiable. Over the next twelve years, there were six proposed alternate development plans differing in the location of the dam, the type of dam (earth or concrete), the location of the powerhouse and the location of the spillway in connection with the schemes involving earth dams. Comparative studies of these plans occurred between 1938 and 1946. A number of pertinent studies related to Philpott Lake have been prepared since the Project was conceived. A list of these studies can be found in Table 1.

Philpott Lake Master Plan Update 1983: This document provides a comprehensive analysis of pertinent base data collected and develops a framework upon which future management of the project and policies related to future development and actions can be based. The Master Plan Update (including all associated appendixes) describes how all project lands, waters, forests, and other resources will be enhanced, developed, used and managed in the public interest.

Operational Management Plan 1992*:* The purpose of the Operational Management Plan (OMP) is to create a reference document which sets forth the procedures, responsibilities and management concerns for the administration of Philpott Lake. There are two main sections of the OMP. The natural resources management section describes the natural features and resources inherent to Philpott Lake. This section describes the management practices for forest, fish, water and wildlife resources. The park management section provides for the development and maintenance of park areas, facilities, and programs aimed at providing quality outdoor recreational opportunities.

Environmental Assessment and Finding of No Significant Impacts for a Proposed Shoreline Protection Project*:* In 1997 it was determined that shoreline erosion was damaging three developed recreation areas at Philpott Lake. The affected recreation areas are Goose Point, Salthouse

Branch, and Horseshoe Point. The proposed project consisted of riprap slope protection along portions of the shoreline at three recreation areas at Philpott Lake. The total length of shoreline proposed for protection at the three recreation areas is approximately 5,000 feet and the amount of riprap that would be required for this work is approximately 2,800 cubic yards. An Environmental Assessment addressing this proposed project was circulated for comment in August 1997. A finding of No Significant Impact was issued in October 1997.

Environmental Assessment and Finding of No Significant Impacts for Proposed Marina*:* In May 2002, Philpott Park Marina, LLC, was conditionally awarded a 20 to 25-year lease on 54 acres to construct a marina complex on the lake and adjacent high ground in the "Philpott Park. The proposed plan includes keeping most of the existing facilities, including infrastructure and constructing new facilities over a five-year period. The facilities to remain include: a serviceable 34-foot concrete boat ramp, parking areas, a comfort station, a picnic shelter, an amphitheater, and toilet facilities. A Corps of Engineers' boathouse presently exists within the project area. It is proposed that this facility be relocated to another site on the lake or removed altogether. In the first year of the plan, the proposed construction includes: two wet boat storage facilities, three dry boat storage facilities, public restroom facilities, a floating courtesy dock with concessions, parking areas, above-ground gasoline storage tanks, sewage pump-out facilities, and four 2-bedroom cabins. In the third year of the plan, the proposed construction includes: two additional wet boat storage facilities attached to those constructed in Year 1, three dry boat storage facilities similar and adjacent to those constructed in Year 1, parking areas, four 2-bedroom cabins, a courtesy dock, and parking/temporary hookups for 10 recreational vehicles. In the fifth, the proposed construction includes: four 2-bedroom cabins, a parking area, and a 50-seat restaurant.

TABLE 1 PERTINENT PRIOR REPORTS PHILPOTT LAKE

Title	**Date Submitted**
Definite Project Report on Philpott Lake	30 November 1946
• Appendix I, Hydrology	30 November 1946
• Appendix II Geology	30 November 1946
• Appendix III Hydraulic Design	30 November 1946
• Appendix IV Structural Design	30 November 1946
• Appendix V Hydroelectric Power	30 November 1946
• Appendix VI Relocations	30 November 1946
• Appendix VII Availability of Construction Materials	30 November 1946
• Appendix VIII Lands and Damages	30 November 1946
• Appendix IX Pollution Abatement and Malaria Control	30 November 1946
• Appendix X Recreation and Wildlife	30 November 1946
• Appendix XI Project Cost Estimates	30 November 1946
• Appendix XII Alternative Plans of Development	30 November 1946
• Appendix XIII Supplementary Data	30 November 1946
• Appendix XIV Plates	30 November 1946
Analysis of Design for Concrete Dam	29 April 1949
Master Plan, Philpott Dam and Lake, VA	25 March 1953
Philpott Reservoir, VA; Design Memorandum 1B (CI), Public Use and Access Facilities	04 August 1964
Design Memorandum (DM)1B; The Master Plan for Philpott Dam 1965 - Land Use Plan	23 December 1965
Philpott Reservoir, VA; Construction Design Memorandum 1B(C2)	28 October 1966
DM 2, Resource Manager's Office & Visitor Center Volume II Interpretive Prospectus	13 February 1969
Philpott Lake, Forest Management Plan	1976
DM 2, Resource Manager's Office and Visitor Center Volume II Design	May 1980
Design Memorandum 3, Recreational Facilities	January 1981
Design Memorandum 4, Master Plan Update	March 1982
Philpott Lake Operational Management Plan	June 1992

Reports Prepared by Others

Virginia Polytechnic Institute and State University Tail Race Fisheries Reports: Virginia Polytechnic Institute and State University, Blacksburg, Virginia, under the terms of a contract with the Virginia Department of Game and Inland Fisheries has studied the tailwater area downstream of Philpott Dam. This calls for three tasks to be completed. Task one focuses on spawning characteristics and rearing habitats of brown trout. The objectives of this task are to characterize habitat conditions in areas where successful spawning and juvenile rearing of brown trout occurs. Task two focuses on the determinants of brown trout abundance and growth. The objectives of this task are: (1) to collect biological data to quantify relative abundance of trout in the Smith River from Philpott Dam to Martinsville and monitor annual variation in brown trout recruitment success; (2) to assess longitudinal and seasonal shifts in brown trout diet composition; and (3) to evaluate the constraints on trout growth under existing temperature regimes. Task three focuses on hydraulic model development and application to Smith River tailwater. The objective is to design a field survey and modeling protocol to measure effects of varying flows on the shear stress, mobilization of streambed gravels, and relate discharge to the amount of spawning area scouring or brown trout fry displacement that would occur at sites in the tailwater. This ongoing work has been presented in four annual reports covering the years 2000 - 2003.

5. Plan Formulation

Proper planning requires a quantitative and qualitative assessment of the resources of the study area. This is done for both current and future conditions, and is used to define existing and future without-project conditions. Existing conditions are those at the time the study is conducted. The forecast of the future without-project condition (No Action) reflects the conditions expected if the project is not implemented. The future without condition includes expected improvements and changes in the study area undertaken in the absence implementation of any proposed alternatives. The future without-project condition provides the basis from which alternative plans are formulated and impacts are assessed. Impact assessment is the basis for plan evaluation, comparison and selection, clear definition and requires full documentation of the without-project condition are essential.

National Objectives

The national or Federal objective of water related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to National Economic Development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation.

The Corps has added a second national objective for Ecosystem Restoration in response to legislation and administration policy. The objective is to contribute to the nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat.

Existing Conditions

Guide Curve: A guide curve (also known in prior years as the rule curve) represents the target lake levels for various times of the year. The guide curve elevations were established to maximize project benefits and optimize support for project purposes. The guide curve provides for

generation at a head while requiring a minimum of spill, or releases not through turbines; an adequate reserve of storage for support of the system dependable capacity during critical dry periods; additional storage during the wetter winter and spring months; a relatively level pool during the boating and swimming season; and filling by early spring to prevent growth along the shoreline. The guide curve elevation is at 971.5 feet, msl, October through January, and 973.5 feet, msl, April through July. The guide curve varies linearly between these two elevations during the remainder of the year. The lake elevation may vary from the guide or target level during periods of abnormal stream flow caused either by heavy rainfall or prolonged drought. Public comments indicate that there is some interest in re-evaluating the guide curve elevations – to develop a year-round discharge hydrograph that would mimic pre-impoundment discharges; as well as to evaluate adjusting the allocation of the storage in Philpott Lake.

