FINAL ENVIRONMENTAL ASSESSMENT

JOHN H. KERR DAM and RESERVOIR
WATER CONTROL PLAN REVISION

VIRGINIA AND NORTH CAROLINA

May 2016

US Army Corps of Engineers

Wilmington

Errata Sheet
John H. Kerr Dam and Reservoir
Virginia and North Carolina
Water Control Plan Revision and Environmental Assessment

Substantive additions and corrections to the information provided in the EA as well as revisions to the Kerr Water Control Plan have been made since the public comment period for the EA ended. These changes, which are documented below, are based on a combination of public comments received, ongoing stakeholder discussions, and additional internal review. Some changes are considered minor editorial changes or additions that are not significant; however, the Water Control Plan changes were more significant in that they clarify intent and/or affect operational flexibility.

Corrections and Additions to Information Provided in the EA

Figure 2.2 Conservation Areas: The figure shows The Nature Conservancy inaccurately as the Managing Institution for conservation easements on several, privately-owned tracts of land. In these instances, the Clean Water Management Trust Fund, an agency of the State of N.C., not the Conservancy, is the easement holder of record.

Section 2.3.1 Wetlands: The sentence, "It is estimated that the entire 92,000 acres of floodplain forest along the lower Roanoke River are affected by altered hydrology due to current flood risk management operations at the Kerr Reservoir" had an inaccurate citation of (TNC 2008). The actual size of the affected environment was taken from *(Wilder et al. 2012a).*"

Section 2.3.2 Fish and Wildlife: To avoid repetition, the original text, "*The lower Roanoke River also provides an immense habitat for fish species such as striped bass, alewife, blueback herring, hickory shad, largemouth bass, white perch, bluegill, pumpkinseed, redear sunfish, yellow perch, and catfish. Other nongame species include the blueback herring, gizzard shad, carp, and suckers (USACE 2001)*." was changed to, "*The lower Roanoke River also provides an immense habitat for fish species such as striped bass, alewife, blueback herring, hickory shad, gizzard shad, largemouth bass, white perch, bluegill, pumpkinseed, redear sunfish, yellow perch, carp, suckers and catfish (USACE 2001)."*

Section 2.5.1 Demographics: The whole section was updated with the most current US Census Data. Section 2.5.1 should read, "*As of February 2016, the State of North Carolina had an unemployment rate of 5.5 % (USBLS, 2016) while Virginia was at 4.1%. The median household income in the study area is $34,084 considerably lower than both states, with $46,693 as the median household income in North Carolina and $64,792 in Virginia (USBLS, 2016). The study area consists of a mix of white (~46%), black (~51%), and Hispanic (~2%) occupants.*

Aside from basic population and ethnicity make-up, household information and poverty data depict a good deal of the overall socio-economic conditions of a region. Table 2.3 indicates higher than average poverty rates in the study area counties, with significantly lower household median incomes, when compared to the respective State totals (U.S. Census Bureau 2016).

	Households, 2014	per household, 2014	Median household income, 2014	below poverty level, percent, 2014
North Carolina	3,742,514	2.54	$46,693	17.20%
Bertie	7,662	2.53	$29,388	27.70%
Halifax	21,554	2.43	$32,834	23.50%
Martin	9,465	2.51	$36,132	19.70%
Northampton	8,564	2.40	$31,468	25.80%
Warren	7,866	2.50	$34,953	22.80%
Washington	5,126	2.47	$33,115	26.80%
Virginia	3,041,710	2.61	$64,792	11.80%
Brunswick	5,865	2.53	$37,028	21.90%
Mecklenburg	12,857	2.36	$37,756	21.10%

Table 2.3. Income and poverty statistics by County.
Source: US Census Bureau, American Community Survey, 2010-2014 5-Year Estimates

Section 2.5.2 Agriculture and Silviculture: Text states "*For Kerr Reservoir levels below 300 feet NGVD 29, discharges are typically limited to 8,000 cubic feet per second (cfs) at Roanoke Rapids Dam to preclude impacting silvicultural operations in the lower Roanoke River floodplain downstream. For reservoir levels between 300 and 312 feet NGVD 29, water releases may be increased to 20,000 cfs which can have major impacts on silvicultural operations."* To clarify the changes since the 8000 cfs limitation was put into place, the following sentence was added to the above paragraph, *"Since the 8000 cfs limitation was put into place, much of the land that was in silvicultural usage and impacted at flows above 8000cfs is now in conservation management."*

Section 3.2.3 Hydropower: The term "original QRR is not accurate and should be removed from this section. The third paragraph should now read, *"Hydropower impacts associated with QRR affect not only Kerr Dam, but also Dominion's Gaston and Roanoke Rapids power stations. Gaston, like Kerr, can accommodate the full 35,000 cfs releases through its turbines, and since Lake Gaston lake levels are not affected by QRR, there is essentially no difference in generation at Gaston (as shown in table 3.2. However, Roanoke Rapids will have to spill QRR releases in excess of 20,000 cfs, which does have a measurable impact on generation. Based on the 80-year historical modeling period, 35,000 cfs releases (requiring 15,000 cfs spill) would have occurred about every 8 years on average under existing operations; however, under QRR, 35,000 cfs releases*

will occur about every 2 years on average. QRR releases between 20,000 and 35,000 cfs will also require spilling from Roanoke Rapids, but obviously to a lesser degree. As a result of these spills, an average annual reduction of 6.46% in generation would have been expected at Roanoke Rapids under QRR; however, when combined with generation impacts at Gaston, the average annual reduction in Dominion generation for both projects is reduced to an estimated 3.21% under QRR."

Section 3.3.1 Wetlands: Revision was made to correct the inaccurate number of agricultural land acres. Sentence was changed from, "Approximately 1,560 acres of agricultural land would potentially be subjected to more frequent, but shorter duration flooding." to "Approximately 1,631 acres of agricultural land would potentially be subjected to more frequent, but shorter duration flooding."

Section 3.5.3 Recreation: To emphasize the net effect is a small increase in the availability of recreational amenities over the summer season and since Some of the material on QRR recreational benefits has been erroneously left out, the second paragraph is changed to, *"During the peak recreation summer season, water levels of 301'-303' occur more frequently under QRR, and water levels at other elevations (both higher and lower) occur less frequently, relative to the Existing scenario. At 302'-303', some amenities are available fewer days (flooded more days) per summer season under the QRR scenario. At 304'+, some amenities are flooded less frequently under the QRR scenario. The net effect is a small increase in the availability of recreational amenities over the summer season (Dumas, C., P. Schuhmann. 2015). By reducing the time that recreation facilities are made unusable by high water levels, the QRR operating policy would increase recreational use of the reservoir, providing an additional $525,000 per year in sales and services in the region and five additional jobs. These are regional economic benefits, which are especially valuable in this low income part of North Carolina and Virginia. In addition to these regional economic benefits, the QRR operating policy would make more of the reservoir's recreational amenities available more of the time to reservoir visitors, resulting in an additional $2,370,000 per year in aggregate recreation value, which is a national net economic benefit of QRR (Dumas, C., P. Schuhmann. 2015)."*

Appendix B, Cumulative Impacts, Section 4.2 Downstream of Roanoke Rapids Dam to Albemarle Sound/Bottomland Hardwoods: The following sentence was removed because it was not relevant to the WCP Revision, *"A refuge expansion plan to connect the Pungo and Roanoke Refuges is being developed internally within the NWR and, if approved, approval would take several years."*

Appendix B, Cumulative Impacts, Section 4.2 Downstream of Roanoke Rapids Dam to Albemarle Sound/Bottomland Hardwoods: Language in the EA stated, "*The Nature Conservancy holds titles or conservation easements privately protecting nearly 91,000 acres designated as the Roanoke River Conservation Area."* The acreages have been corrected so that the last sentence should read,

"The Nature Conservancy holds title to 22,900 acres and easement and/or stewardship interest in an additional 13,950 acres of privately-owned property."

Appendix B, Cumulative Impacts, Section 7, Table 3 entitled: "Average Annual Power Generation - Baseline and QRR Flow Scenarios" was changed to the table below. The changes in the table include removal of obsolete Alternatives and updating the numbers.

Alternative	John H Kerr AMWH	Gaston AMWH	Roanoke Rapids AMWH	System Average Annual Generation AMWH	Difference from Baseline AMWH	Difference from Baseline %
Baseline	479,008	349,142	356,018	1,184,167	---	---
Plan QRR	462,729	349,490	333,024	1,145,243	38,924	-3.29%

Appendix B, Cumulative Impacts, Section 8, Cause and Effect Relationship: was changed to clarify the impacts of the total system, "*As indicated in Table 3, if QRR is implemented there will be a 3.29% loss in total hydropower production for the Kerr/Gaston/Roanoke Rapids system. This will be directly related to an increase in greenhouse emission because this loss in production will likely be replaced by fossil fuel generation."*

Changes to Appendix A (Water Control Plan)

Section C.1 Revisions were made to this section to clarify that, under QRR, releases will not always be exactly equal to weekly average inflows due to situational and operational considerations. Instead, releases may be more or less than the 7-day average, depending on proximity to guide curve, whether the guide curve is rising or falling, and other operational considerations such as spawning releases and implementation of the Betterment Plan. These revisions allow for necessary operational flexibility.

Section C.2 Revisions were made to this section, similar to Section C.1, to maintain needed operational flexibility with respect to releases being equal to weekly average inflows into Kerr under QRR.

Section C.3 Clarification was added concerning Dominion's use of Lake Gaston flood storage during flood operations at Kerr. Clarification was added regarding when Kerr flood operations would be designated by the Corps under QRR (typically for weekly average releases of 20,000 cfs or higher), which determines when Dominion is able utilize flood storage dedicated in Lake Gaston.

Section C.9 Some unnecessarily detailed language about Dominion's operations regarding initiation of flood releases was revised to be less prescriptive for Dominion's operations, while maintaining the intent for necessary coordination while transitioning to and from flood operations at Kerr.

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List of Acronyms

AAHU	Average Annual Habitat Units
BOD	Biochemical Oxygen Demand
BGPA	Bald and Golden Eagle Protection Act
C	Candidate
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
COD	Chemical Oxygen Demand
DHR	Department of Historic Resources
DO	Dissolved Oxygen
E	Endangered
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
ER	Engineer Regulation
ESA	Endangered Species Act
EXP	Experimental Population
FCSA	Feasibility Cost Sharing Agreement
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
FSC	Federal Species of Concern
ft	Foot or Feet
GAP	Geographic Approach to Planning
HTRW	Hazardous, Toxic, and Radioactive Waste
MGC	Modified Guide Curve
mg/l	Milligrams per Liter
msl	Mean Sea Level
MW	Megawatts
NA	No Action
NC	North Carolina
NE	No Effect
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NGVD 29	National Geodetic Vertical Datum of 1929
NMFS	National Marine Fisheries Service
O&M	Operations and Maintenance
P	Proposed
PCB	Polychlorinated Biphenyl
QRR	Quasi Run of River
QRR_GSME	Quasi Run of River with Growing Season Minimum Energy
RRBROM	Roanoke River Basin Reservoir Operations Model
SAIPE	Small Area Income and Poverty Estimates
SEPA	Southeastern Power Administration
SHPO	State Historic Preservation Office
SRVC	Sub Region Virginia/Carolinas

T	Threatened
T&E	Threatened and Endangered
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VA	Virginia
WRDA	Water Resources Development Act

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1 INTRODUCTION

1.1 PROJECT AUTHORITY

The John H Kerr Dam and Reservoir Project (originally Buggs Island Reservoir) was authorized by the Flood Control Act of 1944 for the purpose of flood control, hydropower generation, recreation, low flow augmentation, "and other uses" as part of the comprehensive development of the Roanoke River Basin in Virginia and North Carolina. Water supply and the promotion and conservation of fish and wildlife resources and habitat were added as project purposes by the Water Supply Act of 1958 (P.L. 85-500) and the Fish and Wildlife Coordination Act of 1958 (P.L. 85-624), respectively.

This Environmental Assessment (EA) analyzes a proposed operational change at John H. Kerr through the revision of the Water Control Plan (WCP) (Appendix A). The purpose of the operational change is to offset adverse impacts to the downstream riverine ecosystem caused by dam operations. The Corps' existing authority to operate John H. Kerr Dam and Reservoir for flood control, hydroelectric power generation, and other uses, which provides appropriate authority to make the proposed operational adjustment is the Flood Control Act of 1944. This authority will be implemented using ER 1110-2-240 "Water Control Management" and ER 1105-2-100 "Planning Guidance Notebook."

1.2 PROJECT BACKGROUND AND LOCATION

Prior to the decision to pursue operational changes at John H. Kerr through a Water Control Plan Revision, the Corps conducted a Section 216 feasibility study. The purpose of the study was to review the operation of the John H. Kerr Dam and Reservoir and to determine the advisability of modifying operations for the purpose of improving the quality of the environment in the overall public interest, as authorized under Section 216 of Public Law 91-611, the River and Harbor and Flood Control Act of 1970. Based on the interests of the Sponsors and opportunities for improvement identified to date, the study focused on examining the feasibility of addressing downstream environmental resource concerns in the Lower Roanoke River through changes in operations or structures at the John H. Kerr Dam and Reservoir. The non-federal cost sharing partners for this study were the Commonwealth of Virginia and the State of North Carolina.

Several alternatives were evaluated and the recommended plan was one that could be done by altering the Water Control Plan. A summary of the Kerr 216 study is available at http://www.saw.usace.army.mil/Missions/EcosystemRestorationCAPStudies/KerrWaterControlPlanUpdate.aspx.

The study area for the Kerr 216 study, which is the area of effect for the proposed WCP revision, encompasses the Kerr Reservoir and approximately 1,917 square miles of watershed downstream of Kerr Dam. Kerr Dam is located on the Roanoke River, about 180 river-miles upstream from where the river enters the Albemarle Sound. The dam is in Mecklenburg County, Virginia, 20 miles downstream from Clarksville, Virginia, 18 miles upstream from the Virginia-North Carolina border, and 80 miles southwest of Richmond, Virginia. John H. Kerr Dam and Reservoir currently provides flood risk management, recreation, hydropower, water supply and fish and wildlife conservation to the public. The Reservoir is operated as a unit of a coordinated system of reservoirs in the Roanoke River basin, especially Dominion's Gaston and Roanoke Rapids Dams located downstream of Kerr Dam. The Kerr project has a dependable hydroelectric generating capacity of 225,000 kilowatts.

Kerr Reservoir covers nearly 50,000 acres at its normal summer pool elevation of 299.5 feet National Geodetic Vertical Datum of 1929 (NGVD 29) and extends about 39 miles up the Roanoke River. The impact area of the proposed WCP revision includes the Kerr Reservoir project and the Roanoke River Basin from Kerr Dam downstream to the Albemarle Sound. For this EA, the combined area will be referred to as the Lower Roanoke River Basin. The proposed impact 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, and it is located in the 4th and 5th Congressional Districts of Virginia and the 1st and 13th Congressional Districts of North Carolina. Maps of the dam, reservoir, downstream areas, and study area are shown in Figures 1.1 and 1.2.

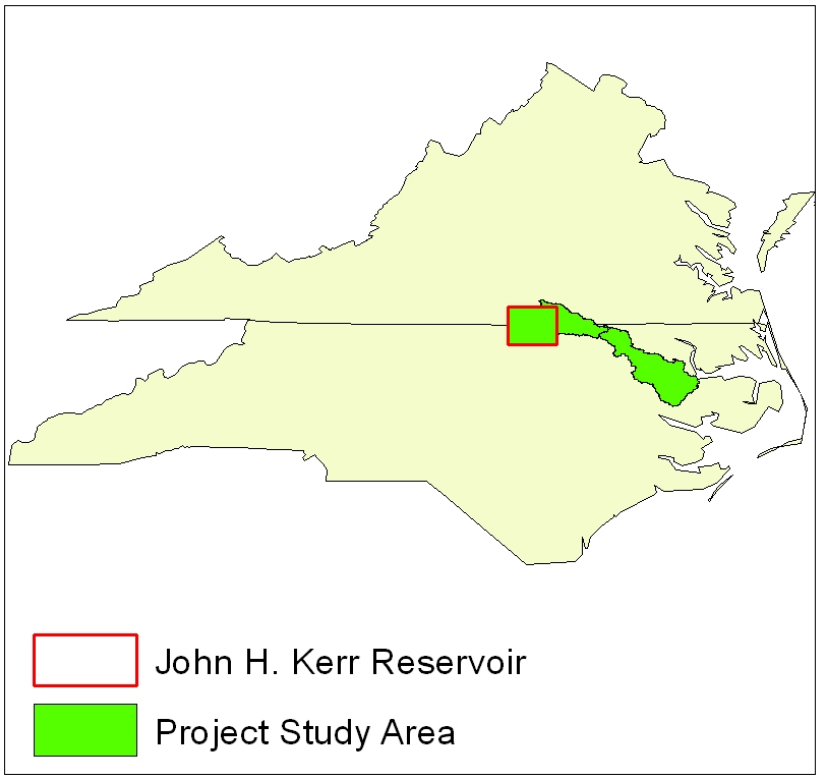
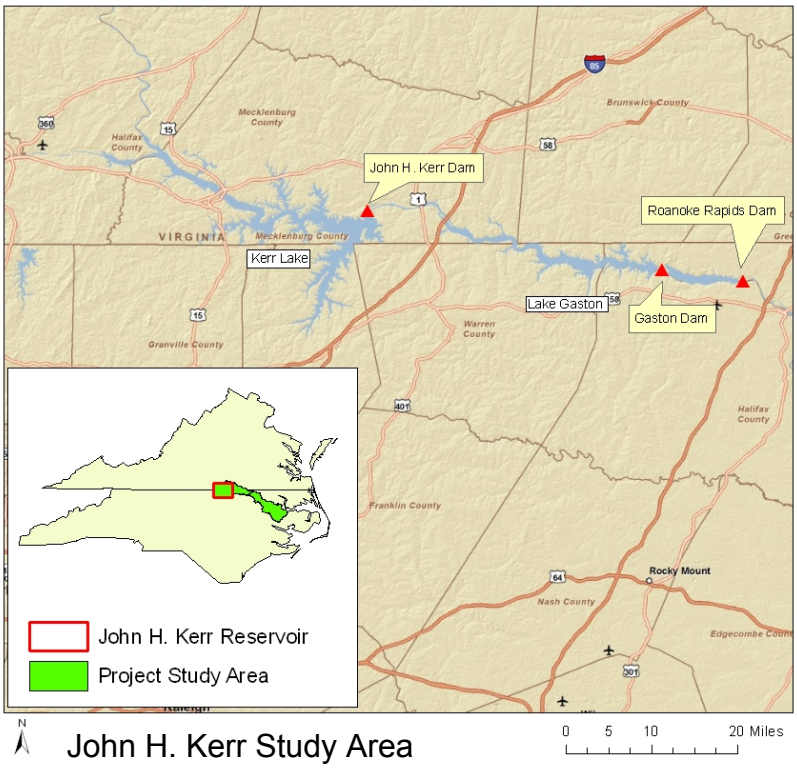


Figure 1.1 Vicinity Map.



John H. Kerr Study Area

Figure 1.2 Plan View.

1.3 PROJECT PURPOSE AND NEED

The purpose is to determine the advisability of modifying operations for ecosystem restoration for the overall public interest. Regulated flows have reduced hydrologic variance in the system and resulted in changes in duration and timing of flood events as compared to pre-dam conditions. This has caused some areas lower in the floodplain to experience longer durations of flooding, and some areas higher in the floodplain to experience less frequent flooding, as compared to an unregulated system. The overall effect is the drier floodplain community types (mesic bottom) moving farther downslope and wetter community types (swamp forest) moving farther upslope, creating a "squeeze" of the middle (wet bottom) community type. The overall benefits to the floodplain ecosystem will serve as the basis for evaluating the alternatives. Kerr Reservoir, which was completed in 1952, is a significant regional resource. Operation of Kerr Reservoir is outlined in a water control plan, last updated in October 1995 (see http://epec.saw.usace.army.mil/KERRWCP.TXT). The primary project purposes authorized by Congress were flood control and hydroelectric power generation and other uses. No additional project purposes have been specifically added to the project since the Flood Control Act of 1944. However, additional purposes of the reservoir were authorized under general standing authorizations including the Flood Control Act of 1944 (recreational development), the Rivers and Harbors Act of 1958, the Flood Control Act of 1958, the Water Supply Act of 1958, and the Fish and Wildlife Coordination Act of 1958. These additional purposes include recreation, water supply, and fish and wildlife (including low flow augmentation). Additionally, under the standing authority of the 1958 Water Supply Act, a limited amount of the reservoir power pool has been re-allocated for water supply. Although recreation was not a specifically authorized project purpose of the reservoir, the reservoir does provide quality natural resource-based recreation for the area. The Water Control Plan indicates that "the project will be operated for recreation in the reservoir to the maximum extent possible without serious interference with the purposes of flood control and hydropower generation".

The Roanoke River Basin below Kerr Dam and Reservoir also represents one of the finest remaining contiguous bottomland hardwood forest ecosystems within the eastern United States. These forested wetlands, upland forests, and streams provide high quality diverse habitat for fish, waterfowl, and other wildlife.

1.4 ALTERNATIVES

Potential management measures were developed for the Kerr 216 study through a collaborative process between the Corps, sponsors and the project stakeholders. Measures that were included were both structural features and operational (non-structural) changes to the Kerr Reservoir releases. Because

the number of measures and permutations related to operational changes that could be considered are nearly limitless, the study focused only on those that would potentially have a measurable environmental benefit and that would generally be acceptable to most stakeholders.

