

DRAFT PROJECT MANAGEMENT PLAN

FEASIBILITY STUDY  
UNDER SECTION 216 OF PUBLIC LAW 91-611, AS AMENDED

JOHN H. KERR DAM AND RESERVOIR  
LOWER ROANOKE RIVER  
VIRGINIA AND NORTH CAROLINA

Prepared by:

US Army Corps of Engineers  
Wilmington District

The State of North Carolina

The Commonwealth of Virginia

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Feasibility Cost Sharing Agreement

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## INTRODUCTION

This Feasibility Study is authorized under Section 216 of Public Law 91-611, the River and Harbor and Flood Control Act of 1970, as amended, to review the operation of the John H. Kerr Dam and Reservoir to report recommendations to Congress on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest. Information developed during the Feasibility Study may become the basis for actions specifically authorized by Congress or by the legislatures of the Sponsors, the State of North Carolina and the Commonwealth of Virginia, for actions under the continuing authorities of the Corps of Engineers, and for actions by non-government organizations. The Study provides an opportunity for the blending of the perspectives and assets of the parties and others to achieve the common goal. The parties commit to effective and efficient management of their responsibilities for the Study, and to the sharing of information about the Study.

Approval of participation in this Feasibility Study by the Corps of Engineers, Wilmington District, was based on a Reconnaissance Report and Supplemental Sheet check titles of documents. These documents said that the Feasibility Study would include the subjects identified by the Initial Appraisal Report for the Study, and by citizens at "listening sessions" held in the Study area. These more than 40 topics have been organized into 11 Study Subjects, and Tasks have been developed to begin the consideration of each Subject.

A key source of guidance for the Study is the Corps of Engineers Regulation 1105-2-100, Planning Guidance Notebook.

## STUDY AREA DESCRIPTION

The John H. Kerr Dam is located on the Roanoke River, about 178.7 river-miles above the mouth. It is in Mecklenburg County, Virginia, 20.3 miles downstream from Clarksville, Virginia, 18 miles upstream from the Virginia-North Carolina border, and 80 air-miles southwest of Richmond, Virginia. The area of inundation at the top of the gate elevation for the Reservoir extends upstream on the Roanoke River 56 miles and on the Dan River 34 miles. The project was completed in 1952.

Kerr Reservoir is a significant regional resource. It provides quality natural resource-based recreation for area residents and a desirable outdoor experience for more than 2 million visitors a year. It provides municipal and industrial water supply, wastewater assimilation, and enhanced farming and forestry opportunities. The Roanoke River Basin below John H. Kerr Dam and Reservoir is one of the finest remaining river swamp forest ecosystems within the eastern United States. These bottomland hardwood forests, uplands, and streams provide a high quality habitat for fish, wildlife and waterfowl.

The study area includes the John H. Kerr Dam and Reservoir and the Roanoke River Basin beginning at the Dam and proceeding downstream to the Albemarle Sound. For this study, the area will be referred to as the Lower Roanoke River Basin. The study area is located in the following Virginia Counties: Charlotte; Halifax; Mecklenburg; and Brunswick, and the

following North Carolina Counties: Granville; Vance; Warren; Halifax; Northampton; Bertie; Martin; and Washington. Furthermore, if any operational changes are proposed for the Kerr project, then the study area will have to be expanded to include the Philpott Reservoir as both the Kerr and Philpott projects are operated as a single system. The counties in the study area would then also include in Virginia: Patrick, Franklin, Henry, and Pittsylvania and in North Carolina: Rockingham, and Caswell.

The study area is located in the following Congressional Districts: the 4th and 5th in Virginia and the 1st and 3<sup>rd</sup> Districts in North Carolina.

## THE PHASES OF THE STUDY

This Project Management Plan (PMP) will be prepared in 3 phases. The first phase details the plan for the Feasibility Study to the first major decision point, the first In-Progress Review (IPR). In the first phase of the Study, existing data about the Study Subjects will be gathered and recommendations for further study will be developed. As the Study progresses, the PMP will be modified to detail the plans for Phases 2 and 3. Also, the Sponsors may request changes in the PMP, and it will be changed by the Corps as plans for the Study change.

When the Tasks in Phase 1 are completed, the parties will conduct an IPR with higher level Corps representatives and resource agency representatives. The IPR will be a Feasibility Scoping Meeting, as described in Appendix G of the Corps' Planning Guidance Notebook. The Feasibility Scoping Meeting will ensure that the Study is focused and tailored to meet specific objectives.

In Phase 2 of the Study, a variety of technical studies, appropriate to the matters under study will be performed to develop specific, quantitative and qualitative goals and objectives for the problems, needs, and opportunities. Phase 2 data collection, modeling, and analysis will set the stage for alternative development and assessment in Phase 3.

In Phase 3 of the Study, alternatives will be developed and evaluated to meet the goals and objectives in Phase 2. Outputs and impacts of each alternative will be determined, trade-off analysis performed, and, if appropriate, actions selected for recommendation to Congress. A feasibility report and National Environmental Policy Act documentation will be prepared.

In the first phase, the Project Management Plan includes the following work for each Study Subject:

- Gather and evaluate existing relevant data.
- Identify gaps in the existing relevant data.
- Develop recommendations to fill gaps in the existing relevant data.
- Identify and evaluate existing methods and tools for study of the subject.
- Develop a plan to keep models and data available to the public and in compatible formats.
- Develop an approach for combining individual models and investigations into an overall system evaluation.

- Develop a stepwise procedure to conceive and test alternatives to the existing condition.
- Identify and assess the risk associated with gaps in existing methods and tools for study of the subject.
- Develop recommendations regarding further study of the subject.

The level of accuracy in these descriptions and in the associated cost estimates depends upon the extent of uncertainties and the depth of investigations made to prepare them.

Although the detailed focus and scope of the entire Feasibility Study are not yet agreed upon, all work that is performed for the Study will, at a minimum, comply with legal obligations and administration policy, and will not compromise professional standards. This will allow the results of all of the Study, even those parts that do not receive detailed focus, to be useful and valuable to the Sponsors and the Corps. Requirements that exceed these minimum standards are likely and will be negotiated by the Sponsors and the Corps, based on complexity, available resources, and risk.

For each Study Subject, enough information will be developed in Phase 1 to produce a product that can allow the Sponsors and Corps decision-makers to decide what further study is needed. In addition, a product (evaluation of existing data and study methods and tools) will be produced that can be useful to both the Corps and the Sponsors regardless of whether they decide to pursue a Study Subject in the Feasibility Study. The goals for the first IPR are to provide information for making decisions about further study, and to provide information that is useful for operation of John H. Kerr Dam for its authorized purposes, for environmental restoration considerations, and for the Sponsors in the performance of their authorized functions.

## COMMUNICATION AND DECISION-MAKING PROCESSES

To strengthen communication and to facilitate decision-making regarding the Study, the Project Delivery Team (referred to as the Study Management Team in the Feasibility Cost Sharing Agreement) is committing to the processes described below for communication, and for identifying and resolving any concerns, problems, or disagreements. To the maximum extent practicable, all concerns, problems, and disagreements will be resolved at the earliest possible stage, by discussion among employees at the level in the Study management at which the matter arises.

Examples of matters that may be discussed in these processes include coordination of Corps requests for funds with the funding cycles of the Sponsors; a Sponsor's potential need to suspend the Study because of lack of funding; and identification of work which the Sponsors may propose for negotiation as work in-kind.

The Corps and the sponsors commit to make the identified individuals, or others with authority to act for them, available within the time periods established for these processes. They commit to use telephone and electronic communications, and face-to-face discussions, as needed to keep each other timely informed on all matters related to the Study.

As provided in the Feasibility Cost Sharing Agreement, to provide for consistent and effective communication, the following people are designated as representatives to the Executive Committee: **2 state people** and **PERSON TO BE DETERMINED** for the Corps. The Executive Committee will generally oversee the Study, consistent with this PMP, and will make recommendations it deems warranted to the District Engineer, including suggestions to avoid potential sources of dispute. The Executive Committee will meet at least quarterly until the end of the Study Period. Location and specific times will be worked out during the conduct of the study.

The Project Delivery Team will inform the Executive Committee of significant pending issues and actions, and will prepare written reports to the Executive Committee on the progress of the Study on a monthly basis. These reports will include expenditures for each Task, with monitoring adequate to provide time for full discussion of possible excess Study Costs before they are incurred.

To provide for full and timely discussion and resolution of any matter which may affect accomplishment of the Study, any member of the Executive Committee, the Project Delivery Team, or any subject matter specialist employed by the Corps of States may call for discussion of any concern, problem, or disagreement affecting the Study. The purpose of these discussions will be to maintain focus on accomplishing the Study.

At the conclusion of Phase 1, the project delivery team will prepare and present recommendations for Phase 2 to the Executive Committee. Recommendations from the PDT will include a proposed scope of work with tasks, costs, responsible party, and cost sharing requirements. The Executive Committee will make the final recommendation to the Commander, Wilmington District. This same approach will be used at the conclusion of each project phase..

Before any order under a contract is issued for work under the Study, the party issuing the order will allow the other parties at least 10 working days to review the order. To the extent allowed by applicable laws and regulations, any party receiving proposals for award of any contract will invite the other parties to participate in evaluation of proposals before making a contract award for work under the Study

#### PUBLIC INVOLVEMENT, COLLABORATION, AND COORDINATION WITH OTHER AGENCIES

As required by Appendix B of the Corps' Planning Guidance Notebook, the Feasibility Study will feature active, substantive involvement by interested government agencies and non-government organizations and businesses. The goal of public involvement is to obtain information and the views of those with an interest in the Study, so that their information and views can be fully considered in the planning process. For several years there has been significant public involvement in the application to the Federal Energy Regulatory Commission (FERC) of Dominion Resources Services for relicensing of hydropower facilities downstream of the Kerr Dam.

The Sponsors, Virginia and North Carolina, have established a Sponsors' Advisory Committee that includes many of those who participated in the FERC process. The Sponsors' Advisory Committee will provide input to the Sponsors for consideration as the Sponsors make decisions regarding the Study. The Sponsors' Advisory Committee includes representatives of federal, state, and local governments, and representatives of businesses and environmental organizations. In operating the Sponsors' Advisory Committee, the Sponsors will avoid creating the appearance of a conflict of interest for those who might become contractors for part of the Study.

No formal collaboration or coordination between the Corps and other agencies are anticipated during Phase 1. However, during Phase 1, subject matter specialists, many of whom participated in the FERC process and are members of the Sponsors' Advisory Committee, will be consulted regarding the Study Subjects. Other steps to obtain public involvement will be developed for Phases 2 and 3.

The costs of attendance at meetings of the Sponsors' Advisory Committee by members of the Executive Committee, the Project Delivery Team, and individuals responsible for performing work for the Corps or for performing in-kind work for the Sponsors shall be included in total project costs and cost shared. Other expenses of the Sponsors' Advisory Committee shall not be included in total project costs or cost shared.

For each of the 11 Study Subjects identified in this PMP for Phase 1, subject matter experts are identified. They include employees of the Corps and sponsors, and employees or representatives of other government agencies, non-government organizations, and businesses. Many of these subject matter experts have participated in the Dominion Resources Services' FERC relicensing process. The subject matter experts will be consulted for information and advice during the performance of each task. For the purpose of conducting Phase 1 actions, the sponsors will contribute 50% of the total project cost by in-kind services.

#### TIMELY INITIATION OF THE FEASIBILITY STUDY

Within 20 working days after signing of the Feasibility Cost Sharing Agreement for the Study by all parties, the Sponsors will advise the Corps about their anticipated ability to fund Phase 1 of the Study, and about their preferences for priority among the various Study Subjects and Tasks. The Corps will carefully consider this advice, and, if considering a different schedule of obligations or priorities will discuss the potential differences with the Sponsors before reaching a decision.

## **TASKS AND COSTS FOR PHASE 1**

### **1. Downstream Flow Regime and Effects on Riparian Ecosystem**

#### ***A. What water levels constitute a flood and what releases from Kerr Reservoir result in those water levels?***

Existing data regarding the relationships among releases from the Kerr Reservoir, downstream flooding, and downstream ecosystems will be gathered and evaluated in the study. Existing methods and tools for study of this subject will also be evaluated. The study will provide information about data, methods, and tools to aid in making recommendations for further study of this subject, which will be considered at the first In-Progress Review.

The relationships among Kerr Reservoir, downstream flooding, and downstream ecosystems are influenced by the effects of water releases from the two reservoirs operated by Dominion Resources Services immediately downstream of Kerr Reservoir, at Lake Gaston and Roanoke Rapids Hydropower Projects. These relationships are also influenced by other characteristics of the floodplain.

For the purposes of this Study, flooding will be considered to occur when water leaves the Roanoke River channel and enters the floodplain. The amount of daily average flow that causes a flood in different reaches of the River varies. Water from Kerr Reservoir contributes to downstream controlled flooding in two ways: (1) the total dispatch of water for a given week – the weekly declaration as affected by the Southeastern Power Association contract and operating guidelines, including flood control; and (2) the dispatch of water at any particular time within a given week – by Dominion Resources Services or Carolina Power and Light for power generation or when the Corps of Engineers supersedes this normal operation for flood control.