Flood Control: The primary purpose of Philpott Lake is flood control. The flood control plan for Philpott Lake provides for reducing damaging stages on the Smith River during each flood as much as possible, and reducing stages on the Dan River during each flood as much as possible. The project design and current plan of operation establish controlled flood storage from elevation 974 to 985 feet, msl. There are 34,200 acre-feet of storage in the controlled flood pool. Uncontrolled flood storage is provided above elevation 985 feet, msl, which is the crest of the ogee-type ungated spillway, to 1,014 feet, msl, and the crest of the dam. Approximately 117,900 acre-feet of storage are provided in the uncontrolled flood pool.

When Philpott Lake is below the crest of the spillway, then the flood control plan calls for the releases up to 5,700 cubic feet per second (cfs), allowing use of all three turbines and one sluice gate. This release rate allows for vacating flood storage within five days, approximates bank full discharge (estimated at 6,000 cfs), and is below damaging flows in downstream urban areas (7,800 cfs at Bassett, Virginia). If the lake elevation rises above 985 feet, msl, then the flood control plan calls for releases such that flows at Bassett, Virginia remain at or below 7,800 cfs, which vacates the flood storage as quickly as possible without causing significant damage downstream. If the stage at Bassett, Virginia is 13 feet or higher, then all turbines and sluices are shut down, regardless of the lake elevation, until 24 hours after the local inflows peak.

> ***Upstream Effects of Flood Control***: No comments concerning flood control within the lake were received. However, experience with the project has revealed effects of flood control operations on the other project purposes. Impacts to recreation areas, such as swim beaches, campsites and boat ramps occur when floodwaters are stored within the lake. There is currently no private development along the shoreline of Philpott Lake, so damage to private property due to withholding floodwaters is not a significant concern. The minimum elevation that land has been purchased or flowage easement acquired is 998 feet, msl. The total surface area at this elevation is 4,060 acres.
>
> To the maximum extent possible, water released in accordance with flood control requirements will be used to generate hydroelectric power. However, the flood control plan may require shutting down the turbines temporarily for flood control measures downstream. The flood control plan also requires releases of stored floodwaters through sluice gates, in addition to the turbines, when excess flood storage needs to be vacated. The power companies prefer to have reliable and unrestricted operation of hydropower generation and not bypass the turbines for releases.

Downstream Effects of Flood Control: No comments were received concerning the effects of flood control on downstream entities. Concerns received to-date regarding floodwater releases are limited to the peaking hydropower operation. Flood and damage stages are identified for downstream locations in the Water Control Plan for Philpott Lake – Flood stage at Bassett, Virginia is 7 feet; damage stage begins at 10 feet.

Hydropower: Philpott Lake has an installed capacity of two vertical shaft Francis turbines rated at 6,700 kilowatts each and a smaller unit rated at 600 kilowatts. Providing Philpott Lake remains above the 951-foot level, the combined generator output provides a dependable capacity of 15 megawatts (MW). Hydropower is generated at Philpott Lake in accordance with contracts between Southeastern Power Administration (SEPA),Appalachian Power Company (APCO) and Dominion Generation. Kerr and Philpott projects are operated as a joint system, with respect to hydropower generation. Both projects produce hydropower independently to meet respective energy requirements. However, during extreme events, such as a drought, the two may be operated as a single system, where SEPA allows the power companies to generate power at one project to compensate for the inability to fulfill contract minimums at the other project. The revenue collected by SEPA for the sale of the power generated is used to repay, with interest, the cost of the Federal investment in both projects. Some comments received indicated that the public is concerned that this joint operation of the Kerr-Philpott system may create operational constraints at Philpott.

Philpott Lake normally operates as a peaking hydropower plant. As a peaking plant, the powerhouse at Philpott Lake supplies power at a high, fairly uniform rate during the maximum load periods and shuts down the remainder of the time. During the hours when generation is not scheduled, releases are made from the smaller turbine unit to satisfy minimum flow requirements downstream. The power plant's three hydraulic turbines have a total discharge capacity of 1,265 cfs. T Each of the two larger Francis turbines will typically discharge flows near 600 to 660cfs, while the third smaller turbine will discharge about 30 to 40 cfs. Water for hydropower generation is drawn from the lake from two intakes, positioned at elevation 902 feet, msl. These deepwater withdrawals result in hypolimnic, or coldwater, releases downstream.

The current hydropower operation was the subject of the majority of the comments received. The fluctuations in magnitude and temperature of releases from the dam appear to be points of concern for several stakeholders in the project. Stakeholders expressed concerns that the fluctuations in flows are adversely impacting the downstream aquatic habitat. There is particular interest in the quality of the trout fishery downstream of Philpott Lake. Although the coldwater releases from Philpott Lake created the suitable conditions for the stocked trout fisheries and supports the wild trout populations below the project, there is concern that the fluctuations in flow are degrading food sources and spawning areas for the trout. There is also concern that the sediment deposition resulting downstream is creating drastic changes in the coldwater releases from the dam and the warmer temperatures in these shallow areas. These impacts are also of concern to the diadromous fish spawning activities. The fluctuations in flows, especially the periods of low flows, are also of concern to the municipalities and industries that have either water supply intakes or wastewater discharge locations downstream, where allowable capacities or discharges are a function of flow. Downstream recreation is also impacted by the fluctuations in flows, as will be discussed in more detail later. In summary, the current “peaking” operation optimizes the flexibility of hydropower generation, and thus the return of revenue to the Federal Treasury. However, the fluctuations inherent to the peaking operation have adverse impacts on downstream aquatic habitat and recreation resources.

Recreation: Philpott Lake provides recreation opportunities within the lake as well as downstream of the dam.

Upstream Recreation: Philpott Lake, consisting of nearly 10,000 acres of public land and water, is located in a predominately rural setting in the foothills of the Blue Ridge Mountains in Virginia. It draws the majority of its visitors from a fifty-mile radius that includes the cities of Roanoke, Virginia to the north and Greensboro, North Carolina to the south. There are 11 existing recreation areas within the project boundaries at Philpott Lake. The Corps of Engineers and private concessionaires operate these facilities. The recreation areas at Philpott Lake were constructed in the 1950's. Some of these recreation areas need to be modernized. These recreation areas offer facilities for camping, picnicking, sight seeing, fishing, boating, swimming, hunting, water sports and other recreational pursuits. Numerous recreational resources lie within the Philpott Lake sphere of influence. Three State parks are located within the North Carolina portion of Philpott's sphere of influence and five State parks are located in the Virginia portion. Fairy Stone State Park, operated by the Commonwealth of Virginia, is adjacent to the Federal lands of Philpott Lake.

A rise or fall in the pool elevation at Philpott Lake has some effect on the lands surrounding the lake, recreation facilities, and project visitation. A rise into the flood control pool impacts some recreation facilities, such as swimming beaches, campsites and boat launching ramps. Floating facilities, such as docks and boat slips, may also be adversely affected at higher lake elevations. Other impacts to recreation that may be associated with high water levels include the accumulation of driftwood, the degradation of surrounding vegetation due to sustained inundation, and shoreline erosion as the floodwaters recede.