A total of 15 management measures were preliminarily identified. After screening of measures, only four measures were identified to undergo additional analysis. Of these four, after further screening, only QRR and No Action were the measures that remained. This EA evaluates the impacts of the QRR and No Action alternatives. More information regarding the management measures and alternatives can be found in the Kerr WCP Summary document.

No Action. Storage in Kerr Reservoir is comprised of a flood pool for storage of floodwaters and a conservation (power) pool that provides water for hydropower generation and other project purposes. Generally, the guide curve is the seasonal target lake level that takes into account the various authorized purposes and operating objectives of the project (Figure 1.3). The elevations and storage capacities for these pools are shown below in Table 1.1.

	Elevation (ft NGVD29)	Storage Capacity (acre-feet)
Controlled Flood Storage Pool	300-320	1,281,400
Conservation (Power) Pool	268-300	1,027,000

Table 1.1. J. H. Kerr Elevations and Storage.

Under the No Action plan, operations will be continued under the Water Control Plan, as it currently exists. Based upon the process mandated by the current Water Control Plan, flood waters in the Reservoir are released in accordance with the following schedule: only up to 20,000 cfs is released between reservoir elevations 300 ft to 312 ft NGVD 29. For reservoir levels between 315 and 320 feet NGVD 29, flood releases may be increased to 35,000 cfs (Table 1.2). Since dam construction, flood releases from Roanoke Rapids Dam have not exceeded 35,000 cfs since the Reservoir water level has not exceeded elevation 320 to date.

Proposed Water Control Plan Revision (**Quasi Run of River Operational Change)*.*** The Kerr 216 study evaluated several alternatives to benefit downstream resources, and the recommended plan was an operational change referred to a Quasi Run of River (QRR). This operational change would allow the weekly volume of inflow in Kerr Reservoir to be released from Roanoke Rapids Dam up to 35,000 cfs and down to the required FERC drought minimum release at Roanoke Rapids Dam (the minimum flow varies seasonally between 1,500 and 2,000 cfs). This release scenario would more closely mimic the unregulated river discharges and would be considered the maximum extent of what could be

changed operationally, without drastically altering reservoir levels and the flood footprint.

1.4.1 ALTERNATIVES ELIMINATED

As part of the Kerr 216 study, a total of 15 management measures were preliminarily identified. After further screening, only QRR and No Action remained. Below is a list of the remaining 13 preliminary management measures and the rational for elimination.

1) Alter the Kerr flood releases through implementation of a modified guide curve with more frequent 35,000 cfs releases January through June (MGC_35K). This measure was eliminated because it did not have a positive environmental benefit.

2) Alter the Kerr flood releases through implementation of a modified guide curve with more frequent 35,000 cfs releases year round (MGC_35k_yr_rnd). This measure was eliminated because it did not have a positive environmental benefit.

3) QRR with growing season minimum energy (QRR_GSME). This measure was eliminated because it did not have a positive environmental benefit.

4) Release shorter "bursts" at higher flows (>20,000 cfs) from Roanoke Rapids Dam. This measure was screened out due to high uncertainty that the measure would produce benefits and because the measure would release less water than any of the three measures discussed above.

5) Plugging canals. This measure was screened out because during long-term releases of 20,000 cfs similar to those in 1998 and 2003, these plugs could prolong floodplain inundation by inhibiting drainage and potentially have greater negative impact on bottomland hardwood forests behind the plugs.

6) Use Roanoke River Basin Reservoir Operations Model (RRBROM) probabilistic model forecasting. This measure was screened out as it was not differentiated enough from the other operational measures being considered, and the preference of the reservoir operation managers would be to have a more firmly defined operational scheme as opposed to one that relied on probabilistic scenarios. The measure could, in the future, be used as an additional tool to assist the operations manager in making decisions about releases under existing operations or other release measures that may be selected.

7) Inject oxygen into the hypolimnion upstream of the John H Kerr dam. Based on a preliminary estimate, pure oxygen injection system placed on the bottom of the reservoir just upstream of the dam could cost about $3.5 million to construct with annual maintenance costs of oxygen of about $0.5 to $1 million. This measure may achieve the objective of obtaining a daily average DO of at least 5 mg/l at a feasible cost. Since the oxygen injection system would be located in Virginia, the fabric weir is no longer a component of the Section 216 study.

8) Inject oxygen downstream of Kerr Dam. This would likely be in the form of oxygen injection. The system would need to be associated with a release from the dam in order to move this oxygenated water an appreciable distance downstream. This measure would need to be combined with other measures in order to achieve the objective of a daily average of 5 mg/l DO for a reasonable distance downstream. This measure was eliminated because it has a higher cost than a fabric weir, but an identical benefit.

9) Place a fabric weir upstream of the dam. A preliminary estimated cost for a 2,730 ft long fabric weir is $7.125 million. Annual O&M costs are estimated to be $90,000 and are primarily based on replacing the weir once over the 50 year project life. Due to the unavailability of funds, the Commonwealth of Virginia has withdrawn from the study as a non-federal cost sharing partner. Since the fabric weir would be located in Virginia, the fabric weir is no longer a component of the Section 216 study.

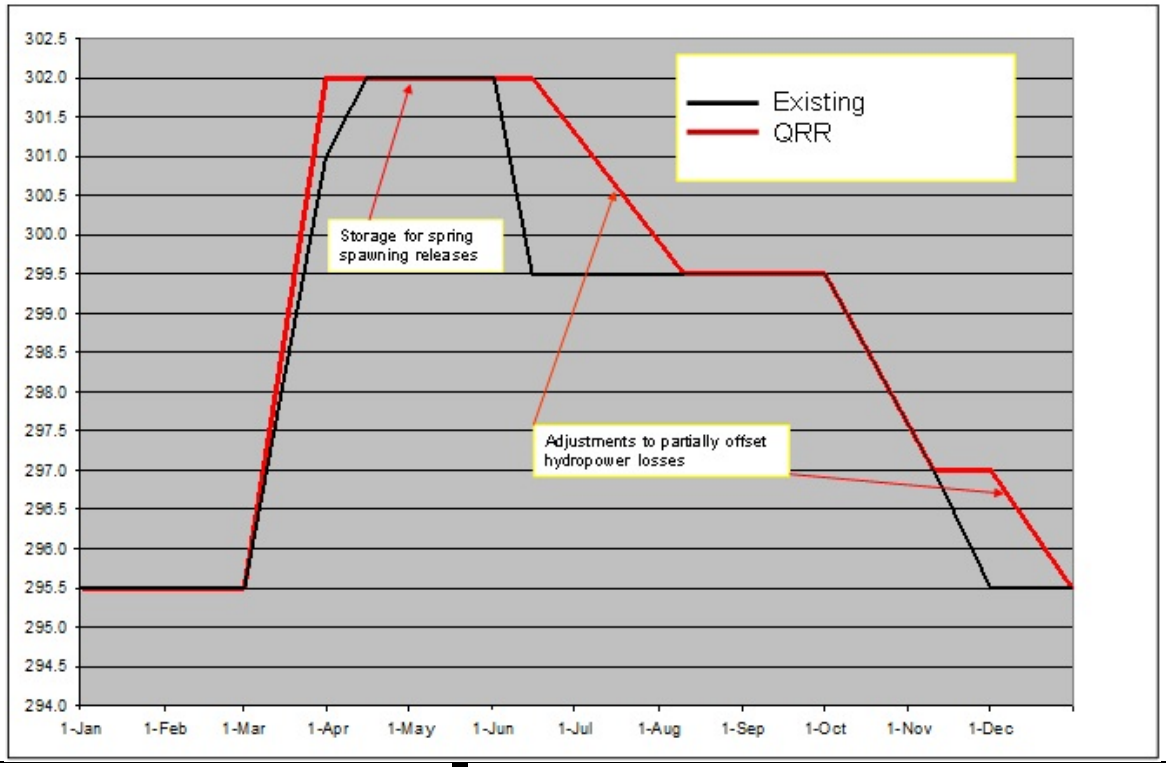
10) Place a rock weir upstream of the dam. The cost for a rock weir, similar to what was constructed upstream of Roanoke Rapids Dam, is estimated to be about $106 million for Kerr Dam, with minimal O&M costs. Benefits from a rock weir would also potentially be slightly lower than that of a fabric weir. Unlike a fabric weir, the elevation of a rock weir is not readily adjustable. Therefore since a fabric weir will achieve the objective at a much lower cost, this measure was dropped from further consideration.

11) Attach a siphon weir structure to the upstream penstock openings. This measure would probably result in meeting the DO standard of 5 mg/l downstream. An estimated cost for installing siphon weirs for the six main turbine units at Kerr Dam would be $18.5 to $25.5 million, with O&M costs ranging from $5,000 to $10,000 per year. The weirs would also likely result in a velocity increase that would be significant enough to reduce the net operating head of the hydropower units, which could negatively affect hydropower production. Since there are less expensive alternatives that could meet the downstream DO standard without an impact to hydropower production (e.g. fabric weir), this measure was eliminated from further consideration.

12) Place surface water pumps in the epilimnion upstream of the dam. This type of device has typically only been marginally effective in large, deep reservoirs like Kerr; therefore, this measure is not likely to obtain the objective of achieving a daily average DO of 5 mg/l. The construction and operation costs for this measure have not been estimated but it is anticipated to be much higher than oxygen injection upstream of the dam or a fabric weir. Therefore this measure was eliminated from further consideration.

13) Modify power generation to include night time and/or weekend releases via the vented turbines. Recent tests using a single turbine indicated that periodic releases of water through vented turbines at night reduces the DO sag for about one mile downstream of the dam. Larger releases using multiple turbines at typical non-generation periods at night and weekends may elevate DO conditions further downstream, but it is doubtful the effect would reach 6 miles downstream to the US 1 bridge unless generation was continuous for several hours. However, impacts on hydropower generation could be high during non-peak hours and this action would likely need to be done most every night during the summer. Therefore this measure was eliminated from further consideration.

Figure 1.3 Quasi Run of River (QRR) vs Existing Operations Guide Curve and Comparison.



Existing Operations		Quasi Run of River
Kerr Lake Level (ft, NGVD29)	Roanoke Rapids Releases (cfs)	Roanoke Rapids Releases (cfs)
below 300	up to 8000	• Above QRR Guide Curve (GC): Weekly Outflows ≈ Weekly Inflows up to 35,000 cfs. • Below GC: Minimum energy (equals or exceeds FERC minimum releases at Roanoke Rapids Dam). • Above elev 320: Existing Operations. • Comply with fishery releases April 1-June 15, if feasible.
300 – 312	20,000	
312 – 315	25,000	
315 – 320	35,000	
320 – 321	85% of inflow	
321	inflow	

Table 1.2. Existing Operations vs. QRR.

2 AFFECTED ENVIRONMENT

This Section describes significant, physical, biological, cultural, and socioeconomic resources located in the Lower Roanoke River Basin, which is the area of potential impact for the WCP revision.

2.1 PHYSICAL RESOURCES

2.1.1 LAND USE

The entire Roanoke River Drainage area is about 9,700 square miles. The project study area encompasses Kerr Reservoir and the approximately 1,917 square miles of the lower Roanoke River Basin. Figure 2.1 shows the extent of general land use categories in the study area, based on the 2010 USGS Geographic Approach to Planning Analysis Program (GAP) land use dataset (USGS 2010). Table 2.1 indicates the acreages and the percentage of the total area encompassed for some more detailed land use categories, derived from the same dataset.

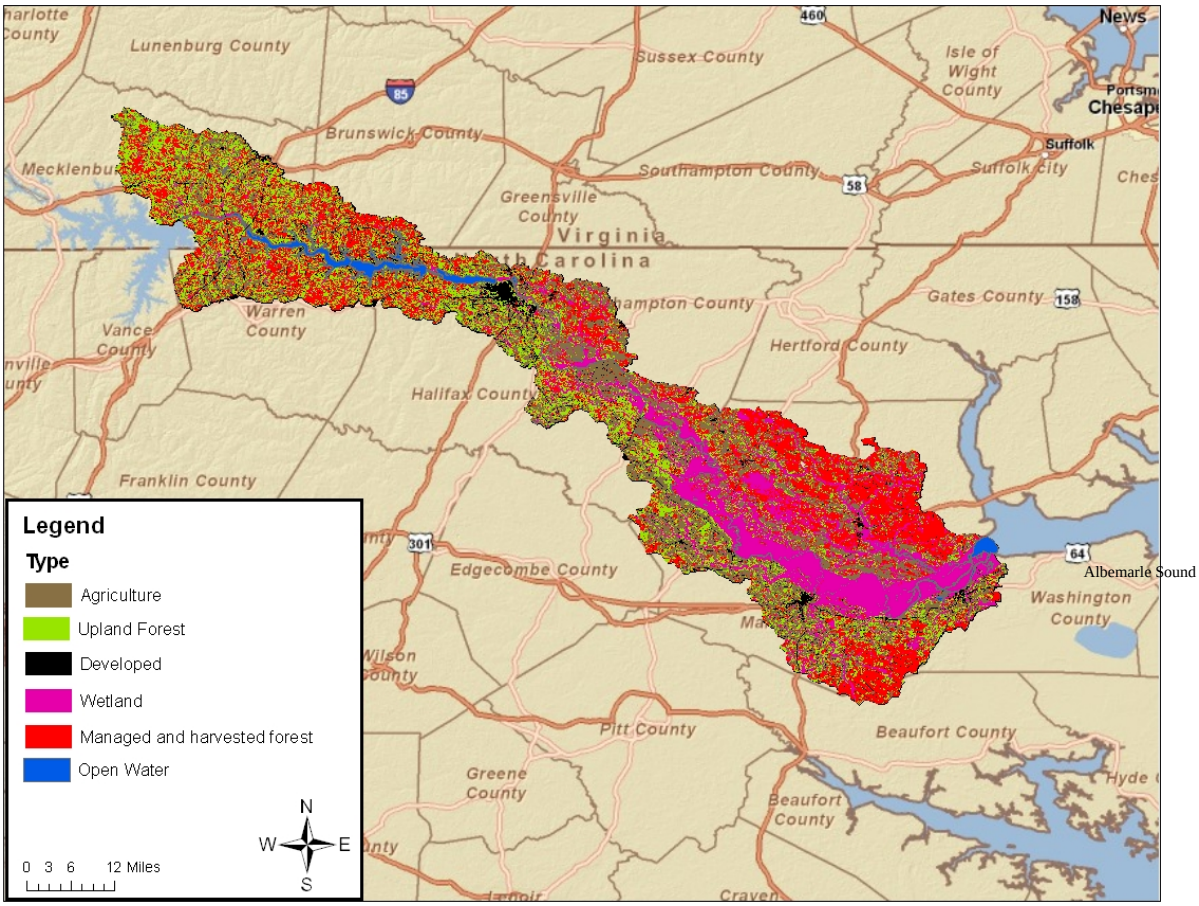


Figure 2.1 Land Use in Study Area (USGS 2010).

Type	Area (sq. miles)	Percent
Agriculture	437.48	22.8
Beach, shore and sand	2.9	0.2
Conifer dominated forest and woodland (xeric-mesic)	76.61	4
Deciduous dominated forest and woodland (mesic-wet)	17.08	0.9
Deciduous dominated forest and woodland (xeric-mesic)	110.11	5.7
Developed	85.75	4.5
Flatwood	6.93	0.4
Floodplain and riparian	320.5	16.7
Freshwater forested marsh, or swamp	17.17	0.9
Freshwater herbaceous wetland	13.76	0.7
Harvested forest	181.59	9.5
Managed forest (plantations)	344.65	18
Mining	0.49	0
Mixed forest and woodland (mesic-wet)	43.03	2.2
Mixed forest and woodland (xeric-mesic)	200.75	10.5
Open Water	58.13	3
Salt, brackish and estuary wetland	0.06	0
Totals	**1,917**	**100**

Table 2.1. Land Use for Lower Roanoke River Basin
Source: United States Geological Survey GAP Analysis (2010).

In the early 1980's the lower Roanoke River floodplain was identified by the NC Natural Heritage Program and the NC Chapter of The Nature Conservancy (TNC) as an area of interest and agreed to put forth a concerted effort to protect and conserve the floodplain ecosystem below the Roanoke Rapids Dam. As part of the conservation effort the North Carolina Wildlife Resources Commission and the U.S. Fish and Wildlife Service (USFWS) have invested in lands that offer public recreation opportunities to citizens throughout the region. Currently there are approximately 52,000 acres in public ownership along the lower Roanoke River. Over 40 million dollars of public funds were expended to acquire these lands with annual maintenance costs of approximately $800,000 for these lands.

There are approximately 36,900 acres of conservation lands in private ownership including over 14,000 protected by conservation easement and 22,900 owned by non-profit conservation groups (Figure 2.2). Of these 3,246 acres are enrolled in the North Carolina Wildlife Resources Commission Game Lands program for public hunting use.

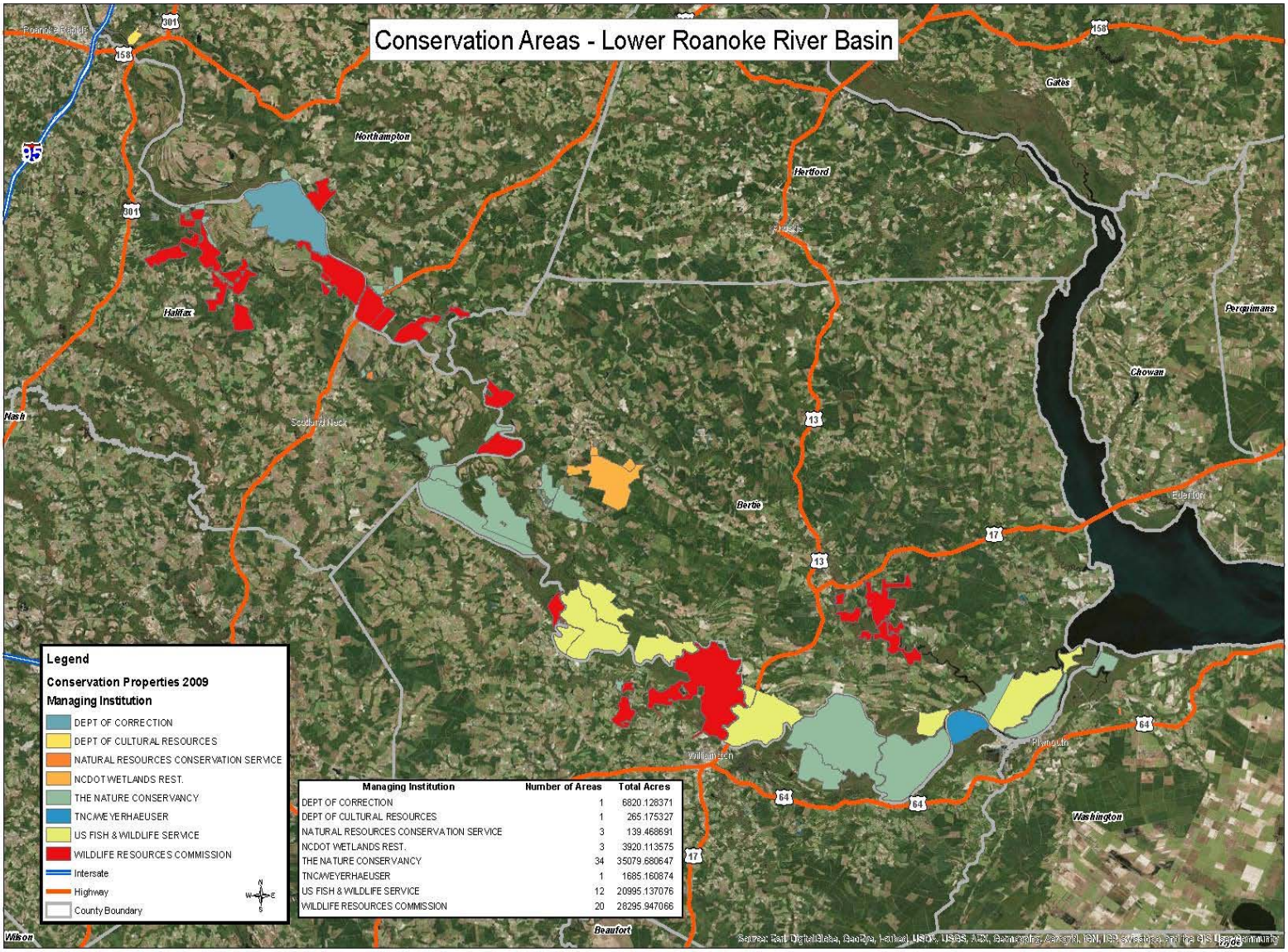


Figure 2.2 Conservation Areas.

2.1.2 GEOLOGY AND SEDIMENTS

The study area is comprised of two main physiographic regions—the Piedmont and the Atlantic Coastal Plain. The Piedmont section of the study area includes the Kerr Reservoir to approximately Roanoke Rapids, North Carolina. Underlying geologic formations of this physiographic region are typified by Precambrian and Paleozoic metamorphic and igneous rock (USGS 2000). The fall line that occurs around Roanoke Rapids represents the area where the Paleozoic metamorphic rocks of the Piedmont give way to the softer alluvial deposits and sedimentary rock of the Coastal Plain (USGS 2000). The project area within the Atlantic Coastal Plain physiographic region includes the lower section of the Roanoke River from the Roanoke Rapids Dam to the Albemarle

Sound. The Atlantic Coastal Plain physiographic region is characterized by Tertiary marine deposited sedimentary rock (Hupp et al.1996). The geology of the Roanoke River downstream of the Roanoke Rapids Dam is the Yorktown Formation which is characterized by fossiliferous clay with varying amounts of fine-grained sand, and shell material commonly concentrated in lenses.