A primary cause of controlled flooding is the determination of weekly releases, including management of flood events (referred to as "flood operations"), by the Corps of Engineers. Weekly declarations over a threshold level can result in downstream flooding. Flood operations sometimes requires the controlled release of water above Lake Elevation 300 feet, mean sea level. During flood operations, the Kerr, Gaston and Roanoke Rapids hydropower projects are operated in conformance with the Water Control Plan for John H. Kerr Dam and Reservoir. Recommendations for detailed data gathering about, and study of, the effects of these releases will be developed in accordance with Corps of Engineers Regulations. This study will examine the Kerr flood operations and their effects, and, unless significantly impacted by the flood operations, the Federal Energy Regulatory Commission licensed discharges will be beyond the scope of this study.

A secondary cause of controlled flooding is the generation of peaking power by Dominion Resources Services and Progress Energy. The magnitude and frequency of discharges for peaking power can cause the river's stage below the Roanoke Rapids Project to exceed channel capacity, and thus water to flow into the floodplain, depending

on the magnitude, duration, and pattern of peaking events. The effects of flow regime downstream of Roanoke Rapids Hydropower Project due to peaking power are currently being studied in the Federal Energy Regulatory Commission's processing of Dominion Resources Services' application for re-licensing. These data will be obtained and evaluated for relevance and adequacy for the study of this subject. If gaps in the relevant data are identified, they will be evaluated for significance, and, if needed, recommendations for obtaining additional data will be developed. Recommendations for obtaining additional data may be needed, and the estimates of time and cost for this work are based on this possibility.

Historical environmental data will be researched and collected to aid in the impacts of low flow augmentation on the riparian ecosystem below the power projects. Knowledge of the present seven-day low flow, with a return of a ten year frequency (7Q10) can be also indicator of potential low stream stages, thereby inferences can be made to its impact to the downstream ecosystem.

**TASKS 1.A.1 - 1.D.3 SUBJECT MATTER SPECIALISTS:**

Dominion Resources Services  
The Nature Conservancy  
North Carolina Department of Water Quality  
Roanoke River National Wildlife Refuge  
US Fish and Wildlife Service  
US Army Corps of Engineers (USACE)

**1.A.1 TASK: Review and Determine Applicability of Peaking Analysis**

**METHODS:** Review Dominion Resource Services' model output of the peaking analysis. Determine validity, accuracy and continuity of data and model. Determine how the peaking model would be used in the study.

**TIME:** 12 person days

**ESTIMATED PROJECT COST:** \$8,000

**SPONSORS' IN-KIND WORK:** \$4,000

**1.A.2 TASK: Identify, Review and Select Flow Model**

**METHODS:** Review literature, communicate with hydrological modelers by telephone, and participate in discussion with Subject Matter Specialists to determine the model for use in the study. Unless contra-indicated by the review, the Roanoke River Basin Reservoir Operations Model (RRBROM) will be the preferred model – given that it has been used extensively throughout the FERC re-licensing and is already familiar to many stakeholders.

TIME: 20 person days

ESTIMATED PROJECT COST: \$13,000

SPONSORS' IN-KIND WORK: \$6,500

**1.A.3 TASK:** Determine Availability and Adequacy of Topographic Survey Data

METHODS: Phone conversations and discussions with Subject Matter Specialists and other technical experts in this field. The Digital Elevation Model (DEM) already developed by the Nature Conservancy will be reviewed first, and if acceptable, the consideration of additional data sources will not be necessary.

If the DEM is acceptable, the time and estimated cost below will be considerably reduced.

TIME: 10 person days

ESTIMATED PROJECT COST: \$7,000

SPONSORS' IN-KIND WORK: \$3,500

**1.A.4 TASK:** Scope Tasks for Development or Revision of Flow Models

METHODS: Communicate with hydrological modelers by telephone and use the input provided by the Subject Matter Specialists to develop an accurate list of tasks and associated costs for development or revision of flow models.

TIME: 10 person days

ESTIMATED PROJECT COST: \$7,000

SPONSORS' IN-KIND WORK: \$3,500

***B. How does flow regime affect downstream agriculture and silviculture operations and hunting and fishing access? When examining the impacts of flooding, consider the frequency, duration, magnitude and timing of flood events.***

The downstream areas subject to flooding, and their elevations, will be identified using the DEM. An inundation model being developed by The Nature Conservancy (TNC) uses 1998 digital ortho-quarter quads. TNC also has land ownership data available in digital format. This geospatial data regarding land uses and associated elevations will be

combined with the flow and inundation models to assess the effects of flow regime on existing land use. Present hunting, fishing, farming and silviculture practices will be determined by literature review, and by personal interview. It is expected that a non-traditional method will be developed using the existing GIS information to analyze the economic impacts of Kerr's flood operations on hunting, fishing, forestry and farming as well as highway, water supply and sewer infrastructure.

Quantification of flood damage cost and frequency was last developed for the Lower Roanoke River during 1982 to 1983. The existing flood damage curves will be evaluated for present accuracy and adequacy for use in the study of this subject. This will be done by determining if the existing curves identify the land that could currently be covered by flood flows and if the range of flows that the curves are based on reflect the actual flood stages. Aerial photography will be used to determine any significant land use changes that have occurred since 1983. It is expected that new flood damage curves will be developed with input from the Sponsors and agriculturists. These curves will provide a method for analysis of the possible flood damage to downstream land. The land covered by flood flow will be identified and then a range of possible flow levels that could overflow the bank will be determined as well. The curves will be based on elevation data for the point where water overflows the bank (The inundation model developed in the FERC process may be used.). The season of the year will be considered in the flood damage curves in order to determine crop loss. The economic loss under the existing conditions will be compared with the economic loss under any revised operation plan that may be studied. The available data will be obtained about present and anticipated land use, land cover, and development in the 100-year flood plain. This data will be evaluated for relevance and adequacy for the study of this subject. If gaps in the relevant data are identified, they will be evaluated for significance, and, if needed, recommendations for obtaining additional data will be developed.

Another objective of this study is to determine the impacts of an array of flood events, representing both high and low frequency events, with various Kerr Dam operational scenarios, on hunting, fishing access, agriculture, silviculture (access, regeneration, and regrowth), infrastructure, other development, and downstream ecosystems. The frequency, duration, magnitude and seasonal timing of flood events will be considered in making these determinations. Existing methods and tools, for determining such impacts will be identified and evaluated for applicability to this study. Recommendations to accomplish this objective, using existing methods and tools, or for the development of other methods and tools, will be prepared. It is expected that existing evaluation tools can be modified and adapted for use in this study, and the estimate of time and cost for this work is based on this assumption.

#### **TASK 1.B.1: Evaluate Adequacy of Existing Imagery and Survey Data**

**METHODS:** Literature review and discussions with local experts to identify existing imagery and survey data. Acquire best available data, analyze for adequacy, and identify

data gaps. The initial review will focus on the data used in the DEM and inundation models developed by TNC.

TIME: Economist: 2 weeks                      Biologist: 2 weeks

ESTIMATED PROJECT COST: \$28,000

Note: Time and costs will be reduced if existing TNC models are used.

SPONSORS' IN-KIND WORK: \$14,000

**1.B.2 TASK:** Prepare Scope for Acquisition of Additional Imagery and/or Survey Data as Needed

METHODS: Determine appropriate methodology and area of coverage, identify product standards and potential sources. Prepare Scope of Work.

TIME: Economist: 2 weeks                      Biologist: 10 person days

ESTIMATED PROJECT COST: \$20,000

Note: Time and costs will be reduced if existing TNC models are used.

SPONSORS' IN-KIND WORK: \$10,000

**1.B.3 TASK:** Identify geographic analysis to be performed (in Phase 2) for the Kerr 216 GIS Data Base Containing Best Available Data.

METHODS: Identify the best available data for the data base.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

***C. How does the downstream riparian ecosystem respond to flow regimes considering the frequency, duration, magnitude and timing of inundation?***

Keystone terrestrial and aquatic plant and animal species will be identified for evaluating how the various downstream ecosystems respond to inundation. Both the survival and reproduction of flora and fauna will be considered. The resulting data from hydrological modeling as described above can be used as input data for Species and Community Response Models. These will focus on the responses of species (including those identified by the Terrestrial Ecosystems Work Group during FERC re-licensing of the Dominion Resources Services projects as well as other species to be determined) to flow

regimes of various frequencies, durations, magnitudes, and seasonal timings. The same Species and Community Response Models will also be used in other tasks pertaining to low flow augmentation and water quality, so their development should also incorporate responses to these parameters.

An array of flow conditions will be developed for the models, representing high and low frequency flooding, and high, normal and low flow antecedent conditions, to allow for analysis of flood events under various operational scenarios. These operational scenarios for John H. Kerr Dam and Reservoir will include altering the flood control operation, and altering the guide curve. It is expected that some existing models can be adapted to local site conditions, and that other models will need to be developed. The estimates of time and cost required for doing this work are based on developing generic scopes of work for both adapting existing models and developing new models.

**1.C.1 TASK: Evaluate Adequacy of Existing Species and Community Response Models**

**METHODS:** Literature review and discussions with local experts to identify key species and existing habitat suitability models. Acquire best available data, analyze for adequacy, and identify data gaps.

**TIME:** 25 person days and \$10,000 for acquisition

**ESTIMATED PROJECT COST:** \$30,000

**SPONSORS' IN-KIND WORK:** \$15,000

**1.C.2 TASK: Prepare Scope for Development or Revision of Species and Community Response Models**

**METHODS:** Identify appropriate analysis factors, habitat, and species of consideration. Identify product standards and potential sources. Prepare Scope of Work. Costs are based on 15 models, but may involve more or less (the recommendations of the FERC relicensing Terrestrial Ecosystems Work Group will be considered).

**TIME:** 28 person days

**ESTIMATED PROJECT COST:** \$22,000

**SPONSORS' IN-KIND WORK:** \$11,000

***D. How is the downstream riparian ecosystem affected by water quality during the time it is subject to flow regime- considering the frequency, duration, magnitude and timing of inundation?***

In addition to inundating plant and animal species in the floodplain, downstream inundation also may affect river flora and fauna by producing changes in water quality. Existing data will be gathered regarding discharge practices for Kerr Dam under various flow conditions, changes in water quality resulting from floodplain inundation, and the effects of drainage of the floodplain by way of man-made breaches in the natural river levee and natural guts and creeks. This data will be evaluated for relevance and adequacy for the study of this subject. If gaps in the relevant data are identified, they will be evaluated for significance, and, if needed, recommendations for obtaining additional data will be developed. It is expected that recommendations for obtaining additional data will be needed, and the estimates of time and cost for this work are based on this.

Existing methods and tools for determining the effects of the identified water quality changes on downstream ecosystems will be identified and evaluated. It is expected that significant baseline water quality data is available for the study area. However, it is also expected that some additional water quality data collection will be required, and the estimates of time and cost for this work are based on this.

Once the data on water quality is collected, the effects of water quality on various species will be studied. The Corps will coordinate with other area scientists to design this portion of the study.

The tasks under this item may link to methods and tools developed as part of other items, including: floodplain water level gauges; the Roanoke River Basin Reservoir Operations Model (item A); an inundation model developed by the Nature Conservancy (item B); and research on organism and ecosystem response models by the Nature Conservancy and others (item C). Additional methods and tools will need to be developed that relate inundation to water quality, as influenced by timing and duration.

Available data related to this subject will be summarized and catalogued, and recommendations for further data collection will be prepared. Existing methods and tools for analysis and study of this subject will be identified.

NOTE: Tasks for Study Subject 2, water quality, will provide information needed for Task 1.D.

**1.D.1 TASK:** Determine What Data is Available and What Additional Data is Needed to Identify Water Quality Requirements for the Keystone Species and Communities Listed During the FERC Process.

**METHODS:** Review and discuss this list with Dominion Resources Services.

**TIME:** 2 person days

**ESTIMATED PROJECT COST:** \$2000

**1.D.1 TASK (continued)**

SPONSORS' IN-KIND WORK: \$1000

**Item 1 Total Cost: \$145,000**

**2. Water Quality**

***A. How does flow regime affect downstream water quality in floodplain areas, tributaries, and the main river channel?***

Existing methods and tools for determining water quality changes will be identified and evaluated. It is expected that significant baseline water quality data is available for the study area. However, it is also expected that some additional water quality data collection will be required, and the estimates of time and cost for this work are based on this.

The tasks under this item may link to methods and tools developed as part of Item 1, including: floodplain water level gauges; the Roanoke River Basin Reservoir Operations Model (1.A.2); and an inundation model developed by the Nature Conservancy (1.B). Additional methods and tools will need to be developed that relate inundation to water quality, as influenced by timing and duration.

Available data related to this subject will be summarized and catalogued, and recommendations for further data collection will be prepared. Existing methods and tools for analysis and study of this subject will be prepared.

Existing data will be gathered regarding discharge practices for Kerr Dam under various flow conditions, changes in water quality resulting from floodplain inundation, and the effects of drainage of the flood plains to the river. This data will be evaluated for relevance and adequacy for the study of this subject. If gaps in the relevant data are identified, they will be evaluated for significance, and, if needed, recommendations for obtaining additional data will be developed. It is expected that recommendations for obtaining additional data will be needed, and the estimates of time and cost for this work are based on this.