Recreation facilities, such as swim beaches, docks, boat slips, and launching ramps, are also impacted as the lake level falls below guide curve elevation during dry conditions. Drawdowns exceeding 10 to 15 feet from guide curve detracts considerably from the value of the lake for recreation. As the lake level falls, shorelines at swim beaches can recede to deeper and more dangerous waters, boat docks can be left out of water, and water levels at ramps can get too shallow to launch boats. Boaters also face the danger of exposed objects that are usually submerged by the normal water levels.

The Smith River, approximately 10 miles above the impoundment, has been identified as a whitewater resource. Currently access available to this resource is limited or difficult.

Stakeholders have identified a need to improve access to recreation resources in the lake, such as boating and fishing. They have also identified the need to improve channel markers and provide lighting in the interest of recreation safety.

***Downstream Recreation*:** The operation of Philpott Lake supports recreation in the Smith River below Philpott Lake as well. Visitors come to the Smith River to fish, canoe and kayak. The effects of the magnitude, frequency and temperature of the releases for hydropower operation at Philpott on the downstream fisheries will be discussed further in the fisheries section. The magnitude of the releases support downstream whitewater sports, but the frequency and inadequate reporting of information concerning the timing of these releases, in addition to the low flows between releases, hinder this recreation benefit. Stakeholders also identified a need to improve access to downstream recreation resources, such as boating and fishing.

Water Supply: There is currently no water supply allocation at Philpott Lake but upto 15% of the conservation (hydropower) pool can be reallocated for use as water supply storage. However, there are several municipal and industrial water supply intakes below Philpott Lake, in the Smith and the Dan Rivers. Minimum releases from the project affect withdrawal capacities downstream.

Water quality: The operation of Philpott Lake impacts the water quality in the lake as well as downstream of the dam. The level of shoreline development allowed and the changes in elevation due to flood control operation impact the quality of water in the lake. The peaking operation for hydropower generation impacts the quality of the Smith and Dan Rivers.

Upstream Water Quality: The water quality of Philpott Lake is ranked very high. It is rated unimpaired by the Virginia Division of Environmental Quality (VADEQ) under continuing testing for impairment by elevated fecal coliform levels, depressed benthic community life, low dissolved oxygen levels, and unbalanced pH levels. This rating can be attributed to the fact that there are no major sources of pollution into the lake. Stakeholders have expressed concerns that the integrity of the lake be preserved, and that the Project Master Plan be updated to assure that the quality of Philpott Lake waters and surrounding lands are protected.

Downstream Water Quality: Releases from Philpott Lake are of high quality, with respect to dissolved oxygen content, temperature, and turbidity. Studies in 1980 indicated that the reservoir releases consistently exceeded the minimum standard of 5.0 mg/l for dissolved oxygen content established by the Virginia Water Quality Standards for Class V (Put and Take Trout) waters. Dissolved iron and manganese concentration in 1980 samples were below the standards of 0.3 mg/l and 0.05 mg/l for dissolved iron and manganese, respectively, established by the Virginia State Water Control Board for public water supply. However, fluctuations in releases, due to the peaking operation for hydropower generation, impact the water quality in the Smith River downstream of the dam. The high flows that are released from Philpott Lake during periods of hydropower generation cause bank erosion. This eroded bank material then settles downstream as the peaking releases cease. The resulting shallow areas of sediment deposition create warmer temperatures, which are in contrast to the cold water being released from the dam, and appear to impact the health of the aquatic ecosystem**.**

The Smith River, downstream of Philpott Lake, is used as a source for industrial and public water supply. It is also a source for disposal of industrial wastes and domestic sewage. The Environmental Protection Agency (EPA) estimated the minimum flows required to provide suitable water quality. The minimum flow requirements downstream of Philpott Lake are as follows: at Stanleytown, Virginia – 59 cfs in summer; at Fieldale, Virginia – 45 cfs in summer; and at Martinsville, Virginia – 90 cfs October through May, 125 cfs in June, 140 cfs July through September 15, and 125 cfs September 15 through September 30. The flow at Martinsville, Virginia is controlled by a hydropower project operated by the City of Martinsville, Virginia. Thus, the minimum flow of the Smith River can be supported by releases from Philpott Lake only in the reach from the dam to the Martinsville Reservoir. A minimum flow of 35 cfs has been found adequate for fish and wildlife conservation in the river channel immediately downstream from Philpott Lake.

There is concern that the minimum flows released from Philpott Lake can support the current and future demands for water supply withdrawals. Point discharges into the Smith and Dan Rivers downstream of the project were also raised as a concern by the stakeholders.

The minimum flows released by Philpott Lake affect the discharges allowed by industries and municipalities downstream.

The Virginia Department of Environmental Quality (VADEQ) and the North Carolina Department of Environment and Natural Resources (NCDENR) have for several years documented water quality problems in the Smith River downstream of Philpott Reservoir. The documented water quality problems reported over three decades include taste and odor problems in finished water, color, high conductivities, chlorides, and elevated total dissolved solids concentrations in raw water. VADEQ also reported impairment of benthic communities in the Smith River below wastewater plant discharges at Martinsville, Virginia. However, no bioaccumulative metal or organics were found in the stream benthos.

The regulated flows from Philpott are a factor in the water quality conditions observed in the Smith River below the dam. The quality of the Philpott releases is not adversely affecting downstream water quality in the Smith River, and the quantity of water being released meets established streamflow targets at Stanleytown, Virginia. Philpott releases control the hydrology of the Smith River below the dam.

The Philpott water releases themselves do not contribute significant loads of chlorides and increased conductivities to the Smith River. Significant loadings are made with municipal and industrial wastewater discharges to the Smith River below the dam. These facilities continually discharge to the Smith River. When Philpott is not making hydropower releases, the discharges tend to pool in the vicinity of the discharge pipes. As weekday peaking power generation begins and the flow surge leaves Philpott, the contents of the Smith River are pushed in a surge ahead of the flow. On Saturday and Sunday, weekend lulls when hydropower releases are not made, a volume of waste accumulates in the river. Monday's surge can produce a peak or slug of affected water reflecting the accumulated materials.

In 1987 and 1988 at the request of the Virginia State Water Control Board (VASWCB) and EPA Region 3, the U.S. Army Corps of Engineers' Waterways Experiment Station, Environmental Laboratory, attempted to use the Corps of Engineers' CE-QUAL-RIV1 one-dimensional riverine hydrodynamic and water quality numerical model to study the Smith River below Philpott. The model study was to evaluate the water quality impacts of modifications to point source loadings and impoundment releases from Philpott Dam. The model application was not successful in providing useful data. The model could not accommodate the high and low flow conditions present in the system.

In 1998 VADEQ coordinated with the VDGIF to conduct a fish community assessment. In 1999 the status of fish communities below the sewage treatment plants in Martinsville was found by VADEQ and VDGIF to be much better than they expected prior to the assessment. Improvements in the benthic invertebrate population were also noted at that time.

Drought Management: A drought is a shortage of rainfall over an extended period of time, and is considered a naturally recurring climate condition. Droughts are successional and typically manifest themselves as agricultural droughts, surface water depletion, or groundwater depletion. Drought conditions impact the efficiency and capacity of hydropower generation, use of recreation facilities, downstream water quality conditions, and water supply withdrawals downstream.