Soils downstream of the Roanoke Rapids Dam along the Roanoke River floodplain mainly consist of nearly level, poorly drained loamy soils. The Natural Resources Conservation Service (NRCS) Soil Surveys for Halifax, Northampton Martin, Bertie and Washington Counties show the general soil types along much of the Roanoke River to be Wehadkee-Congaree along the north side of the river and Chewacla along the south. As the river gets closer to the Albemarle Sound the soils have been mapped in the NRCS Soil Survey of Washington County as being the Dorovan series which is characterized as very poorly drained, mucky, predominated saturated soils (USDA, NRCS 1981). These soils are classified as hydric soils. Hydric soils are "soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (USDA, NRCS 2010).

2.1.3 FLOODPLAINS

The floodplains located within the Roanoke River Basin are some of the largest in North Carolina with areas reaching up to five miles wide near Albemarle Sound. Water found in the floodplain is generally a combination of precipitation, groundwater and/or surface water which is conveyed to the floodplain during overbank flooding events (Brinson 1993).

Some of the features found within the Roanoke River floodplain landscape include levees, swamp sloughs, a series of ridges and swales, and abandoned river channels. These distinctive features cover over 150,000 acres adjacent to the Roanoke River and provide a diverse habitat for birds, herptiles, (reptiles and amphibians) mammals, and fish (USFWS 2006). Bottomland hardwood floodplains especially provide several major benefits including: nutrient retention, groundwater recharge, flood storage, wildlife habitat, strong biogeochemical activity, and areas of high biodiversity (Brinson 1993). See “Bottomland Hardwood Forests” below for more information.

2.2 **WATER RESOURCES**

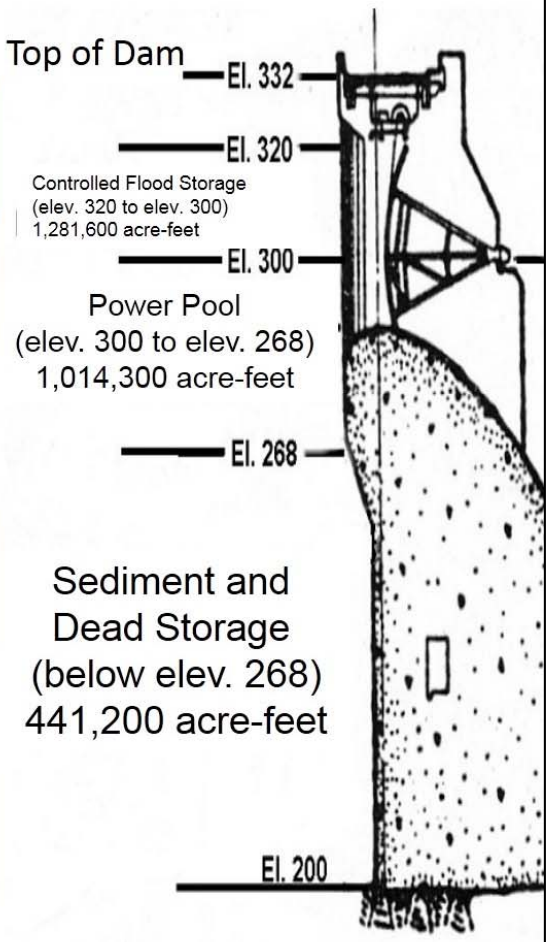
2.2.1 FLOOD RISK MANAGEMENT OPERATIONS AT KERR RESERVOIR

The Kerr Reservoir project operation is predicated on a seasonally varying guide curve. The guide curve elevation is the targeted lake level at which the water storage in the reservoir best serves current project purposes. The controlled flood storage at the reservoir is located between elevations 300 and 320 feet-mean sea level (msl, which is equivalent to NGVD 29). During flood operations, the Water Control Plan (http://epec.saw.usace.army.mil/KERRWCP.TXT)

dictates a discharge regime at Roanoke Rapids Dam dependent on the Kerr Reservoir level. This is illustrated in Figure 2.3 below. For Kerr Reservoir levels above guide curve but below 300 feet NGVD 29, discharges are typically limited to 8,000 cubic feet per second (cfs) at Roanoke Rapids Dam to reduce impacts on timber harvesting in the lower Roanoke River basin, especially below Hamilton. This discharge scenario is most common in the winter when the guide curve drops to 4.5 feet below the bottom of the flood storage pool. For reservoir levels between 300 and 312 feet NGVD 29, flood releases from Roanoke Rapids Dam may be increased to 20,000 cfs which inundates much of the bottomland hardwood forests. For reservoir levels between 312 and 315 feet NGVD 29, flood releases may be increased to 25,000 cfs. For reservoir levels between 315 and 320 feet NGVD 29, flood releases may be increased to 35,000 cfs. These latter two releases extend inundation beyond forests and begin flooding farm fields. From elevation 320 to 321, 85% of inflow is released and above elevation 321, outflow equals inflow. Since dam construction, flood releases from Roanoke Rapids Dam releases have not exceeded about 35,000 cfs since the reservoir water level has not exceeded elevation 320 to date.

Figure 2.3 Kerr Reservoir existing flood operation elevations, releases, and storage. Whenever the reservoir rises into the flood storage space or whenever a rise into the flood storage space is assured, the release will be such as to regulate the flow at the Roanoke Rapids gage as follows:

Elevation Range	Release at Roanoke Rapids Dam
>321	100% of inflow to Kerr Dam
320-321	85% of inflow to Kerr Dam
315-320	35,000 cfs
312-315	25,000 cfs
300-312	Up to 20,000 cfs



Source: USACE 2014.

Kerr Reservoir flood operations must also take into account downstream local drainage into Lake Gaston and Roanoke Rapids Reservoir. For example, during 35,000 cfs flood releases from Roanoke Rapids, releases from Kerr might only be about 33,000 cfs to allow for 2,000 cfs additional downstream local drainage into Lake Gaston and Roanoke Rapids Reservoir.

The hydropower facilities at Kerr and Gaston Dams can both generate with flows over 35,000 cfs, with significant additional discharge capacity provided by flood control gates. However, the hydropower facility at Roanoke Rapids can only generate power up to a discharge of about 20,000 cfs. Therefore, any additional discharge above 20,000 cfs from Roanoke Rapids must be spilled (i.e., released without going through the turbines).

Flood management operations at the Reservoir may affect resources in the Lower Roanoke River Basin. Parts of the lower Roanoke River floodplain can typically be characterized as broad and flat. The lower Roanoke River channel conveyance capacity is approximately 20,000 cfs before substantial flooding over the existing natural river levees occurs. However, floodplain inundation into the bottomland hardwood forest is initiated via natural (creeks) and man-made (canals) breaches in the levees when the weekly average flow is at or above approximately 11,000 cfs. Releases in excess of 8,000 cfs average for 3 days or longer are known to interfere with downstream timber removal operations near Williamston; therefore, winter releases are currently limited to this rate when lake levels are above the winter guide curve (295.5 ft NGVD 29) but below the flood pool (300 ft NGVD 29). At flows below 8,000 cfs, drainage of water from the floodplain occurs.

Under existing operations, economic damages from sustained high flows occur primarily to agricultural lands during the growing season, May-November. The growing season normally starts in March, but May was chosen since replanting after May 1 is generally not practicable due to a reduced yield. These agricultural damages begin when sustained flows exceed 20,000 cfs. At 20,000 cfs approximately 250 acres of agricultural lands are impacted, at 25,000 cfs approximately 604 acres are impacted, and at 35,000 cfs, an estimated 1,631 acres are impacted.

Overall for both agricultural and non-agricultural areas, the flood control operations at Kerr Reservoir have precluded releases higher than 35,000 cfs, and the average annual damages prevented over the last 34 years (1980-2013) have been about $11.4 million. This has ranged from $0 in a drought year like 2002 up to about $149 million in wet years like 1996. These dollar values are based on the indicated year estimates, and have not been updated to year 2015 values. Annual damages prevented are estimated based on stage damage curves developed for the lower Roanoke River. A representative curve can be found in the Kerr Reservoir Regulation Manual – Plate A-17 (USACE 1965).

Flood releases for about the last 40 years have not exceeded an average daily value of 35,000 cfs from Roanoke Rapids Dam. However, average daily inflows to Kerr Reservoir over the same period exceeded 100,000 cfs during eight different years with one inflow exceeding 163,000 cfs. The most recent inflow approaching 100,000 cfs was 90,000 cfs in November 2009. During the 40 year period before construction of any of the dams, average daily flows exceeded about 100,000 cfs in eight different years, with one flow exceeding 250,000 cfs in August 1940 which resulted in massive flood damage that justified the need for Kerr Dam.

Prior to construction of Kerr Dam, flood flows had a more rapid rise and decline, but with Kerr Dam in place these peaks have been reduced to no more than 35,000 cfs, which greatly reduces damages to structures and farmland.

However, the duration of flood releases (20,000 to 35,000 cfs) have been extended by several months in some cases. Even though damages caused by high flood peaks have been precluded, the extended duration of flood releases (20,000 to 35,000 cfs) has changed and is continuing to change the ecosystem of the lower Roanoke River.

The controlled reduction of natural flooding by Kerr Dam results in longer duration flood flows downstream, albeit at lower depths of flooding. The management of natural flooding continues to provide numerous hydropower, agricultural, recreational, and real estate benefits to the area; however, the management of flooding has also had negative impacts. The impacts of flood flows of a long duration can include interruption of economic activities such as hunting leases, forestry operations, agricultural operations and recreation. The public lands along the lower River totaling approximately 52,000 acres, offer quality hunting opportunities to the general public who do not have access to the many private hunt clubs that lease or own lands along the lower river. Untimely and long duration floods often prevent hunters from being able to access hunting areas. Long duration and untimely flood events also interfere with many other recreational activities on the lower river such as bird watching, fishing, environmental education, photography, hiking etc

The impacts of prolonged flood events can also cause downstream ecosystem problems. Water is the driving force in creating and maintaining the ecological integrity of bottomland forest communities. When the timing and duration of flood events is significantly altered from what the floodplain and riverine ecosystem evolved with, the potential for ecological degradation of the natural communities results. Controlled flood releases can negatively affect the timing of critical annual environmental activities such as wildlife breeding, fish spawning, vegetation regeneration, and death and stress on canopy and understory vegetation as well as changes to the river's channel morphology. Some agricultural impacts resulting from controlled flood releases can also occur, but much less than would occur without the dams.

Upstream of the reservoir, minor impacts to roadways and recreation facilities begin whenever Kerr Reservoir rises to or above 303 feet NGVD 29, or 3 feet into the flood pool, with more significant impact above 305 feet NGVD 29. Reservoir levels at or above 320 are rare events and have not occurred during the 60 plus year history of the Kerr project. Elevation 320 is associated with a 50-year frequency flood event, and elevation 321 is associated with a 100-year frequency flood event.

2.2.2 WATER QUALITY

Water quality standards for both Virginia and North Carolina apply to the study area. The Virginia designated use of the Roanoke River downstream of the Kerr Reservoir to the state line is classified for public water supply. Additional

information related to the Virginia designated classes are listed under Title 9 from the State Water Control Board (VDEQ, 2009). The Virginia 303 (d) list of impaired waters includes the Kerr Reservoir, Roanoke River, and Lake Gaston due to polychlorinated biphenyl (PCB) concentrations measured in fish tissue.

North Carolina's designated uses of the Roanoke River downstream of the state line to Jamesville, NC include water supply and primary and secondary recreation. Information related to the North Carolina designated water use classes is at the North Carolina Division of Water Quality Website http://portal.ncdenr.org/web/wq/ps/csu . The North Carolina 303 (d) list of waters not meeting water quality standards includes Lake Gaston, Roanoke Rapids Lake, and the Roanoke River. The Roanoke River from Roanoke Rapids Dam downstream to Jamesville, NC has been identified for impairment due to mercury. A half-mile upstream of Lake Gaston Dam downstream to Roanoke Rapids Dam has been listed for aquatic weeds. A segment of the Roanoke River from Highway 17 downstream to Jamesville, NC has been identified for dissolved oxygen (DO) impairment due to frequent values below the state standard of 5.0 mg/l during the warmer months.

Reservoir operations affect water quality downstream including temperature, nutrient levels, and DO. Decreased DO levels may be indicative of too many bacteria (organic wastes) in the water, including untreated sewage; runoff from dairies, feedlots, and other agricultural operations; lawn clippings, top soil, and other materials from residential areas, land clearing activities such as logging or construction; and runoff from agricultural fields. Low DO levels in particular have been identified as an issue of concern, as low DO impairs habitat quality and has led to fish kills. Penstocks that provide water to the powerhouse turbines at Kerr Dam draw water from the lower portion of the reservoir (the hypolimnion), and in the warmer months, when the reservoir is stratified, this layer is oxygen depleted. During these months, releases from the dam can lower DO values below the state standard of a daily average of 5 mg/l (VDEQ, 2009) downstream in Lake Gaston for about 6 miles. These six miles are basically a riverine system beyond which the lentic influences of Lake Gaston dominate. Additionally, during non-peaking periods in the summer, DO levels downstream of the dam at night frequently decline to around 1 mg/l. In order to improve DO levels downstream of Kerr Dam, the six main turbines have been vented, which allows air to be entrained into the water. This work was completed in January 2012. When 3 or less of these vented turbines are used, this venting helps raise the downstream DO daytime values by 2-3 mg/l to frequently meet the state standard. However, DO values continue to decline at night to or below 2 mg/l. When all the vented turbines are used, DO does not improve downstream since venting efficiency greatly diminishes when more than four turbines are used. This is due to a decreased venturi effect of sucking air into the turbines with higher tailwater elevation below Kerr Dam with increased discharge.

The low DO levels generally do not extend below Lake Gaston Dam, as there is a submerged weir that is located just upstream of Lake Gaston Dam which permits only the oxygenated surface waters to flow downstream. There is also a similar weir just upstream of Roanoke Rapids Dam. The Gaston weir is primarily composed of concrete and the Roanoke Rapids weir is composed of rock rubble. However, during flood events in the warmer months, low DO releases from Kerr Dam may overwhelm the system and affect releases from Lake Gaston and Roanoke Rapids Dams. Measures to provide further improvements to DO were considered as part of the Kerr 216 study but were dropped due to costs. Other authorities may be explored in the future to improve low DO.

A major concern for the lower Roanoke River is the effect of low DO concentrations during warm weather. When approximately 20,000 cfs is released over long periods of time, water tends to stand in the downstream swamps and the DO approaches zero due to biochemical oxygen demand (BOD) and chemical oxygen demand (COD). This low DO water eventually drains back into the river when discharge from the dam is reduced and the low DO values can result in fish kills. A Betterment Plan was developed by a multiagency group and was initiated to attempt to reduce this effect. When the Kerr Reservoir water levels were back near the guide curve, flood releases were stepped down in about 5,000 cfs increments from Roanoke Rapids Dam and each step was held for several days. Since implementation in 1998, this plan has been effective and no fish kills have occurred following protracted Kerr Reservoir flood releases.

2.2.3 HYDROPOWER

Prior to turbine rehab completed in October 2010, Kerr Dam had a capacity of 225 megawatts (MW). Following the rehab, the capacity is 267 MW. The Roanoke Rapids station has a total capacity of 104 MW, and the Gaston Power hydro-station has a total capacity of 224 MW. The hydropower generated at Kerr Dam is managed through contracts between the SEPA and Duke Power and Dominion (Virginia/ North Carolina Power Company).

The Wilmington District submits a weekly energy declaration of capacity and generation amounts to SEPA and the power companies. The declaration amount includes the minimum contractual firm energy for each week, plus any additional “secondary” energy needed to bring the lake level back down towards the guide curve or additional outflow for striped bass spawning season. These spawning releases are determined by collaboration between the Wilmington District and the North Carolina Wildlife Resources Commission to determine desirable spawning flows, subject to the availability of spawning storage (Section 2.3.2).

During non-flood and non-striped bass spawn periods, daily power generation at Kerr Reservoir, Gaston, and Roanoke Rapids is coordinated and scheduled by Dominion. Dominion’s operation of the three projects adhere to the following guidelines 1) the weekly energy declaration amount for Kerr Reservoir is

generated, 2) the desired schedules of SEPA's preference customers are met, 3) the FERC license minimum flows are met downstream of Roanoke Rapids, and 4) Lake Gaston and Roanoke Rapids Lake elevations are maintained within FERC license ranges. SEPA contracts do allow for Dominion to take additional power (overdraw) or less power (payback) on a limited basis each week according to their customer power demands or other constraints.

During flood events (generally 20,000 cfs or greater), the Wilmington District dictates the flows to be released from Roanoke Rapids Dam. These flood operations typically equal and occasionally exceed the generation capacity at Roanoke Rapids; however, it does typically allow the power companies to continue "peaking" generation at Kerr Dam and Gaston Dam. "Peaking" is when hydropower facilities are operated during the portion of the day when the demand for electric power is the highest.

2.2.4 WATER SUPPLY

Water supply was not an original congressionally authorized purpose of the Kerr Reservoir project. However, under the standing authority of the 1958 Water Supply Act, a limited amount of the conservation (power) pool can be reallocated for municipal and industrial water supply (Figure 2.3). Four local entities have acquired water supply storage which totals 21,380 acre-feet. This is just over 2% of the 1,027,000 acre-feet of conservation pool storage that exists between elevations 268 and 300 feet NGVD 29. These entities are the City of Virginia Beach, VA, Virginia Department of Corrections, Mecklenburg Cogeneration Limited Partnership (now Dominion Power), and the City of Henderson, NC. In addition, the City of Clarksville, VA, and Burlington Industries (no longer in operation) are small, grandfathered water supply users. Water released for flood control or hydropower does not diminish water available from these water supply storage accounts for these entities.

Downstream water supply withdrawals below Roanoke Rapids Dam include both public water systems and industrial water users. Drought conditions can influence the location of the salt wedge in the lower river, but minimum release requirements under the Dominion FERC license (2,000 cfs for all months except 1,500 cfs September through November) generally precludes impacts on downstream water users except during severe droughts.

2.3 BIOLOGICAL RESOURCES

2.3.1 WETLANDS

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 C.F.R. § 328.3). Wetlands possess three essential

characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology. The majority of wetlands in the lower Roanoke consist of floodplain forest.

Throughout the floodplain forest ecosystem is a complex micro topography that was carved over several hundreds of years. Each feature can support a unique forest community relative to the hydrologic gradient on the floodplain. For example, a relief as little as three inches can mean the difference between an oak forest and a red maple/green ash forest. The result is a diversely-rich ecosystem that can support a variety of ecological niches and provide numerous ecological services. Most of the floodplain forest within the affected area of the lower Roanoke River floodplain consists of two major vegetation community types – swamp forest, covering approximately 38,000 acres and which is dominated by water tupelo, blackgum, and cypress; and about 54,000 acres of bottomland hardwood. The bottomland hardwood can be further broken out into two types, 29,000 acres of wet bottom (consisting largely of maple, oak, tupelo, sweetgum, box elder, sugarberry, and ash) and about 25,000 acres of mesic bottom (consisting of oak, sweetgum, beech, hickory and pine). According to USGS (1997), the bottomland hardwood forest that exists in the Roanoke River floodplain is one of the largest contiguous, relatively undisturbed examples of this forest type in the mid-Atlantic region. These bottomland hardwood forests are the most valuable forest type in the lower basin in terms of biological and ecological diversity, game value, timber value, and water quality enhancement. However, the extent of bottomland hardwood forests is also decreasing dramatically in the region. Between 1960 and 1975, the southeastern United States lost 429,963 acres of bottomland hardwood forest annually. In North Carolina, bottomland hardwood forests accounted for 8.9 percent of the total land area in 1970. From 1960 to 1975, these forests were lost at the rate of 30,023 acres per year, or one percent annually (Peet and Rice 1997).

It is estimated that the entire 92,000 acres of floodplain forest along the lower Roanoke River are affected by altered hydrology due to current flood risk management operations at the Kerr Reservoir (TNC 2008). The forest dynamics along the lower Roanoke River are strongly influenced by longer duration floods especially those that occur during the growing season. During flood operations, certain portions of the forest can be inundated for extended periods during the growing season, and other areas are flooding less than they would under a natural hydrologic regime. The overall effect is a reduction in forested community diversity in the watershed. White and Peet (2013) found that there is one dominant group of tree species on the active floodplain: prolific seeders, with a high germination rate most years across a broad gradient, combined with fast growth. These species belong to a functional group consisting of species such as *Fraxinus pennsylvanica* (green ash) and *Acer rubrum* (red maple) that are moderately flood-tolerant, shade-tolerant, and have low-density wood. This group has high mortality in all seedling and sapling size classes, but consistent recruitment at least partially compensates for this mortality. Since these species are only moderately flood tolerant, a series of years with tolerable conditions is

necessary to enable growth out of the vulnerable seedling and sapling stage. The data suggest that other species that produce a more variable seed crop or are more specialized are not capable of survival and growth out of the seedling and sapling stage in the floodplain when subjected to long duration floods during the growing season. Examples of these include several species of oak and hickory, the hard mast producers that provide a valuable food source for multiple species of wildlife e.g., waterfowl, large and small mammals. As the hard mast producing tree species drop out of the floodplain forest the complexity of the forest ecosystem will be diminished reducing its ability to provide habitat for a variety of wildlife and its overall resilience to catastrophic events. Wilder et. al., 2012b concluded that the long duration flood events that the floodplain forest has been subjected to over the past five decades is stressing the trees in the lower Roanoke River. If the stresses persist species composition of the forest will shift and the degradation of the floodplain forest will continue. Another example of a case study of the Lower Roanoke River showed evidence that the vegetation communities along the Roanoke are becoming increasingly stratified due to the change in the natural flood regime caused by altered flood patterns from regulation by the upstream dams. This change in the natural inundation pattern is allowing for less flood tolerant species to become established in areas naturally inhabited by bottomland hardwood species thereby lowering the overall vegetative diversity of the floodplain (Richter et al. 1996). According to the Environmental Benefits Analysis performed for the floodplain forest, the habitat value of this resource will continue to decline over the next 50 years if releases from Kerr Reservoir are not changed.

