Scope of Work for
John H. Kerr Section 215 Feasibility Study
Roanoke River Hydrodynamic and Water Quality Monitoring and Modeling
Description of Existing
And
Future Without Project Conditions

1. Introduction: The U.S Army Corps of Engineers, Wilmington District (Wilmington District) in partnership with the State of North Carolina and the Commonwealth of Virginia are sponsoring a feasibility study under the authority of Section 216 of the River and Harbor and Flood Control Act of 1970 (Public Law 91-611). Section 216 authorizes the review of the operation of completed Corps of Engineers projects and development of recommendations for modifying the project structures or their operation and for of improving the quality of the environment in the overall public interest. Public, stakeholder, and local, State, and Federal agency input received during the early stages of this study indicated there is a public interest in reviewing the following areas: (1) downstream flow regime and effects on riparian ecosystem; (2) water quality; (3) sedimentation and channel morphology; (4) reservoir resources; (5) downstream flow based recreation; (6) salt wedge; (7) diadromous fish and riverine aquatic resources; and (8) water supply. Study Teams were formed for each of these areas of interest, and each of the teams has developed a Scope of Work to inventory existing conditions and to forecast the future conditions that would exist if no modifications are made to operating procedures at the John H. Kerr Dam. This analysis being done in accordance with U.S. Water Resources Council 's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* as implemented by the U.S. Army Corps of Engineers' *Planning Guidance Note Book* (Engineering Regulation 1105-2-100). A summary of the progress made thus far on the John H. Kerr 216 Study can be found in the 2004 *Project Management Plan, John H. Kerr 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.* This management plan and other materials regarding the John H. Kerr 216 study are available at the following website: http://www.saw.usace.army.mil/Authorized_Projects/Main.htm. The purpose of this contract is to inventory the existing conditions and to forecast future conditions for water quality if no operational changes are implemented at John H. Kerr Dam. Information gathered during the course of this contract, will be used along with information gathered for the other identified areas of interest, to evaluate the impacts and feasibility of implement of various modifications to the operation or structure at John H. Kerr Dam.

2. Technical Proposal: The Contractor shall prepare a Technical Proposal to be submitted along with the required Cost Proposal. The Technical Proposal will consist of a detailed description of the methods the Contractor proposes to use to collect the data requested by this Scope of Work. In addition to demonstrating a clear understanding of the technical requirements of this Scope of Work, the Contractor must demonstrate a clear understanding of: (1) current operation of the John H. Kerr Reservoir; (2) the relationship between John H. Kerr and the two downstream dams operated by Dominion Power; and (3) the Corps of

Engineers Planning process and how the future without project conditions analysis will influence future analysis of alternatives resulting from the John H. Kerr 216 Study.

3. *Study Area Description:* *(The following discussion is based on material contained in the John H. Kerr 216 Feasibility Study Project Management Plan, PMP.)* The John H. Kerr Dam and Reservoir 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 extends 34 miles on the Dan River. 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 Charlotte, Halifax, Mecklenburg, and Brunswick Counties of Virginia, and in Granville, Vance, Warren, Halifax, Northampton, Bertie, Martin and Washington Counties of North Carolina.

4. Relevant Operational Guidance and FERC Settlement Agreement: John H. Kerr Reservoir is operated in accordance with the "*Water Control Plan for John H. Kerr Dam and Reservoir.*" which was updated in February 1995. A copy of this plan is attached (Attachment 1). The Contractor shall become familiar with this plan and shall use it as the basis for the future without conditions analysis.

While the operation of John H. Kerr Reservoir under the terms of the 1995 Water Control Plan has a significant influence on the Lower Roanoke River Basin, the lower basin is also influenced by the downstream Roanoke Rapids and Lake Gaston Reservoirs, which are operated by Dominion Power. Roanoke Rapids and Lake Gaston are operated under the terms of the 2003 "*Comprehensive Relicensing Settlement Agreement for the Roanoke Rapids and Gaston Dam Project"* (Attachment 2) that resulted from the Federal Energy Regulatory Commission (FERC) relicensing process. The Contractor shall be come familiar with this settlement agreement and shall use it to help distinguish between downstream influences on sedimentation, erosion, and channel morphology caused by the operation of John H. Kerr and the downstream influences caused by the operation of Roanoke Rapids and Lake Gaston.