The Water Control Plan for Philpott Lake provides guidance for operation procedures during times of drought in the Drought Contingency Plan. Numerous factors, including the Kerr-Philpott system power demands, lake elevation, time of year, duration of the rainfall deficiency, and the severity of

the drought, have an impact on the management of the project in drought conditions. The pool elevation at Philpott Lake is currently used as an indicator for when the project is considered to be in drought status and for making decisions to initiate action during drought conditions.

As the lake level falls into certain "zones," the Wilmington District initiates correspondence and actions in order to inform the public of possible worsening conditions and to request measures to conserve the storage in Philpott Lake so that water may be available for a longer period of time. Power companies may be requested to consider reducing energy generation from Philpott to less than is required by contract, or be asked to replace the energy foregone with energy generated or purchased elsewhere. Philpott Lake shares system demands with Kerr Lake. During drought operation at Kerr, Philpott Lake may be relied upon to provide the energy foregone due to conservation measures requested at Kerr. Other options available during periods of drought include, but are not limited to reducing water quality releases, with agreement of the State(s) affected, and releasing water from Fairy Stone Lake into Philpott Lake by the Commonwealth of Virginia.

The most recent drought (1997 – 2002) was the most severe in the period of record. Due to the severity of drought conditions during this time, Wilmington District Water Management deviated from the existing Drought Management Plan. The existing plan calls for additional releases from Philpott Lake to supplement inflows to Kerr, and for increasing generation from Philpott Lake to replace the energy foregone by reductions at Kerr. Since one foot of storage in Kerr is equivalent to roughly 15 feet of storage in Philpott Lake, depending on losses between the two, the Wilmington District and other stakeholders in the Roanoke River Basin agreed that the negative impacts to recreation and natural resources from drawing down Philpott Lake would be larger than the benefits gained at Kerr.

Fish and Wildlife Resources

Wildlife Management: Protection of wildlife resources has been vested in the Virginia Department of Game and Inland Fisheries (VDGIF) since 1952 following the completion of Philpott dam. Techniques of management practices were developed by VDGIF and Corps of Engineers personnel for the benefit of all species of wildlife on designated wildlife land areas as well as suitable non-designated areas. Wildlife land and water acreage was licensed to the VDGIF on 11 August, 1969, for a period of 20 years with an option of renewal exercised on 11 August 1989, Wildlife management lands leased by the Corps to the State of Virginia consists of 5,914 acres Management of such lands promotes not only increased recreational possibilities for sportsmen but also creates outdoor classrooms and research areas and offers opportunities for photographing wildlife in natural surroundings.

Resident Game Species

• Wild Turkey	• Canada Goose	• Red Fox
• Bobwhite Quail	• White-tailed Deer	• Muskrat
• Mourning Dove	• Gray Squirrel	• Beaver
• Wood Duck	• Cottontail Rabbit	• Mink
• Black Duck	• Raccoon	• Black Bear (rare)
• Mallard Duck	• Opossum	• Ruffled Grouse (rare)

Upstream Fisheries Management: The Virginia Department of Game and Inland Fisheries (VDGIF) has managed both the lake and tailwater fisheries resource since 1952. The stated management objective for the lake fisheries has been to offer viable populations of coolwater fish species not available in other reservoirs within the VDGIF district due, perhaps in part, to habitat limitations. Objective species have included rainbow trout, brown trout, and walleye. Population studies, reports, and various other information continue to be exchanged between VDGIF and the Corps of Engineers. Philpott Lake supports a fishery of moderate value. The major species of game fish being managed are the largemouth and the smallmouth bass. Smallmouth bass were native to the river and tributary streams prior to impoundment. The lake was stocked with 1,000 largemouth bass in the spring of 1952 by the VDGIF. Largemouth have been successfully replenishing themselves through natural reproduction since that time. In July of 1974, the VDGIF imposed a minimum size limit on bass caught in Philpott Lake and other impoundments throughout the state. Although trout stocking has been discontinued above the dam, stocking for walleye continues in the lake. Harvest of smallmouth and largemouth bass is regulated by a 12-inch size limit and a creel limit of five per day. Trout harvest is restricted to a 10-inch size limit and a creel limit of five fish per day. Walleye harvest is regulated by a creel limit of eight per day and there is no size or creel limit imposed on the other types of available fish. No species of fish in the lake are controlled by closed fishing seasons.

Downstream Fisheries Management: The deep-water withdrawals for the peaking hydropower operation result in widely fluctuating flows of cold water downstream of Philpott Dam. These cold-water releases have helped establish one of the top cold-water fishing resources in Virginia. This 20-mile river reach, from the Philpott Dam to Martinsville, is managed as both a stocked rainbow trout and a wild brown trout fishery. Trout fishing is restricted periodically in the tailwater, where there exists an extensive stocking program. There is a concern that the existing wild brown trout fishery is operating well below its maximum potential in these waters. Possible factors include: point and non-point discharge; fluctuating temperatures and flow; sedimentation, and lack of food organisms. An Instream Flow Incremental Methodology (IFIM) study prepared by the U.S. Fish and Wildlife Service in 1985 indicated that the existing flow regime severely limits habitat for all life-stages of brown trout. Benthic invertebrate surveys performed by Virginia Department of Environmental Quality at selected sites in the Smith River near Martinsville, Virginia have indicated impairment of the river. Detailed studies are needed to determine the source of these problems and develop appropriate corrective actions. The local interests are also concerned with reducing a significant potential for flood damages along the Smith River, but water quality issues within the basin are of chief concern. Local interests want the current trends reversed or at least stabilized. The environmental and economic viability of the region is at stake.

Endangered Species: The following is a list of endangered (E) and threatened (T) species, which may occur in the project area (Franklin, Henry, and Patrick Counties).

SPECIES	**SCIENTIFIC NAME**	**STATUS**
Roanoke logperch	*Percina rex*	E
Small-anthered bittercress	*Cardamine micranthera*	E
Smooth coneflower	*Echinacea laevigata*	E
Bog turtle	*Clemmys muhlenbergii*	PT(S/A) [1]

1. PT(S/A) - proposed threatened due to similarity of appearance to a Federally listed species

Roanoke logperch: The Roanoke logperch is endemic to the Roanoke drainage and its greatest population density is found in the Roanoke River. This species typically inhabits relatively clean sections of moderate size streams having a succession of riffle-run-pool habitats (Burkhead, 1983). The Roanoke logperch is typically a riverine species and is unlikely to be found in Philpott Lake. It is known to occur in the Smith River downstream of Philpott Dam, as well as in streams above the lake.

Small-anthered bittercress*:* Small-anthered bittercress grows on streambanks and in moist woods near wooded streams (Cooper et al., 1977), and potential habitats could exist along river and stream banks upstream and downstream of the impounded waters of Philpott Lake.

Smooth coneflower*:* The smooth coneflower is typically found in open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way. Potential habitat for this species exists in the Philpott Project area.

Bog turtle: According to VADGIF, the presence of the Bog Turtle has been documented in Patrick County. Potential habitat could exist in areas of open wetlands associated with slow-moving waters in tributaries of Smith River and Philpott Lake.

Natural Resources

Topography: Philpott Lake is located in the southwest Piedmont of Virginia within the Roanoke River Basin. The dam site and lower portion of the lake are on the Piedmont Plateau. The lake area is an impoundment of the Smith River which flows southeasterly to its confluence with the Dan River in North Carolina. The ground surface in this vicinity varies from approximately 800 to 1,100 feet above mean sea level and has a local relief of 300 to 500 feet above the lake. The upper portion of the lake lies on the foothills of the Blue Ridge Mountains. The total project area includes a 2,880-acre lake and 6,770 acres of land located within three counties. The topography consists of narrow V-shaped valleys and steep-sided ridges in the central and northwestern parts of the area and rolling terrain in the southeastern part. Elevations around the lake range from a maximum of 1,786 feet at Brown Hill, a ridge in the north, to a low of less than 770 feet in the southeast, below the dam.