2.3.2 FISH AND WILDLIFE

The John H. Kerr Dam and Reservoir system and the lower Roanoke River Basin downstream of the dam provide a high-quality habitat for fish and wildlife. Wildlife resources include North Carolina's largest population of wild turkey and critical habitat for the black bear; 214 species of birds including species such as wood ducks, bald eagles, barred owls, great blue herons, and cerulean warblers. There are 33 breeding neo-tropical migratory bird species and 88 additional species of breeding birds identified in the Roanoke River basin including 7 major heron nesting and breeding areas (TNC 2008). Concentrations of these wintering waterfowl, nesting ducks, raptors, osprey, and neo-tropical migrants represent the highest diversity of breeding birds in the North Carolina coastal plain including the largest inland heron rookery in North Carolina (USFWS 2006).

However, the impacts of prolonged flood events at the wrong time can negatively affect the timing of critical annual environmental activities such as wildlife breeding and fish spawning disrupting the delicate balance of the timing and availability of life requisite resources. When prolonged flood events occur during the nesting season for wild turkeys along the Roanoke River, Cobb et. al. 1993 found that turkey recruitment was significantly reduced and forces turkeys to concentrate in isolated locations out of the bottomlands to locations where they

were more vulnerable to predators and increased legal and illegal harvest. The Swainson's warbler, a high priority species as recognized by the USFWS and NCWRC is a ground foraging bird that spends most of its time foraging for arthropods in the leaf litter. Nesting activity by ground foraging birds such as the Swainson's warbler may be affected by long duration floods that occur during the growing season by reducing their food base which has negative implications on productivity (Neil Chartier pers. Comm.; Graves 2001; Thompson 2005; Savage 2009).

The lower Roanoke River also provides an immense habitat for fish species such as striped bass, alewife, blueback herring, hickory shad, largemouth bass, white perch, bluegill, pumpkinseed, redear sunfish, yellow perch, and catfish. Other nongame species include the blueback herring, gizzard shad, carp, and suckers (USACE 2001). Efforts are being made to restore American shad, an anadromous species native to the Roanoke River basin, through cooperation with the NC Wildlife Resources Commission, US Fish and Wildlife Service, and Dominion. Shad fry are raised at hatcheries and then stocked in the basin every year. Stocks are evaluated by biologists each fall when the juveniles move downstream (NCWRC 2010). The goal is that the populations will become self-sustaining and stocking will no longer be needed. However, the altered flow regime on the river has significantly changed the morphology of the river channel below the Roanoke Rapids Dam which has implications for aquatic organisms. Since the construction of the dams, accelerated rates of bank erosion have been an ongoing occurrence downstream. The upper reach most likely began eroding soon after dam completion in 1953. Presently, it is believed that the channel in the upper reach has reached some semblance of equilibrium (Hupp et al. 2010). That is, starting at the base of the last dam to approximately 70 miles downstream, the river channel has conformed to the regulated flow regime. The upper reach has a wider channel (not the typical trend on alluvial rivers) and higher banks than downstream. Presently, the impetus for erosion has lessened in the upper reach and has migrated downstream to the middle reaches (Hupp et al. 2009a). In the middle reach where the banks are actively eroding, the highly regulated dam-release patterns concentrate flow on the middle and lower bank surfaces and facilitate bank erosion.

The managed flow regime on the river has significantly dampened the magnitude of short duration floods by creating long duration moderate floods. These post-dam flood events don't have the energy associated with them to scour floodplain drainages and build levees from overbank flooding. Recent studies have indicated that the micro topography on the floodplain is slowly being diminished. The sediment laden floodwaters that meander on to the floodplain via guts and creeks deposit their sediment in the backswamps gradually filling in these low-lying areas (Hupp et al. 2009b). Loss of topographic relief will lead to the loss of some forest communities, reducing the number of ecological niches and associated wildlife species resulting in simplifying an otherwise complex ecological system.

Kerr Reservoir has a landlocked population of striped bass. On two occasions in the 1980s, groups of adult striped bass passed through the turbines at Kerr Dam resulting in at least 50 percent mortality. These events were caused by heavy rains that resulted in a significant rise in elevation of Kerr Reservoir and the subsequent increase in heavy power generation to bring the reservoir back down to the guide curve. The striped bass returning in June from their spawning runs up the Dan and Staunton Rivers followed the density current set up in the reservoir from the heavy generation and attempted to pass downstream through the turbines (VDGIF 2010a). A protocol was established in 1992 to help preclude similar occurrences. When the reservoir rises rapidly in June due to heavy rainfall, boat mounted fish finders are used to survey upstream of the turbines for the presence of large fish. If these fish are observed near the turbines, releases via the turbines are stopped for several hours to a day to allow the striped bass to disperse. No striped bass mortality has been observed since this protocol has been implemented.

In the lower Roanoke River during the spring striped bass spawning season, collaboration between the Wilmington District and the North Carolina Wildlife Resources Commission determines what flows are to be released from Roanoke Rapids Dam. These releases are based upon inflows into Kerr Reservoir, amount of water remaining in designated seasonal striped bass spawning storage in Kerr Reservoir, and the progress of the spawn. Flow targets during the striped bass spawning season, established in 1989, are as follows:

	Lower Flow (cfs)	Median Flow (cfs)	Upper Flow (cfs)
April 1-15	6,600	8,500	13,700
April 16-30	5,800	7,800	11,000
May 1-15	4,700	6,500	9,500
May 16-31	4,400	5,900	9,500
June 1-15	4,000	5,300	9,500

These targets are met except during droughts when designated seasonal striped bass spawning storage cannot be achieved and during flood conditions when higher releases are required in accordance with the Kerr Reservoir water control plan (http://epec.saw.usace.army.mil/KERRWCP.TXT). In addition to changes in fishing regulations, these releases have been beneficial in restoring the striped bass fishery in the Roanoke River (Nelson 1994). During drought conditions in the spring, the FERC minimum release of 2,000 cfs from Roanoke Rapids Dam would be in effect.

2.3.3 ENDANGERED SPECIES

Coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) was conducted to identify endangered and threatened species (as well as Federal Species of Concern and candidate species) that might be present within the study area based on species information, maps of species distributions, species occurrences, and geographic search areas. Threatened and endangered species that may be present in North Carolina and Virginia around and downstream of Kerr Reservoir in the lower Roanoke River basin include: Red-cockaded woodpecker, Dwarf wedgemussel, Tar River spinymussel, shortnose and Atlantic sturgeon, Roanoke logperch, red wolf, smooth coneflower, Michaux's sumac, Harperella and the Northern long-eared bat. The only threatened and endangered species in North Carolina that falls under the jurisdiction of the NMFS are the shortnose and Atlantic sturgeons. Table 2.2 contains a complete listing of protected species, their scientific names, and official status (USFWS 2014; NOAA 2014).

Effective May 4, 2015, the USFWS listed the Northern Long-Eared Bat as a threatened species, with an interim special rule under Section 4(d) of the Endangered Species Act (ESA). A Conservation Measure included in the interim 4(d) rule states that incidental take from forest clearing activities will not be prohibited if the activity is conducted in a manner that avoids cutting or destroying known, occupied maternity roost trees during the pup season (June 1-July 31). During the summer, northern long-eared bats typically roosts singly or in colonies in a wide-variety of forested habitats, underneath bark or in cavities/crevices of both live trees and snags. Northern long-eared bats have also been documented roosting in man-made structures (i.e., buildings, barns, etc.) during the summer. Northern long-eared bats predominately winter in hibernacula that include caves and abandoned mine portals, and potentially large boulder areas. It should be noted that the general habitat types described above may not be all-inclusive, and additional habitat types may be identified as new information is obtained. The Corps is aware of the potential presence of the Northern Long Eared Bat, and with future consultation, the Corps will adopt necessary measures to implement our ESA responsibilities, to the extent that they are within the Corps' legal authorities, consistent with the Corps' missions and responsibilities, and are feasible from both a technological and economic point of view.

Although several listed species may be present in the counties where the Dam and downstream areas are located, most species are not present in the project area of effect. Therefore, the Corps has determined there is no effect to the Red-cockaded woodpecker, Dwarf wedgemussel, Tar River spinymussel, shortnose and Atlantic sturgeon, Roanoke logperch, red wolf, smooth coneflower, Michaux's sumac, Harperella and the Northern long-eared bat.

The shortnose and Atlantic sturgeon may be in the project area, however, since there are no proposed changes in the spring releases, the historic runs of spring-spawned sturgeon should not be adversely impacted by the proposed WCP revision. Recent studies, however, have documented a population of Atlantic sturgeon that migrate up the Roanoke River in late summer and spawn in September (Smith et al. 2015). Future measures that improve DO in the river and simulate more natural river discharge will most likely benefit sturgeon.

The Roanoke River is under study as part of a program to restore American eels (Anguilla rostrata), a federally listed species of concern, to the Roanoke River basin by providing passage upstream of the dams (VDGIF 2010b). Eels are a catadromous species meaning that adults move downstream from freshwater streams and rivers to spawn in the ocean and the young eels (elvers) migrate back into freshwater streams and rivers to mature. The dams on the Roanoke River block both the movement of adults downstream and of the elvers moving upstream.

In the spring of 2010, eel ladders were installed at Roanoke Rapids Dam to provide American eels an avenue to continue to move upstream into more of their historic habitat range. The eels range at one time extended up into the head waters of the Roanoke River (Dominion 2010). The success of the Roanoke Rapids eel ladder is currently being studied and evaluated. Eel traps are currently in place at Gaston Dam to determine if eels move that far upstream. Based on those results, the need to install ladders at Gaston Dam will be evaluated under Dominion's FERC license requirements. The Gaston Dam evaluation will probably not be completed until after this EA is completed. After that date, if eel ladders appear to be warranted at Kerr Dam, then further action could be pursued under the Corps Section 1135 continuing authority (project modification for improvement of the environment).

Table 2.2 Threatened and Endangered Species within the Roanoke River Basin

Species Common Names	Scientific Names	Federal Status	State
Vertebrate			
Alewife Herring	*Alosa aestivalis*	FSC	NC
American alligator	*Alligator mississippiensis*	T (S/A)	NC
American eel	*Anguilla rostrata*	FSC	NC
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	E	NC
Bachman's sparrow	*Aimophila aestivalis*	FSC	NC
Bald Eagle	*Haliaeetus leucocephalus*	BGPA	NC&VA
Blueback herring	*Alosa pseudoharengus*	FSC	NC
Black throated green warbler	*Dendroica virens waynei*	FSC	NC
Carolina madtom	*Noturus furiosus*	FSC	NC
Cerulean warbler	*Dendroica cerulea*	FSC	NC
Eastern Henslow's sparrow	*Ammodramus henslowii susurrans*	FSC	NC
Lake Phelps killfish	*Fundulus cf. diaphanus*	FSC	NC
Northern long-eared bat	*Myotis septentrionalis*	T	NC&VA
Pinewoods shiner	*Lythrurus matutinus*	FSC	NC
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	FSC	NC
Red wolf	*Canis rufus*	EXP	NC
Red-cockaded woodpecker	*Picoides borealis*	E	NC
Red knot	*Calidris canutus rofa*	P	NC
Roanoke bass	*Amblophites cavifrons*	FSC	NC
Roanoke log-perch	*Percina rex*	E	VA
Shortnose sturgeon	*Acipenser brevirostrum*	E	NC
Southeastern myotis	*Myotis austroriparius*	FSC	NC
West Indian manatee	*Trichechus manatus*	E	NC
Invertebrate			
Atlantic pigtoe	*Fusconaia masoni*	FSC	NC
Brook floater	*Alasmidonta varicosa*	FSC	NC
Chowanoke crayfish	*Orconectes virginiensis*	FSC	NC&VA
Dwarf wedgemussel	*Alasmidonta heterodon*	E	NC
Green floater	*Lasmigona subviridis*	FSC	NC
Tar River spinymussel	*Elliptio steinstansana*	E	NC
Yellow lampmussel	*Lampsilis cariosa*	FSC	NC
Yellow lance	*Elliptio lanceolata*	FSC	NC
Vascular plant			
Bog St. John's-wort	*Hypericum adpressum*	FSC	NC
Butner's barbara's-buttons	*Marshallia sp.*	FSC	NC
Buttercup phacelia	*Phacelia covillei*	FSC	NC
Harperella	*Ptilimnium nodosum*	E	NC&VA
Michaux's sumac	*Rhus michauxii*	E	VA
Prairie birdsfoot-trefoil	*Lotus unifoliolatus var. helleri*	FSC	NC
Reclining bulrush	*Scirpus flaccidifolius*	FSC	NC
Sandhills bog lily	*Lilium pyrophilum*	FSC	NC
Smooth coneflower	*Echinacea laevigata*	E	NC&VA
Smooth seeded hairy nutrush	*Scleria sp.*	FSC	NC
Tall larkspur	*Delphinium exaltatum*	FSC	NC
Torry Mountain-mint	*Pycanthemum torrei*	FSC	NC
Virginia last trillium	*Trillium pusillum var. virginianum*	FSC	NC

Definitions of Federal Status Codes:
E = endangered. A taxon "in danger of extinction throughout all or a significant portion of its range."
T = threatened. A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."
C = candidate. A taxon under consideration for official listing for which there is sufficient information to support listing. (Formerly "C1" candidate species.)
BGPA =Bald and Golden Eagle Protection Act.
FSC = federal species of concern. A species under consideration for listing, for which there is insufficient information to support listing at this time. These species may or may not be listed in the future, and many of these species were formerly recognized as "C2" candidate species.
T(S/A) = threatened due to similarity of appearance. A taxon that is threatened due to similarity of appearance with another listed species and is listed for its protection. Taxa listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation.
EXP = experimental population. A taxon listed as experimental (either essential or nonessential). Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and as species proposed for listing on private land.
P = proposed. Taxa proposed for official listing as endangered or threatened will be noted as "PE" or "PT", respectively.

2.4 CULTURAL RESOURCES

Formal archaeological investigations have been conducted at the Kerr Reservoir project and vicinity for over 40 years. The largest and most comprehensive study to date was an archaeological survey of approximately 6,000 acres and 220 miles of shoreline. The survey identified 315 archaeological sites in Virginia and North Carolina (Garrow et al. 1980).

Detailed cultural resources surveys of Buggs Island were completed for the USACE, Wilmington District (Abbott et al. 2000, New South Associates 2004). Buggs Island, state site number 44MC491, is a prehistoric archaeological site near the base of Kerr Dam. This site has been determined to be a historic property eligible for nomination to the National Register of Historic Places (Abbott et al. 2000). Past studies have documented the rate and location of erosion at Buggs Island.

A total of 365 archeological sites had been previously recorded within and in the immediate vicinity of Lake Gaston. Of these, 237 were located within North Carolina and 128 were located within Virginia. The majority of sites represent prehistoric period sites. A total of 107 archeological sites were previously identified within the project area and immediate vicinity of Roanoke Rapids Lake. Like those sites recorded in the Lake Gaston project area and vicinity, these sites are predominantly prehistoric.

The archeological site data files consulted did not contain information about any sites recorded in the Lower Roanoke River portion of the project area. While site frequencies may be low in this area, the lack of previously recorded sites may be a reflection of the fact that little archeological survey work had been conducted in this portion of the project area (Tetra Tech 2005).

2.5 SOCIO-ECONOMIC RESOURCES

2.5.1 DEMOGRAPHICS

In 2009, the four most significant employment sectors in the study area economy were retail trade, manufacturing, public administration, and health care. The 2009 collective unemployment rate for the study area is 11.4%, which represents persons over the age of 16 that are in the labor force. Overall, in 2009, the State of North Carolina had an unemployment rate of 9.8 % (USBLS, 2009) while Virginia was at 6.7%. The average 2008 personal per capita income in the study area is $28,406, considerably lower than both states, with $34,437 as the median per capita income in North Carolina and $42,870 in Virginia (USBLS, 2009). The study area consists of a mix of white (46.4%), black (51.4%), and Hispanic (2.2%) occupants.

Aside from basic population and ethnicity make-up, household information and poverty data depict a good deal of the overall socio-economic conditions of a region. Table 2.3 indicates higher than average poverty rates in the study area counties, with significantly lower household median incomes, when compared to the respective State totals (U.S. Census Bureau 2009).

	Households, 2009	Persons per household, 2009	Median household income, 2008	Persons below poverty level, percent, 2008
North Carolina	3,541,807	2.47	$46,574	14.60%
Bertie	7,766	2.41	$31,375	23.30%
Halifax	21,595	2.49	$31,495	23.70%
Martin	9,753	2.38	$35,072	23.40%
Northampton	7,959	2.54	$31,054	26.60%
Warren	7,594	2.51	$33,632	24.40%
Washington	4,936	2.56	$34,027	23.20%
Virginia	2,936,634	2.54	$61,210	10.20%
Brunswick	6,149	2.44	$35,876	22.20%
Mecklenburg	12,532	2.44	$36,941	17.40%

Table 2.3. Income and poverty statistics by County, Kerr 216 Study.

Housing: Source: US Census Bureau, American Community Survey, 2005-2009 5 Year Estimates
Income: Source: US Census Bureau, 2008 Small Area Income and Poverty Estimates (SAIPE)
Poverty: Source: US Census Bureau, 2008 Small Area Income and Poverty Estimates (SAIPE)

2.5.2 AGRICULTURE AND SILVICULTURE

Agricultural development is extensive throughout the upstream and downstream counties affected by Kerr Reservoir (Figure and Table 2.1). Upstream counties include Brunswick and Mecklenburg counties in Virginia. Downstream counties include Halifax, Warren, Northampton, Bertie, Martin, and Washington Counties in North Carolina. Farm acreage (cropland, pastureland, and grazing) accounts for some 244,017 acres of the upstream counties and 775,679 acres of the downstream counties. In most counties the major crops are soybeans, corn, peanuts, wheat, hay, cotton, and some remaining tobacco. The average market value of goods produced, per farm, in the upstream counties of Virginia is $44,326 and North Carolina downstream counties, per farm, is approximately $289,136 (USDA 2007). This dollar value difference is primarily due to farms averaging a larger size in North Carolina. Much of the area is currently prime farmland and some of it will gradually be converted to commercial and residential use. The existing operation of Kerr Reservoir will not affect that rate of conversion. Much of the remaining downstream area is devoted to commercial forestry management and production, as well as conservation management.

Economic damages under existing conditions during sustained high flows occur primarily to agricultural lands during the growing season. These agricultural damages begin when sustained flows exceed 20,000 cfs. Releases up to 35,000 cfs occur periodically during flood operations. At 20,000 cfs about 250 acres of agricultural lands are impacted, at 25,000 cfs about 604 acres, and at 35,000 cfs about 1,631 acres.

For Kerr Reservoir levels below 300 feet NGVD 29, discharges are typically limited to 8,000 cubic feet per second (cfs) at Roanoke Rapids Dam to preclude impacting silvicultural operations in the lower Roanoke River floodplain downstream. For reservoir levels between 300 and 312 feet NGVD 29, water releases may be increased to 20,000 cfs which can have major impacts on silvicultural operations.

2.5.3 RECREATION

The Roanoke River and associated floodplain provide many opportunities for an assortment of recreational activities. The river itself provides opportunity for sport fishing, canoeing, kayaking, swimming, and boating. Dominion's FERC license requires whitewater recreation flows from June 16 – Oct. 31 on weekends below Roanoke Rapids Dam when declarations (releases) are ≥8,000 cfs. The Roanoke River boasts a 200 mile paddle trail system which features a series of camping platforms maintained by the Roanoke River Partners. Many sport fishermen are drawn to the river each year for the chance to catch one of many sought-after species like striped bass, largemouth bass, black crappie, hickory shad, perch, sunfish, catfish and bowfin. During an annual survey conducted by the NC Wildlife Resources Commission in 2005-2006, anglers spent an

estimated $2.5 million to enjoy fishing on the lower Roanoke River (McCargo et al. 2007). The Roanoke River National Wildlife Refuge, Kerr Reservoir, along with several Nature Conservancy Preserves, and several state and local parks provide many land-based recreational opportunities such as: bird watching, hunting, hiking, camping, and photography and wildlife observation.

The Kerr Reservoir project will be operated for recreation in the reservoir to the maximum extent possible without serious interference with the purposes of flood control and hydropower generation. In the first half of June, the guide curve descends from the spring spawning storage level to the summer target level, or from lake elevation 302.0 to 299.5 feet NGVD 29. Lake level elevations greatly affect commercial and recreation activities at the project. For example high elevations can flood camp sites and parking lots, and low levels can limit boat ramp and swim beach use. Currently there are 30 recreation areas on Kerr Reservoir with a total of 1,322 campsites, 228 picnic sites, and 38 boat ramps. Visitors to these recreation sites average about 1.7 million per year. The Corps of Engineers manages 12 of these areas and leases land to the State of North Carolina and the Commonwealth of Virginia to manage 15 other areas. There are 4 marina areas managed by private companies and 15 quasi-public recreation areas under lease to various churches, civic, and scout organizations. Twenty-six wildlife management areas are located around the reservoir, which are used by hunters and nature enthusiasts. Along with the wildlife management areas, there are private gun and hunting clubs, including the Roanoke and Tar River Gun Club, which lease or own land to offer hunting and recreation opportunities to their members.