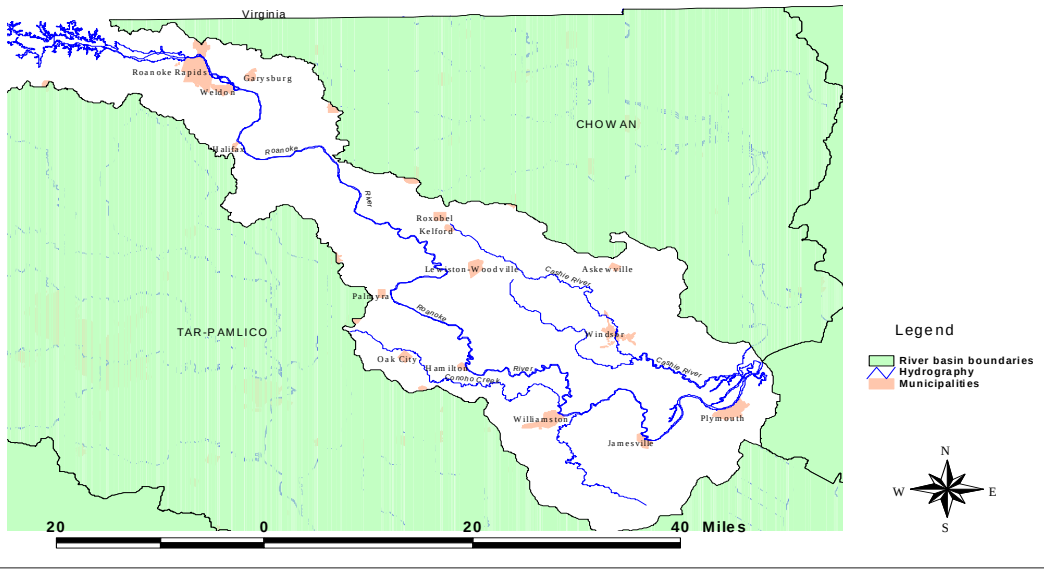
5. Purpose: The purpose of this water quality contract is to inventory the existing conditions and to forecast future conditions for providing recommendations to address

several main issues regarding flow releases from John H. Kerr Dam to the Roanoke River. Such issues are:

- How do releases at Kerr Dam translate to changes into water quality in the Roanoke River?
- What is the effect of riparian swamp water drainage on the Roanoke River oxygen levels?
- What is the oxygen related assimilative capacity of the Roanoke River associated with different flow regimes and management operations at the dam?

Information gathered during the course of this contract, will be used along with information gathered for the other identified areas of interest, to evaluate the impacts and feasibility of implement of various modifications to the operation or structure at John H. Kerr Dam. Monitoring and modeling should be one combined task where it will be sent out as two separate proposals, but for the same award. Also, nutrients and eutrophication are not considered major issues. The Roanoke River from the Roanoke Rapids Dam to the mouth below Plymouth is shown in Figure 1.

Figure 1. Roanoke River below Roanoke Rapids Dam



6. Background: Under Water Quality tasks in the PMP (USACE 2004) there are three objectives labeled A, B and C:

A. "*How does flow regime affect downstream water quality in floodplain areas, tributaries, and the main river channel*".
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?*"
C. "*Evaluate the water quality of the release from the Kerr Dam impoundment through the Roanoke Rapids tailrace.*"

This scope of work primarily addresses objective B and secondarily, objective A. Objective C is not included in this scope of work.

The water quality issues highlighted by the Water Quality Task Group (Task Group) include those related to dissolved oxygen levels in the water column.

The monitoring and modeling effort should include the Roanoke River and adjacent swamp lands from the Roanoke Rapids Dam to the mouth at the Albemarle Sound. Several stretches of the river are braided or diverted to side channels. The flow in these channels (not reflected in Figure 1) can be substantial, thus special considerations should be given to characterizing water movement and quality in these areas. For example, below Jamesville the Roanoke and Cashie Rivers have in common several natural and man-made channels through which water can flow from one system to another. With the added tidal influence, water movement in this area has the potential to change direction frequently.

At this time, the Task Group anticipates the need for about 28 months (Section 8. Timeline) of monitoring throughout all seasons. Thus multiple seasons, meteorology and hydrologic conditions can be captured through both monitoring and modeling. Typically, high temperature, low flow situations are associated with low dissolved oxygen levels in riverine systems. However, the changes in flow regime due to dam releases, the influence of adjacent swamps, and the relative natural contributions from rainfall need to be characterized in a manner that will allow appropriate management actions. The proposed 28 month monitoring period could be shortened depending on the environmental conditions that occur naturally or if releases from the reservoirs would be adjusted to meet requirements. These specific flow requirements would range from extreme high flows of 30,000 cfs to low flows of 1,500 cfs. In addition, these ranges could be met for each of the four seasons in a year, given the availability of inflows to J.H. Kerr Reservoir.

Swamp drainage. The majority of the land on both sides of the Roanoke River downstream of Weldon is comprised of extensive wetlands and swamps that are subject to frequent flooding. This flooding often results from high flow releases from Roanoke Rapids dam. Flooding in response to heavy rainfall is less frequent. Since the swamps have naturally occurring low dissolved oxygen levels and depending on the season, have higher temperature values, the water quality model of the river will need to consider the oxygen consuming loads from the adjacent wetlands and swamps as it relates to water quality in the main channel of the Roanoke River. The impacts of industrial and domestic discharges on DO depletion also needs to be assessed along with the relatively contribution to DO depletion by swamp drainage and industrial discharges. The monitoring to address these issues (as well as the modeling) will be directly relevant to Objective A described above.