Slope: Slope is one of the major environmental factors determining the capability of land to support various land use activities. The average slope is approximately 30-35 percent with extremes ranging from nearly flat in narrow valleys to greater than 80% along the lake. Lands in the 0%-8% range are generally confined to broad ridge tops, natural flood plains, and secondary terraces. Vegetation on these areas generally consists of mature forests. The overall percentage of project lands in the 0%-8% category is very small. Typically occurring on hillsides and rather evenly dispersed throughout the project, lands in the 8%-15% slope range are not extensive on the project. Land areas that have slopes in excess of 15% are best utilized as natural buffer and for forest, wildlife, and watershed conservation.

Geology and Soils: Major geologic formations are composed of metamorphic rocks. Schist and gneiss rocks of uncertain age underlie the southeast part of the lake while Moneta gneiss and the Precambrian Lynchburg Formation underlie the northwest section. Quartzite and metagraywacke are ore common in the northwestern portion of the area. The soils of the Philpott area are generally shallow loams. Of the 24 different soil series occurring on the area, 60% are residual, 30% alluvial, and 10% colluvial. The numerous steep slopes around the lake have a "mixed stony" textured surface horizon. The average depth of the A and B-horizons is 30 inches and ranges from 5 to 60 inches. The depth of bedrock ranges from 10 inches to 50 feet.

Vegetation Types: Soil properties influence vegetation growth. Differences in soil depth, texture, slope, moisture capacity, and nutrient content determine the species and growth rates of vegetative cover. The Philpott Lake area supports several vegetation types that are typical throughout the Piedmont and Blue Ridge Mountain region of Virginia. Four major vegetation cover types have been identified on project lands. Upland Hardwood, which covers 64% of Project Land Area, is the most extensive cover type found on project lands, representing the climax forest type for the region. The association is dominated by oak and hickory, along with a few pines. More than twenty species of trees and shrubs have been identified in these stands. Pine covers 23% of project land area. These are the first trees to become established in secondary succession and can maintain dominance for up to 100 years. The major pine species found at the project include white pine, short leaf pine, and Virginia pine. Mixed Woodland covers 12% of project land area. These stands typically contain approximately 31% pines and 69% hardwoods. Mixed woodlands generally occur for two reasons: either as an intermediate stage of succession or as a result of selective timber cutting. In ether case, this forest type will normally mature into the climax oak-hickory forest. Open Land covers 1% of the project land area. Included in this category are all lands with less than 10% canopy closure. These areas include agricultural lands, utility right-of-ways, lawn areas, and open areas associated with recreation use. The vegetation of these areas generally consists of mown grass or row crops. Trees and shrubs are often maintained for aesthetic, wildlife, or screening purposes within these areas.

Shoreline Management: The Shoreline Management Plan for Philpott Lake has been in place since the early 1990's to ensure future shoreline protection and restrictions on future facility developments. Generally, permits and licenses for docks and floating facilities are granted in areas that are not being used for recreation or other high priority purposes. Facilities are allowed in areas zoned for future recreation use only if floating facilities were located in these areas prior to zoning. Permits for floating facilities are limited to a one-year term, which allows cancellation of the permit if the areas are needed for recreational development. Access to permitted floating dock facilities is by unimproved footpaths or by boat. The general public has legal access on all Federal fee-owned lands at Philpott Lake except prohibited areas that have been restricted for safety or security reasons. Citations are issued where Title 36 CFR violations occur such as littering and unauthorized camping. There are 18 public boat-launching lanes at Philpott Lake. These are dispersed throughout the lake area and provide ready access for the boating public.

Erosion and Siltation:

***Upstream Erosion and Siltation*:** Erosion of the shoreline at Philpott Lake has been slowly progressing over the past several years. In some areas escarpments (small cliffs) of one to three feet in height have developed. A formal erosion study at Philpott has not been conducted. However, it is thought that the erosion is most likely a result of several factors, including the steep terrain, the highly erodible soils, the increased use of personal watercraft, and normal fluctuations in the lake level.

Downstream Erosion and Siltation: Operation of Philpott Dam creates downstream pulsing flows which result in localized areas of scour that disturb benthic habitat, which in turn limits growth and production of young trout and their prey. Suspended sediments also result in increased temperature of water, which has an impact on downstream fisheries.

Aesthetic and Scenic Resources: The aesthetic and scenic resources at Philpott Lake are exceptional. Philpott Lake and surrounding lands cover approximately 10,000 acres, including 100

miles of nearly undeveloped shoreline, and 6,770 acres of relatively undeveloped public lands. The lake is nestled in the rugged foothills of the Blue Ridge Mountains, which frame many of the vistas from the lake. Wildlife can be viewed from the lake or shore, from picnic areas and campsites, or from the nature and hiking trails that follow the lake and Smith River. Public comments indicate a significant interest in preserving the scenic beauty of the lake.

Cultural Resources: The archaeological predictive model used for the Philpott Project consisted of a survey of a 5% sample of the fee owned property. The sample area was approximately 321 acres. The sample design used for the study was a clustered, stratified, random sample procedure. The sample involved the delineation of three topographically distinct landforms (ridges, slopes, and terraces). The proportion of each landform was measured from topographic maps using a planimeter. Next, the entire reservoir was divided into units or clusters each measuring approximately 247 acres. This resulted in the delineation of 24 clusters. Each cluster was assigned a number, and four clusters were selected from a table of random numbers for examination by intensive survey.

In total, 20 sites and five isolated finds were recorded during the survey. Of these, seven contained prehistoric components, nine contained historic components, and three sites exhibited both prehistoric and historic remains. The prehistoric sites were all represented by scatters of chipped stone with no diagnostic materials. The historic sites were of three types, including domestic sites (former farmsteads or homesites), cemeteries, and abandoned liquor stills. None of the sites recorded during this survey are considered eligible for inclusion on the National Register of Historic Places. The only archaeological property located at Philpott Lake that is considered eligible for inclusion on the National Register of Historic Places is Archaeological Site 44Pk9.

Expected Future Conditions

Flood Control: Factors that could affect the ability of Philpott Lake to provide adequate flood control for downstream entities include possible increased development upstream of the lake, which could increase and change the timing of inflows to the project; potential constraints on the rise or fall in lake elevations; potential constraints on the ability to release stored flood waters from the lake; and increased development downstream of the project, which could affect the magnitude of releases.

Philpott Lake extends into Franklin, Henry Counties in Virginia. Census data indicate that the populations of these counties have increased 19.6 %, 1.7%, and 11.1% respectively, between 1990 and 2003. The Wilmington District does not foresee future impacts to the ability of the Philpott Lake project to provide adequate flood control. No comments were received from the public addressing flood control issues.

Hydroelectric Power: Increased power demands are expected in the future. However, an increased need in capacity at Philpott Lake is not anticipated. The transmission lines that distribute power generated at Philpott Lake are at maximum capacity. Thus, an increase in generation capacity at Philpott Lake would require significant and costly upgrades to the transmission lines. There is a need to look into more efficient generators to reduce the flows needed to produce each megawatt of energy. This would reduce the magnitude of flows released during the peaking operation, while maintaining the contract requirements and flexibility of power generation.

There is significant public concern that the fluctuations in flows produced by the peaking operation at Philpott Lake will continue to degrade the aquatic habitat downstream and have a negative impact on future trout populations and the associated recreation and economic benefits.