2.6 OTHER RESOURCES

2.6.1 AIR QUALITY AND NOISE

According to the NC, Division of Air Quality (NCDAQ 2010) and the Virginia Office of Air Quality (VAOAQ 2011), counties in both North Carolina and Virginia, within the project boundaries, are in attainment for ozone and particulates. Areas of the country where air pollution levels persistently exceed the national ambient air quality standards may be designated as “non-attainment.” There are no known air quality problems in the study area.

There is noise associated with highway traffic and boat traffic year round, and boat traffic is higher in the warmer months related to fishing, skiing, and other activities. Also there is hunting activity along the lower Roanoke River during the fall and early winter. Otherwise there are no regular noise disturbances.

2.6.2 CLIMATE

The project area generally has mild winters and warm humid summers. Average summertime highs are in the upper 80's and winter time lows average in the low 30's. Precipitation is fairly well distributed throughout the year and average annual rainfall is around 40 inches.

2.6.3 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES (HTRW)

There are no known HTRW waste sites around Kerr Reservoir or in the lower Roanoke River below Roanoke Rapids Dam that are affected by existing operations.

2.6.4 AESTHETICS

The aesthetic environment around the reservoirs and along the lower Roanoke River is rural, dominated by woodlands and farming with a few residential or urban areas adjacent to the water. These natural areas attract birdwatchers, hikers, and other noncomsumptive outdoor recreationalists.

3 ENVIRONMENTAL EFFECTS

This section discusses the probable effects or impacts of the proposed WCP revision on the resources discussed in Section 2. The recommended plan is Quasi Run of River (QRR). The effects discussed can be either beneficial or adverse and were considered over a 50-year period of analysis. Figure 3.1 shows the extent of the environmental effects of the QRR alternative.

In addition to QRR, the impacts of the No Action alternative are addressed in this section. The no action alternative involves the existing condition of the resources in the project area as well as the future without-project condition of these resources also over a 50-year period of analysis. A future without-project condition entails no changes in the current operation of the John H. Kerr Dam and Reservoir, or additions or modifications to structures beyond normal maintenance. In addition, impacts of the No Action plan are compared to QRR in Table 3.1 and are discussed in more detail in the sections following Table 3.1.

Benefits resulting from QRR are not measured monetarily, but are instead quantified in terms of increases over the no-action plan in average annual ecosystem habitat or functional outputs (e.g. Habitat Units (HU)). Environmental benefits were measured based on the amount of area (usually acres) being improved (quantity), multiplied by the increase in quality of that area. Quality is generally measured through the use of an environmental benefits model, which is an index-based model where the habitat is rated on a scale of 0 through 1. These models were meant as a simplified method for representing, measuring, and comparing relative changes in ecosystem quality, and as such may not capture or include every aspect of a complex ecosystem. Hydrologic conditions for all scenarios were simulated for the Roanoke River using Roanoke River Basin Reservoir Operations Model (RRBROM) and Hydrologic Engineering Center's River Analysis System (HEC-RAS). The Roanoke River Basin Reservoir Operations Model is a reservoir operations mass-balance model of the Roanoke Basin that takes inflows to dams, determines needed outflows dependent upon reservoir operating rules, and computes lake level changes over time. By varying these modeled operating rules to match the proposed changes to flood operations at Kerr, releases and lake levels for each alternative could be generated for comparison and use by other models. The USACE Hydrologic Engineering Center's River Analysis System software allows users to perform one-dimensional steady and unsteady flow river hydraulics calculations.

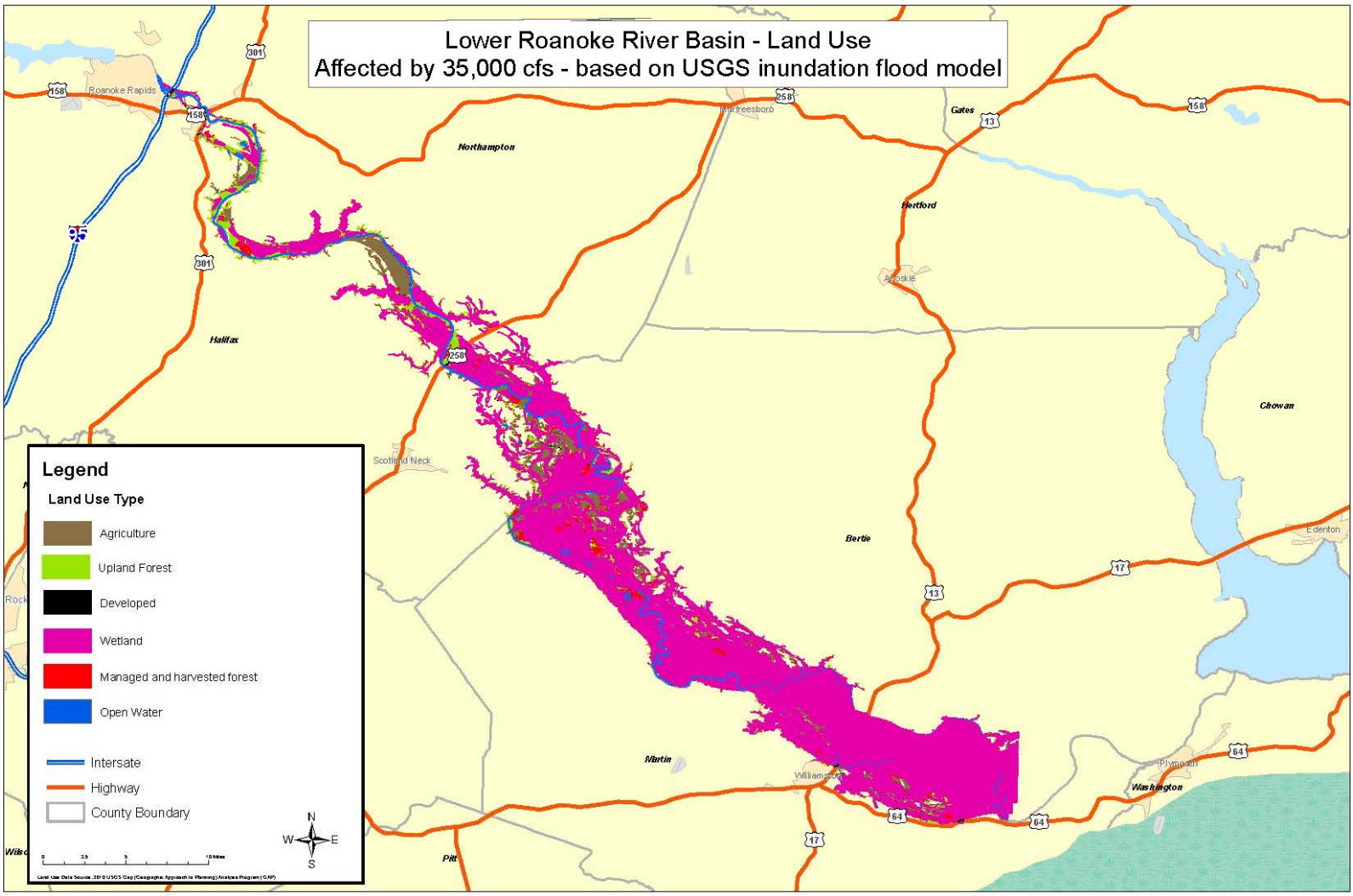


Figure 3.1 Affected Environment.

3.1 PROJECT PURPOSES AND PHYSICAL RESOURCES

The purpose is to determine the advisability of modifying operations for ecosystem restoration for the overall public interest.

	Alternative Plans	
Environmental Effect	**No Action**	**Quasi Run of River (QRR)**
Land Use	No Change	Increased frequency of flooding on 1,631 acres of farm land.
Geology and Sediments	Continued elevated rates of erosion and turbidity as compared to natural flow.	Reduced rate of erosion and reduced turbidity.
Floodplains	Vegetation continue to shift away from natural conditions.	Vegetation slowly shifts toward natural conditions.
Flood Risk Management	No Change	Evacuate flood pool sooner thus restoring Kerr flood storage quicker.
Water Quality	DO levels below Kerr Dam will remain below state standards during the warmer months.	Slight improvement in DO in the lower river following flood events.
Hydropower	No Change	Less than 3.3% loss in hydropower generation.
Water Supply	No Change	No effect
Wetlands	Vegetation will continue to shift away from natural conditions.	Vegetation slowly shift toward natural conditions.
Fish and Wildlife	Continued degradation of habitat.	More stable Kerr Reservoir level would benefit fisheries. Lower river habitat increased by 1,976 average annual habitat units by improving conditions in 92,000 acres of forest.
Endangered Species	Continued degradation of habitat.	Slight improvement in DO in lower river following flood events may improve conditions for the endangered Atlantic and shortnose sturgeon.
Cultural Resources	No Change	Increased frequency of 35,000 cfs releases may impact site on Buggs Island.
Demographics	No Change	No effect
Agriculture	Farmland impacted by sustained releases to 20,000 cfs will continue to be impacted.	1,631 acres flooded more frequently resulting in an average annual increase in damages of $234,272 compared to no action.
Silviculture	Habitats continue to degrade. Higher $ value tree species are replaced by lower $ value species.	More frequent flooding may occasionally limit access, but productivity should increase due to a more natural flooding regime.
Recreation	No Change	More stable Kerr Reservoir level would benefit recreation features such as boat ramps, swim beaches and camp sites. A greater fluctuation allows for additional days when the floodplain is not inundated and thereby increases availability.
Air Quality & Noise	No Change	Increase near or less than 2 hundredths of a percent of the total emissions for the SRVC.
Climate Change	No Change	No effect
HTRW	No Change	No effect
Aesthetics	As habitats degrade visual aesthetics that attract nonconsumpitve users degrade.	Bank erosion along the reservoir and downstream will likely be reduced leading to less denuded banks and more scenic vistas.

Table 3.1 Comparison of Environmental Effects of the No Action Alternative with the Recommended Plan

3.1.1 LAND USE

QRR: Approximately 1,631 acres of agricultural land would potentially be subjected to more frequent, but shorter duration flooding. It is possible that the owners would choose to convert some of this land to other use. See section 3.5.2 for additional information.

No Action: No changes to existing land uses would be expected.

3.1.2 GEOLOGY AND SEDIMENTS

QRR: This alternative should not change the geology of the area. Regarding sediments, current operations are causing a higher rate of river bank collapse due to erosion, which results in loss of riparian vegetation and increased turbidity. QRR is closer to the natural flow regime and its implementation should reduce the rate of bank collapse and turbidity.

No Action: No changes in geology. Regarding sediments, no action will result in continued elevated rates of erosion and turbidity as compared to natural flow.

3.1.3 FLOODPLAINS

QRR: During flood operations, certain portions of the forest can be inundated for extended periods during the growing season, and other areas are flooding less than they would under a natural hydrologic regime. The overall effect is a reduction in forested community diversity in the watershed. By altering the existing hydrology so that it is closer to that of an unregulated system (reducing the duration of flooding events), QRR would benefit about 92,000 acres of bottomland hardwoods in the lower Roanoke River. Vegetation composition in these areas will slowly shift back towards what had been established prior to the building of the Kerr Reservoir. This component would produce an average benefit of 1,976 habitat units a year (Wilder et al. 2012a). The Recommended Plan would not involve any construction components.

There are no known structures within the floodplain that would be impacted.

No Action: Vegetation will continue to shift away from the natural condition that existed prior to construction of the dam

3.2 WATER RESOURCES

3.2.1 FLOOD RISK MANAGEMENT OPERATIONS AT KERR RESERVOIR

QRR: If this alternative is implemented, existing flood risk management operations at the Kerr Reservoir (Section 3.2.1) would be altered to follow a new, slightly modified guide curve and operational rules. Kerr Reservoir water levels would probably be maintained closer to the guide curve. For example, under existing operations, only up to 20,000 cfs is released between reservoir elevations 300 ft to 312 ft NGVD 29. However under QRR, releases up to 35,000 cfs can be made when the lake is above guide curve elevation, which would keep the reservoir elevation from going as high, and return the reservoir elevation to the guide curve more quickly. This would evacuate flood waters in the reservoir sooner, restoring flood storage capacity in the reservoir more expeditiously. For example, under year-round QRR, elevation 304 feet NGVD 29 under QRR would only be exceeded about 2.7% of the time, but for existing operations that elevation would be exceeded about 21.5% of the time. Thus a greater percentage of the flood pool storage would be available under QRR operations. This is illustrated below in Figure 3.2. Lower lake levels will also reduce in-lake flooding impacts associated with higher lake levels. In addition, QRR would reduce the risk of lake levels exceeding 320 ft NGVD 29, which would result in flood releases greater than 35,000 cfs.

The average annual damages of about $11.4 million prevented under current operations (No Action) would be reduced by the average annual additional agricultural damages (about $234,000) indicated for QRR in section 4.5.2 below. Actual agricultural damages could be significantly higher or lower than this average annual estimate depending on actual flood releases.

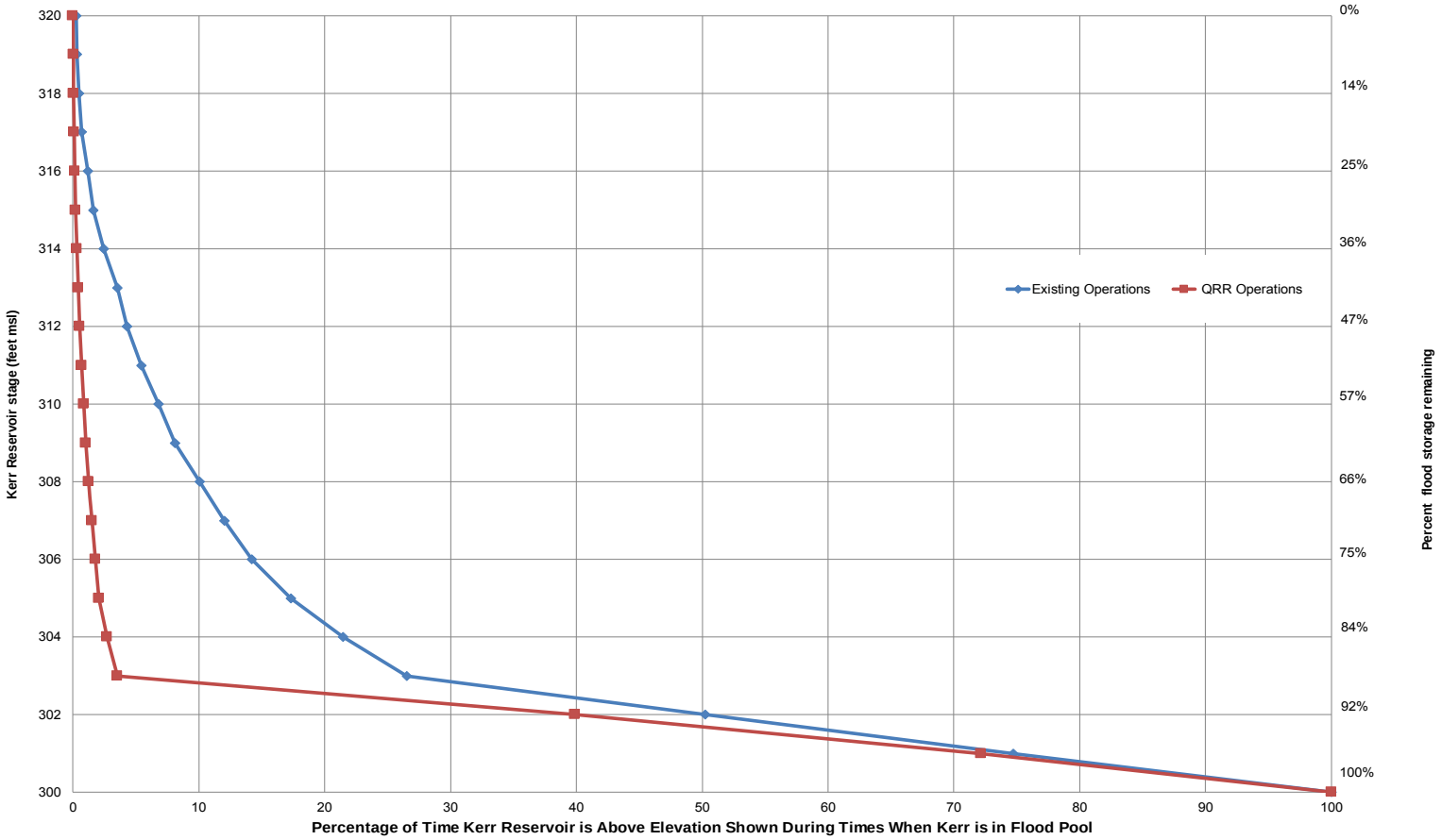
No Action: No change to current flood risk management operations would be expected.

3.2.2 WATER QUALITY

QRR: A major concern for the lower Roanoke River is the effect of low DO concentrations during warm weather. Under current operations, water stands in the downstream swamps for extended periods of time, which results in low DO. Under QRR, flood waters would more actively flow through the swamps versus standing and stagnating. QRR operations would reduce the duration that water would stay in the swamp, and therefore the DO concentration of the water draining back into the river from the swamp may be slightly higher than under existing conditions, especially if used in conjunction with the Betterment Plan benefiting all aquatic wildlife.

No Action: When flood waters are released over long periods of time, water tends to stand in the downstream swamps and the DO approaches zero due to BOD and COD. This low DO water eventually drains back into the river when discharge from the dam is reduced and has resulted in fish kills. DO levels below Kerr Dam will remain below state standards during the warmer months of the year.

Figure 3.2 Percent of Time Kerr Reservoir is at Elevation 300 feet msl or Higher During Times When Kerr is in Flood Pool for Existing and QRR operations.



Source: USACE 2014 Note: Chart depicts the original year-round QRR alternative and not the modified QRR.

3.2.3 HYDROPOWER

QRR: Since QRR only affects releases when Kerr Reservoir is above guide curve and/or in the flood pool, this alternative will have no effect on Kerr's ability to meet its weekly minimum energy commitments to its customers or Kerr's ability to maintain its marketed dependable capacity of 225 MW. Hydropower generation impacts at Kerr will be limited to secondary energy generation that is in excess of its contractual minimum energy requirements.

Based on modeled hydropower outputs for the historical period from 1930-2010, it is estimated that average annual secondary (excess) power generation would be reduced by about 3.4% at Kerr Dam (see Table 3.2 below). Secondary energy is excess energy generated during flood operations, and is in excess of what is needed to meet minimum energy requirements. During flood operations, higher releases under QRR will generally prevent pool levels from reaching as high and will also bring pool levels down more quickly compared to existing operations. These lower flood pool elevations result in lower plant efficiencies, thereby reducing the overall secondary (excess) energy output; however, all water released under QRR's 35,000 cfs flood releases will be released through Kerr's turbines (i.e., used for generation).

Hydropower impacts associated with QRR affect not only Kerr Dam, but also Dominion's Gaston and Roanoke Rapids power stations. Gaston, like Kerr, can accommodate the full 35,000 cfs releases through its turbines, and since Lake Gaston lake levels are not affected by QRR, there is essentially no difference in generation at Gaston (as shown in table 3.2. However, Roanoke Rapids will have to spill QRR releases in excess of 20,000 cfs, which does have a measurable impact on generation. Based on the 80-year historical modeling period, 35,000 cfs releases (requiring 15,000 cfs spill) would have occurred about every 8 years on average under existing operations; however, under the original QRR, 35,000 cfs releases would have occurred about every 2 years on average. QRR releases between 20,000 and 35,000 cfs will also require spilling from Roanoke Rapids, but obviously to a lesser degree. As a result of these spills, an average annual reduction of 6.46% in generation would have been expected at Roanoke Rapids under the original QRR; however, when combined with generation impacts at Gaston, the average annual reduction in Dominion generation for both projects is reduced to an estimated 3.21% under the original QRR.

Alternative	Average Annual Power Generation (MWH)			
	John H Kerr	Gaston	Roanoke Rapids	Gaston+RR
Existing	479,008	349,142	356,018	705,160
QRR	462,729	349,490	333,024	682,514
Difference	-16,279	348	-22,994	-22,646
% Difference	-3.40%	+0.10%	-6.46%	-3.21%

Table 3.2 Average Annual Power Generation (based on year-round QRR).

A portion of the generation differences is offset by beneficial guide curve modifications associated with QRR and is reflected in Table 3.2. From mid-June to mid-August and during the month of December, the QRR guide curve elevations are higher, increasing capacity and generating efficiency. In addition, the delayed guide curve drawdown associated with these changes potentially allow for additional secondary energy generation during higher demand periods than the existing guide curve.

Lost hydropower generation would potentially need to be replaced by other more expensive sources of energy. Assuming that all of this reduced generation would need to be replaced, the average annual cost of this replacement energy has been estimated at approximately $3.8 million (based on year-round QRR; these costs are expected to less under QRR as proposed); however, since this is excess energy during a flood event that may not be fully needed to meet actual power demands, full replacement may not be necessary. Note also that this value does not reflect a direct cost to the energy end-user. The cost ultimately paid by the consumer is based on a variety of other factors, such as market conditions, that go beyond replacement energy costs.

Although the QRR alternative will result in a slight decrease of secondary power generation, no significant hydropower impacts are expected to occur.

No Action: No change to existing hydropower generation would be expected.

3.2.4 WATER SUPPLY

QRR: QRR should not impact water supply availability or requirements in the basin. There are no ongoing federal water supply studies for the reservoir. Because a major population increase or the growth of major industries is not anticipated for the study area during the period of analysis, water supply will likely only be affected by natural events, such as drought. It is possible that at some point in the future issues of water allocation in the reservoir could be raised; however, the timing and nature of this are not known, nor is it expected to

impact the current study. Also, there are also no water supply impacts because the QRR is only affecting releases during flood time operations, not during normal or drought conditions when water supply could be a concern. Regardless, individual water supply storage accounts in Kerr Reservoir are not affected by releases from Kerr Dam, since they are separate from both the flood pool and the power pool.