Flow regime. The quantity of water in the Lower Roanoke River is dependent upon operation of the three reservoirs (J.H. Kerr, Gaston and Roanoke Rapids). Gaston and Roanoke Rapids are owned and operated by a public utility company. The J.H. Kerr dam is owned and operated by the USACE and is located upstream from the Roanoke Rapids dam. USACE gives weekly flow declarations to the public utility company to inform them of anticipated quantity amounts to be received. Under these conditions large water outflows are released from Roanoke Rapids dam and thus, subsequent flooding of the swamps. Under drought conditions, a minimum flow requirement is established per the power company's

Federal Energy Regulatory Commission license to avoid mass deterioration of downstream aquatic ecosystems.

Diurnal variation. The water quality model will need to consider changes to dissolved oxygen through a daily cycle, for all seasons and flow releases.

Salt wedge. The mouth of the Roanoke River drains into the Albemarle Sound, which is an estuarine system. During times of low flow and drought conditions salt has been observed to move into the Roanoke River. The change in density and saturation associated with salt water affect the levels of oxygen in the water column. The water quality model will need to simulate the movement of the salt wedge and its impacts on dissolved oxygen values.

Determination of saltwater movement in Albemarle Sound is covered by the salt wedge task area. Within the sound, saltwater movement is driven by river flow over the prior weeks to months and wind conditions. Operations at Kerr Reservoir may affect river flows and hence salt water movement in the sound. In the absence of predictions or downstream boundary monitoring data, model input data on salt water at the mouth of the Roanoke River will need to be developed making assumptions about the relationship between salt water movement and river flow.

7.0 Technical Services: This scope of work requests services related to objectives A and B described in Section 6.

7.1 Monitoring Strategy Development (Task 1): The Contractor will develop a monitoring strategy to support hydrodynamic and water quality modeling of the Roanoke River from Roanoke Rapids Dam to the mouth at the Albemarle Sound. In order to develop a successful monitoring strategy, the Contractor should have ready access to hydrodynamic and water quality modeling staff to provide expertise regarding the usefulness of the existing monitoring networks and the additional needs for modeling purposes. Actual monitoring will be carried out in Task 2. The Task Group is expecting data needs to include geomorphology/bathymetry, discharge and velocity, dye studies, vertical water level and water quality parameters for water quality modeling as well as parameters for hydrodynamic modeling.

Several scientific and water quality issues have been identified that will need to be addressed as part of this project including strategies related to low dissolved oxygen values for J.H. Kerr Reservoir. This also includes the influence of swamp drainage including adjacent flooding, the influence of controlled releases from Roanoke Rapids dam, the diurnal variation in water quality, and the movement of the salt wedge in response to changes in flow regimes. These should all be addressed in the monitoring strategy. Issues of hypothetical effects at J.H. Kerr Reservoir is important to address; however, Task C from the draft PMP was identified as low priority. Therefore, theoretical DO values will be assumed regarding flows from J.H. Kerr Reservoir dam.

As previously stated, the Water Quality Task Group feels that monitoring and modeling should occur over a period of 28 months. Although actual monitoring takes place in Task 2, the Quality Assurance Project Plan (QAPP) and budget should reflect a 28 month time

period. If supported by scientific data and analysis, the Contractor may suggest an alternate time period to meet the project goals.

- Prepare a data review document. The Task Group has prepared a summary of the sources of data, however a summary of the data has not been prepared. The Contractor will prepare a data review that includes descriptions of physical characteristics, previous water quality investigations by any agency, a review of existing modeling frameworks, an existing data compilation, exploratory data analysis, identification of data gaps and recommendations for monitoring. The data review should address the differences in analytical methods and precision among existing monitoring networks and highlight incompatible data. This document will be prepared in draft and final form and should be presented to the Task Group for consideration prior to the development of the Quality Assurance Project Plan (QAPP).
- The Contractor will prepare a combined monitoring strategy and a QAPP according to EPA guidance (EPA 240/R-02/009). A NC certified laboratory should be utilized for chemical parameter analysis. Monitoring frequency and location should be specified in the QAPP and a contingency procedure should be provided in case of extreme weather during the monitoring period. A draft QAPP, with a preliminary budget, will be provided to the Task Group for review and comment. Comments related to the QAPP and a final budget should be addressed in the final document. Approvals, in the form of signatures, should be obtained from both the USACE and DWQ.

In summary, the deliverables for this task are:

1. Roanoke River Data Review Document.
2. Draft and final Quality Assurance Project Plans (QAPP) for monitoring strategy.
3. QAPP meeting and presentation to Task Group.

7.2 Field Monitoring (Task 2): The Contractor will implement the monitoring strategy described in the QAPP developed for Task 1. Along with brief monthly updates, at a midpoint during the field study, the Contractor will provide a detailed memorandum to the Task Group to describe the progress with monitoring and expenditures. All quality assurance and control procedures outlined in the QAPP will be followed.

The following information should be included in the MS Access compatible database:

Station information:
- Station ID
- Description
- Latitude
- Longitude
- County
- USGS Station Number (if applicable)

Chemical analysis information:
- Parameter
- Media
- Analytical method
- Reporting limit

Chemical monitoring information:

Station ID
Date
Time
Depth
Parameter
Result
Data qualifier

Hydrologic and hydraulic data should be provided in an ASCII file (or files). The format for hydrologic and hydraulic data should be similar to the chemical monitoring information.