**2.A.1 – 2.C.3 SUBJECT MATTER SPECIALISTS:**

Dominion Resources Services  
NC Division of Water Quality  
Roanoke River National Wildlife Refuge  
USACE  
USFWS  
VA Department of Fish and Game

**2.A.1 TASK: Evaluate Adequacy of Existing Water Quality Data and Prepare Recommendations for Further Data Collection as Needed**

METHODS: Consult with Sponsors and decide what data will be needed to answer the questions that will lead to an adequate description and discussion of water quality issues in the Feasibility Report.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**2.A.2 TASK: Prepare Scope for Collection of Water Quality Data as Needed**

METHODS: Communicate with water quality experts by telephone and use the input provided by the Subject Matter Specialists to develop an accurate list of tasks and associated costs.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**2.A.3 TASK: Prepare Scope for Development or Revision of Water Quality Models related to flood plain flooding**

METHODS: Communicate with hydrological modelers by telephone and use the input provided by the Subject Matter Specialists to develop an accurate description of tasks and estimated associated costs.

TIME: 10 person days.

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**B. How do downstream flows maintained by releases from Kerr Reservoir affect water quality in the river channel between Roanoke Rapids and the mouth of the river?**

The FERC license for the Lake Gaston and Roanoke Rapids hydroelectric projects requires minimum flows that vary by month. The North Carolina Division of Water Quality (DWQ) uses these minimum flows to determine assimilative capacity in the Roanoke River and establish effluent limits for point source discharges. However, the

water quality model used by DWQ does not specifically address flood plain flooding/re-entry, fluctuating flows, and coastal plain hydrology. An agreement between the USACE, the North Carolina Wildlife Resources Commission (WRC), and Dominion Resources Services also sets flow targets for the spring run of diadromous fish species.

This section of the Water Quality study item will focus on downstream water quality in the river channel to develop a model that can be linked to the reservoir operations flow model developed in 1.A.2. The existing water quality monitoring stations will be examined and water quality experts within DWQ will be consulted. The anticipated outcome is a data collection approach and flow related model that can be used to evaluate reservoir operations and make decisions regarding downstream assimilative capacity.

**2.B.1 TASK: Prepare Scope for Development or Revision of Downstream Water Quality Models Related to River Flow**

METHODS: Meet with DWQ, USGS, and other experts and use the input provided by the Subject Matter Specialists to develop an accurate description of tasks and estimated associated costs. Assure that model can be linked to reservoir operations model.

TIME: 10 days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**2.B.2 TASK: Evaluate Existing Water Quality and Stream Flow Gauging Stations for Use in Developing Model**

METHODS: Meet with DWQ, USGS, and other experts and use their input. Consider whether locations and lengths of record from existing stations are adequate or if additional data is needed for model calibration.

TIME: 8 days

ESTIMATED PROJECT COST: \$6,000

SPONSORS' IN-KIND WORK: \$3,000

***C. Evaluate the water quality of the release to the Kerr Dam tailwater and impacts on Lake Gaston.***

The turbines at Kerr Dam have recently been modified to improve dissolved oxygen (DO) concentrations in the water released from the powerhouse. This is an attempt to

address long-standing concerns about water quality standards and aquatic biota in Lake Gaston downstream of the discharge. Follow-up monitoring of the tailwater discharge is needed to assess if additional measures are needed to meet water quality goals.

**2.C.1 TASK: Determine Data Requirements**

METHODS: Meet with Virginia and North Carolina water quality and fisheries staff to determine data requirements.

TIME: 8 days

ESTIMATED PROJECT COST: \$6,000

SPONSORS' IN-KIND WORK: \$3,000

**2.C.2 TASK: Review Existing Data**

METHODS: Collect and review existing water quality data, potential sources include Virginia Power, the Storage and Retrieval Data Base, Virginia Department of Game and Inland Fisheries, North Carolina Division of Water Quality, and the Virginia State Water Control Board.

TIME: 5 days

ESTIMATED PROJECT COST: \$5,000

SPONSORS' IN-KIND WORK: \$2,500

**2.C.3 TASK: Develop Monitoring Plan Scope of Work**

METHODS: Develop Monitoring Plan Scope of Work in with input from Virginia and North Carolina water quality and fisheries staff.

TIME: 7 days

ESTIMATED PROJECT COST: \$6,000

SPONSORS' IN-KIND WORK: \$3,000

**Item 2 Total Cost: \$55,000**

### 3. Downstream Aquatic Habitat

#### ***A. How Does Alteration of the Downstream Flow Regime Affect Habitat for Aquatic Organisms in the Main River Channel?***

During re-licensing of Dominion Resources Services' hydroelectric projects, a habitat based in stream flow study was conducted using the In stream Flow Incremental Methodology (IFIM). This has been invaluable in developing minimum flow recommendations, and to some degree in examining the impacts of peak releases for power generation. Additional study is needed to evaluate the potential effects of peaking power releases, and to gain more insight into target base flows – particularly for diadromous species.

#### **3.A.1 – 3.A.3 SUBJECT MATTER SPECIALISTS:**

Dominion Resources Services  
NC Wildlife Resources Commission  
NC Division of Water Resources  
NC Wildlife Resources Commission  
US Army Corps of Engineers  
USFWS – South Atlantic Fisheries

#### **3.A.1 TASK: Review the Existing IFIM Study and Fishery Data Obtained During Re-licensing**

**METHODS:** Review data provided by Dominion Resources Services and consult with members of the Fisheries Technical Work Group formed during re-licensing as well as other Subject Matter Specialists.

**TIME:** 10 days

**ESTIMATED PROJECT COST:** \$8,000

**SPONSORS' IN-KIND WORK:** \$4,000

#### **3.A.2 TASK: Develop a Detailed Study Plan, Scope of Work and Cost Estimate to Address Questions Related to Hydroelectric Peaking Operation and Downstream Aquatic Biota**

**METHODS:** Consider approaches including: mesohabitat mapping and modeling; sampling for fish species dependent on shallow habitat areas; observations of fish behavior and movement; and comparisons with similar rivers not subject to peaking generation. Results should provide an opportunity to contrast habitat availability at different points in a peaking cycle or describe fish response to high flows. Results should also lead to identifying relative population levels of species whose preferred habitat might be limited by high flows.

**3.A.2 TASK (continued)**

TIME: 30 days

ESTIMATED PROJECT COST: \$24,000

SPONSORS' IN-KIND WORK: \$12,000

**3.A.3 TASK: Develop a Detailed Study Plan to Evaluate Different Target Flows for Diadromous Fish Reproduction**

METHODS: Consider approaches including: comparison of velocity profiles at selected locations over a range of flows; and monitoring of fish runs and spawning activity under different flow conditions. Results should describe effect of different flows on velocities throughout the water column, and, in turn, how this affects spawning behavior and egg viability.

TIME: 24 days

ESTIMATED PROJECT COST: \$19,000

SPONSORS' IN-KIND WORK: \$9,500

**Item 3 Total Cost: \$51,000**

**4. Sedimentation and Channel Morphology**

To learn more about the past, present, and future behavior of the Roanoke River, the following parameters will be studied: hydrology, sedimentation, channel geometry, man-made modifications and water management operations. Data to determine and qualify river trends and associated impacts in the Roanoke River Basin will be identified. The area studied will include the upper Roanoke and Dan Rivers in Virginia to Albemarle Sound in North Carolina. The period of time required for this investigation will depend largely on the availability of existing data plus the quality of data collected during the study period.

**TASKS 4.A.1 SUBJECT MATTER SPECIALISTS:**

Dominion Resources Services  
North Carolina Department of Water Quality  
Appalachian Laboratories, University of Maryland  
Roanoke River National Wildlife Refuge  
USACE

**4.1 TASK:** Establish a data base on available information.

METHODS: Review literature and results from other studies, as well as collecting, organizing and processing the existing prototype data including gauge data, surveys sediment concentrations and bed material gradation. This will be done through meetings and oral, written, and electronic communications and using different software for processing the data. Dr. Phil Townsend from Appalachian Laboratories at the University of Maryland has information on this study subject.

TIME: 1 month

ESTIMATED PROJECT COST: \$16,000

SPONSORS' IN-KIND WORK: \$8,000

**Item 4 Total Cost: \$16,000**

**5. Reservoir Resources**

***A. What Patterns and Trends of Shoreline Development Characterize the Periphery of Kerr Reservoir? Are Additional Management Measures Needed to Protect Reservoir Resources?***

An important issue for Dominion Resources Services' downstream reservoirs has been the development of a Shoreline Management Plan (SMP). The proposed SMP identifies areas for protection of natural resources and provides for public access. It also addresses the use of power company property by adjacent property owners for docks, etc. The SMP seeks to protect reservoir resources by placing controls on clearing of vegetation and other activities along the shoreline. This item will consider whether a similar effort is needed for Kerr Reservoir, but will not entail the development of an actual SMP.

**TASKS 5.A.1 – 5.B.4 SUBJECT MATTER SPECIALISTS:**

NC Parks and Recreation  
NC Wildlife Resources Commission  
Regional Partnership of Local Government  
Roanoke River Basin Association  
Southeastern Power Administration  
US Army Corps of Engineers  
VA Department of Conservation & Recreation  
VA Department of Fish and Game

**5.A.1 TASK:** Review the Shoreline Management Plan Developed for Lake Gaston and Roanoke Rapids Lakes

METHODS: Consult Dominion Resource Services, Water Research Commission, and adjacent property owners' organizations, including the Lake Gaston Association.

TIME: Planner: 4 days      Economist: 4 days

ESTIMATED PROJECT COST: \$6,000

SPONSORS' IN-KIND WORK: \$3,000

**5.A.2 TASK: Develop scope of work for a GIS database of land use and ownership surrounding Kerr reservoir**

METHODS Consult county government property tax and GIS departments to determine if tax parcel information and digital property lines are available. Ideally, the property line surveys from the Register of Deeds would be available in GIS format. The land surrounding Kerr Reservoir includes portions of Northampton, Halifax, Warren, Vance, and Granville counties in North Carolina and portions of Halifax, Charlotte, and Mecklenburg counties in Virginia.

TIME: Planner: 2 weeks      Economist: 2 weeks

ESTIMATED PROJECT COST: \$16,000

SPONSORS' IN-KIND WORK: \$8,000

**5.A.3 TASK: Develop Scope of Work to Inventory Shoreline Development and Land Use Practices**

METHODS: Inventory available aerial photography for the study area and develop plan to accomplish ground truthing. The purpose is to ultimately identify areas where vegetation has been cleared, and locate structures such as docks, piers and bulkheads. This task includes assessment of the existing condition of shoreline (erosion problems) and to link the data to a GIS database. A cost estimate for collecting the base information using LIDAR would be developed. Aerial photography (scale 1 in. = 400 feet or less) would be needed to determine land use surrounding the Reservoir. The cost of converting the LIDAR data to digital 2-foot contour maps would be developed.

TIME: Planner 4 days      Economist 4 days

ESTIMATED PROJECT COST: \$6,000

SPONSORS' IN-KIND WORK: \$3,000

**5.A.4 TASK:** Inventory areas with significant natural resource values, public access, and recreational use.

METHODS: Consult with Water Research Commission, the Commonwealth of Virginia, and the NC Division of Parks and Recreation. Identify environmentally significant areas, wetlands, wildlife habitat, rare and endangered species' habitats, erosion problem areas, known lake fishing areas, and recreation facilities. Develop plan to link data to GIS database.

TIME: 10 days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**5.A.5 TASK:** Develop Plan to Prepare Report Summarizing Shoreline Condition

METHODS: Determine cost of map preparation using GIS database. The task would include delineation of the following: areas with existing and potential erosion problems; areas with high concentrations of shoreline structures; and areas with significant resources that may be vulnerable to clearing or other changes in land use.

TIME: Planner 5 days            GIS consultant: 5 days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

***B. How Does Water Management in Kerr Reservoir Affect Shoreline Erosion, Reservoir Fisheries, Recreational Use and Real Estate Values?***

Water levels in the reservoir have been identified as an important concern for reservoir fisheries management, recreational use, stability of the lakeshore, and property values. Improved understanding of the relationship between these variables and lake levels will allow them to be considered along with other factors in evaluating any potential changes in reservoir operations. The reservoir operations model will be an important link between inflow/outflow and water levels - that in turn affect reservoir resources. These tasks may utilize the GIS database developed in item 5A.

**5.B.1 TASK:** Develop a Detailed Study Plan to Determine Threshold Reservoir Levels for Recreation, Lake Fisheries, and Shoreline Vulnerability

METHODS: Consult agencies from North Carolina and Virginia involved in fisheries

**5.B.1 TASK (continued)**

management and recreation, along with adjacent property owners' organizations and businesses involved in lake recreation. Consider monthly or seasonal variations. Include bathymetry in description of the existing condition.

TIME: Planner: 2 weeks      Economist: 2 weeks

ESTIMATED PROJECT COST: \$16,000

SPONSORS' IN-KIND WORK: \$8,000

**5.B.2 TASK: Develop a Detailed Study Plan to Evaluate the Relationship Between Lake Levels and Real Estate Values**

METHODS: Consult local governments and real estate interests. Consider both the actual lake level, as well as the amount of variation.

TIME: Planner: 1 week      Economist: 1 week  
Real Estate Specialist: 1 week

ESTIMATED PROJECT COST: \$14,000

SPONSORS' IN-KIND WORK: \$7,000

**5.B.3 TASK: Develop Plan to Collect Information Needed to Follow the Study Plans Described in 5.B.1 and 5.B.2**

METHODS: Determine time and cost of analysis of past real estate sales in the Kerr Reservoir area during varying periods of lake level variation. Scope may require searching tax records and deeds in all adjoining counties.