No Action: No changes to water supply would be expected.

3.3 BIOLOGICAL RESOURCES

3.3.1 WETLANDS

QRR: This measure would affect about 92,000 acres of forested areas, but it likely would not result in any loss of wetland acreage. Vegetation composition in these forested wetlands would slowly convert back to the vegetation types that had been established prior to the building of the Kerr Reservoir.

A slight increase in wetland acreage may be realized if some or all of the 1,560 acres of agricultural land that would potentially be subject to an increased frequency of flooding is converted to conservation land.

No Action: Vegetation changes will continue to shift away from the natural conditions that existed before construction of the dam. This will result in a reduction of forested community diversity in the watershed which will cause the habitat value of this resource to decline. Wetland loss will continue as bank erosion occurs.

3.3.2 FISH AND WILDLIFE

QRR: If this alternative is implemented, the Kerr Reservoir water level would probably be more consistently near the guide curve. The lower and more consistent reservoir levels would benefit fish spawning in the reservoir, especially for sunfishes, that spawn near the shallow shoreline. Reservoir shoreline vegetation would be inundated for shorter durations.

The purpose of this alternative is to more closely mimic unregulated river flows which benefits fish and wildlife resources because they were historically adapted to unregulated conditions. This alternative would also result in the floodplain ecosystem returning to a more natural state as indicated in Section 3.1.3 above. It is estimated that this alternative would result in an increase of 1,976 AAHU (Average Annual Habitat Units). To obtain this estimate, daily-mean discharges at Roanoke Rapids were simulated with the Roanoke River Basin Reservoir Operations Model. Output from the RRBROM on September 7, 2011 served as

the upstream boundary conditions for HEC-RAS developed for the lower Roanoke River Basin by the USGS and modified by ERDC (Wilder et al. 2012a). The flow releases during the spring for anadromous fish would remain the same (Section 3.3.2) so that anadromous fish spawning would not be adversely impacted.

QRR would not affect the upstream or downstream passage of anadromous and catadromous fish at Kerr, Gaston and Roanoke Rapids Dams.

No Action: Continued degradation of habitat would be expected.

3.3.3 ENDANGERED SPECIES

QRR: Even though there are several endangered species in the counties within the Roanoke Basin, the only species that may occur in the Roanoke system that could be affected by a change in operations at Kerr Dam are the endangered Atlantic and shortnose sturgeon. There are no proposed changes in the spring releases indicated in Section 3.3.2, thus the shortnose sturgeon should not be adversely impacted by QRR, especially since QRR would more closely mimic unregulated river flow the rest of the year. However, as indicated in Section 4.2.2, QRR would probably have a marginal improvement in the river DO levels which would benefit sturgeon and other aquatic species. Therefore, QRR should have no effect on protected species.

QRR would reduce the negative impacts to forest diversity caused by prolonged inundation. Reduction of these impacts would provide a benefit to the threatened Northern Long-Eared Bat and the two bats that are a Federal Species of Concern, Rafinesque's bigeared bat and the Southeastern myotis bat.

By letter dated December 11, 2014, the USFWS stated that QRR should improve habitat for several listed species as well as species that are currently being considered for listing. The USFWS letter also stated that implementing QRR would reduce impacts of flood control operations on the system and provide benefits to the system's listed species making QRR consistent with Section 7(a)(1) of the ESA.

No Action: Continued degradation habitat would be expected.

3.4 CULTURAL RESOURCES

QRR: Buggs Island, state site number 44MC491, is a prehistoric archaeological site near the base of Kerr Dam. This site has been determined to be a historic property eligible for nomination to the National Register of Historic Places. Past studies at Buggs Island have documented the location and rate of erosion at site

44MC491. Control points were established in 1997 at the northwest head of the island in 10 locations to monitor erosion. No appreciable erosion was recorded over a 661-day period along the western edge of 44MC491; however, severe erosion was noted at the head of the island (Abbott et al. 2000). A program of periodic monitoring of Buggs Island to document the rate of erosion, as supported by the State Historic Preservation Office (SHPO) (VDHR 2003), is in place**.** The latest monitoring occurred in March of 2012. A comparison of the recent measurements to the 2012 measurements is provided in Table 3.3. Little or no erosion was observed at monitoring points 2, 4, 6, 8, 9, and 10. Erosion monitoring points 1, 3, and 7 represent areas where large trees fell along the bluff.

Erosion Monitor Point #	Azimuth	Distance to Bluff in Meters (1997)	Distance to Bluff in Meters (2012)	Change in Distance to Bluff in Meters From 1997 to 2012
1	285	10.71	6.50	4.21 (13.81 ft)
2	269	10.67	10.45	.22 (.72 ft)
3	300	10.97	7.61	3.36 (11.02 ft)
4	299	9.34	9.34	No Change
5	256	10.98	9.93	1.05 (3.44 ft)
6	270	12.12	11.69	.43 (1.41 ft)
7	270	16.85	14.45	2.40 (7.87 ft)
8	242	11.15	11.15	No Change
9	248	10.18	10.18	No Change
10	262	10.06	10.06	No Change

Table 3.3. Cultural Resources Erosion Monitoring Results (USACE 2012)

The base of the bluff from the head of the island to erosion control monitoring point 10 was inspected for cultural material and signs of erosion. Two weathered, ceramic shards were observed at the base of the bluff near monitoring point 3. No erosion or undercutting attributable to stream flow was observed.

Bluff erosion at 44MC491 appears to be most greatly influenced by slope steepness, sediment type, and vegetation (large trees) along the bluff line. It is possible that root motion associated with tree movement during wind events is a major factor in bluff erosion at the site.

Management practices such as removal of large trees along the bluff, continued monitoring of erosion control points, and observation of the bluff during and after major discharges, should be considered. Should QRR increase erosion at site 44MC491, additional consultation with the SHPO, Advisory Council on Historic Preservation, and interested federally recognized tribes to address mitigation of adverse effects will be required. Mitigation measures could involve data recovery (Phase III archaeological investigation) or erosion protection (e.g. shoreline armoring) along the shoreline where it meets the western edge of the site.

QRR has a small potential to cause erosion at the site, but no adverse effect is expected for historic properties located in the project area downstream of Kerr Dam. Coordination with North Carolina SHPO and Virginia Department of Historic Resources is complete.

No Action: No changes to the existing conditions described above would be expected.

3.5 SOCIO-ECONOMIC RESOURCES

3.5.1 DEMOGRAPHICS

QRR: The floodplain affected by this alternative is largely unpopulated; hence it is not expected to affect the demographics of the area.

No Action: No changes to existing conditions would be expected.

3.5.2 AGRICULTURE AND SILVICULTURE

QRR: This measure would cause an increased probability of a growing season 35,000 cfs discharge to about once every 3.8 years versus once every 16 years under existing conditions. The 35,000 cfs discharge would impact about 1,631 acres of agricultural land. This would lead to additional average annual damages of $234,272 as compared to a No Action (existing) scenario.

The growing season normally starts in March, but May was chosen since replanting after May 1 is generally not practicable due to a reduced yield. The majority of this land is currently planted as cotton and soybeans. It is possible that some of this land would be taken out of agriculture due to the increased risk of flood damages occurring.

There are about 92,000 acres of forest land that could potentially be affected by this alternative. Since QRR has no provision for limiting winter releases to 8,000 cfs below lake elevation 300 ft NGVD 29, the alternative could have an effect on silviculture operations by limiting accessibility to certain logging roads and timber areas during floods more frequently as compared to No Action. However, restoration of a more natural hydrologic regime in these areas could also lead to increased productivity and/or decreased tree mortality in these areas.

No Action: No changes to existing agricultural conditions would be expected. Sustained high flows would continue to result in economic damages during the May to November growing season. Degradation of silviculture habitats would also be expected to continue with higher dollar value trees being replaced by those of lower value.

3.5.3 RECREATION

QRR: If this alternative is implemented, the Kerr Reservoir water level would probably be more consistently near the existing guide curve. The lower and more consistent reservoir levels would benefit the use of recreation features such as boat ramps, swim beaches, and camp sites. QRR may require some modification to public use facilities in an anticipation of the protracted guide curve into the peak recreation season.

During the peak recreation summer season, water levels of 301'-303' occur more frequently under QRR, and water levels at other elevations (both higher and lower) occur less frequently, relative to the Existing scenario. At 302'-303', some amenities are available fewer days (flooded more days) per summer season under the QRR scenario. At 304'+, some amenities are flooded less frequently under the QRR scenario have studied the economic benefits of the QRR water control plan at Kerr Lake compared to the existing operating policy (Dumas, C., P. Schuhmann. 2015). The report finds that by reducing the time that recreation facilities are made unusable by high water levels, the QRR operating policy would increase recreational use of the reservoir, providing an additional $525,000 per year in sales and services in the region and five additional jobs. These are regional economic benefits, which are especially valuable in this low income part of North Carolina and Virginia. In addition to these regional economic benefits, the QRR operating policy would make more of the reservoir's recreational amenities available more of the time to reservoir visitors, resulting in an additional $2,370,000 per year in aggregate recreation value, which is a national net economic benefit of QRR.

On the lower River, shorter duration flood events will result in more hunter days with more than 100,000 acres of floodplain forest land available to hunters on both public and private lands. Anglers would have more quality fishing days. Other activities such as bird watching, hiking, environmental interpretation, photography would not be interrupted as often.

No Action: Flood flows of a long duration (No Action) can interrupt recreational activities. Also, as the downstream habitat continues to degradeboth consumptive and nonconsumptive uses may be adversely affected.

3.6 OTHER RESOURCES

3.6.1 AIR QUALITY AND NOISE

QRR: There will be no construction with this alternative so there will be no construction associated air quality or noise issues. There also will be no noise

issues associated with implementation, but there will be some potential air quality effects. Since this alternative would decrease hydropower generation, that energy would need to be replaced through other sources, such as fossil fuels or coal, which would result in increased greenhouse gas and criteria pollutants (nitrous oxides and sulfur dioxides). A rough estimate of the potential increase in these emissions is shown in Table 3.4. It should be noted that these values were calculated for a regional area encompassing North Carolina, South Carolina, and parts of Virginia (Sub Region Virginia/Carolinas, SRVC), and the values in Table 3.4 are near or less than 2 hundredths of a percent of the total emissions for the SRVC. Emissions shown are for year-round QRR, so QRR as proposed is expected to have even less potential for increased emissions since hydropower generation would be greater. It is not possible to readily determine with any certainty how these increases would affect air quality in the much smaller John H Kerr area and the associated counties.

Greenhouse Gases (tons)			**Criteria Pollutants (tons)**	
Carbon Dioxide (CO_2)	Methane (CH_4)	Nitrogen Oxide (N_2O)	Nitrous Oxides (NO_x)	Sulfur Dioxide (SO_2)
20,106.00	0.46	0.3	25.06	96.43

Table 3.4. Estimated average annual increase in regional emissions of greenhouse gases and criteria pollutants that could potentially result from implementation of the year-round QRR alternative.

No Action: The No Action plan would not result in the need for lost hydropower generation to be replaced by other sources, so there would be no change to current air quality. Likewise, there will be no changes to noise in the project area.

3.6.2 CLIMATE CHANGE

Evaluation of short-term and long-term hydrologic records could discern no trends one way or another, which would indicate potential climate change impacts to riverine flow, peak flows, or volumes. While this may be true now, it is uncertain what the future may hold. A future WCP revision could be initiated if climate change results in significant unanticipated results.

QRR: QRR is expected to have no effect on climate change and climate change would have no effect on QRR.

No Action: No Action would also have no effect on climate change and climate change would have no effect on No Action.

3.6.3 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES (HTRW)

QRR: QRR is expected to have no effect on HTRW and QRR would not result in the production of HTRW.

No Action: No Action would also have no effect on HTRW and would not result in the production of HTRW.

3.6.4 AESTHETICS

QRR: Bank erosion along the reservoir and downstream will likely be reduced leading to less denuded banks and more scenic vistas.

No Action: Bank erosion along the reservoir and downstream will continue at the current rate, which may adversely affect aesthetics in some areas.

3.7 CUMULATIVE IMPACTS

The detailed analysis of cumulative effects is included as Appendix A.

The point of a cumulative impact analysis is to determine if the proposed project, along with other past, present, and reasonably foreseeable projects conducted by the Corps of other parties contribute to more adverse effects on important resources. Examples included changes to hydropower production in the region by the Corps of Engineers, Dominion, Duke and other companies, changes in the basin caused by alterations in business practices by paper mills, changes in land use, water supply withdrawals, etc. Cumulative impacts can be either adverse or beneficial, and this assessment of cumulative impacts will focus on five issues related to the John H. Kerr Dam and Reservoir WCP: water quality, fisheries, bottomland hardwoods, agricultural lands, and hydropower. Cumulative impacts will focus on two different geographic areas. The first area is the Roanoke River watershed from John H. Kerr Dam and Reservoir downstream to where the river enters the Albemarle Sound. The discussion on water quality, fisheries, bottomland hardwoods and agriculture will be restricted to that area since impacts to these resources will not likely be appreciable outside of the watershed.

On the other hand, hydropower impacts will be related to a much larger area since the hydropower losses during flood releases are not likely to be replaced from operations within the Roanoke River watershed. The area selected is the Southeastern Electric Reliability Council sub-region of Virginia/Carolina (SRVC) because the three hydropower facilities affected by the Kerr WCP lie within the

center of this sub-region. This sub-region covers North and South Carolinas and much of Virginia**.**

In summary, there will be some loss in hydropower generation, a resultant slight increase in air emissions due to replacement energy efforts, increased impacts to agriculture and silviculture, but a long-term ecological improvement in the lower river ecosystem.

3.8 RECOMMENDED PLAN (QRR)

The Recommended Plan is expected to produce a cumulatively positive effect on the environment. Cumulative significant adverse effects are not expected. Although there is a slight negative impact to hydropower, the benefits to the 92,000 acres of downstream ecosystem far outweigh the negative impacts.

The proposed QRR operational change will have long-term ecological benefits to the forested ecosystem of the Roanoke River floodplain, by shifting the hydrology of the system closer to a more natural (pre-reservoir) state. Beneficial changes would include a long-term increase in vegetative diversity in the floodplain, with potential associated increases in habitat diversity and wildlife utilization, silvicultural benefits, recreational benefits, reservoir benefits, and agricultural benefits

The only adverse impacts from the recommended alternative are associated with the loss of hydropower generation during flooding operations and its replacement with fossil fuel generation, and the potential for more frequent flooding of agricultural land. However, the loss of hydropower associated with flood releases would not affect the marketed minimum energy and capacity of Kerr Dam. If additional projects that would negatively impact hydropower generation were to be implemented in the Virginia/Carolina service area, there could be a potential for cumulative air quality impacts associated with the increased use of fossil fuels. The USACE is not aware of any such projects currently being planned in this area, and even if such projects were to be implemented, the magnitude and location of air quality impacts would be uncertain. Therefore, concerns about cumulative impacts to air quality would be extremely speculative at this stage.

3.9 EXECUTIVE ORDERS (EO)

3.9.1 EXECUTIVE ORDER (E.O.) 12898, FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (EO 12898).

This EO requires the federal government to achieve environmental justice by identifying and addressing high, adverse and disproportionate effects of its

activities on minority and low-income populations. The EO also states that the impacts of the action would not be disproportionate towards any minority or low-income population. The activity cannot (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color, or national origin. It requires the analysis of information such as the race, national origin, and income level for areas expected to be impacted by environmental actions. It also requires federal agencies to identify the need to ensure the protection of populations relying on subsistence consumption of fish and wildlife, through analysis of information on such consumption patterns, and the communication of associated risks to the public.

The proposed WCP revision (QRR) would provide benefits to the quality of life by improving the natural environment, and would only flood areas currently affected by existing 35,000 cfs releases. No residences or public facilities would be impacted by any proposed actions. Also, the proposed activity would potentially improve any "subsistence consumption of fish and wildlife" by enhancing ecosystem features downstream of Roanoke Rapids Dam. In public outreach efforts to date, no potential environmental justice issues have been identified. Also appropriate demographic information related to environmental justice was indicated in Section 2.5.1. Therefore the proposed WCP revision complies with EO 12898.

3.9.2 PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL QUALITY (EO 11514)

The Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals.

According to the Environmental Benefits Analysis performed for the floodplain forest, the habitat value of this resource will continue to decline over the next 50 years if releases from Kerr Reservoir are not changed. Environmental quality will be enhanced therefore; the proposed WCP revision complies with Executive Order 11514/11991.

3.9.3 PROTECTION AND ENHANCEMENT OF THE CULTURAL ENVIRONMENT (EO 11593)

The Federal Government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Federal agencies shall administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people, and, in consultation with the Advisory Council on Historic

Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural or archaeological significance. The proposed WCP revision would have no impact on historic resources and therefore complies with Executive Order 11593.

3.9.4 FLOODPLAIN MANAGEMENT (EO 11988)

Executive Order 11988 requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."

By altering the existing hydrology so that it is closer to that of an unregulated system, this project would lead to a beneficial change in the composition of the floodplain, particularly in about 92,000 forested acres. Vegetation composition in these areas will slowly shift back towards what had been established prior to the building of the Kerr Reservoir. With the recommended plan, the ability to get back to the guide curve quicker restores flood storage capacity sooner than the no action alternative. The proposed WCP revision complies with Executive Order 11988.

3.9.5 PROTECTION OF WETLANDS (EO 11990)

Executive Order 11990 directs all Federal agencies to issue or amend existing procedures to ensure consideration of wetlands protection in decision making and to ensure the evaluation of the potential effects of any new construction proposed in a wetland. The proposed action would not require filling any wetlands and would not be expected to produce significant changes in hydrology or salinity affecting wetlands.

It is estimated that the entire 92,000 acres of floodplain forest along the lower Roanoke River are affected by altered hydrology due to current flood risk management operations at the Kerr Reservoir (TNC 2008). During flood operations, certain portions of the forest can be inundated for extended periods during the growing season, and other areas are flooding less than they would under a natural hydrologic regime. The overall effect is a reduction in forested community diversity in the watershed. According to the Environmental Benefits Analysis performed for the floodplain forest, the habitat value of this resource will continue to decline over the next 50 years if releases from Kerr Reservoir are not changed. The proposed WCP revision complies with Executive Order 11990.

4 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

In addition to the indicated public involvement, the National Environmental Policy Act of 1969, as amended (NEPA), requires consideration of the environmental impacts for major federal actions. The purpose of the EA for this project is to ensure the environmental consequences of the proposed action are considered and that environmental and project information are available to the public.

This EA was be prepared in accordance with NEPA of 1969, the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) parts 1500-1508), U.S. Army Corps of Engineers Department of the Army procedures for implementing NEPA (33 CFR parts 230), and Engineering Regulation (ER) 200-2-2.

The EA has undergone the normal NEPA review period.

The WCP revision (QRR) has been coordinated with the US Fish and Wildlife Service and NMFS regarding consultation under Section 7 of the under the Endangered Species Act and coordination will continue throughout the NEPA process. A US Fish and Wildlife Service Fish and Wildlife Coordination Act Report is not required, since the proposed action involves an operational change, only.

The proposed project does not require a Section 404(b) analysis since it involves no discharge of dredged or fill material.

4.1 MONITORING

The Corps is not proposing any monitoring because the ecological changes would be gradual and hard to measure, especially if flooding events are infrequent as they have been since 2003.

Table 4.1 lists the compliance status of the major Federal Laws, policies and Executive Orders that were applicable or considered for the project. Upon completion of the NEPA process, the proposed WCP revision will be “in compliance” with all requirements.

One Federal Law is listed as “not applicable” but is included here since it is frequently included in USACE projects. This is the Magnuson Fishery Conservation and Management Act – Essential Fish Habitat (EFH). Even though this project is near the coast, this law is not applicable because no EFH species exist in the Roanoke River.

Table 4.1. The relationship of the proposed action to Federal Laws and Policies.

Title of Public Law	US CODE	Compliance Status
Abandoned Shipwreck Act of 1987	43 USC 2101	Compliant
Anadromous Fish Conservation Act of 1965, As Amended	16 USC 757 a et seq.	Compliant
Antiquities Act of 1906, As Amended	16 USC 431	Compliant
Archeological and Historic Preservation Act of 1974, As Amended	16 USC 469	Compliant
Archeological Resources Protection Act of 1979, As Amended	16 USC 470	Compliant
Clean Air Act of 1972, As Amended	42 USC 7401 et seq.	Compliant
Clean Water Act of 1972, As Amended	33 USC 1251 et seq.	Compliant
Coastal Zone Management Act of 1972, As Amended	16 USC 1451 et seq.	Compliant
Endangered Species Act of 1973	16 USC 1531	Compliant
Estuary Program Act of 1968	16 USC 1221 et seq.	Compliant
Equal Opportunity	42 USC 2000d	Compliant
Farmland Protection Policy Act	7 USC 4201 et seq.	Compliant
Fish and Wildlife Coordination Act of 1958, As Amended	16 USC 661	Compliant
Historic and Archeological Data Preservation	16 USC 469	Compliant
Historic Sites Act of 1935	16 USC 461	Compliant
Magnuson Fishery Conservation and Management Act – Essential Fish Habitat	16 USC 1801	Not Applicable
National Environmental Policy Act of 1969, As Amended	42 USC 4321 et seq.	Compliant
National Historic Preservation Act of 1966, As Amended	16 USC 470	Compliant
National Historic Preservation Act Amendments of 1980	16 USC 469a	Compliant
Native American Religious Freedom Act of 1978	42 USC 1996	Compliant
Executive Orders		
Protection and Enhancement of Environmental Quality	11514/11991	Compliant
Protection and Enhancement of the Cultural Environment	11593	Compliant
Floodplain Management	11988	Compliant
Protection of Wetlands	11990	Compliant
Federal Actions to Address Environmental Justice and Minority and Low-Income Populations	12898	Compliant

5 AGENCY AND PUBLIC INVOLVEMENT

As established by USACE Regulation 1105-2-100, Planning Guidance Notebook, the feasibility study will document substantial active involvement by interested government and non-governmental agencies and organizations. The goal of public involvement is to obtain information and views of those with an interest in the study, so that their comments and concerns receive full consideration in the planning process. All the information gathered from the actions indicated below has been and will be used as a part of the planning process.