With the midpoint progress memorandum, the Contractor will provide the USACE and DWQ with an ArcView shape file mapping all monitoring locations. The metadata should include the station ID, type of monitoring that occurs at that station (e.g., temperature only, chemical, hydrologic/hydraulic), and the agency or group responsible for data collected at that station. The submittal should include an interactive website with a map linked to real-time data.

The Contractor will also provide a brief summary report of the data collected for this effort. This will include graphical representations of conditions during the study and data summaries. The monitoring report should also compare the data collected for this effort to the historical record to determine if the monitoring period was particularly wet or dry.

Deliverables:

1. Monthly reports and Midpoint progress memorandum.
2. MS Access compatible database with all project chemical data. ASCII database with all project hydrologic/hydraulic data.
3. ArcView shape file describing all monitoring stations and including metadata.
4. Draft and Final Monitoring Report, including graphs and tables.

7.*3 Hydrodynamic Modeling (Task 3):* The Contractor will develop a hydrodynamic model of the Roanoke River from the Roanoke Rapids Dam to the mouth at the Albemarle Sound. The hydrodynamic model should be capable of simulating rapid changes in the flow regime due to changes in dam releases. The hydrodynamic model should also be capable of simulating, to some extent, flooding of adjacent wetlands and forests and subsequent drainage back to the river. At this time, the Task Group believes that several lateral cells should be included in the modeling framework in order to describe the wetting and drying that occurs in riparian areas. These lateral wetting and drying cells will be repeated in the water quality model.

At this time, the Task Group feels that an existing modeling framework should be utilized to construct the Roanoke River hydrodynamic model. Examples of existing frameworks include CE-QUAL-RIV1, CE-QUAL-W2, RMA2 and EFDC. The Contractor shall seek permission from both the USACE and DWQ if a proprietary code or model is preferred.

The treatment of braided channels is an important consideration in the Roanoke River model. This is particularly important in the lower portion of the Roanoke River near the mouth of the Cashie River where many channels are present and where tidally influenced movement is likely to be greatest.

The Contractor should provide a written and oral description of the modeling approach to the Task Group for review. The technical memorandum and presentation should include a description of the model selection procedure, calibration goals and methods, and the approach to characterizing model uncertainty. (The Contractor may prepare a combined hydrodynamic and water quality modeling approach document and presentation.)

Deliverables:

1. Modeling approach presentation and technical memorandum.
2. Calibrated hydrodynamic model compatible with MS Windows NT.
3. Graphical representations of water movement and temperature changes in the system including movies.
4. Draft and final hydrodynamic model technical reports (can be included in a combined hydrodynamic and water quality modeling report).
5. Presentation of results (see Section 7.4).

7.4 Water Quality Modeling (Task 4): The Contractor will develop a dynamic water quality model of the Roanoke River from the Roanoke Rapids Dam to the mouth below the Cashie River at the Albemarle Sound. The water quality model should be capable of simulating rapid changes in dissolved oxygen due to changes in Roanoke Rapids dam releases and to swamp water inputs. The water quality model should also be capable of simulating, to some extent, the oxygen consuming properties of riparian swamp water inflow after a flooding event. Sediment oxygen demand should be explicitly included in the model.

At this time, the Task Group feels that an existing modeling framework should be utilized to construct the Roanoke River water quality model. Examples of existing frameworks include CE-QUAL-RIV1, CE-QUAL-W2, EFDC, and WASP. The Contractor shall seek permission from both the USACE and DWQ if a proprietary code or model is preferred. The Task Group also feels that a minimum of a 2-dimensional water quality model is needed in order to address issues with swamp drainage, tidal influences, and the salt wedge.

The Contractor should provide a written and oral description of the modeling approach to the Task Group for review. The technical memorandum and presentation should include a description of the model selection procedure, model linkage, calibration goals and methods, and the approach to characterizing model uncertainty. (The Contractor may prepare a combined hydrodynamic and water quality modeling approach document and presentation.)

Deliverables:

1. Modeling approach presentation and technical memorandum. (Can be included in a combined hydrodynamic and water quality modeling report.)
2. Calibrated water quality model compatible with MS Windows NT
3. Graphical representations of dissolved oxygen in the system including movies.
4. Draft and final water quality model technical reports (can be included in a combined hydrodynamic and water quality modeling report).
5. Presentation of results to the Task Group.

7.5 Management Scenario Analysis(Task 5): In addition to providing modeling output describing water movement and dissolved oxygen levels by segment on a daily basis, the Contractor will evaluate several other management scenarios in order to guide management

of water releases from Kerr Reservoir. These additional management scenarios include the following:

- Evaluate mainstem water quality conditions with minimum release flows at the Roanoke Rapids Dam that vary monthly.
- Evaluate mainstem water quality conditions with minimum release flows at the Roanoke Rapids Dam and permitted effluent loads of oxygen consuming wastes.
- Evaluate mainstem water quality conditions under flood control scenarios as defined by the USACE for Kerr Reservoir.
- Evaluate mainstem water quality conditions following high flow pulse releases from the Roanoke Rapids Dam.
- Evaluate mainstem water quality conditions following sustained releases of flood-level flows. (See example Figures 2 and 3)
- Evaluate riparian swamp area water quality conditions following sustained releases of flood-level flows.
- Evaluate riparian swamp area water quality conditions following high flow pulse releases from Roanoke Rapids Dam.
- Evaluate response of downstream DO to hypothetical management alterations of DO improvements at J.H. Kerr Dam. (The Contractor will have to make assumptions regarding the effects of changes at J.H. Kerr Dam to releases at Roanoke Rapids Dam. Reservoir modeling is not included in this project).