Recreation: Recreational use at Philpott Lake continues to increase upstream and downstream of the dam. Philpott Lake is a recreation resource that provides the surrounding communities with opportunities for economic improvement. There is significant public interest in improving access to recreation sites in and adjacent to Philpott Lake and on the Smith River downstream of Philpott Dam.

Upstream Recreation: Visitation to Philpott Lake is expected to increase, especially as other nearby lakes become increasingly crowded. As the numbers of visitors increase, recreation facilities will need to be expanded, improved, and modernized to meet the future demand. Plans are already in place to increase environmental education opportunities and interpretive exhibits, as well as expand nature, hiking, biking and equestrian trail systems. Public thoughts differ concerning the extent of development that should be allowed on Philpott Lake for recreation. There is some public interest in allowing developments such as marinas, boating supply shops, and bait shops on the lake. However, there is also public interest in improving access to the lake while prohibiting private development of the Federal lands.

Downstream Recreation*:* Recreation below Philpott Lake includes fishing, boating, and whitewater sports. Interest in these opportunities is expected to continue to increase. However, continuing the current peaking hydropower operation may not support an increased participation in downstream recreation. The continued peaking hydropower operation from Philpott Lake may not have further adverse effects on boating, canoeing or kayaking, but the resulting fluctuations in downstream flows may further degrade the fishing opportunities downstream.

Water Supply: Water supply demands are expected to continue to increase. Water is withdrawn from the Smith and Dan Rivers for municipal and industrial uses. The low flows that occur between the hydropower peaking releases impact the number and magnitude of water supply withdrawal rates and impact the requirements placed on municipal wastewater discharges in the Smith and Dan Rivers. There is public interest in providing minimum flows from Philpott Lake that support continued operation of existing water or wastewater treatment plants. There is also interest in providing adequate discharges to support the future demands for water supply.

Water Quality:

Upstream Water Quality: Census data indicate that the populations of Franklin, Henry, and Patrick Counties have increased by 19.6 %, 1.7%, and 11.1% respectively, between 1990 and 2003. It is not expected that this rate of growth will increase. Therefore, it is not anticipated that there would be a significant impact on water quality due to a significant increase in population.

Downstream Water Quality*:* The operation of Philpott Lake has a significant impact on downstream water quality. This operation is expected to continue without significant alteration. While downstream water quality is expected to continue to degrade, the rate of this degradation is not expected to increase significantly.

Drought Management: The existing Drought Management Plan provides guidance for conserving storage in Philpott Lake during drought conditions. The plan was developed to maintain enough storage at Philpott to protect in-lake recreation and natural resources and to provide sufficient releases to support downstream water quality and natural resources, while attempting to meet hydropower contract minimums for as long as possible during the drought.

During the most recent drought, which was the most severe drought of record, Wilmington District Water Management and stakeholders recognized the need to study the impacts of low lake elevation at Philpott Lake to in-lake resources. Droughts are recurring events. Interest in recreation and the natural resources at Philpott Lake are expected to continue, if not increase. Therefore, there is a need to understand the impacts of the existing Drought Management Plan, and provide updates that include recent experience and future demands.

Fish and Wildlife Resources:

Wildlife Management: Since the high ground associated with Philpott Lake will remain relatively undeveloped, there exist unusual opportunities for maintaining and furthering a good balance of wildlife species, as compared with other more intensely-developed reservoir lakes. The types and extents of development allowed under the Operational Management Plan (OMP) could be effectively adjusted and balanced with the need for appropriate wildlife habitat. The OMP itself as a "living document", can change as the need occurs to keep human use in reasonable balance with native wildlife. Natural habitat could be enhanced to benefit the scarcer species of wildlife and create a more natural balance. Pursuant to the OMP, wildlife management measures could also be taken to control overpopulation of the more common species.

Upstream Fisheries Management: Continuing study is needed to understand the nature of the Philpott Lake fishery, which has been termed an "enigma" by the VDGIF. Featured species such as trout, become "absent" after stocking, or growth-limited and relatively unexploited by anglers, as in the case of walleye. According to VDGIF, largemouth and smallmouth bass populations seem to be perpetuated with intermittent strong year classes, although the mechanisms driving year class strength are not understood. In order to better understand the fishery and better manage it, VDGIF has proposed several actions:

(1) Enhance the visibility of the walleye resource through informative articles and promotional partnerships with the Corps of Engineers. Either increase angler exploitation of this resource or sizeably reduce the stocking density.
(2) Aggressively sample the trout fishery with gill nets, telemetry, and hydroacoustics to better understand abundance and distribution patterns within the reservoir. Communicate effective trout angling techniques to the angling public.
(3) Evaluate predation of stocked trout by walleye to determine whether it is insignificant, or whether it limits walleye growth in the reservoir.
(4) Analyze mortality rates of walleye over a continuum of age classes by use of shoreline gill net sets.
(5) Identify factors controlling year class strength of bass species, using residual analysis from catch curves.

The upgrading and development of shoreline angler access around the lake could also benefit the fishery with minimal impact on aquatic habitat.

Downstream Fisheries Management: An important potential improvement in fisheries management would be the successful enhancement of brown trout habitat in the Smith River below Philpott Dam. Stakeholders have suggested that future studies should include imodification of dam discharge conditions, to reduce the currently extreme variations in downstream flow. This could reduce bank and bottom scouring and radical temperature variations below the discharge, and increase the availability of forage fish and insects. Reduced variations in flow may also widen the range of clean, suitably sized spawning gravel for the brown trout. Such gravel is currently forced downstream by high flows from the dam, and eventually covered by sedimentation where flow subsides in the lower reaches. Such improvements could result in the dual benefit of both economic gain for the region due to fishery improvements, along with the improvement of aquatic resources. A 1998 analysis by Virginia Tech graduate Jonathan Hartwig concluded that doubling an angler's chances of catching a large brown trout would more than double the net economic value of the Smith River fishery. Other improvements might include development of passages for diadromous fish species into and through Philpott Lake from downstream. Structural improvements such as upgrading and developing shoreline angler access could benefit the fishery with minimal impact on aquatic habitat.

Endangered Species: The potential occurrence of Threatened and Endangered Species must be considered in the planning of any work that could affect their potential habitat. Where any such species occur, coordination with Fish and Wildlife Service must be done prior to starting work in those areas.

Roanoke logperch*:* The Roanoke logperch could be affected by work activity in areas draining to the Smith River and its tributaries, and upstream of waters impounded by Philpott Dam, as well as by any work at Philpott Lake which may affect the quality of waters discharged through the dam.

Small-anthered bittercress*:* Small-anthered bittercress could be affected if encountered in proposed work areas along streambanks and in moist woods near wooded streams up- and downstream of the impounded waters of Philpott Lake.

Smooth coneflower: The smooth coneflower could be affected if encountered in any proposed work areas in open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way. These areas of potential habitat could occur in high-ground areas of the Philpott Lake boundaries.

Bog turtle: The Bog Turtle could be affected, if encountered during any proposed work activity in areas of open wetlands associated with slow-moving waters in tributaries of Smith River and Philpott Lake, particularly in Patrick County.

Shoreline Management: The Shoreline Management Plan for Philpott Lake has been in place since the early 1990's to ensure future shoreline protection and restrictions on future facility developments. The Philpott Lake shoreline continues to be managed in accordance with the policies established in this plan. It is not anticipated that significant changes in shoreline management policy will occur.