A scoping process was developed to obtain input from those individuals and groups affected by the operation of the John H. Kerr Dam and Reservoir. A scoping letter was prepared and coordinated with the States. The letter was mailed on March 13, 2000, to known parties with an interest in the operational aspects of the John H. Kerr Dam and Reservoir and the lower Roanoke River Basin. The recipients included municipalities, counties, State and Federal agencies, environmental and business organizations, and elected officials. The letter requested written comments to help in the identification of significant water resource issues and concerns relative to John H. Kerr Dam and Reservoir and the lower Roanoke River Basin. The comment period ended April 28, 2000.

In addition to the letter, three public informational meetings were held at the following locations and dates:

Roanoke Rapids, NC April 4, 2000
Clarksville, VA April 5, 2000
Williamston, NC April 6, 2000

These meetings were open to the public and served as an additional means to gather comments from the public as a part of the scoping process. A wide range of interested parties attended these meetings. Concerns associated with the operation of John H. Kerr Dam and Reservoir were identified based on comments received from the public. These concerns were then grouped into 11 general categories of concern, which then became the basis for the formation of 11 work groups indicated below. These work groups consisted of subject matter experts from federal and state agencies (including the USACE and the sponsors), non-profit organizations, and businesses.

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 – has been combined with the water quality group
7. Diadromous Fish and Downstream Riverine Aquatic Resources
8. Water Supply
9. Operating Policies and Administrative Procedures

10. Modeling Oversight
11. Hydropower

These workgroups were critical to the study process and assisted in the identification of problems and opportunities, data needs, and potential alternatives and their impacts. These work groups have met individually and collectively several times a year since 2003.

Each of the federal and state agencies indicated below was involved in at least one of the workgroups listed above. A summary of the specific input received from each agency follows. All input has been addressed in the draft report.

National Marine Fisheries Service (NMFS). This agency's major concerns were for potential impacts of changes in operational releases on anadromous fish; therefore, no changes are proposed to the releases during the spring. Also NMFS indicated that the Corps needs to comply with the Endangered Species Act for the endangered Atlantic and shortnose sturgeon. The Corps will comply with the Endangered Species Act.

Southeastern Power Administration (SEPA). SEPA's was concerned about the impact the potential operational changes may have on hydropower production. As such SEPA was extensively involved related to input and review of the Hydropower Design Center's analysis which is in Appendix O.

US Geological Survey. USGS's primary input was the water quality modeling for the lower Roanoke River related to existing operations and potential release alternatives. Their comments related to recommending specific models (EFDC and WASP), and the PDT agreed to these recommendations.

US Fish and Wildlife Service (USFWS). The USFWS has provided input for the Kerr 216 study since inception. However, a Fish and Wildlife Coordination Act Report is not required for this project since it will only involve operational changes. In summary, their input involved five areas that correspond to the initial 5 project objectives: 1) lessen the duration of flood releases on the lower Roanoke River bottomland hardwoods and the associated adverse impacts on the ecosystem, 2) improve DO levels in the floodplain and river following long-term flood events, 3) improve DO levels for the 6 miles below John H. Kerr Dam, 4) reduce mass wasting and erosion rates downstream of Roanoke Rapids Dam, and 5) improve connectivity in the river to help the restoration of the American shad and American eel populations. USFWS also provided significant review and input related to USGS modeling effort.

NC Department of Agriculture (NCDA). This agency was concerned about potential impacts of a change in release operations on the agricultural lands along the lower Roanoke River. NCDA helped arrange meetings to obtain input from the farming communities.

NC Division of Forest Resources (NCDFR). NCDFR was concerned about existing and potential impacts of a change in release operations on the forestry lands along the lower Roanoke River.

NC Division of Marine Fisheries (NCDMF). NCDMF input was similar to NMFS.

NC Division of Natural Resources and Conservation (NCDNRC). This agency provided documentation of important and unique habitat areas in the NC that could be affected by potential alternatives.

NC Division of Parks and Recreation (NCDPR). NCPDR provided data on state recreation areas around Kerr Reservoir and the impacts of fluctuating reservoir water levels.

NC Division of Water Quality (NCDWQ). NCDWQ provided significant review and input related to the USGS modeling effort.

NC Division of Water Resources. The State of North Carolina is one of the two non-federal sponsors for the Kerr 216 study, and the NC Division of Water Resources is the POC agency for North Carolina. This agency's major concerns have been project cost sharing, land use changes in the lower Roanoke River, and modeling of operational alternatives involving changes in releases to the lower Roanoke River.

NC Wildlife Resources Commission (NCWRC). NCWRC provided information on the impacts on fisheries due to fluctuating reservoir water levels and due to flood releases in the lower Roanoke River. Also NCWRC provided extensive assistance to the Corps in collecting data for the HEP modeling below Kerr Dam and collecting DO data used in evaluation of options to improve DO concentration below Kerr Dam.

VA Department of Conservation and Recreation (VADCR). VADCR provided data on state recreation areas around Kerr Reservoir and the impacts of fluctuating reservoir water levels.

VA Department of Environmental Quality. The Commonwealth of Virginia is one of the two non-federal sponsors for the Kerr 216 study, and VA Department of Environmental Quality is the POC agency for Virginia. This agency's major concerns have been project cost sharing and improved water quality in the 6 miles below John H. Kerr Dam.

VA Department of Game and Inland Fisheries (VADGIF). This agency provided information on the impacts on fisheries due to fluctuating reservoir water levels and impacts of low DO concentrations below Kerr Dam. VADGIF provided extensive assistance to the Corps in collecting data for the HEP modeling below

Kerr Dam and collecting DO data used in evaluation of options to improve DO concentration below Kerr Dam.

Finally, in addition to the above, public coordination was also conducted regarding a proposed deviation to the John H. Kerr guide curve and release schedule at Roanoke rapids dam (measure 6B described in Section 3.3.1, and Appendix G). Four public informational meetings on the topic were held at the following locations and dates:

Williamston, NC May 12, 2008
Halifax, NC May 13, 2008
Kerr Resource Management Center, VA May 14, 2008
Williamston, NC August 28, 2008

Information was obtained in writing from the participants both during and after the meetings. All the information gathered from the public involvement actions described above has and will continue to be used as a part of the planning process for this study.

In addition, a letter dated December 11, 2011 was addressed to all federally recognized tribes to identify any issues of importance to the tribes. Comments were requested within 30 days of the date of that letter and no responses have were received.

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http://portal.ncdenr.org/web/wq/ps/csu

Appendix A

Kerr Water Control Plan Update October 2015

NOTE: This version of the Water Control Plan is the original version that was submitted as part of the Environmental Assessment for public review.

The final version of the Water Control Plan for John H. Kerr Dam and Reservoir, that incorporates revisions resulting from the public review process, can be found at the following link:

http://www.saw.usace.army.mil/Portals/59/docs/ecosystem_restoration/JHK_WCP_FINAL

DRAFT

WATER CONTROL PLAN FOR JOHN H. KERR DAM AND RESERVOIR

A. INTRODUCTION

The water control plan for John H. Kerr Dam and Reservoir describes the proper operation of the project during floods as well as for hydropower generation, low flow regulation, and other project purposes. This plan is an updated extract from the Reservoir Regulation Manual for Kerr Reservoir, Appendix A of the Roanoke River Basin Reservoir Regulation Manual.

B. OBJECTIVES OF RESERVOIR REGULATION

1. **General**. The authorized purposes and operating objectives for John H. Kerr Reservoir are listed below:

a. Flood control
b. Hydroelectric power
c. Low flow augmentation
d. Fish and wildlife
e. Water Supply
f. Recreation

Storage in Kerr Reservoir is comprised of a controlled flood storage pool for storage of floodwaters and a conservation pool that provides water for hydropower generation and other project purposes. The elevations and storage capacities for these pools are shown below. More detailed elevation and capacity data are available in the Pertinent Data Section of the Kerr Reservoir Regulation Manual referenced in Section A.

	Elevation (ft-NGVD29)1	Storage Capacity (acre-feet)
Controlled Flood Storage Pool	300-320	1,281,400
Conservation Pool	268-300	1,027,000

The boundary between the conservation and controlled flood storage pools remains static at elevation 300 ft-NGVD29; however, the operational guide curve varies seasonally to better support all operational objectives of the project. For instance, the guide curve in the winter drops into the conservation pool to elevation 295.5 ft-NGVD29 to provide additional flood storage capacity, while still providing sufficient storage in the conservation pool to support minimum energy commitments during droughts. In the spring, the guide curve extends into the flood pool to elevation 302 ft-NGVD29 to

1 All elevations in this Water Control Plan are referenced to NGVD29 vertical datum. The conversion to NAVD88 is -1.02 ft (e.g., elevation 300 ft-NGVD29 converts to elevation 298.98 ft-NAVD88).

provide supplementary storage in the reservoir to be utilized to support striped bass spawning releases downstream of the project (discussed in Section F.1). During the summer, the guide curve drops to the normal summer pool elevation of 299.5 ft-NGVD29, which provides sufficient storage to support increased minimum energy commitments during the summer, while having the added benefit of optimizing recreational opportunities. The controlled flood storage and conservation pools, as well as the guide curve, are depicted in Plate 1. Additional discussion of the operations with respect to the guide curve is provided throughout this water control plan.

Dominion owns and operates two hydropower projects located in series directly downstream of Kerr (Gaston below Kerr and Roanoke Rapids below Gaston). The extent to which Kerr operates as a system with Dominion's downstream projects for each operational objective is described in detail later in subsequent sections of this water control plan. (Plate A-1 and Appendix D of the Roanoke River Basin Reservoir Regulation Manual provide the geographic layout and operational descriptions of the Gaston and Roanoke Rapids Projects.)

2. **Reservoir operation for flood control**. The primary objective of the project is flood control, with a dedicated flood storage pool between elevations 300 and 320 ft-NGVD29 reserved exclusively for the detention storage of flood waters. In addition, a lower winter guide curve elevation allows the reservoir to be drawn down to elevation 295.5 ft-NGVD29, which provides additional flood control benefits.

The objective of flood control operation is to reduce flood risk along the Roanoke River below Kerr Dam. Flood waters temporarily stored in the reservoir will be released at the maximum rate possible without causing significantly damaging stages downstream. (See Kerr Reservoir Regulation Manual for more detailed information concerning flood damages for downstream interests and locations, including procedures for estimating flood damages with and without project operations.) Higher releases will be made only when forecasts of inflow indicate such releases are necessary to prevent a reservoir rise above elevation 320 ft-NGVD29. Details of flood operation are described in Section C.

3. **Reservoir operation for power**. The Kerr Hydroelectric Power Plant operates as a peaking plant, meaning most of the energy produced will be generated during hours of peak customer demand. When the headwater elevation is at or below guide curve elevation, the project will be operated to the greatest extent possible to meet minimum energy requirements and maintain dependable capacity. When releases in excess of minimum generation are necessary for flood flows or other project purposes, those releases will be made by power generation to the fullest extent possible to maximize hydropower value.

The Corps of Engineers will operate the Kerr Power Plant and deliver the entire output thereof (less the power and energy required in the operation of the project) to Dominion on its 115-kv lines in the Kerr station switchyard. The power operation is subject to such regulations concerning the maximum and minimum release of water from the reservoir

for flood control and flow regulation as may be established by the Wilmington District. Details of reservoir operation for power generation are described in Section D.

4. **Operation for low flow augmentation**. Kerr Reservoir is no longer specifically operated for low flow augmentation, since low flow requirements are now being met by Dominion, which owns and operates Gaston and Roanoke Rapids hydroelectric power projects immediately downstream of Kerr Dam. In accordance with their Federal Energy Regulatory Commission (FERC) license (No. 2009-18) for the Gaston-Roanoke Rapids power project, Dominion will release water from the Roanoke Rapids Dam to meet target flows for maintenance of proper quantity and quality of water in the lower Roanoke River. However, weekly releases from Kerr to meet Kerr's minimum energy requirements are generally more than adequate to sustain the FERC minimum release requirements from the Roanoke Rapids project. Details of these FERC flow requirements related to Kerr operations are included in Section E.

5. **Operation for fish and wildlife**. Additional flows from Roanoke Rapids Dam that are required during the striped bass spawning season are made possible by releasing additional water from Kerr Reservoir. These flows are reregulated by the Roanoke Rapids Dam. These spawning flows place an additional demand on the storage available at Kerr. At present, the additional flows for the striped bass are provided by storing water in the flood control pool during the spring of the year, before and during the striped bass spawning season. Details of the requirements and the means by which the project meets these requirements are included in Section F.

6. **Operation for water supply**. Normally, there are no special reservoir operations required for water supply withdrawals. Local interests that have contracted for water supply storage in a percentage of Kerr's conservation pool shall have the right to utilize water from Kerr to the extent that their storage will provide. Several water supply contracts to utilize storage in Kerr Reservoir are in effect. Details of these water supply contracts are discussed in Section G.

7. **Operation for recreation**. The project will be operated for recreation in the reservoir to the maximum extent possible without serious interference with the purposes of flood control and hydropower generation. Operation in accordance with the established guide curve and rules of operation provides a full or nearly full pool during the main recreation season in all but extremely dry years. Refer to Section H for additional information.

8. **Mosquito-control operations**. Kerr mosquito-control operations will be performed in accordance with ER 1130-2-413, Pest Control Program for Civil Works Projects. Corps of Engineers' policy is to respond whenever an authorized public health agency declares an emergency health hazard. It is against policy to participate in general pest/mosquito control programs to eliminate nuisance pests. Nuisance pest/mosquito control will only be performed on lands adjacent to Corps-managed public recreation facilities, operation and maintenance areas. Water level management will include,

whenever consistent with other purposes, a gradual drawdown of the conservation pool during the hot summer months. Refer to Section I for additional information.

C. OPERATION FOR FLOOD CONTROL

1. **Method of operation.** The method of operation planned for Kerr Reservoir is generally designed to make maximum beneficial use of available storage in each flood event. Whenever the reservoir level rises into the flood storage pool (above elevation 300 ft-NGVD29) or whenever a rise into the flood storage pool is assured, the release will be such as to regulate the flow at the Roanoke Rapids gage as follows:

Table 1. Planned Flood Releases

Reservoir Elevation (ft-NGVD29)	Flood Release (cubic feet per second)
300-320	Inflow up to 35,000
320-321	85% of inflow
321	Inflow

For reservoir levels below elevation 320 ft-NGVD29, planned flood releases will generally be based on weekly average inflows following a flood event. If weekly average inflows exceed 35,000 cubic feet per second (cfs) following a flood event, planned flood releases at Roanoke Rapids dam will be limited to 35,000 cfs unless reservoir levels are assured of exceeding elevation 320 ft-NGVD29. In addition, some allowance (typically 1000-2000 cfs) will generally be made to allow for additional flood releases from Roanoke Rapids dam to handle runoff (i.e., flood releases from Kerr would be limited to 33,000 to 34,000 cfs).

Flood release decisions are typically made on a weekly basis in concert with our energy declaration procedures; however, flood releases and corresponding energy declarations can be revised as necessary throughout the week. Section D below gives more detail regarding the operation of Kerr for power generation.

2. **Regulation within the upper conservation pool range**. The reservoir guide curve varies seasonally, being only a half-foot below the bottom of the flood storage pool in the summer but as much as 4.5 feet below in the winter. Whenever the reservoir level is in this upper conservation pool range between the bottom of the flood storage pool elevation (300 ft-NGVD29) and the guide curve elevation, this storage space will also be evacuated using releases up to 35,000 cfs at Roanoke Rapids dam based on weekly average inflows into Kerr Reservoir, consistent with the flood operations described above. While releases up to 35,000 cfs are possible, planned releases in this range of lake levels will be contingent on inflows and proximity to guide curve to ensure that lake level is not drawn down below guide curve.

3. **Control point for reservoir releases**. The control point for releases from the reservoir is at the Roanoke Rapids, NC, stream gage located about 3 miles downstream of Roanoke Rapids Dam, which is also a National Weather Service flooding forecast location for Roanoke Rapids and other downstream communities along this portion of the river. The local watershed between Kerr Dam and Roanoke Rapids contains about 645 square miles and contributes a significant amount of flow to the Roanoke River. A portion of this flow will be stored in the 3 feet of flood storage provided in Lake Gaston and in the conservation pool at Roanoke Rapids Lake. Below the Roanoke Rapids gage the watershed is narrow and runoff reaches the river in a few hours. Coordinating releases from Kerr with the streamflow originating in this area is impractical because the time of travel from the dam is about 3 days.

In the event that flood storage is utilized at Lake Gaston, the releases from Kerr will take into account any planned releases to empty the flood storage in Lake Gaston; however, it should not be necessary to reduce generation of on-peak energy at Kerr to accommodate flood storage releases from Lake Gaston.

The discharge at the Roanoke Rapids gage will be permitted to exceed 35,000 cfs only when necessary to prevent filling Kerr Reservoir above elevation 320 ft-NGVD29. Forecasts of inflow will be periodically revised as updated streamflow and rainfall data become available, and the desired outflow adjusted if necessary. The object of this operation will be to obtain a maximum reduction in flood crests while utilizing all the available storage up to elevation 320 ft-NGVD29 in Kerr Reservoir.

4. **Emptying operation**. In the event that a discharge greater than 35,000 cfs is established in controlling a flood in accordance with Table 1, the reservoir will be operated so as to maintain that established maximum discharge until the reservoir falls to elevation 315 ft-NGVD29, providing enough flood control storage to hold one inch of additional runoff from the drainage area above Kerr Dam. Upon reaching elevation 315 ft-NGVD29, that maximum discharge would then be reduced to 35,000 cfs until the reservoir level is near guide curve. If a maximum discharge above 35,000 cfs is not warranted in accordance with Table 1 for a flood event, that maximum discharge will be maintained until the reservoir level is near guide curve. In all cases, discharges will be reduced toward the end of flood operations as needed to adhere to the Betterment Plan when applicable (see Section C.10) and/or to ensure that the lake level is not drawn down below guide curve.

5. **Surcharge storage**. Deliberate use of surcharge storage was not anticipated in the design of Kerr Dam or the gate operating machinery, or in the land acquisition program for the reservoir. The following features of the project, as constructed, limit the use of surcharge storage:

a. From Kerr Dam upstream to Clarksville, VA, the land has been acquired only to about elevation 320 ft-NGVD29; however, flooding of this land above elevation 320 ft-NGVD29 would not be expected to cause serious damage.

b. The motors for the water supply and sewage pumps for Clarksville and others are located slightly above elevation 320 ft-NGVD29 (approximately elevation 323 ft-NGVD29).

c. Primary highways and railroads have been raised or relocated so that low steel is at elevation 325 ft-NGVD29 or above.

d. There is no freeboard on the top of the spillway gates, which are at elevation 320 ft-NGVD29 when fully closed.

e. The gate operating indicators and machinery are at about elevation 323 ft-NGVD29, and the base of the motors is at about elevation 325 ft-NGVD29. Thus a rise of the reservoir above elevation 323 ft-NGVD29 before the gates are fully open could make gate operation hazardous with the further possibility that wave action might immobilize the motors and make further opening of the gates impossible.

However, surcharge storage will be used to a limited extent by discharging 85 percent of inflow whenever a rising reservoir is between elevation 320 and 321 ft-NGVD29. Inflow used as a basis for determination of discharge required shall be actual inflow in emergency operation and a forecast maximum inflow in normal operation. Rise above elevation 321 ft-NGVD29 will be resisted by discharging 100 percent of inflow. Safety considerations dictate that all spillway gates should be fully open before there is any possibility that they might be immobilized by a reservoir elevation higher than 321 ft-NGVD29.

6. **Spillway gate regulation schedules**. Generally, releases directed by Wilmington District Water Management (Water Management) will be based on inflow and lake level forecasts. A gate regulation schedule has also been developed in accordance with EM 1110-2-3600 which will enable Water Management to make a quick determination of the required release. (The Spillway Gate Regulation Schedule is provided in Plates A-34 and A-35 of the Kerr Reservoir Regulation Manual.) This schedule may also be used by the damtender as an emergency operation tool in the event that communication with Water Management fails and the only data known to the damtender is that available at the dam.

The minimum outflow required to prevent a reservoir rise above elevation 320 ft-NGVD29 for any given inflow and reservoir elevation can be determined from this schedule. The inflow to the reservoir at any time can be determined by either (1) discharge data recorded at Paces, Randolph, and Halifax, VA stream gages plus the local discharge as computed by the unit hydrograph, or (2) by the change in reservoir storage and the prevailing outflow at the dam. Determinations by each method will be made by Water Management and checked against the other as appropriate. Hourly inflow computations are available from the SCADA (supervisory control and data acquisition) system at the powerhouse. These computations will be made manually by powerhouse personnel on form SAW-35 (provided in the Kerr Reservoir Regulation Manual) when necessary.