The Contractor should convene a conference call with the Task Group following the completion of the water quality model. This conference call will be held to discuss these management scenarios and any other scenarios that may arise. The Task Group anticipates that batch runs of the water quality and/or hydrodynamic model will be required to answer these management questions.

Figure 2. Example management scenario result: Percent of River Violating Standards

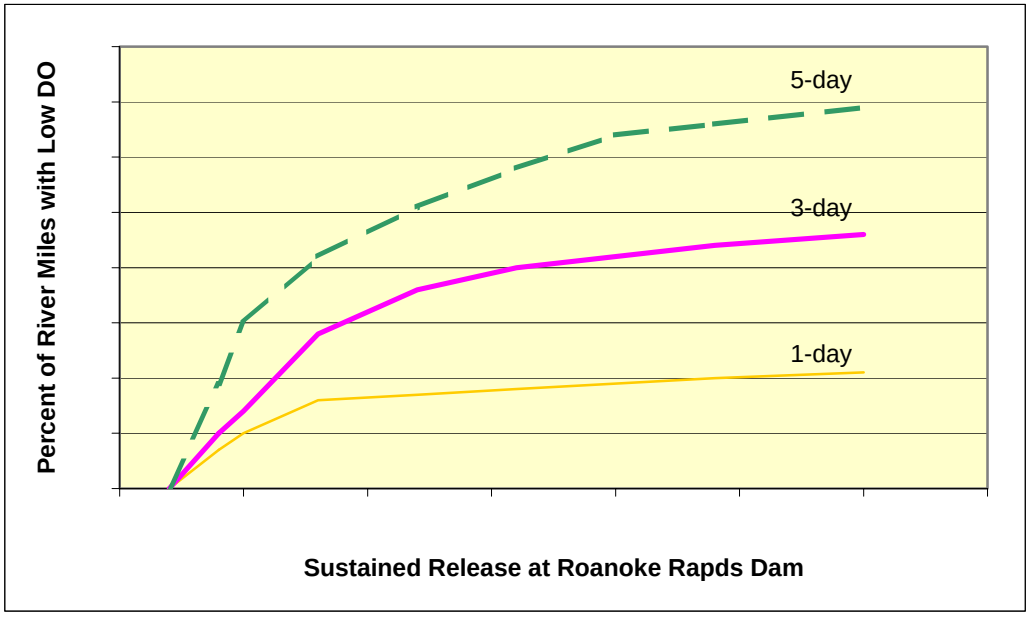
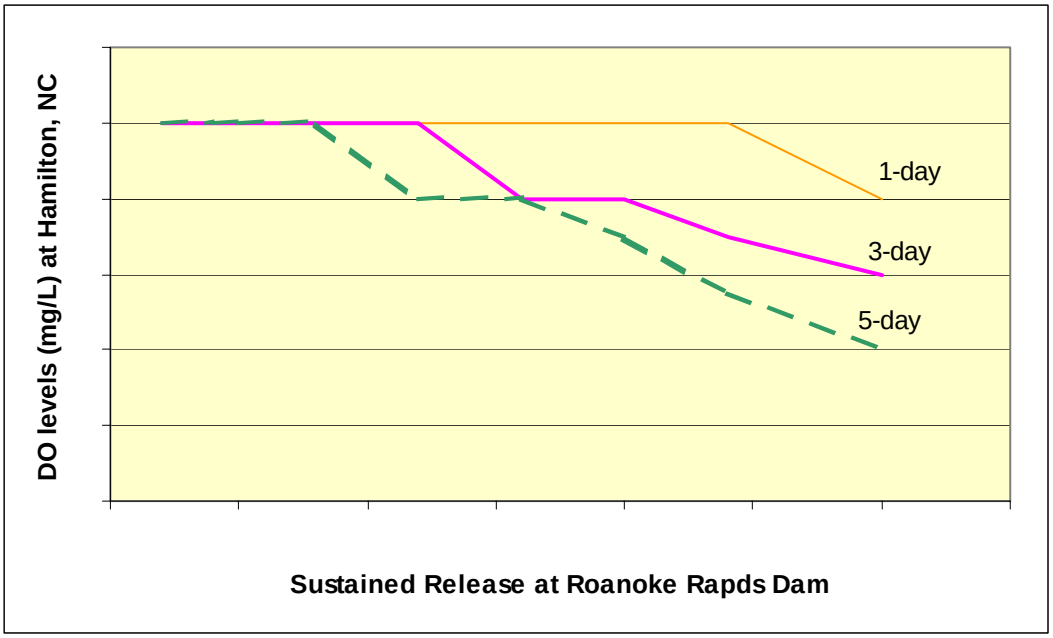


Figure 3. Example management scenario result: Water Quality Impacts at Hamilton, NC



Deliverables:

1. Presentation of results to the Task Group
2. Draft and final scenario analysis reports (can be included in a combined hydrodynamic and water quality modeling report.)