Erosion and Siltation:

Upstream Erosion and Siltation: Upstream of Philpott Dam, Philpott Lake is subject to both erosion and siltation, however neither is considered a serious concern at this time. It is anticipated that shoreline erosion and sedimentation will continue at existing rates as long as there are not significant changes in the operation of Philpott Lake.

Downstream Erosion and Siltation: Operation of Philpott Lake has a significant impact on downstream erosion and siltation. This operation is expected to continue without significant alteration. This will result in continued scour and downstream sedimentation. While downstream habitat is expected to continue to degrade, the rate of this degradation is not expected to increase significantly.

Aesthetic and Scenic Resources: Impacts on aesthetic and scenic resources found at Philpott Lake are expected to increase as development continues in the Study Area. Public comments indicated an interest in maintaining the natural beauty of Philpott Lake and surrounding areas, while providing access to the lake's recreation resources.

Cultural Resources: The lands surrounding Philpott Lake have a potential to contain significant prehistoric and historic archaeological resources. Prior to any ground disturbing activities archaeological investigations will be required. Changes in operation of Philpott Dam have the potential to affect archaeological resources if operational changes induce shoreline erosion. Archaeological site 44Pk9 is located in an area that may be affected by changes in operations. This site should be closely monitored. There are no standing structures upstream of Philpott Dam that will be affected by changes in the operation of the Dam. Downstream affects are expected to be minor.

Problems and Opportunities: Based on the Reconnaissance Phase scoping process, the goals of the 216 Study are to evaluate problems and opportunities for possible improvements or enhancements at Philpott Lake. The improvements and enhancements may be related to: (1) hydropower, (2) hydrologic conditions in the Smith River, (3) flood control, (4) water supply, (5) water quality, (6) ecosystems downstream of Philpott Lake, (7) ecosystems upstream of Philpott Dam, (8) recreation, (9) tourism, and (10) recommendations for future land-use.

Alternative Plans: Alternative plans will address the concerns identified in the Reconnaissance Phase scoping process. The alternative plans will be developed in more detail during the feasibility study and may include, but are not necessarily limited to the following:

(1) Operational change alternatives
   (a) changes in flood control releases
   (b) changes in guide curve levels
   (c) changes in hydropower release rates; and
   (d) changes in the levels of the conservation or controlled flood storage pools
   (e) modification or replacement of existing turbines to allow more desirable flow rates
(2) Re-allocation of storage alternative
   (a) re-allocation of storage within the conservation pool
   (b) re-allocation of storage within the controlled flood storage pool.

The feasibility study will also address the following items.

(1) Operations of Philpott Lake
   (a) Low flow augmentation
   (b) Aeration/dilution
   (c) Erosion/siltation
   (d) Flooding
   (e) Fish habitat
   (f) Pool elevation stability
   (g) Hydropower peaking

(2) Land-use
   (a) Local zoning and future planning
   (b) Urban growth and future development
   (c) Topography drainage ways
   (d) Flood plains
   (e) Wetlands (hydrologic units, adjacent-isolated, types, etc.)
   (f) Vegetation
   (g) Environmentally sensitive areas
(3) Hydrologic studies
   (a) Hydrologic model
   (b) Lag-times
   (c) Impervious cover (past, existing, future)
(4) Water quality
   (a) Water quality model
   (b) Impact of operational changes on water quality

All inventories will be accomplished in the Geographic Information System (GIS). Specifically, all the data collected (inventories) will be organized in a manner suitable for numerical and spatial analysis of the Smith River Basin. This data, once organized in a GIS system, will allow compatible access to and sharing with other State and Federal agencies and serve as a long-term data archive.

Preliminary Evaluation of Alternatives: At this level of study, a detailed analysis of the benefits and costs of each alternative associated with operational changes and storage re-allocation at Philpott Lake has not been performed. These alternatives will be evaluated in more detail during the feasibility phase of the Philpott Lake 216 Study.

During the feasibility phase of this study, applicable Corps of Engineers planning policies and guidelines will be used to evaluate proposed alternatives. Multi-objective optimization methods will also be used in evaluating proposed alternatives. The Project Management Plan (PMP) for conducting the feasibility study will be based on the identification of potential alternatives and will be coordinated with the non-Federal project sponsor. The feasibility phase will provide detailed evaluations of the alternatives and will result in the selection of a recommended plan. This final plan will be coordinated with study stakeholders.

6. Federal Interest

The Philpott Dam and Lake is presently operated as a multi-purpose project that includes flood control, hydroelectric power, recreation, water supply, low flow augmentation, and fish and wildlife. Resource concerns for the Smith River include downstream aquatic ecosystem restoration through improvements to the hydrologic regime and water quality which also will enhance the downstream trout fisheries. Ecosystem restoration is within the Federal interest and is a high priority budget output. At this level of the Study, operational change alternatives and storage re-allocation alternatives at Philpott Dam and Lake could result in net environmental benefits downstream for ecosystem restoration. Additional incidental benefits may be derived from increased recreation and tourism that would help the locally depressed economy. Based on preliminary reconnaissance analysis, there is a high probability that one or more alternatives will be economically justified.

7. Preliminary Financial Analysis

The Commonwealth of Virginia, represented by the Virginia Natural Resources' Deputy Regional Director of the Department of Environmental Quality, has indicated that they intend to sponsor the study and they look forward to working with the Corps of Engineers and all other interested parties. The Commonwealth has the financial ability to cost share in this study and also to cost share in project construction as evidenced by their performance on current and past Corps of Engineers studies and projects within the Wilmington District. The potential sponsor is aware that they will be responsible for 50% of the costs for feasibility phase studies as described in the Project Management Plan (PMP) and to also share in the costs of construction for any improvements recommended in the feasibility study. The letters of intent from the sponsor can be found as attachment 1.

8. Summary Of Feasibility Study Assumptions

The feasibility study assumptions will be used for formulation, evaluation, coordination, and reporting procedures for the feasibility study as described in Corps of Engineers Regulations (ER 1105-2-100 and ER 200-2-2) and related planning phase guidance. There are no anticipated deviations from the normal feasibility study procedures.

9. Feasibility Phase Milestones

The reconnaissance phase is scheduled for completion in January 2005 upon execution of the Feasibility Cost Sharing Agreement (FCSA). The reconnaisanc phase milestones are as follows:

Headquarters Approves 905(b) Analysis	September 2004
Complete Project Management Plan	December 2004
Execute FCSA	January 2005

The feasibility phase is expected to take approximately three years. The PMP will follow this three-year schedule and will identify funding needs for completion of the Feasibility Study. Feasibility phase milestones are as follows:

Begin Feasibility Phase (If funding received)	February 2005
Conduct Public Meetings	March 2005
Assess Baseline Conditions	April 2005
Describe Without-Project Conditions	June 2005
Identify Problems, Needs, and Opportunities	August 2005
Plan Formulation	May 2006
Endangered/Threatened Species Coordination	August 2006
Prepare Final Plan Descriptions	October 2006
Prepare/Process Integrated Report/EIS	September 2007

10. Feasibility Phase Cost Estimate

The preliminary programmatic cost estimate for the feasibility study is $2,000,000, which is to be shared on a 50-50 basis by Federal and non-Federal interests. This study estimate will be refined in the PMP and could change considerably based on the requirements for data collection, model studies, and analyses that will be identified for the feasibility study. A summary of the current estimated study cost sharing through the feasibility phase is as follows:

Reconnaissance Phase (Federal)	$100,000
Feasibility Phase (Federal)	$1,000,000
Feasibility Phase (non-Federal)	$1,000,000
Total Estimated Study Cost	$2,100,000