TIME: Real Estate Specialist: 1 week

ESTIMATED PROJECT COST: Real Estate Specialist: \$6,000 (including travel)

**5.B.4 TASK: Prepare Report Describing Relationships Between Lake Levels and Shoreline Erosion, Fisheries, Recreation, and Property**

METHODS: Prepare scope to present results, which may include rating tables for each reservoir resource and different lake levels, with seasonal variations. The relationships will be quantified where possible, but qualitative ratings may also be used.

#### **5.B.4 TASK (continued)**

TIME: Planner: 2 days      Economist: 2 days  
Real Estate Specialist: 2 days

ESTIMATED PROJECT COST: \$6,000

SPONSORS' IN-KIND WORK: \$3,000

#### ***C. How do reservoir fisheries respond to lake level changes considering the frequency, duration, magnitude and timing of inundation due to various operating scenarios?***

Kerr reservoir supports an important recreational fishery for variety of sport fish including large mouth bass, crappie, bluegill, catfish and striped bass. This fishery is supported by healthy fish population, and good access to productive fishing grounds. Most of the public access to this fishery is by boat since boat access is highly available and designated bank fishing areas have not been developed at John H, Kerr Reservoir. Bank fishing is a popular activity at the lake and local fishermen have found and frequent many undeveloped shoreline areas. The Virginia Department of Game and Inland Fisheries indicate the good shoreline fish habitat is limited at “Although the reservoir provides abundant aquatic life, there is a shortage of good littoral habitat. Land clearing prior to impoundment, fluctuating lake levels, and natural aging has limited habitat for many species of aquatic invertebrates and fish.” Opportunities exist at John H Kerr for improvement of littoral fish habitat.

Modified reservoir operations would change the depth, frequency, duration and timing of inundation of important fish habitats. These changes could directly or indirectly improve or reduce feeding, spawning, nursery and cover availability and may also limit or improve fisherman access. Striped bass entrainment through Kerr turbines has been attributed to a specific combination of lake level, discharge and timing. Fish impingement on various water intakes found in Kerr Reservoir may also be affected by reservoir operation.

Sites that are used for bank fishing access or those with high potential for development would be identified. The location of all public boat ramps will be mapped and limitations due to lake elevation determined. Keynote aquatic plant and animal species that represent important fish habitat (such as aquatic plant beds), food resource or target fish species, will be identified for evaluation by models to determine how these species would respond to predicted conditions from an array lake management scenarios. Physical habitat requirements for keynote species such as cover, substrate, and contour would be surveyed and mapped in existing and potential littoral areas. Sites with high potential for aquatic ecosystem restoration would be identified. Both the survival and reproduction will be considered. Data from lake hydrological modeling produced under other work items can be used as input data for Fish and/or Fish Community Response Models.

A full range of lake conditions will be developed for the models, predicted from an array of potential lake management scenarios tested under high, normal and low inflow conditions. This could include status quo and several revised conditions such as altering the flood control operation, and altering the guide curve. It is expected that some existing models can be adapted to local site conditions, and that other models will need to be developed. The estimates of time and cost required for doing this work are based on developing generic scopes of work for both adapting existing models and developing new models.

**5.C.1 TASK:** Determine indicators of existing and potential bank fishing areas and boat ramps and identify survey methodology.

**METHODS:** Literature review and discussions with local experts. Acquire best available data, analyze for adequacy, and identify data gaps.

**TIME:** 10 person days

**ESTIOMATED PROJECT COST:** \$8,000

**SPONSORS' IN-KIND WORK:** \$4,000

**5.C.2 TASK:** Prepare Scope for Survey

**METHODS:** Identify appropriate survey factors. Identify product standards and potential sources. Prepare Scope of Work.

**TIME:** 10 person days

**ESTIMATED PROJECT COST:** \$8,000

**SPONSORS' IN-KIND WORK:** \$4,000

**5.C.3 TASK:** Determine physical species requirements from models and identify survey methodology.

**METHODS:** Literature review and discussions with local experts. Acquire best available data, analyze for adequacy, and identify data gaps.

**TIME:** 10 person days

**ESTIMATED PROJECT COST:** \$8,000

**SPONSORS' IN-KIND WORK:** \$4,000

**5.C.4 TASK: Evaluate Adequacy of Existing Species and Community Response Models.**

METHODS: Literature review and discussions with local experts to identify key species and existing habitat suitability models. Acquire best available data, analyze for adequacy, and identify data gaps.

**5.C.4 TASK (continued)**

TIME: 25 person days and \$5,000 for acquisition

ESTIMATED PROJECT COST: \$25,000

SPONSORS' IN-KIND WORK: \$12,500

**5.C.5 TASK: Prepare Scope for Development or Revision of Species and Community Response Models.**

METHODS: Identify appropriate analysis factors, habitat, and species of consideration. Identify product standards and potential sources. Prepare Scope of Work. Costs are based on 5 models, but may involve more or less.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

***D. How does Hydropower Generation at Kerr Reservoir, Lake Gaston and Roanoke Rapids Affect Shoreline Erosion, Reservoir Fisheries, Recreational Use and Real Estate Values?***

Hydropower generation has been identified as an important concern for reservoir fisheries management, recreational use, stability of the lakeshore, and property values. Improved understanding of the relationship between these variables and power generation will allow them to be considered along with other factors in evaluating any potential changes in reservoir operations. The reservoir operations model will be an important link between inflow/outflow and water levels - that in turn affect reservoir resources. These tasks may utilize the GIS database developed in item 5A.

**5.D.1 TASK: Develop a Detailed Study Plan to Determine Impacts to Recreation, Lake Fisheries, and Shoreline Vulnerability With Various Scenarios of Hydropower Generation (considering economic and ecological standards).**

**5.D.1 TASK (continued)**

METHODS: 1) Consult agencies from North Carolina and Virginia involved in fisheries management and recreation, along with adjacent property owners' organizations and businesses involved in lake recreation. 2) Review available models and assessment methodologies and develop a scope of work to assess effects of various hydropower generation schemes on recreation, lake fisheries, and shoreline.

TIME: Planner: 2 weeks      Economist: 1 weeks

ESTIMATED PROJECT COST: \$12,000

SPONSORS' IN-KIND WORK: \$6,000

**Item 5 Total Cost: \$155,000**

**6. Downstream Flow Based Recreation**

*A. What impact does releases from John H. Kerr reservoir have on swimming, canoeing, boating, fishing, and hunting in the areas below the three reservoirs in North Carolina? What impacts do releases have on nature-based recreation (aesthetics, wildlife educational opportunities, including nature photography and bird watching) in the river study area?*

**TASKS 6.A.1 SUBJECT MATTER SPECIALISTS:**

NC Division of Water Resources  
NC Wildlife Resources Commission  
The Nature Conservancy  
US Army Corps of Engineers  
VA Department of Conservation & Recreation

**6.A.1 TASK** Develop a detailed study plan to determine the reservoir releases that impact and optimize downstream flows for stream-based recreation

METHODS: Study team will consult with recreation resource agencies (Federal, State, and local) to develop the detailed study plan. The study plan will identify tasks required to evaluate a range of flows and associated impacts on stream based recreation activities.

TIME: Economist: 4 days      Outdoor recreation planner: 1 week

ESTIMATED PROJECT COST: \$4,000

SPONSORS' IN-KIND WORK: \$2,000

**Item 6 Total Project Cost: \$4,000**

## 7. Salt Wedge/ Salt Water Intrusion

### *A. How is the location of the salt wedge in the lower river affected by different releases from the reservoir?*

Existing data regarding the relationships among the releases from Kerr Reservoir, Lake Gaston and Roanoke Rapids Hydropower Projects and the salt wedge dynamics in the Lower Roanoke River will be gathered and evaluated in the study. In addition, there are other weather related factors that have been found to have an influence in the salt wedge dynamics in the Lower Roanoke River. Weather data (winds, drought/drought operations, and hurricanes) will also be gathered and analyzed. The study will provide information about data, methods and tools to aid in making recommendations for further study of this subject, which will be considered at the first IPR.

The relationships among Kerr Reservoir, Lake Gaston and Roanoke Rapids Hydropower Projects and the salt wedge dynamics in the Lower Roanoke River downstream may be influenced by both project operations and weather factors.

For the purposes of this Study, salt-water wedge will be considered when oceanic/marine seawater migrates from the Albemarle Sound into the Lower Roanoke River. Influences can be; (1) the lack of river flow (drought/drought operations) (2) directional winds-weather and (3) hurricanes.

The first, drought operations related, may cause salt-water intrusion due to the lower water release from Roanoke Rapids Dam. The lower water flow from the Roanoke Rapids Hydropower plant may be insufficient to impede the salt-water migration upstream.

The second, weather related, may cause more saline water from the Pamlico Sound into the waters of the Roanoke River. Southwesterly winds cause the more saline waters of the Pamlico Sound into the Albemarle Sound then inland up the Roanoke River. Also, Northwest wind tides (an effect similar to bathtub sloshing) in the Albemarle Sound may cause a movement of salt-water up the Roanoke River.

Lastly, are hurricanes, which are a natural weather phenomena which forces saltier Albemarle Sound water inland by the hurricane's storm surge. The hurricane's forward momentum preceding landfall produces an abnormally "higher tide" on the north side of the hurricane moving ashore/inland by the counter clockwise winds of the hurricane.

#### **TASKS 7.A.1 – 7.B.3 SUBJECT MATTER SPECIALISTS:**

NC Division of Water Quality

USACE

USFWS

Weyerhaeuser Corporation

**7.A.1 Task:** Evaluate the adequacy of existing river stage, storm surge, sea level rise, tidal, water quality, salt water wedge, and weather data.

METHODS: Consult with Subject Matter Specialists and decide what data will be needed to answer the questions that will lead to an adequate description and discussion of salt-water intrusion issues in the Feasibility Report.

TIME: 16 person days.

ESTIMATED PROJECT COST: \$11,000

SPONSORS' IN-KIND WORK: \$5,500

**7.A.2 TASK:** Prepare recommendations for further data collection.

METHODS: Consult with Subject Matter Specialists and decide what data will be needed to answer the questions that will lead to an adequate description and discussion of salt-water intrusion issues in the Feasibility Report.

TIME: 10 person days.

ESTIMATED PROJECT COST: \$7,000

SPONSORS' IN-KIND WORK: \$3,500

**7.A.3 TASK:** Prepare scope for development or revision of models

METHODS: Consult with Subject Matter Specialist and develop an accurate list of tasks and associated costs. Possible in kind service, in house model (inter-agency), or contracted model.

TIME: 6 person days.

ESTIMATED PROJECT COST: \$4,000

SPONSORS' IN-KIND WORK: \$2,000

***B. How Does the Salt Wedge Affect Water Quality, Wetlands, Aquatic Habitat and Fish Resources?***

The salt wedge and its location can affect fishery resources. Most resident freshwater fish and other aquatic organisms are intolerant to salt water and may be displaced from preferred habitat by salt intrusion, spawning success may be reduced. Many freshwater marsh and wetland forest plants are also intolerant to salt may be damaged or killed by

the presence of a salt wedge. It also can affect water quality - particularly in terms of dissolved oxygen concentrations at different depths in the water column. The presence of salt may be inconsistent with intended uses such as irrigation or commercial use.

**7.B.1 TASK:** Review the Existing Water Quality Data - Including Dissolved Oxygen and Salinity

METHODS: Consult Weyerhaeuser, DWQ, and USGS.

TIME: 5 person days

ESTMATED PROJECT COST: \$4,000

SPONSORS' IN-KIND WORK: \$2,000

**7.B.2 TASK:** Review the Existing Fisheries Data in the Vicinity of the River Mouth and Salt Wedge, and Also Information Available in Scientific Literature.

METHODS: Consult WRC, the Division of Marine Fisheries (DMF) and the National Marine Fisheries Service (NMFS).

TIME: 15 person days

ESTIMATED PROJECT COST: \$12,000

**7.B.3 TASK:** Develop a Detailed Study Plan and Cost Estimate to Evaluate the Influence of the Salt Wedge on Water Quality, Wetlands, Aquatic Habitat, and Fish Resources.

METHODS: Consult WRC, DMF, NMFS, Weyerhaeuser, USGS, and DWQ.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**Item 7 Total Costs: \$42,000**

**8. Diadromous Fish.**

***A. What affect does the operation of the dam have on diadromous fish?***

During re-licensing of Dominion Resource Services' hydroelectric projects, state and

Federal fishery agencies developed a draft restoration plan for diadromous fisheries in the Roanoke River. This plan will provide a valuable resource in the evaluation of dam affects on migratory aquatic species. However, additional study is needed to address uncertainties regarding affected species. Some of these uncertainties include: respective use of upstream habitats, the extent they use this habitat, access to this habitat, and potential for successful restoration. Additional studies should also determine what actions the Corps of Engineers should take to promote diadromous fish restoration in the Roanoke River and determine the feasibility of potential restoration alternatives.