8. Timeline:

The estimated timeline for each task of this project is provided below.

Task	Scheduled completion
Award contract	
Task 1. Monitoring Strategy Development	6 months after contract award
Task 2. Field Monitoring	28 months after QAPP and budget approval, assuming same contractor performs Task 1 and 2.
Task 3. Hydrodynamic Modeling	8 months after contract award or receipt of all monitoring data
Task 4. Water Quality Modeling	5 months after completion of hydrodynamic modeling
Task 5. Management scenario analysis	2 months after completion of water quality modeling

9. Monthly Status Reports: The Contractor shall submit written monthly status reports by the 5th day of each month the contract is in force. A Monthly Status Report must accompany all requests for payment. These reports may be in brief letter format and should summarize work performed and problems encountered. A concise statement and/or graphic presentation of estimated work progress (incremental and cumulative percentage completed), by task,

shall be included in each report. The report should also note difficulties, if any, in meeting the work schedule. The Contractor shall be responsive to verbal requests from the Contracting Officer for specific information to be included in the monthly reports. Any matters requiring an immediate action or decision by the Contracting Officer shall be identified by expeditious telephone contact with the Contracting Officer's Representative (COR).

10. Project Reports: Upon completion of all work under the five tasks under the terms of this contract, the Contractor shall submit a draft report for review. The report and findings shall be objective and fully substantiated by documentation. The appendices will contain tabulations of all physical, biological, and statistical data and a list of all participating technical staff and their respective responsibilities on the project. The report shall contain appropriate summary tables and figures. Text material shall be printed on 8-1/2" by 11" bond paper with 1-1/2" margins on the left for binding. All pages must be consecutively numbered. Drawings or plates bound in the report shall be no larger than 11" by 17" and shall include a graphic bar scale for control during reduction or enlargement. Additional larger maps or drawings shall be provided on standard 30" by 42" sheets, unless the Contracting Officer and the Contractor agree otherwise. **Draft reports requiring extensive proofreading or incomplete draft reports are unacceptable and will be returned to the Contractor.** The Contracting Officer will provide written comments on the accepted draft report. The Contractor will revise the report in accordance with these comments and, then, submit the report as final. In some instances a revised draft report to assure that all agency requirements are properly addressed prior to release of the report for agency or public review may be required.

(1) Electronic copies of each report will be delivered to the USACE and DWQ and should be compatible with Adobe Acrobat and MS Word 2000. In addition, 15 hard copies of each report will be required. This requirement includes the following documents:
    1. Roanoke River Data Review Document
    2. Draft and final Quality Assurance Project Plans (QAPPs)
    3. Monitoring Data Report
    4. Draft and final Hydrodynamic and Water Quality Modeling Report
    5. Various technical memoranda.
(2) Monitoring database including hydrologic, hydraulic and water quality data. All files must be compatible with MS Access 2000 or ASCII as specified in Section 7.2.
(3) All input and output modeling files with, if necessary, a copy of an executable version of the model. All files will be compatible with Windows operating systems (prefer 2000) and/or ArcView version 9.0.
(4) Shape files with locations of all monitoring stations and metadata. These shape files will be compatible with ArcView 9.0.
(5) Stakeholder presentations. The Contractor shall provide, in advance, copies of the presentations and any handouts to be provided to the Task Group. Electronic copies of presentations should be compatible with Adobe Acrobat and MS PowerPoint.

11. Report Title Page: The title page of the project report(s) will bear an inscription that indicates the source of funding for the particular item of work covered by the report. This inscription will reference the Contract Number. In addition, the title page shall bear the following inscription: "Project Manager: (Name)." If someone other than the Project

Manager has prepared the document, this inscription will, instead, state Prepared Under the Supervision of (Name), Project Manager.

12. Instructions for Proposals: To expedite the review and selection process, the Letter of Interest, Statement of Qualifications, and Cost Proposal shall not be in excess of 50 pages, including appendices. The document shall be formatted as follows:

Part I. Letter of Interest (1 page)
Part II. Table of Contents
Part III. Technical Approach
Part IV. Project Team (1 page maximum)

This section should identify the lead firm that will have total responsibility for coordination with the USACE. Describe lead firm's and any sub-contractors' responsibilities and anticipated percentage of total work for each team participant. Identify project work location(s) and describe how coordination and communication will be conducted. Provide a brief summary of past joint work with each sub-contractor, if applicable.

Part V. Organization Chart (1 page maximum)

Identify the Project Manager (that person responsible for day-to-day communication with the USACE contract) and all personnel contributing to the contract. Indicate the firm with which the individual works.