11. Views of Other Resource Agencies and the Public

A scoping letter was sent on December 8, 2003, to assist the Corps of Engineers in providing an assessment of water and related land resource problems and opportunities specific to the Philpott 216 Study Area. This letter was sent to various Federal, State, and Local agencies, and private interest groups. It indicated that the resource concerns for the Smith River could include operational change and storage re-allocation alternatives at Philpott Dam and Lake that could produce environmental benefits downstream for ecosystem restoration. The letter also explained that additional incidental benefits may be derived from recreation and tourism that could help the local economy. The scoping letter solicited comments from all interested parties and the general public to help in the identification of significant water resource issues and in the development of the project management plan. Twenty-eight comment letters were received. The list of groups that submitted comments includes:

Category of Respondents	Number
Federal agencies	2
Commonwealth of Virginia	6
State of North Carolina	3
Local agencies	4
Citizens	8
Commercial enterprises	2
Special interest stakeholders	3

The responses were grouped into the categories shown in Table 2. The areas of most concern based on comments received are: natural resources, downstream fisheries management related to the brown trout fishery, water quality, the Philpott guide curve and its effects on various resources, and upstream fisheries related to the largemouth bass fishery in Philpott Lake. Hydropower and upstream recreation were topics addressed in several comment letters. Downstream water supply and recreation, erosion and siltation, drought management, fish and wildlife, endangered species, cultural resources, and shoreline management are of concern. However; very few comments were submitted regarding these concerns. There were no comments received regarding flood control, upstream water supply, or aesthetic resources. Table 3 is a list of specific comments received for each category.

Table 2
Agency and Public Responses Grouped by Category
Ranked by Number of Responses

Natural Resources	25	17%
Fisheries Management - Downstream	21	14%
Water Quality	18	12%
Guide Curve	17	12%
Fisheries Management - Upstream	14	10%
Hydropower	12	8%
Recreation - Upstream	12	8%
Water Supply - Downstream	7	5%
Recreation - Downstream	6	4%
Erosion and Siltation	4	3%
Drought Management	2	1%
Fish and Wildlife	2	1%
Endangered Species	2	1%
Cultural Resources	2	1%
Shoreline Management	1	1%
Flood Control	0	0%
Water Supply - Upstream	0	0%
Aesthetic and Scenic Amenities	0	0%
Total	145	100%

TABLE 3
COMMENTS RECEIVED AS A RESULT OF
INITIAL SCOPING
RESOURCES AGENCIES AND PUBLIC RESPONSES
(GROUPED BY RESOURCE CATEGORY)

FLOOD CONTROL — 0 RESPONSES, 0% OF TOTAL
- ❑ No comments received

HYDROPOWER — 12 RESPONSES, 8% OF TOTAL
- ❑ Affect on Diadromous Fish Spawning
- ❑ Combine Kerr & Philpott 216 Studies
- ❑ Evaluate Operations of Kerr & Philpott as One
- ❑ Install More Efficient Generators
- ❑ Operational Constraints - Low of Revenue
- ❑ Operational Timing Restrictions
- ❑ Schedule Separate from Kerr

GUIDE CURVE — 17 RESPONSES, 12% OF TOTAL
- ❑ Downstream Flow
- ❑ Downstream Irrigation Withdrawals
- ❑ Minimum Downstream Flows
- ❑ Regulation of Downstream Flows
- ❑ Lake Level and Water Releases
- ❑ Assure Sufficient Releases to Operate STP
- ❑ Investigate Water Withdraws and Re allocation of Storage

RECREATION - UPSTREAM — 12 RESPONSES, 8% OF TOTAL
- ❑ Improve Channel Markers
- ❑ Provide Lighted Channel Markers
- ❑ Improve Access
- ❑ Improve Angler Access
- ❑ Marina Development
- ❑ Provide White Water Areas

RECREATION - DOWNSTREAM — 06 RESPONSES, 4% OF TOTAL
- ❑ Consult User Groups in Both States
- ❑ Improve Downstream Access
- ❑ Improve Public Information
- ❑ Locate Public Access Significantly Closer to Mouth of Smith River
- ❑ Increase Tourism and Recreation

WATER SUPPLY - UPSTREAM — 00 RESPONSES, 0% OF TOTAL
- ❑ No comments received

WATER SUPPLY - DOWNSTREAM — 07 RESPONSES, 5% OF TOTAL
- ❑ Identify Intakes
- ❑ City of Eden, NC Intake

WATER QUALITY — 18 RESPONSES, 12% OF TOTAL
- ❑ Downstream
- ❑ Identify Waste Water Discharges
- ❑ Investigate Low DO
- ❑ Investigate Runoff from Parking Lots
- ❑ Seek Information from VA and NC
- ❑ Upstream
- ❑ Water Temperature

DROUGHT MANAGEMENT — 02 RESPONSES, 1% OF TOTAL
- ❑ Effect of Drought on STP
- ❑ Effects of Drought on Water Supply Intakes

FISH AND WILDLIFE — 02 RESPONSES, 1% OF TOTAL
- ❑ Seek Information from VA and NC
- ❑ Affects of Inundation

FISHERIES - UPSTREAM — 14 RESPONSES, 10% OF TOTAL
- ❑ Fish Pathology in Lake
- ❑ Economics of Upstream Fisheries

FISHERIES MANAGEMENT - DOWNSTREAM — 21 RESPONSES, 15% OF TOTAL
- ❑ American Shad
- ❑ Fish Passage for Anadromous Fish
- ❑ Lack of Bottom Substrate
- ❑ Seek Information from VA and NC

ENDANGERED SPECIES — 02 RESPONSES, 1% OF TOTAL
- ❑ Consider Endangered Species During Analysis
- ❑ Consider Roanoke Log Perch

NATURAL RESOURCES — 25 RESPONSES, 17% OF TOTAL
- ❑ Master Plan - Focus on Economic Benefits
- ❑ Master Planning - Skiatook Lake Model
- ❑ Aquatic Resources - Downstream
- ❑ Aquatic Resources - Upstream
- ❑ Inventory Natural Resources - Downstream
- ❑ Inventory Natural Resources - Upstream
- ❑ Wetlands

SHORELINE MANAGEMENT — 01 RESPONSES, 1% OF TOTAL
- ❑ Update Shoreline Management Plan

EROSION AND SILTATION — 04 RESPONSES, 3% OF TOTAL
- ❑ Downstream Bank Erosion
- ❑ Downstream Sedimentation

AESTHETIC AND SCENIC RESOURCES — 00 RESPONSES, 0% OF TOTAL
- ❑ No comments received

CULTURAL RESOURCES — 02 RESPONSES, 1% OF TOTAL
- ❑ Cultural Resources - Archaeological Resources
- ❑ Cultural Resources -Historic Resources

12. Potential Issues Affecting Initiation of Feasibility Phase

At this time, there are no potential issues, which may affect the initiation of the feasibility phase or project implementation with the exception of the availability of Federal funds as this study was not included in the President's budget for Fiscal Year 2005.

13. Study Area Map

A map of the study area is provided as Enclosure A.

14. Recommendations

I recommended that this study continue into a cost-shared feasibility study. This recommendation is based on Army and budgetary policies, the likelihood that the criteria for Federal participation in project implementation will be met, and the Sponsor's desire to pursue this initiative.

Date: _____

_____
CHARLES R. ALEXANDER, JR.
Colonel, EN
Commanding

PHILPOTT LAKE AND VICINITY
PROJECT AREA MAP

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