**TASKS 8.A.1 – 8.A.2 SUBJECT MATTER SPECIALISTS:**

Dominion Resources Services  
National Marine Fisheries Service  
NC Division of Marine Fisheries  
NC Wildlife Resources Commission  
US Army Corps of Engineers  
USFWS – South Atlantic Fisheries  
VA Department of Fish and Game

**8.A.1 TASK:** Review the Existing Restoration Plan and Fishery Data Obtained During Re-licensing.

METHODS: Review data provided by Dominion Resources Services and meet with members of the Fisheries Technical Work Group formed during re-licensing.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**8.A.2 TASK:** Develop a Detailed Study Plan, Scope of Work and Cost Estimate to Address Questions Related to Habitat Restoration for Diadromous Fish.

METHODS: Consider habitat mapping; fish sampling; observations of fish behavior and movement; and comparisons with similar unregulated rivers. Case studies of fish restoration alternatives should be collected and reviewed

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**Item 8 Total Costs: \$16,000**

## 9. Water Supply Use of Reservoir

### *A. What are existing and potential future water supply withdrawals from the three impoundments?*

Existing methods and tools for determining water supply will be identified and evaluated. Significant baseline water supply data is available for the study area. However, it is expected that additional water supply data may be required, and estimates of time and cost for this work are based on this.

The tasks under this item will link to methods and tools developed as part of previous items and/or result in the development of new tools using GIS technology. The Roanoke River Basin Reservoir Operations Model (RRBROM) (1.A.2) will be reviewed and analyzed to determine its effectiveness in supplying results needed to analyze future impacts.

Available data related to this subject will be summarized and catalogued, and recommendations for additional data collection will be prepared. Existing methods and tools for analysis and study of this subject will be prepared.

Existing data will be gathered regarding both water supply intakes located in the reservoir and downstream. Water supply discharge practices for Kerr Dam under various flow conditions as well as changes in available water supply resulting from various operational constraints will be reviewed. These data will be evaluated for relevance and adequacy for the study of this subject. If gaps in the relevant data are identified, they will be evaluated for significance, and, if needed, recommendations for obtaining additional data will be developed.

#### **TASKS 9.A.1 - 9.B.6 SUBJECT MATTER SPECIALISTS:**

City of Virginia Beach  
Dominion Resources Services  
NC Division of Water Resources  
Roanoke River Basin Association  
Southeastern Power Administration  
US Army Corps of Engineers  
VA Department of Environmental Quality

#### **9.A.1 TASK: Evaluate Adequacy of Existing Water Supply Data and Prepare Recommendations for Further Data Collection as Needed.**

**METHODS:** Consult with Subject Matter Specialists and decide what data will be needed to answer the questions that will lead to an adequate description and discussion of water supply issues in the Feasibility Report. Determine cumulative data needs on basin for water supply from both surface and subsurface sources.

**TIME:** 10 person days

**9.A.1 TASK (continued)**

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**9.A.2 TASK:** Prepare Scope for Collection of Water Supply Data as Needed.

METHODS: Communicate with water supply experts by telephone and use the input provided by the review committee to develop an accurate list of tasks and associated costs.

TIME: 3 person days

ESTIMATED PROJECT COST: \$3,000

SPONSORS' IN-KIND WORK: \$1,500

**9.A.3 TASK:** Prepare Scope for Development or Revision of Water Supply Models related to future withdrawals.

METHODS: Communicate with hydrological modelers by telephone and use the input provided by the review committee to develop an accurate list of tasks and associated costs.

TIME: 10 person days.

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**9.A.4 TASK:** Review/Analyze RRBROM for adequacy to provide desired Water Supply impacts and make recommendation for its use/revision or development of a new tool.

METHODS: Employ existing data set and evaluate results.

TIME: 45 person days

ESTIMATED PROJECT COST: \$36,000

SPONSORS' IN-KIND WORK: \$18,000

**B. What percentage of the water is consumptive, and how will this affect lake levels and downstream flows?**

This section of the Water Supply study item will focus on a review of all related water supply plans, projections and inter-basin transfers (IBT) of water supply as well as consumptive impacts. Existing water supply locations will be examined for capacity, expansion connect ability to other systems and water supply experts within municipal, industrial and governmental arenas will be consulted. The anticipated outcome is a real time data collection/input approach and water supply related model that can be used to evaluate impacts on reservoir operations and make decisions regarding available capacity during critical drought periods.

**9.B.1 TASK: Prepare Scope for Development of a new GIS Model or Revision of RRBROM for Water Supply Related to Consumptive Impacts and IBT.**

METHODS: Meet with municipal, industrial, governmental, and other experts along with the input provided by the review committee to develop an accurate list of tasks and associated costs. Assure that model can be linked to reservoir operations model.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**9.B.2 TASK: Evaluate Adequacy of Existing Data and Prepare Recommendations for Further Data Collection through consultation with various experts.**

METHODS: Consult with Subject Matter Specialists and decide what data will be needed to answer the questions that will lead to an adequate description and discussion of consumptive and IBT issues in the Feasibility Report. Determine cumulative data needs for basin.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**9.B.3 TASK: Prepare Scope for Collection of Consumptive and IBT Data as Needed.**

METHODS: Communicate with related experts by telephone and use the input provided by the review committee to develop an accurate list of tasks and associated costs.

**9.B.3 TASK (continued)**

TIME: 3 person days

ESTIMATED PROJECT COST: \$3,000

SPONSORS' IN-KIND WORK: \$1,500

**9.B.4 TASK:** Prepare Scope for Development or Revision of models to evaluate future critical periods on a real time basis.

METHODS: Communicate with hydrological modelers and use the input provided by the review committee to develop an accurate list of tasks and associated costs.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**Item 9 Total Costs: \$82,000**

**10. Operating Policies and Administrative Procedures.**

***A. How are operations of the dam influenced by operating policies and procedures?***

A key part of this study will entail describing the policies and administrative procedures that influence operational decisions at John H. Kerr Dam and Reservoir. This information will be described clearly and thoroughly so that it can be easily understood and interpreted by all stakeholders. Policies and procedures will also be defined in a manner that allows them to be incorporated in all relevant models used in other task items. In this way, potential changes in policies and procedures can be evaluated for their effects on the reservoir and downstream resources.

**TASKS 10.1 – 10.3 SUBJECT MATTER SPECIALISTS:**

City of Virginia Beach  
Dominion Resources Services  
Hydro Logics, Inc.  
NC Division of Water Resources  
Southeastern Power Administration  
US Army Corps of Engineers  
VA Department of Environmental Quality

**10.1 TASK:** For Each of the Following Policies or Sources of Policy, Provide Details on Source(s) and Purpose(s). How Formulated? How Amended? How and When Renewed? What are the Terms and Conditions? How It Influences the Operation of John H. Kerr?

- a) SEPA contracts
- b) Kerr guide curve and stage release policies
- c) USACE informal policies and procedures for adjusting to weather forecasts and other inputs
- d) Interactions with Philpott operations
- e) All storage accounts and their management
- f) Spawning release strategies
- g) Water quality betterment strategies
- h) USACE Drought Management Plan and Policies
- i) Agreements between USACE and Dominion Resources Services
- j) USACE water allocation policies
- k) Any other policies, procedures, or practices that influence the management of John H. Kerr Dam and Reservoir

METHODS: Literature review, agency coordination, and documentation.

TIME: 15 person days

ESTIMATED PROJECT COST: \$10,000

SPONSORS' IN-KIND WORK: \$5,000

**10.2 TASK:** Describe the Way These Policies are Formulated and Implemented. How Do They Interact? How are they Weighted? What are Their Cumulative and Net Effects?

METHODS: Literature review, agency coordination, and documentation. This policy framework is, in large part, implemented in the Roanoke River Basin Reservoir Operations Model (RRBROM). USACE will work with the entities responsible for maintaining the model to complete (as necessary) and, especially, to document the implementation of all relevant polices and administrative procedures. USACE will prepare a document explaining this policy framework in layman's terms, with input from SEPA and the private utilities. The policy framework will be transparent to anyone who reads the document.

TIME: 12 person days

ESTIMATED PROJECT COST: \$9,000

SPONSORS' IN-KIND WORK: \$4,500

**10.3 TASK:** Evaluate the Economic Relationships between the Various Parties Involved in the Generation and Transfer of Electricity.

METHODS: Literature review, agency coordination, and documentation. Document the exchange of electricity and dollars over the last five years. Outline who buys how much at what cost, and then to whom it is sold and for what price.

TIME: 10 person days

ESTIMATED PROJECT COST: \$7,000

SPONSORS' IN-KIND WORK: \$3,500

**Item 10 Total Costs: \$26,000**

**11. Applicable Regulations and Requirements**

**TASK 11.1 SUBJECT MATTER SPECIALISTS:**

NC Division of Water Resources

US Army Corps of Engineers

VA Department of Environmental Quality

**TASK 11.1:** Identify Applicable COE, Federal, State, and Local Regulations and Requirements.

METHODS: Literature review, agency correspondence, and documentation.

TIME: 10 person days

ESTIMATED PROJECT COST: \$8,000

SPONSORS' IN-KIND WORK: \$4,000

**Item 11 Total Costs: \$8,000**

**TOTAL COSTS FOR PHASE 1: \$600,000**

## **TASKS AND COSTS FOR PHASE 2**

Tasks and associated costs for Phase 2 will be determined during Phase 1 of the study.

The estimated cost for Phase 2 of the study is: \$1,600,000.

## **TASKS AND COSTS FOR PHASE 3**

Tasks and associated costs for Phase 3 will be determined during Phase 2 of the study.

The estimated cost for Phase 3 of the study is: \$800,000.

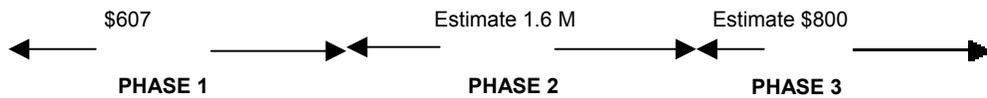
During Phase 3 it will be necessary to integrate study elements and consider overall alternatives. The PDT in consult with appropriate subject matter specialists will develop a process to formulate alternatives. The suggested approach is to make use of all of the interrelationships and feedback loops between the various components of the Roanoke system. A diagram illustrating the linkages between the different study elements is shown on the following page.

## **TOTAL STUDY COSTS**

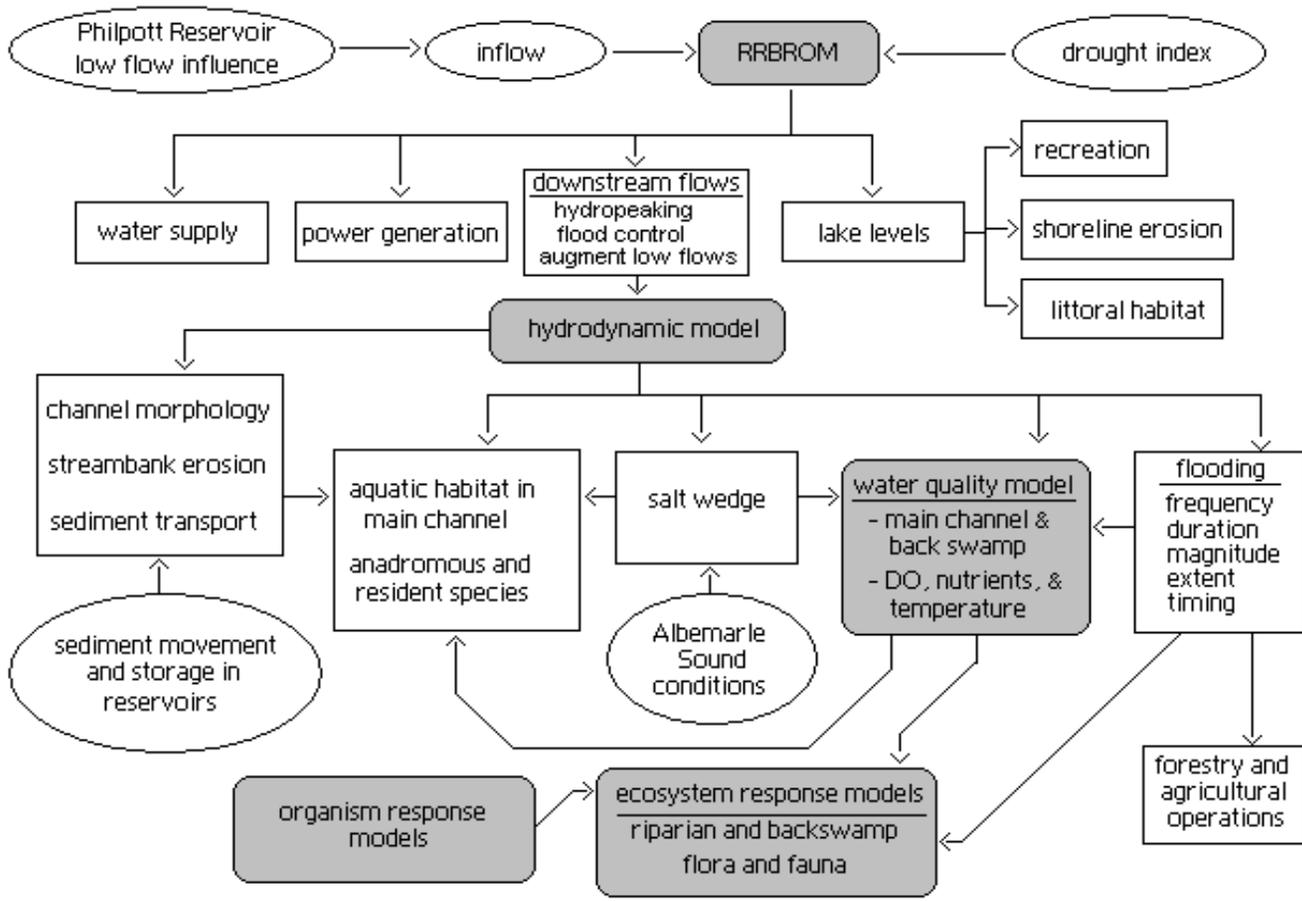
The total study costs at this time are estimated to be 3,000,000 dollars. Cost amounts may change throughout the various phases of this study.