Part VI. Qualifications, Experience and References

This Section must include the following information:

A. Description of the Proposer's most significant qualifications for this project;
B. Summary of the Proposer's experience with similar projects, highlighting projects completed in the Carolinas (include client's name, brief description of project, project contract period, contract amount, and names of the Proposer's key personnel who worked on the project);
C. References concerning the Proposer's qualifications, experience, and performance on prior and current assignments that are similar to the proposed project (name, title, organization, address, phone number, etc.)

Part VII. Resumes

Provide resumes to present the credentials and experience of each team member identified in the proposal. Each resume should be limited to one page or less.

13. Proposal Evaluation and Contractor Selection: The Task Group will consider numerous criteria to evaluate proposals received in response to this Request for Qualifications. Criteria include, but are not limited to:

1. Technical approach
2. Technical qualifications and competence of the contractor, including applicable subcontractors,
3. Experience and qualifications of key staff assigned to this project ,
4. Organization of the proposal, and
5. Costs

14. Contractor Obligations:

a. Permits, Licenses, And Approvals: The Contractor shall obtain all necessary permits, licenses, and approvals required by Federal, State, or local authorities for conducting work under this contract. Personnel conducting work on endangered and threatened species must have demonstrable knowledge of the biology and current conservation practices for the species in the work area, and they must have, or be able to demonstrate the ability to obtain, all necessary permits required to survey and monitor listed species. Should it become necessary in the performance of the work and services for the Contractor to secure the right of ingress and egress to perform any of the work required under this contact on properties not owned or controlled by the Government, the Contractor shall, if practicable, secure the consent of the owner, his representative, or agent prior to effecting entry on such property. In the event all efforts by the Contractor fail to gain permission from the property owner(s) for entry to the property for performing the required work, the Contractor shall contact the Contracting Officer to obtain instructions for further action. In the event that the Contracting Officer must take action to obtain right-of-entry for the Contractor, the Contractor will be entitled to an equitable extension of time for the period required to obtain said right-of-entry. The Contractor shall assume all responsibility for and take all precautions to prevent damage to private and Government-owned property. The Contractor shall be responsible for any claims covering actions not approved by the Contracting Officer.

b. Project Management: The Project Manager shall be the individual responsible for the validity of the material in all reports and shall have recognized expertise in the appropriate field. During execution of the work, the Project Manager shall provide adequate professional supervision to assure timeliness, accuracy, quality, and completeness. In the event of controversy or court challenge, the Project Manager may be called upon, under separate contract, to testify on behalf of the Government in support of the Contractor's findings.

c. Product Quality: The Contractor shall be responsible for accomplishing all work in an accurate and professional manner. Any work deemed inadequate or nonconforming by the Contracting Officer shall be re-done by the Contractor, as necessary, to comply with the contract requirements at no additional cost to the Government.

15. Personnel Qualifications: All professional persons employed under the terms of this contract must meet the minimum qualifications for their profession as established by the United States Office of Personnel Management. The duties and basic qualifications of key staff are as follows:

a. Project Manager/Principal Investigator.

(1) **Duties**. The Project Manager or Principal Investigator is the individual identified in the contract as being authorized to act for the Contractor and is responsible for contract administrative actions and research formulation for the contract firm. This individual usually selects the Technical Director and appropriate work crews, determines appropriate level of investigation and

analysis, coordinates activities with the Contracting Officer's Representative, and performs other administrative functions. This individual is responsible for overall contract quality control.

(2) **Qualifications**. Persons in charge of a project or research investigation, in addition to meeting the appropriate standards for their respective profession, must have a doctorate or an equivalent level of professional experience as evidenced by a publication record that demonstrates experience in project formulation, execution, and technical monograph reporting. If prior projects were of a sort not ordinarily resulting in a publishable report, a narrative should be included, detailing the proposed Project Manager/Principal Investigator's previous experience along with references suitable to obtain opinions regarding the adequacy of this earlier work.

b. Technical Director.

(1) **Duties**. The Technical Director is the individual in charge of accomplishing specific scientific data collection, analysis, evaluation, and reporting. This individual follows work from initiation to completion and provides technical support to the Project Manager/Principal Investigator utilizing a basic understanding of scientific methods and procedures. The Technical Director is responsible for conducting literature reviews; office, field, and laboratory research; field surveys; site testing; and scientific analyses using various reference materials, maps, interviews with knowledgeable individuals, scientific instruments, and aerial photographs and other remotely-sensed data. The Technical Director is the individual who authors reports under the supervision of the Project Manager/Principal Investigator. Under the guidance of the Project Manager/Principal Investigator, this individual is responsible for making day-to-day decisions regarding the data collection, testing and analysis, and evaluations. The Technical Director is responsible for the accuracy of the information collected and for the scientific validity of recommendations made in draft and final reports. Technical Directors oversee and supervise the crewmembers assigned to their projects. The Technical Director assures that assignments are carried out in a safe and timely manner according to procedures established by the Project Manager/Principal Investigator.

(2) Qualifications. Individuals in this job category must hold a Master's or higher degree in the field of their work assignment, or possess an equivalent level of professional experience.

c. Scientist.

(1) **Duties**. Personnel in this category must carry academic and experiential qualifications in the field of their work assignment. Such qualifications are to be documented by means of vitae attachments submitted with the proposal or at a later time if this person has not been retained at the time of proposal.