ID	Task Name	Total Cost	2003				2004				2005				2006			
			Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
1	Sign FCSA	0	0															
2	Receive Non-Federal Funds	0	0															
3	Initiate Study	2		2														
4	Project Management (Phase 1)	55		5	10	10	15	15										
5	Public Involvement (Phase 1)	25						25										
	Determine Data Needs																	
	Determine Data Gaps																	
	ID Studies Needed to Fill Gaps & Costs																	
	Assign Tasks to Appropriate Elements																	
	Determine Studies & Costs for Phase 2																	
6	Produce Scope of Work for Phase 2	500		100	100	100	100	100										
7	Project Management (Phase 2)	50							10	10	10	10	10					
8	Public Involvement (Phase 2)	35							20				15					
	Perform Studies																	
	Describe Problems, Needs, Opportunities																	
	Establish Goals & Objectives																	
	ID Integration Methodology																	
9	Produce Scope of Work for Phase 3	1.5 M							100	200	400	400	400					
10	Project Management (Phase 3)	60												15	15	15	15	
11	Public Involvement (Phase 3)	35													15			20
	Develop Alternatives																	
	Determine Action Outputs & Impacts																	
	Trade-off Analysis																	
	Select Recommendations																	
12	Feasibility Report and NEPA Document	500												100	100	100	200	
13	15% Contingency																	
14	Reconnaissance Study	150																
	Reconnaissance Study is not cost shared.																	
	Reconnaissance Study 100% Fed. funded.																	

**QUARTERLY TOTAL**  
**FISCAL YEAR TOTAL**



**STUDY TOTOL (Place Holder Estimate) \$3 M**



**ATTACHMENT 1  
EXECUTIVE COMMITTEE AND  
PRODUCT DELIVERY TEAM MEMBERS**

**EXECUTIVE COMMITTEE:**

<b><u>NAME</u></b>	<b><u>ORGANIZATION</u></b>	<b><u>E-MAIL ADDRESS</u></b>	<b><u>PHONE</u></b>
John Morris	Director, Division of Water Resources	<a href="mailto:john.morris@ncmail.net">john.morris@ncmail.net</a>	919-733-4064
David Paylor	Deputy Secretary, Virginia Dept. of Environmental Quality	<a href="mailto:dkpaylor@deq.state.va.us">dkpaylor@deq.state.va.us</a>	804-698-4240
<b>TO BE DETERMINED</b>	US Army Corps of Engineers	<a href="mailto:@usace.army.mil">@usace.army.mil</a>	910-251-

**PRODUCT DELIVERY TEAM:**

Terry Brown	Coastal/Hydraulics & Hydrology (H & H Engineer), USACE	<a href="mailto:terry.m.brown@usace.army.mil">terry.m.brown@usace.army.mil</a>	910-251-4761
Noel Clay	Lead Planner, USACE	<a href="mailto:noel.c.clay@usace.army.mil">noel.c.clay@usace.army.mil</a>	910-251-4706
Robert Dennis	John H. Kerr Forester, USACE	<a href="mailto:Robert.c.dennis@usace.army.mil">Robert.c.dennis@usace.army.mil</a>	434-738-6101,ext 160
Dan Emerson	Coastal/H & H Engineer, USACE	<a href="mailto:daniel.c.emerson@usace.army.mil">daniel.c.emerson@usace.army.mil</a>	910-251-4490
Joe Hassell (correct person?)	VA Department of Environmental Quality	<a href="mailto:jphassell@deq.state.va.us">jphassell@deq.state.va.us</a>	804-698-4072
Lisa Hetherman	Project Manager, USACE	<a href="mailto:lisa.l.hetherman@usace.army.mil">lisa.l.hetherman@usace.army.mil</a>	910-251-4831
Richard Kimmel	Archeologist, USACE	<a href="mailto:Richard.h.kimmel@usace.army.mil">Richard.h.kimmel@usace.army.mil</a>	910-251-4994
Jim Mead (correct person?)	NC Division of Water Resources	<a href="mailto:jim.mead@ncmail.net">jim.mead@ncmail.net</a>	919-715-5428
Allen Piner	Hydraulic Engineer, USACE	<a href="mailto:george.a.piner@usace.army.mil">george.a.piner@usace.army.mil</a>	910-251-4762
Hasan Pourtaheri	Hydraulic Engineer, USACE	<a href="mailto:hasan.pourtaheri@usace.army.mil">hasan.pourtaheri@usace.army.mil</a>	910-251-4547
Terry Ramsey	Parks & Recreation Management, Chief, USACE	<a href="mailto:terry.a.ramsey@usace.army.mil">terry.a.ramsey@usace.army.mil</a>	434-738-6101,ext 110
Frank Snipes	Economist, USACE	<a href="mailto:frank.e.snipes@usace.army.mil">frank.e.snipes@usace.army.mil</a>	910-251-4774
Caroline Struthers	Attorney, USACE	<a href="mailto:caroline.j.struthers@usace.army.mil">caroline.j.struthers@usace.army.mil</a>	910-251-4977
Chuck Wilson	Biologist, USACE	<a href="mailto:charles.r.wilson@usace.army.mil">charles.r.wilson@usace.army.mil</a>	910-251-4746

**ATTACHMENT 2**  
**SUBJECT MATTER SPECIALISTS**

Study Subject 1. Downstream Flow Regime and Effects on Riparian Ecosystem

Callie Dobson	NC Division of Water Quality	<a href="mailto:callie.dobson@ncmail.net">callie.dobson@ncmail.net</a>	919-733-5083 ext.583
John Ellis	US Fish and Wildlife Service (USFWS)	<a href="mailto:john_ellis@fws.gov">john_ellis@fws.gov</a>	919-856-4520 ext. 26
Dan Emerson	US Army Corps of Engineers	<a href="mailto:daniel.c.emerson@usace.army.mil">daniel.c.emerson@usace.army.mil</a>	919-251-4490
Bob Graham	Dominion Resources Services	<a href="mailto:bob_graham@dom.com">bob_graham@dom.com</a>	804-271-5377
Sam Pearsall	The Nature Conservancy	<a href="mailto:spearsall@tnc.org">spearsall@tnc.org</a>	919-403-8558
Jean Richter	USFWS/Roanoke River Natl. Wildlife Refuge	<a href="mailto:jean_richter@fws.gov">jean_richter@fws.gov</a>	252-794-3808
Chuck Wilson	US Army Corps of Engineers	<a href="mailto:charles.r.wilson@usace.army.mil">charles.r.wilson@usace.army.mil</a>	910-251-4746

Study Subject 2. Water Quality

Tom Augsburger	USFWS		
Bill Bolin	Dominion Resources Services	<a href="mailto:bill_bolin@dom.com">bill_bolin@dom.com</a>	804-271-5304
Callie Dobson	NC Division of Water Quality	<a href="mailto:callie.dobson@ncmail.net">callie.dobson@ncmail.net</a>	919-733-5083 ext.583
Bud LaRoche	VA Department of Fish and Game	<a href="mailto:blaroche@dgif.state.va.us">blaroche@dgif.state.va.us</a>	540-857-7705
Jean Richter	USFWS/Roanoke River Natl. Wildlife Refuge	<a href="mailto:jean_richter@fws.gov">jean_richter@fws.gov</a>	252-794-3808
Chuck Wilson	US Army Corps of Engineers	<a href="mailto:charles.r.wilson@usace.army.mil">charles.r.wilson@usace.army.mil</a>	910-251-4746

Study Subject 3. Downstream Aquatic Habitat

Bill Bolin	Dominion Resources Services	<a href="mailto:bill_bolin@dom.com">bill_bolin@dom.com</a>	804-271-5304
Bob Graham	Dominion Resources Services	<a href="mailto:bob_graham@dom.com">bob_graham@dom.com</a>	804-271-5377
Pete Kornegay	NC Wildlife Resources Commission	<a href="mailto:kornegayjw@earthlink.net">kornegayjw@earthlink.net</a>	252-338-3607
Wilson Laney	USFWS – South Atlantic Fisheries	<a href="mailto:Wilson_laney@fws.gov">Wilson_laney@fws.gov</a>	919-515-5019
Jim Mead	NC Division of Water Resources	<a href="mailto:jim.mead@ncmail.net">jim.mead@ncmail.net</a>	919-715-5428
Kent Nelson	NC Wildlife Resources Commission	<a href="mailto:nelsonk3@earthlink.net">nelsonk3@earthlink.net</a>	
Chuck Wilson	US Army Corps of Engineers	<a href="mailto:charles.r.wilson@usace.army.mil">charles.r.wilson@usace.army.mil</a>	910-251-4746

**ATTACHMENT 2**  
**SUBJECT MATTER SPECIALISTS (Continued)**

Study Subject 4. Sedimentation and Channel Morphology

Bill Bolin	Dominion Resources Services	<a href="mailto:bill_bolin@dom.com">bill_bolin@dom.com</a>	804-271-5304
Callie Dobson	NC Division of Water Quality	<a href="mailto:callie.dobson@ncmail.net">callie.dobson@ncmail.net</a>	919-733-5083 ext.583
Hasan Pourtaheri	US Army Corps of Engineers	<a href="mailto:hasan.pourtaheri@usace.army.mil">hasan.pourtaheri@usace.army.mil</a>	910-251-4547
Jean Richter	USFWS/Roanoke River Natl. Wildlife Refuge	<a href="mailto:jean_richter@fws.gov">jean_richter@fws.gov</a>	252-794-3808
Phil Townsend	University of Maryland, Appalachian Lab.	<a href="mailto:Ptownsend@al.umces.edu">Ptownsend@al.umces.edu</a>	301-689-3115 ext.210

Study Subject 5. Reservoir Resources (include hydropower as element)

Gene Adesso	Roanoke River Basin Association	<a href="mailto:adesso@btitelecom.net">adesso@btitelecom.net</a>	919-870-0833
Carter Edge	Southeastern Power Administration	<a href="mailto:cartere@sepa.doe.gov">cartere@sepa.doe.gov</a>	706-213-3855
Richard Gibbons	VA Department of Conservation & Recreation	<a href="mailto:rgibbons@dcr.state.va.us">rgibbons@dcr.state.va.us</a>	804-786-4132
Wayne Jones	NC Wildlife Resources Commission	<a href="mailto:nelsonk3@earthlink.net">nelsonk3@earthlink.net</a>	
Bud LaRoche	VA Department of Fish and Game	<a href="mailto:blaroche@dgif.state.va.us">blaroche@dgif.state.va.us</a>	540-857-7705
Russell Slayton	Regional Partnership of Local Government	<a href="mailto:sbclaw@telpage.net">sbclaw@telpage.net</a>	434-848-3632
Frank Snipes	US Army Corps of Engineers	<a href="mailto:frank.e.snipes@usace.army.mil">frank.e.snipes@usace.army.mil</a>	910-251-4774
Brian Strong	NC Parks and Recreation	<a href="mailto:brian.strong@ncmail.net">brian.strong@ncmail.net</a>	919-715-8711
Scott Van Horn	NC Wildlife Resources Commission	<a href="mailto:vanhorns3@earthlink.net">vanhorns3@earthlink.net</a>	

Study Subject 6. Downstream Flow Based Recreation

Richard Gibbons	VA Department of Conservation & Recreation	<a href="mailto:rgibbons@dcr.state.va.us">rgibbons@dcr.state.va.us</a>	804-786-4132
Jeff Horton	The Nature Conservancy	<a href="mailto:jhorton@tnc.org">jhorton@tnc.org</a>	
Jim Mead	NC Division of Water Resources	<a href="mailto:jim.mead@ncmail.net">jim.mead@ncmail.net</a>	919-715-5428
Kent Nelson	NC Wildlife Resources Commission	<a href="mailto:nelsonk3@earthlink.net">nelsonk3@earthlink.net</a>	
Frank Snipes	US Army Corps of Engineers	<a href="mailto:frank.e.snipes@usace.army.mil">frank.e.snipes@usace.army.mil</a>	910-251-4774

Study Subject 7. Salt Wedge

Tom Augsburger	USFWS		
Callie Dobson	NC Division of Water Quality	<a href="mailto:callie.dobson@ncmail.net">callie.dobson@ncmail.net</a>	919-733-5083 ext.583
Dan Emerson	US Army Corps of Engineers	<a href="mailto:daniel.c.emerson@usace.army.mil">daniel.c.emerson@usace.army.mil</a>	919-251-4490
Martin Lebo	Weyerhaeuser Scientist		

**ATTACHMENT 2**  
**SUBJECT MATTER SPECIALISTS (Continued)**

Study Subject 8. Diadromous Fish (discuss releases and physical obstacles)