(2) **Qualifications**. Individuals in this job category must hold a Bachelor's or higher degree in the field of their work assignment and must possess at least 12 month combined field and laboratory experience.

d. Technician.

(1) **Duties**. Technicians work under the direction of the Technical Director. Technicians conduct a variety of tasks, including locating field sites by using maps and instruments, conducting scientific data collection, performing analytical procedures and techniques, and performing accurate record-keeping. Technicians may be required to calibrate and operate various types of analytical instruments. Technicians may also be required to perform preliminary treatments on samples or specimens requiring later detailed analyses.

(2) **Qualifications**. Technicians must possess an Associate's or higher degree (except archaeological technicians, who must have a Bachelor's degree) in the field of their work assignment, or at least 12 months combined field and laboratory experience.

e. Consultant.

(1) **Duties**. Consultants are personnel subcontracted on a short-term basis for their special knowledge and expertise.

(2) **Qualifications**. Consultants must carry academic and/or experiential qualifications in the field of their work assignment. Such qualifications are to be documented by means of vitae attachments submitted with the proposal or at a later time if the consultant has not been retained at the time of proposal.

16. Equipment And Facilities: The Contractor must provide or demonstrate access to the following capabilities:

a. Adequate field and laboratory equipment necessary to conduct whatever operations are defined in this Scope of Work

b. Adequate facilities necessary for the proper treatment, analysis, and storage of samples and/or specimens likely to be obtained from a given project. This does not necessarily include such specialized facilities as pollen, geochemical, or radiological laboratories, but it does include facilities sufficient to properly preserve or stabilize specimens for any subsequent specialized analysis that may be required.

c. Adequate facilities for secure storage and efficient retrieval of data and records.

17. Release Of Information: Neither the Contractor nor the Contractor's representatives shall release any report, data, specification, drawing, rendering, perspective, sketch,

photograph, cost estimate, or other material obtained or prepared under this contract without prior specific written approval of the Contracting Officer.

18. Inspection Of Services: The Government's rights regarding the inspection of services under the terms of a fixed-price services contract are explained in Section I "Contract Clauses." Generally, under this clause, the Government has the right to inspect all services called for by this contract and any Task Order issued under it. If any of the services do not conform with the contract and the Task Order requirements the Government may require the Contractor to perform the services again in conformity with the contract and Task Order requirements, **at no increase in the contract amount**. If the Contractor fails to promptly perform the services again in conformity with the contract and Task Order requirements, the Government may: perform the services (or have the services performed) and charge the Contractor any cost incurred by the Government; cancel the services required under terms of a specific Task Order; or in extreme case may **terminate the contract** for default.

19. Travel: All travel and per diem in connection with work performed under this contract will be at the Contractor's expense, including travel time to and from work sites.

20. Payment: Payments will be made based on documented progress. Evidence of progress (e.g. percentage of task complete) shall be documented in the monthly progress report that must accompany invoices.

21. Method Of Payment: Partial payments to the Contractor will be made through the end of each month, for work or services performed by the Contractor during that month, upon submission of a proper invoice on the submitted on corporate letterhead. In order to be considered a proper invoice each invoice must be accompanied by the monthly status report accepted by the COR clearly indicating what the work has been accomplished during the billing period. Partial payments will not be made in amounts less than $1,000 (except for final submittals). Each invoice must identify the contract and indicate whether the payment is a partial billing (e.g. "partial #1") or a final bill (e.g. "#4, final"). For purposes of billing, the acceptance date of deliverables (not delivery date or date of invoice) will constitute the billing date for the purposes of all payments.

22. References Cited:

Federal Energy Regulatory Commission
2003 *Comprehensive Relicensing Settlement Agreement for the Roanoke Rapids and Gaston Dam Project FERC Project No. P-2009,* June 2003

U.S. Army Corps of Engineers
1988 *Environmental Quality - Procedures for Implementing NEPA*. Publication Number: Engineering Regulation 200-2-24 March 1988, U.S. Army Corps of Engineers, Washington D.C.
1992 *Authorized and Operating Purposes of Corps of Engineers Reservoirs July 1992* U.S. Army Corps of Engineers, Washington D.C.

2000 *Planning Guidance Note Book*. Engineering Regulation 1105-2-100, April 22, 2000, U.S. Army Corps of Engineers, Washington D.C.

U.S. Army Corps of Engineers, Wilmington Distinct
1995 *Water Control Plan For John H. Kerr Dam And Reservoir,* Wilmington, North Carolina.

2004 Project Management Plan, John H. Kerr 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, Wilmington North Carolina.

2004 Wilmington District Authorized Project Web Site
http://www.saw.usace.army.mil/Authorized_Projects/Main.htm.\

U.S. Council on Environmental Quality
1978 *Regulations for Implementing National Environmental Policy Act*. 40 Code of Federal Regulations Parts 1500-1508, 43 Federal Register 55990, November 28, 1978.

U.S. Water Resources Council
1983 *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. 8 July 1983, United States Water Resources Council, Washington DC.