Bill Bolin	Dominion Resources Services	<a href="mailto:bill_bolin@dom.com">bill_bolin@dom.com</a>	804-271-5304
Prescott Brownell	National Marine Fisheries Service	<a href="mailto:prescott.brownell@noaa.gov">prescott.brownell@noaa.gov</a>	843-762-8591
Pete Kornegay	NC Wildlife Resources Commission	<a href="mailto:kornegayjw@earthlink.net">kornegayjw@earthlink.net</a>	252-338-3607
Wilson Laney	USFWS – South Atlantic Fisheries	<a href="mailto:Wilson_laney@fws.gov">Wilson_laney@fws.gov</a>	919-515-5019
Bud Laroche	VA Department of Fish and Game	<a href="mailto:blaroche@dgif.state.va.us">blaroche@dgif.state.va.us</a>	540-857-7705
Sara Winslow	NC Division of Marine Fisheries	<a href="mailto:sara.winslow@ncmail.net">sara.winslow@ncmail.net</a>	252-264-3911
Chuck Wilson	US Army Corps of Engineers	<a href="mailto:charles.r.wilson@usace.army.mil">charles.r.wilson@usace.army.mil</a>	910-251-4746

Study Subject 9. Water Supply

Tom Brawner	Roanoke River Basin Association	<a href="mailto:tbrawner@rrba.org">tbrawner@rrba.org</a>	336-294-0744
Carter Edge	Southeastern Power Administration	<a href="mailto:cartere@sepa.doe.gov">cartere@sepa.doe.gov</a>	706-213-3855
Joe Hassell	VA Department of Environmental Quality	<a href="mailto:jphassell@deq.state.va.us">jphassell@deq.state.va.us</a>	804-698-4072
Thomas Leahy	City of Virginia Beach	<a href="mailto:tleahy@vbgov.com">tleahy@vbgov.com</a>	252-492-1426
John Morris	Director, Division of Water Resources	<a href="mailto:john.morris@ncmail.net">john.morris@ncmail.net</a>	919-733-4064
Allen Piner	US Army Corps of Engineers	<a href="mailto:george.a.piner@usace.army.mil">george.a.piner@usace.army.mil</a>	910-251-4762
Jim Thornton	Dominion Resources Services	<a href="mailto:james_thornton@dom.com">james_thornton@dom.com</a>	804-273-3257

Study Subject 10. Operation Policies and Administrative Processes

Terry Brown	US Army Corps of Engineers	<a href="mailto:terry.m.brown@usace.army.mil">terry.m.brown@usace.army.mil</a>	910-251-4761
Carter Edge	Southeastern Power Administration	<a href="mailto:cartere@sepa.doe.gov">cartere@sepa.doe.gov</a>	706-213-3855
Tom Francin	NC Division of Water Resources	<a href="mailto:tom.francin@ncmail.net">tom.francin@ncmail.net</a>	919-733-4064
Jim Thornton	Dominion Resources Services	<a href="mailto:james_thornton@dom.com">james_thornton@dom.com</a>	804-273-3257
Thomas Leahy	City of Virginia Beach	<a href="mailto:tleahy@vbgov.com">tleahy@vbgov.com</a>	252-492-1426
Brian McCrodden	Hydro Logics, Inc.	<a href="mailto:bmccrodden@hydrologics.net">bmccrodden@hydrologics.net</a>	919-856-1288
Jim Mead	NC Division of Water Resources	<a href="mailto:jim.mead@ncmail.net">jim.mead@ncmail.net</a>	919-715-5428
Joe Hassell	VA Department of Environmental Quality	<a href="mailto:jphassell@deq.state.va.us">jphassell@deq.state.va.us</a>	804-698-4072
John Morris	Director, Division of Water Resources	<a href="mailto:john.morris@ncmail.net">john.morris@ncmail.net</a>	919-733-4064

**ATTACHMENT 2**  
**SUBJECT MATTER SPECIALISTS (Continued)**

Study Subject 11. Applicable COE, Federal, State and Local Regulations and Requirements

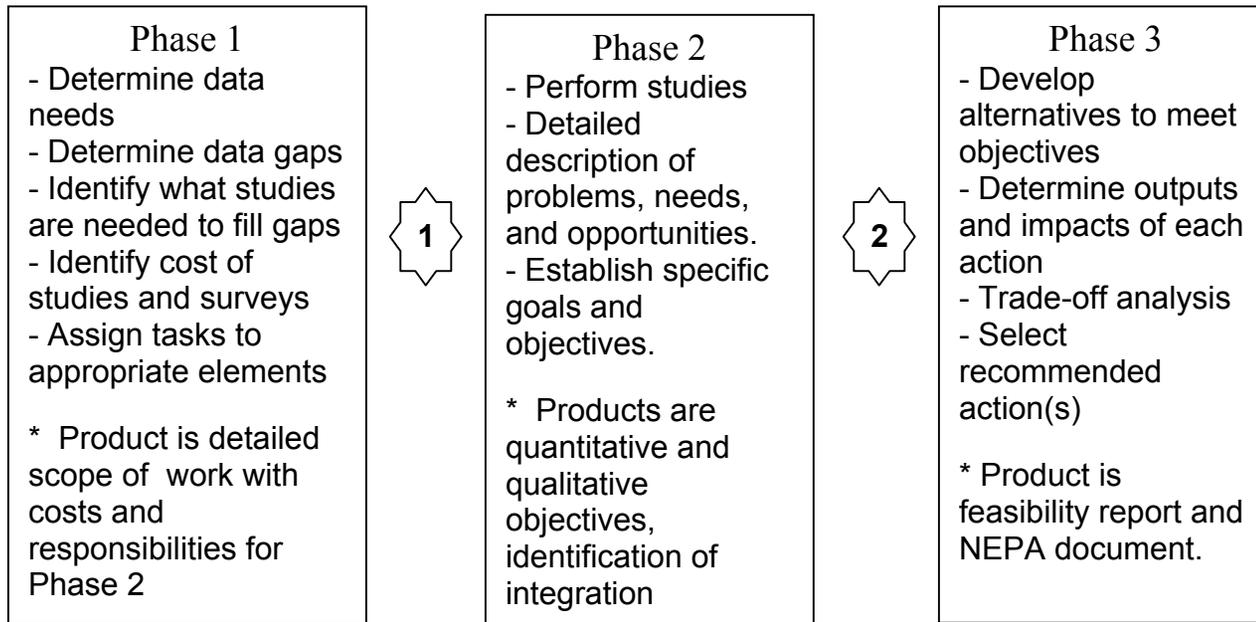
Terry Brown	US Army Corps of Engineers	<a href="mailto:terry.m.brown@usace.army.mil">terry.m.brown@usace.army.mil</a>	910-251-4761
Joe Hassell	VA Department of Environmental Quality	<a href="mailto:jphassell@deq.state.va.us">jphassell@deq.state.va.us</a>	804-698-4072
Jim Mead	NC Division of Water Resources	<a href="mailto:jim.mead@ncmail.net">jim.mead@ncmail.net</a>	919-715-5428
Caroline Struthers	US Army Corps of Engineers	<a href="mailto:caroline.j.struthers@usace.army.mil">caroline.j.struthers@usace.army.mil</a>	910-251-4977
Chuck Wilson	US Army Corps of Engineers	<a href="mailto:charles.r.wilson@usace.army.mil">charles.r.wilson@usace.army.mil</a>	910-251-4746

### ATTACHMENT 3 THREE PHASE STUDY APPROACH

**Corps Requirements:** PMP and FCSA must identify full cost of feasibility study  
FCSA must identify allocation of costs for each partner

**Sponsor Requirements:** PMP should be structured to be useful to project sponsor and beneficiaries.  
PMP should identify stakeholder contributions  
PMP should address tasks, methods, costs, and responsible parties

**Actions:** Project Management Plan will be structured to identify a 3-phase approach, identify Subject Matter Specialists for phase 1 activities, and costs for each project phase. The three phases are described in the following table.



 Decision Point 1 – what studies, surveys, etc. will be conducted in Phase 2 and how will the costs be allocated.

 Decision Point 2 – what objectives will be addressed in Phase 3 and how will costs be allocated.

**ATTACHMENT 4  
DRAFT FEASIBILITY COST SHARING AGREEMENT**

AGREEMENT  
BETWEEN THE DEPARTMENT OF THE ARMY  
AND  
THE COMMONWEALTH OF VIRGINIA  
AND  
THE STATE OF NORTH CAROLINA  
FOR THE  
JOHN H. KERR DAM AND RESERVOIR  
SECTION 216 FEASIBILITY STUDY

THIS AGREEMENT is entered into this \_\_\_\_\_ day, of \_\_\_\_\_, 2003, by and between the Department of the Army (hereinafter the "Government"), represented by the U.S. Army Engineer, Wilmington District (hereinafter the "District Engineer"), and the Commonwealth of Virginia, represented by the Deputy Secretary of Natural Resources and the State of North Carolina, represented by the Secretary, Department of Environment and Natural Resources (hereinafter the "Sponsors").

WITNESSETH, that

WHEREAS, the Congress has authorized the Secretary of the Army, acting through the Chief of Engineers, to review the operation of projects constructed by the Corps of Engineers for navigation, flood control, water supply, and related purposes when found advisable due to significantly changed physical, economic or environmental conditions, and to report to Congress with recommendations on the advisability of modifying the structures or their operation, pursuant to the authority provided by Section 216 of the River and Harbor and Flood Control Act of 1970, Public Law 91-611; and

WHEREAS, the Government has conducted a reconnaissance study of the operations of the John H. Kerr Dam and Reservoir and the effects to the Lower Roanoke River Basin pursuant to this authority, and has determined that further study in the nature of a "Feasibility Phase Study" (hereinafter the "Study") is required to fulfill the intent of the study authority and to assess the extent of the Federal interest in participating in a solution to the identified problems; and

WHEREAS, Section 105 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, specifies the cost sharing requirements applicable to the Study; and

WHEREAS, the Sponsors have the authority and capability to furnish the cooperation hereinafter set forth and are willing to participate in study cost sharing and financing in accordance with the terms of this Agreement; and

WHEREAS, the Sponsors and the Government understand that entering into this Agreement in no way obligates any party to implement a project and that whether the Government supports a project authorization and budgets it for implementation depends

upon, among other things, the outcome of the Study and whether the proposed solution is consistent with the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and with the budget priorities of the Administration.

NOW THEREFORE, the parties agree as follows:

#### ARTICLE I - DEFINITIONS

For the purposes of this Agreement:

A. The term "Study Costs" shall mean all disbursements by the Government pursuant to this Agreement, from Federal appropriations or from funds made available to the Government by the Sponsors, and all negotiated costs of work performed by the Sponsors pursuant to this Agreement. Study Costs shall include, but not be limited to: labor charges; direct costs; overhead expenses; supervision and administration costs; the costs of participation in Study Management and Coordination in accordance with Article IV of this Agreement; the costs of contracts with third parties, including termination or suspension charges; and any termination or suspension costs (ordinarily defined as those costs necessary to terminate ongoing contracts or obligations and to properly safeguard the work already accomplished) associated with this Agreement.

B. The term "estimated Study Costs" shall mean the estimated cost of performing the Study as of the effective date of this Agreement, as specified in Article III.A. of this Agreement.

C. The term "excess Study Costs" shall mean Study Costs that exceed the estimated Study Costs and that do not result from mutual agreement of the parties, a change in Federal law that increases the cost of the Study, or a change in the scope of the Study requested by the Sponsors.

D. The term "Study Period" shall mean the time period for conducting the Study, commencing with the release to the U.S. Army Corps of Engineers, Wilmington District of initial Federal feasibility funds following the execution of this Agreement and ending when the Assistant Secretary of the Army (Civil Works) submits the feasibility report to the Office of Management and Budget (OMB) for review for consistency with the policies and programs of the President.

E. The term "PMP" shall mean the Project Management Plan, which is attached to this Agreement and which shall not be considered binding on any party and is subject to change by the Government, in consultation with the Sponsors.

F. The term "negotiated costs" shall mean the costs of in-kind services to be provided by the Sponsors in accordance with the PMP.

G. The term "fiscal year" shall mean one fiscal year of the Government. The Government fiscal year begins on October 1 and ends on September 30.

#### ARTICLE II - OBLIGATIONS OF PARTIES

A. The Government, using funds and in-kind services provided by the Sponsors and funds appropriated by the Congress of the United States, shall expeditiously prosecute and complete the Study, in accordance with the provisions of this Agreement and Federal laws, regulations, and policies.

B. In accordance with this Article and Articles III.A., III.B. and III.C. of this Agreement, the Sponsors shall contribute cash and in-kind services equal to fifty (50) percent of Study Costs other than excess Study Costs. The Sponsors may, consistent with applicable law and regulations, contribute up to 50 percent of Study Costs through the provision of in-kind services. The in-kind services to be provided by the Sponsors, the estimated negotiated costs for those services, and the estimated schedule under which those services are to be provided are specified in the PMP. Negotiated costs shall be subject to an audit by the Government to determine reasonableness, allocability, and allowability.

C. The Sponsors shall pay a fifty (50) percent share of excess Study Costs in accordance with Article III.D. of this Agreement.

D. The Sponsors understand that the schedule of work may require the Sponsors to provide cash or in-kind services at a rate that may result in the Sponsors temporarily diverging from the obligations concerning cash and in-kind services specified in paragraph B. of this Article. Such temporary divergences shall be identified in the quarterly reports provided for in Article III.A. of this Agreement and shall not alter the obligations concerning costs and services specified in paragraph B. of this Article or the obligations concerning payment specified in Article III of this Agreement.

E. If, upon the award of any contract or the performance of any in-house work for the Study by the Government or the Sponsors, cumulative financial obligations of the Government and the Sponsors would result in excess Study Costs, the Government and the Sponsors agree to defer award of that and all subsequent contracts, and performance of that and all subsequent in-house work, for the Study until the Government and the Sponsors agree to proceed. Should the Government and the Sponsors require time to arrive at a decision, this Agreement shall be suspended in accordance with Article X of this Agreement, for a period of not to exceed six months. In the event the Government and the Sponsors have not reached an agreement to proceed by the end of their 6 month period, this Agreement may be subject to termination in accordance with Article X of this Agreement.

F. No Federal funds may be used to meet the Sponsors' share of Study Costs unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

G. The award and management of any contract with a third party in furtherance of this Agreement which obligates Federal appropriations shall be exclusively within the control of the Government. The award and management of any contract by the Sponsors with a third party in furtherance of this Agreement which obligates funds of the Sponsors and does not obligate Federal appropriations shall be exclusively within the control of the Sponsors, but shall be subject to applicable Federal laws and regulations.

### ARTICLE III - METHOD OF PAYMENT

A. The Government shall maintain current records of contributions provided by the parties, current projections of Study Costs, current projections of each party's share of Study Costs, and current projections of the amount of Study Costs that will result in excess Study Costs. At least quarterly, the Government shall provide the Sponsors a report setting forth this information. As of the effective date of this Agreement, estimated Study Costs are \$3,000,000 and the Sponsors' share of estimated Study Costs is \$1,500,000. The

dollar amounts set forth in this Article are based upon the Government's best estimates, which reflect the scope of the study described in the PMP, projected costs, price-level changes, and anticipated inflation. Such cost estimates are subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Sponsors.

B. The Sponsors shall provide their cash contribution required under Article II.B. of this Agreement in accordance with the following provisions:

1. For purposes of budget planning, the Government shall notify the Sponsors by August 1 of each year of the estimated funds that will be required from the Sponsors to meet the Sponsors' share of Study Costs for the upcoming fiscal year.

*2. No later than 30 calendar days prior to the scheduled date for the Government's issuance of the solicitation for the first contract for the Study or for the Government's anticipated first significant in-house expenditure for the Study, the Government shall notify the Sponsors in writing of the funds the Government determines to be required from the Sponsors to meet their share of Study Costs for the remainder of the first fiscal year. No later than 15 calendar days thereafter, the Sponsors shall provide the Government the full amount of the required funds by delivering a check payable to "FAO, USAED, Wilmington " to the District Engineer or verifying to the satisfaction of the Government that the Sponsors have deposited the required funds in an escrow or other account acceptable to the Government, with interest accruing to the Sponsors or presenting the Government with an irrevocable letter of credit acceptable to the Government for the required funds or providing an Electronic Funds Transfer in accordance with procedures established by the Government.*

3. For the second and subsequent fiscal years of the Study, the Government shall, no later than 60 calendar days prior to the beginning of such fiscal year, notify the Sponsors in writing of the funds the Government determines to be required from the Sponsors to meet their required share of Study Costs for that fiscal year, taking into account any temporary divergences identified under Article II.D. of this Agreement. No later than 30 calendar days prior to the beginning of such fiscal year, the Sponsors shall make the full amount of the required funds available to the Government through any of the payment mechanisms specified in paragraph B.2. of this Article.

4. The Government shall draw from the funds provided by the Sponsors such sums as the Government deems necessary to cover the Sponsors' share of contractual and in-house financial obligations attributable to the Study as they are incurred.

5. In the event the Government determines that the Sponsors must provide additional funds to meet their share of Study Costs, the Government shall so notify the Sponsors in writing. No later than 60 calendar days after receipt of such notice, the Sponsors shall make the full amount of the additional required funds available through any of the payment mechanisms specified in paragraph B.2. of this Article.

C. Within ninety (90) days after the conclusion of the Study Period or termination of this Agreement, the Government shall conduct a final accounting of Study Costs, including disbursements by the Government of Federal funds, cash contributions by the Sponsors, the amount of any excess Study Costs, and credits for the negotiated costs of the Sponsors, and shall furnish the Sponsors with the results of this accounting. Within thirty (30) days thereafter, the Government, subject to the availability of funds, shall reimburse the Sponsors for the excess, if any, of cash contributions and credits given over their required share of Study Costs, other

than excess Study Costs, or the Sponsors shall provide the Government any cash contributions required for the Sponsors to meet their required share of Study Costs other than excess Study Costs.

*D. The Sponsors shall provide their cash contribution for excess Study Costs as required under Article II.C. of this Agreement by either: delivering a check payable to "FAO, USAED, Wilmington" to the District Engineer; or providing an Electronic Funds Transfer in accordance with procedures established by the Government; as follows:*

1. After the project that is the subject of this Study has been authorized for construction, no later than the date on which a Project Cooperation Agreement is entered into for the project; or

2. In the event the project that is the subject of this Study is not authorized for construction by a date that is no later than 5 years after the date of the final report of the Chief of Engineers concerning the project, or by a date that is no later than 2 years after the date of the termination of the Study, the Sponsors shall pay their share of excess Study Costs on such date either 5 years after the date of the final report of the Chief of Engineers or 2 years after the date of the termination of the study.

#### ARTICLE IV - STUDY MANAGEMENT AND COORDINATION

A. To provide for consistent and effective communication, the Sponsors and the Government shall appoint named senior representatives to an Executive Committee. Thereafter, the Executive Committee shall meet regularly until the end of the Study Period.

B. Until the end of the Study Period, the Executive Committee shall generally oversee the Study consistently with the PMP.

C. The Executive Committee may make recommendations that it deems warranted to the District Engineer on matters that it oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider such recommendations. The Government has the discretion to accept, reject, or modify the Executive Committee's recommendations.

D. The Executive Committee shall appoint representatives to serve on a Study Management Team. The Study Management Team shall keep the Executive Committee informed of the progress of the Study and of significant pending issues and actions, and shall prepare periodic reports on the progress of all work items identified in the PMP.

E. The costs of participation in the Executive Committee (including the cost to serve on the Study Management Team) shall be included in Study Costs and shared in accordance with the provisions of this Agreement.

## ARTICLE V – DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, that party must first notify the other parties in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to all parties. The parties participating in the non-binding alternative dispute resolution shall each pay an equal share of any costs for the services provided by such a third party as such costs are incurred. Such costs shall not be included in Study Costs. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

## ARTICLE VI - MAINTENANCE OF RECORDS

A. Within 60 days of the effective date of this Agreement, the Government and the Sponsors shall develop procedures for keeping books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect Study Costs. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the Sponsors shall maintain such books, records, documents, and other evidence in accordance with these procedures for a minimum of three years after completion of the Study and resolution of all relevant claims arising therefrom. To the extent permitted under applicable Federal laws and regulations, the Government and the Sponsors shall each allow the other to inspect such books, documents, records, and other evidence.

B. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the Sponsors are required to conduct under the Single Audit Act Amendments of 1996, 31 U.S.C. Sections 7501-7507. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits shall be included in Study Costs and shared in accordance with the provisions of this Agreement.

## ARTICLE VII - RELATIONSHIP OF PARTIES

The Government and the Sponsors act in independent capacities in the performance of their respective rights and obligations under this Agreement, and neither is to be considered the officer, agent, or employee of the other.

## ARTICLE VIII - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, nor any resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

## ARTICLE IX - FEDERAL AND STATE LAWS

In the exercise of the Sponsors' rights and obligations under this Agreement, the Sponsors agree to comply with all applicable Federal and State laws and regulations, including Section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500.11 issued pursuant thereto and published in 32 C.F.R. Part 195, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army".

## ARTICLE X - TERMINATION OR SUSPENSION

A. This Agreement shall terminate at the conclusion of the Study Period, and neither the Government nor the Sponsors shall have any further obligations hereunder, except as provided in Article III.C. of this Agreement; provided, that prior to such time and upon thirty (30) days written notice, any party may terminate or suspend this Agreement. In addition, the Government shall terminate this Agreement immediately upon any failure of the parties to agree to extend the study under Article II.E. of this Agreement, or upon the failure of the Sponsors to fulfill their obligation under Article III of this Agreement. In the event that any party elects to terminate this Agreement, the parties shall conclude their activities relating to the Study and proceed to a final accounting in accordance with Article III.C. and III.D. of this Agreement. Upon termination of this Agreement, all data and information generated as part of the Study shall be made available to all parties.

B. Any termination of this Agreement shall not relieve the parties of liability for any obligations previously incurred, including the costs of closing out or transferring any existing contracts.

*C. In the event that either of the Sponsors elect to terminate its own responsibilities under this Agreement, and the remaining Sponsor elects to continue to participate in the Study, the Government shall negotiate in good faith with the remaining Sponsor to effect a timely and productive conclusion to that portion of the Study pertaining to the remaining Sponsor's area of statutory authority. The Government shall prepare a revised PMP and revised estimated Study Costs, including the remaining Sponsor's share, to complete that portion of the Study of interest to the remaining Sponsor. If the remaining Sponsor elects to complete the Study, this Agreement shall be amended to reflect the negotiated revisions to the PMP and Study Costs. Cost amendments to this Agreement made pursuant to this paragraph shall reflect credits for the previous cash and in-kind contributions of all Study Sponsors and shall reflect task reductions made as a result of withdrawal of any Study Sponsor.*

## ARTICLE XI – NOTICES

A. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and either delivered personally or by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the Commonwealth of Virginia: David K. Paylor, Deputy Secretary  
of Natural Resources  
P.O. Box 1475

Richmond, Virginia 23218

If to the State of North Carolina: John N. Morris, Director  
NC Division of Water Resources  
1611 Mail Service Center  
Raleigh, NC 27699-1611

If to the Government: Charles R. Alexander, Colonel  
U.S. Army Corps of Engineers  
P.O. Box 1890  
Wilmington, NC 28402-1890

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

## ARTICLE XII – OBLIGATION OF FUTURE APPROPRIATIONS

A. Nothing herein shall constitute, nor be deemed to constitute, an obligation of future appropriations by the General Assembly of the Commonwealth of Virginia, where creating such an obligation would be inconsistent with the Constitution or the statutory limitations of the Commonwealth of Virginia.

B. Nothing herein shall constitute, nor be deemed to constitute, an obligation of future appropriations by the General Assembly of the State of North Carolina, where creating such an obligation would be inconsistent with the Constitution of the State of North Carolina.

C. The Sponsors intend to satisfy their obligations under this Agreement. The Sponsors shall include in their budget requests or otherwise propose, for each fiscal period, appropriations sufficient to cover the Sponsors' obligations under this Agreement for each year, and will use all reasonable and lawful means to secure the appropriations for that year sufficient to make the payments necessary to fulfill their obligations hereunder. The Sponsors reasonably believe that funds in amounts sufficient to discharge these obligations can and will lawfully be appropriated and made available for this purpose. In the event the budget or other means of appropriations does not provide funds in sufficient amounts to discharge these obligations, the Sponsors shall use their best efforts to satisfy any requirements for payments under this Agreement from any other source of funds legally available for this purpose. Further, if the Sponsors are unable to satisfy their obligations hereunder, the Government may exercise any legal rights it has to protect the Government's interests related to this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the District Engineer.

DEPARTMENT OF THE ARMY

COMMONWEALTH OF VIRGINIA

BY: \_\_\_\_\_  
Charles R. Alexander, Jr.  
Colonel, Corps of Engineers  
District Engineer  
Wilmington District

BY: \_\_\_\_\_  
David K. Paylor  
Deputy Secretary of Natural Resources

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

STATE OF NORTH CAROLINA

Secretary, Department of Environment  
and Natural Resources

BY: \_\_\_\_\_  
William G. Ross, Jr.

DATE: \_\_\_\_\_

CERTIFICATE OF AUTHORITY

I, Roger L. Chaffe, do hereby certify that I am authorized by the principal legal officer of the Commonwealth of Virginia to make this certification; that the Commonwealth of Virginia is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army, the Commonwealth of Virginia, and the State of North Carolina in connection with a study of the John H. Kerr Dam and Reservoir; and that the persons who have executed this Agreement on behalf of the Commonwealth of Virginia have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this \_\_\_\_\_ day of \_\_\_\_\_, 2003.

\_\_\_\_\_  
Roger L. Chaffe  
Senior Assistant Attorney General  
Commonwealth of Virginia

CERTIFICATE OF AUTHORITY

I, James C. Gulick, do hereby certify that I am authorized by the principal legal officer of the State of North Carolina to make this certification; that the State of North Carolina is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army, the Commonwealth of Virginia, and the State of North Carolina in connection with a study of the John H. Kerr Dam and Reservoir; and that the persons who have executed this Agreement on behalf of the State of North Carolina have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this \_\_\_\_\_ day of \_\_\_\_\_, 2003.

\_\_\_\_\_  
James C. Gulick  
Senior Deputy Attorney General  
State of North Carolina

## CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

*(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.*

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

\_\_\_\_\_  
David K. Paylor  
Commonwealth of Virginia  
Deputy Secretary of Natural Resources

DATE: \_\_\_\_\_

## CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

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(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

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This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

\_\_\_\_\_  
William G. Ross, Jr.  
State of North Carolina  
Secretary, Department of Environment and Natural Resources

DATE: \_\_\_\_\_