7. **Emergency operation and instructions to Kerr powerhouse operators**. If communication between Kerr Dam and Water Management personnel is not possible during a flood event, the dam and powerhouse operators will regulate the reservoir in accordance with the emergency procedures and specific instructions as stated in the "John H. Kerr Dam Emergency Operation for Flood Control" manual (issued separately from this water control plan).

The emergency procedure is adequate to ensure a safe, reasonably efficient operation of the reservoir throughout the flood by trained powerhouse personnel. Extended failure of communication is unlikely. However, should communications fail during a major flood, one or more persons from Water Management could be sent to the project within a few hours to direct reservoir releases.

In the event that there is potential for uncontrolled releases or dam failure, the Emergency Action Plan (EAP) should be implemented. The EAP is updated annually and can be found in the Water Management, Readiness Contingency Operations, and Geotechnical Sections of the District Office and at the Kerr powerhouse.

8. **Rate of change of discharge**. Discharge from Kerr Dam flows directly into Lake Gaston. Since there is no open river flow between the projects, no limit is set on the rate of change of discharge because of downstream effects. Dominion will be notified when water is to be spilled and when a substantial change is to be made in the rate of spill.

9. **Reregulation of Kerr flood releases by Gaston and Roanoke Rapids Dams**. Flood releases from Kerr and Gaston Dams can be made by operating the turbines at a discharge rate up to approximately 40,000 cfs. Reregulation of turbine releases from Kerr to the specified uniform flood release rate is done at Roanoke Rapids Dam. Since sufficient storage space for this reregulation is not normally available in Roanoke Rapids Lake, it must be made available at the beginning of each flood period. Depending on conditions at Roanoke Rapids Lake, this can be done by Dominion by establishing the flood release at Roanoke Rapids for a half-day or so prior to starting the higher releases at Kerr and Gaston if needed. If the planned flood flow at the Roanoke Rapids gage is more than 20,000 cfs, the Roanoke Rapids turbines are fully loaded (20,000 cfs) and the remainder of the specified flow is spilled. Water Management determines the starting time and release rate for flood releases from Roanoke Rapids.

10. **Mitigation of hypoxic swamp water drainage into main stem of lower Roanoke River during summer months**. In the 1990s, as a result of fish kills and critically low dissolved oxygen along the main stem of the lower Roanoke River following the termination of summer flood operations, a multi-agency group developed a plan (referred to as the Betterment Plan) to mitigate these effects. The Betterment Plan is designed to lessen the negative impact of hypoxic swamp water draining into the main stem of the lower Roanoke River during the transition from flood control operation to normal hydropower peaking operations. The plan is based on the assumption that a prolonged step-down decrease in releases from the Roanoke Rapids dam will slow the rate of drainage from the lower Roanoke River swamp lands and provide higher mainstem river

flow with high DO level to counteract the effect of the low DO level swamp water. Since implementation of this plan in 1998, it has been effective in avoiding any significant fish kills following protracted, hot weather releases.

The Betterment Plan assumes the following conditions exist on the lower Roanoke River:

a. Kerr Reservoir is being operated in flood control mode which has resulted in the flooding of the lower Roanoke River swamp lands.

b. Daytime temperatures greater than 90 degrees F have occurred during the period that the swamp lands have been flooded.

If the above conditions exist or have existed, the Betterment plan will be implemented as follows:

a. During the week prior to the planned termination of flood operation, determine if hypoxic conditions (DO levels< 3mg/l) exist in the lower Roanoke River swamp waters based on consultation with Dominion biologists and state and federal fishery and water quality resource agencies.

b. If hypoxic conditions exist in lower Roanoke River swamp waters, retain adequate flood storage in Kerr Reservoir for a step-down flow regime as described below in section (c).

c. Initiate the following step-down flow regime from Roanoke Rapids dam (if flow at the 20,000 cfs level has already existed for 4 days, proceed to the next level).

Approximate Target Flow	Duration
20,000 cfs	4 days
15,000 cfs	4 days
10,000 cfs	3 days
5,000 cfs	3 days

D. **OPERATION FOR POWER GENERATION**

1. **General**. While Kerr Reservoir has been constructed primarily to provide flood control, it is also intended that the greatest possible amount of the water released will be used for power generation, regardless of whether those releases are for flood control or other purposes (such as spawning releases).

Power plant facilities at Kerr include 7 units having a total operating capacity of 267 megawatts (MW) and a dependable capacity of 225 MW, with a minimum dependable capacity pool elevation of 293 ft-NGVD29. Daily/hourly generation scheduling at Kerr is normally set by Dominion in coordination with generation at their Gaston and Roanoke

Rapids projects, taking into account federal power customer schedules as coordinated by Southeastern Power Administration (SEPA), the Corps-declared weekly energy totals for Kerr (including any Corps-directed flood or spawning releases), and Dominion's FERC license requirements.

The guide curve and generation requirements will be used as the basis for power generation at the plant. The guide curve represents the lower limit of reservoir level throughout the year that provides sufficient storage to support contractual minimum energy commitments during a repeat of any drought in the period of available record. Section D.2, below, provides additional information on contractual minimum energy requirements. The reservoir guide curve is shown on Plate 1.

2. **Energy Generation Requirements.** Whenever Kerr Reservoir level is at or below the guide curve, the power plant will be operated to produce only the minimum energy required to guarantee dependable capacity. When the power plant is not in operation to meet customer load, only water required to generate energy for station use will be released. Such an operation will ensure that dependable power (energy and capacity) can be supplied during a repeat of any drought on record. Minimum weekly energy requirements for Kerr per current SEPA contracts are shown below in Table 2:

Table 2. Minimum Weekly Energy Contract Amounts for John H. Kerr

Month	John H. Kerr Effective 1 January 1997		
	Dominion (MWH/week)	Duke Energy Progress (MWH/week)	Total (MWH/week)
JAN	1550	1450	3000
FEB	1370	975	2345
MAR	1275	975	2250
APR	1275	975	2250
MAY	1275	975	2250
JUN	1900	975	2875
JUL	1910	1470	3380
AUG	1910	1470	3380
SEP	1900	1470	3370
OCT	1275	975	2250
NOV	1275	975	2250
DEC	1550	1450	3000

When an energy declaration week (Saturday through Friday) falls within two months, use minimum energy for the month that includes Wednesday.

Kerr project power will be marketed in accordance with the SEPA contracts with Dominion and Duke Energy Progress. Power generated at Kerr, in excess of that used at the dam and at Island Creek Pumping Station, is made available for sale by Southeastern Power Administration (SEPA), the marketing agency of the Department of Energy.

SEPA has a contract with Dominion which provides for taking all of the project power from Kerr. Minimum energy and any excess (secondary) energy resulting from flood operations or spawning releases shall be distributed as follows:

a. Fifty-eight percent (58%) or 130 megawatts (MW) of dependable capacity at Kerr Dam and two-thirds of the excess (secondary) project power is to be used by Dominion and preference customers in the area served by Dominion.

b. The remaining 95 MW (42%) dependable capacity and one-third of the excess (secondary) project power is provided for transmission by Dominion from Kerr switchyard to Duke Energy Progress for use by Duke Energy Progress and preference customers in the area served by Duke Energy Progress (also per contract with SEPA).

c. Provision is made for interchange of energy between Philpott and Kerr projects.

3. **Mechanics of project operation for power**. On Wednesday of each week, Water Management personnel prepare an energy declaration for the upcoming Saturday-through-Friday energy week. The total amount of energy (minimum plus secondary) declared for the upcoming week is based on the release required to meet the operational objectives of Kerr. These releases consider recent and expected inflows (usually without additional rainfall), lake levels, minimum energy requirements, and necessary releases for flood operations or spawning flows. Other considerations include any necessary limitations on discharges (e.g., allowance for local inflows into Gaston and Roanoke Rapids projects) and Dominion's energy storage account balance. The energy declaration is emailed to SEPA and is also posted on Water Management's website. SEPA provides the power customers' schedule for the declared energy amount to Dominion, which Dominion uses to schedule generation at Kerr in coordination with its operations at Gaston and Roanoke Rapids projects. Dominion then provides the following day's schedule to Kerr powerhouse and Water Management personnel each day. Water Management also coordinates the declaration with Dominion personnel during flood operations to ensure the proper flow from Roanoke Rapids.

Energy declarations may be revised at any time. Generally, revisions can be implemented in 2 business days (i.e., a revision submitted to SEPA on Monday would be incorporated into the Wednesday through Friday schedule); however, an urgent revision can possibly be implemented the following day if necessary.

E. OPERATION FOR LOW FLOW AUGMENTATION

As previously indicated, minimum downstream flows are now maintained by Dominion's Roanoke Rapids Dam per its FERC license requirements, with Kerr's minimum energy requirements generally being more than adequate to sustain those license requirements. Those target flow and minimum flow requirements are intended to protect the water

quality standards and enhance the biological integrity of the Roanoke River downstream of the dam. Table 3 (Table FL2-1 from Article FL2 of Dominion's FERC License 2009-018) summarizes those release requirements from Roanoke Rapids Dam.

Table 3. Minimum and Target Flow Releases from Roanoke Rapids Dam (Table FL2-1)

Timeframe	Condition	Minimum Flow
Jan. 1 – 15	Declaration < 6000 cfs	2000 cfs
	Declaration >= 6000 cfs	2500 cfs
Jan. 15 – Feb. 28/29	Declaration < 6000 cfs	2500 cfs
	Declaration >= 6000 cfs	3000 cfs
March	Declaration <= 3500 cfs	Minimum flow = declaration
	Declaration > 3500 cfs	Minimum flow = 3500 for peaking days
		5 peaking days during month
		3 peaking day limit per week
		3 consecutive peaking day limit
		Can only peak in two of the weeks
	Ramp up	Ramp up from min. by 5000 cfs, hold for one hour then go to full load
	Ramp down	Ramp down to min. flow + 5000 cfs, hold for one hour then go to minimum flow
April 1 – June 15	All conditions	Flow = mean of weekly declaration, no peaking
	Ramp	Change from one to next weekly declaration cannot exceed 5000 cfs per hour
June 16 – June 30	All conditions	2800 cfs
July 1 – Sep. 15	All conditions	2000 cfs
Sept. 16 – Nov. 15	All conditions	1500 cfs
Nov. 16 – Nov. 30	All conditions	2000 cfs
Dec. 1 – Dec. 31	Declaration < 6000 cfs	2000 cfs
	Declaration >= 6000 cfs	2500 cfs

In addition, whenever Water Management declares a drought, Article FL2 further indicates the drought minimum flows shown in Table 4 (Table FL2-2 from Article FL2), unless otherwise directed by Water Management in consultation with State of North Carolina water quality and fishery agencies.

Table 4. Drought Minimum Flows (Table FL2-2)

January – August	2000 cfs
September – November	1500 cfs
December	2000 cfs

F. OPERATION FOR FISH AND WILDLIFE

1. **Striped Bass Spawning Releases.** The striped bass fishery in the Roanoke River downstream from Kerr Dam is extremely important from an ecological, recreational, and economic standpoint. The major spawning ground for the striped bass in North Carolina waters is in the vicinity of Weldon. The striped bass require high water conditions to move up the river in the spring to the spawning ground. Continued high water even after spawning occurs is necessary for survival and transport of eggs and juvenile fish. The annual spawning run usually begins about April 15 and is completed by about May 15 with the peak of activity occurring about May 1.

Soon after Kerr went into operation in 1953, objections to minimum flows provided during the striped bass spawning season were voiced. Although efforts were made to improve conditions, the objections persisted. On January 30, 1957, the Chief of Engineers authorized, on an interim basis, the use of storage in Kerr Reservoir between elevation 302 ft-NGVD29 and the guide curve to provide increased minimum flows during the striped bass spawning season.

In 1971 a memorandum of understanding was signed by representatives of Virginia Power (now Dominion), the Wilmington District U.S. Army Corps of Engineers, and the N.C. Wildlife Resources Commission, which identifies reserved storage in Kerr Reservoir between 299.5 and 302 ft-NGVD29 for augmentation flow for striped bass spawning and a 13-foot minimum stage at Weldon during the spawning period. The telemark gage at Weldon was discontinued in July 1985. The releases to meet the 13-foot stage at Weldon have been measured at the Roanoke Rapids gage since July 1985. The 13-foot stage at Weldon is the equivalent of about 4.8 feet on the Roanoke Rapids gage.

In cooperation with state and federal fish and wildlife agencies, the Wilmington District agreed to test a new fish flow regime in the lower Roanoke River to enhance striped bass fish reproduction. On April 1, 1989, a schedule of regulated releases at Roanoke Rapids Dam was implemented over a 4-year trial period to benefit striped bass spawning, and was subsequently implemented on a permanent basis in 1995. The schedule of spawning flow target releases measured at the Roanoke Rapids gage are shown below in Table 5:

Table 5. Lower Roanoke River Spawning Flow Targets

Dates	Lower Target Flow Rate (cfs)	Median Target Flow Rate (cfs)	Upper Target Flow Rate (cfs)
April 1-15	6600	8500	13,700
April 16-30	5800	7800	11,000
May 1-15	4700	6500	9500
May 16-31	4400	5900	9500
June 1-15	4000	5300	9500

In addition to the above, outflow from Roanoke Rapids Dam is limited to a maximum hourly variation of 1500 cfs. This schedule is followed each year to the extent that water

available from natural flow plus spawning storage at Kerr will permit. However, when flood operations at Kerr become necessary during the spawning release period, releases from Roanoke Rapids can exceed the upper target flow rates.

Since flows released from Kerr are reregulated by Gaston and Roanoke Rapids, all spawning releases from Kerr for the striped bass should typically be made during on-peak hours. As a result, Dominion must store a portion of this water during the week and release it on weekends. In order to reduce the drawdown of Gaston and Roanoke Rapids Reservoirs over the weekends, the Corps has agreed to allow Dominion to use a one-foot portion of the 3 feet of flood storage in Lake Gaston for storing water for spawning releases, which is also reflected in its FERC license.

2. **Mechanics of project operation during striped bass spawning season**. During the striped bass spawning season (April 1 through June 15), any energy declaration in excess of the weekly minimum energy for the purposes of providing increased spawning releases is contingent on water being available from spawning storage and/or having sufficiently high inflows. Prior to each spawning season, an overall plan of operation is discussed with N.C. Wildlife Resources Commision (NCWRC) and other interested agencies (e.g., U.S. Fish & Wildlife Service), based on Water Management forecasts of available storage and inflows during the upcoming spawning season. Water Management will consult each week with NCWRC to coordinate planned releases based on available/forecast spawning storage and inflows and the status of the spawn, consistent with other operational considerations (e.g., flood operations). Release schedules are coordinated with Dominion as necessary to ensure that sufficient water is provided and releases from Kerr are appropriately reregulated by their projects. These releases are incorporated into Water Management's weekly energy declaration (see Section D.3).

3. **Fish Passage through Turbines**. Passing of striped bass through the turbines at Kerr Dam is a fisheries concern during high inflow events following spawning upstream of the dam. As a result, whenever Kerr Reservoir is forecast to exceed elevation 303 ft-NGVD29 during the month of June and weekly average releases exceed 10,000 cfs, coordination with fishery agencies will be increased. Monitoring will include downstream fish pickup transects and chart fathometer transects at the upstream face of dam, as frequently as daily during a passage event. (A flowchart is available from Water Management that was developed in conjunction with fisheries agencies during the 1990s. This flowchart helps identify when conditions exist for fish passage through turbines and indicates procedures to be used to reduce fish passage.) Potential temporary operational changes to reduce fish passage include turbine shutdown and spillway releases; however, any significant operational changes would be coordinated with South Atlantic Division.

4. **In-Lake Fisheries**. To ensure success of bass spawning activities in the reservoir itself, a reasonably steady reservoir level is desirable for a 3 to 4 week period after the water temperature near the reservoir surface reaches 60 degrees F (about mid-April). This will be accomplished whenever practical; however, drawdown of the spawning storage to maintain target striped bass flows downstream often makes this impractical.

G. OPERATION FOR WATER SUPPLY

In accordance with the provisions of the Water Supply Act of 1958, Public Law 85-500, the Government is authorized to include storage in any reservoir project constructed by the Corps of Engineers to impound water for municipal or industrial water use. Water supply storage space within Kerr Reservoir has been reallocated from the power pool for some water supply users, while other users have grandfathered withdrawal rights due to pre-impoundment withdrawals. Current water supply agreements in effect at Kerr Reservoir are described below, along with a storage summary in Table 6.

Table 6. John H Kerr Water Supply Storage Summary

Agreement Holder	Estimated Water Supply Storage (acre-feet)	Percent of Conservation Storage
City of Henderson	10,292	1.050
City of Virginia Beach	10,447	1.066
Virginia Department of Corrections	24	0.0024
Mecklenburg Co-Generation	617	0.063
Total	21,380	2.181

a. The Town of Clarksville, Virginia is allowed to make grandfathered water supply withdrawals from Kerr Reservoir at no cost in accordance with preproject agreements. Burlington Industries near Clarksville also had a grandfathered withdrawal, but is no longer in operation.

b. A water use agreement between the Federal Government and the City of Henderson, North Carolina, was entered into on February 12, 1974, allowing withdrawals from Kerr Reservoir at a rate not to exceed 20 million gallons per day (MGD). This water use agreement was converted to a water storage contract on March 17, 2006, giving the City of Henderson the right to utilize 1.050 percent of the conservation storage in Kerr Reservoir between elevations 268 and 300 ft-NGVD29. This space is currently estimated to contain 10,292 acre-feet of storage.

c. A water supply storage contract with the City of Virginia Beach, Virginia, for releases from Kerr Reservoir was signed on January 13, 1984. The City of Virginia Beach has a FERC-approved water supply intake in Lake Gaston, located downstream of Kerr Dam. The Kerr contract stipulates that the City of Virginia Beach has the right to utilize 1.066 percent of the conservation storage in Kerr Reservoir between elevations 268 and 300 ft-NGVD29, currently estimated to contain 10,447 acre-feet. This storage is not intended to directly provide water supply to Virginia Beach, but rather to provide limited mitigation storage to help meet downstream spawning or minimum releases on a short-term basis during severe droughts to offset concerns related to the City's interbasin transfer of water from Lake Gaston. Releases from this storage will be made following coordination with the City of Virginia Beach and the State of North Carolina.

d. On January 25, 1989, a water storage contract was approved for the Virginia Department of Corrections (VDOC) for water supply storage space in Kerr Reservoir. VDOC has the right to utilize an undivided 0.0024 percent of the conservation storage from elevation 268 to 300 ft-NGVD29 in Kerr Reservoir or approximately 24 acre-feet. The specified withdrawal rate is not to exceed 60,000 gallons per day. This water supply allocation has not yet been utilized.

e. On June 5, 1991, a water supply storage contract was approved for the Mecklenburg Cogeneration Limited Partnership (MCLP), now operated by Dominion. The 120 megawatt coal-fired cogeneration facility at Clarksville, Virginia, uses raw water from Kerr Reservoir as process water, cooling water, and steam supply for the facility, with maximum water use of approximately 3 mgd. MCLP has the right to utilize an undivided 0.063 percent (approximately 617 acre-feet) of the conservation storage in Kerr Reservoir.

H. **OPERATION FOR RECREATION**

A reservoir level near the guide curve would be desirable throughout the recreation season to provide the greatest lake area and most attractive shoreline. This water level requirement will be met when consistent with other flow regulation requirements. The reservoir will normally be near guide curve level from June through August; however, summer drawdown below guide curve enough to impact recreation can be expected to occur during droughts.

I. **OPERATION FOR MOSQUITO CONTROL**.

In the interest of mosquito control, the following is desirable:

a. Rapid drawdown of a 1- or 2-foot surcharge above the maximum conservation pool in the spring to strand drift (floating vegetative debris).

b. Maintain reservoir at the maximum conservation pool elevation from April through June to curb shoreline vegetation growth.

c. Gradually draw reservoir down from July through September at a rate equal to 0.2 feet per week or more to keep the shoreline below the advancing growth.

The one or two feet of drift-stranding surcharge is provided by the storage of water for the striped bass. While a faster drawdown would be more effective in stranding the drift, a separate drawdown for each purpose would not be practical. The other water level requirements will usually be met by normal power operations when consistent with flow regulation requirements.

J. **DEVIATION FROM NORMAL REGULATION.**

a. **General**. The District Engineer is occasionally requested to deviate from normal regulation of Kerr Reservoir. Prior approval for a deviation is obtained from SAD, except as noted in the following emergencies, unplanned minor deviations and planned deviations which are discussed below. Requirements and guidance on deviations are provided in ER 1110-2-240, Water Control Management, dated 8 October 1982 with special updates on 1 March 1994.

b. **Emergencies**. Some emergencies that can be expected are drownings and other accidents, failure of operation facilities, and flushing of pollution during fish kills. Necessary action under emergency conditions is taken immediately unless such action would create equal or worse conditions. SAD will be informed as soon as practicable, and a written confirmation showing the deviation and conditions will be furnished to SAD.

c. **Unplanned Minor Deviations**. These are unplanned instances that create a temporary need for minor deviations from the normal regulation of the reservoir, although they are not considered emergencies. Construction accounts for the major portion of incidents and includes utility stream crossings, bridge work, and major construction contracts. Changes in releases are sometimes necessary for maintenance and inspection. Requests for changes of release rates are generally for a few hours to a few days. Each request is analyzed on its own merits. Consideration is given to reservoir and watershed conditions, potential flood threat, and possible alternative measures. These requests are generally accommodated, provided there are no adverse effects on the overall regulation of the project for the authorized purposes. Water Management will obtain approval for these minor deviations from SAD normally by telephone or email, with a follow-up written confirmation showing the deviation and conditions.

d. **Planned Deviations**. Each planned deviation should be analyzed on its merits. Sufficient data on flood potential, reservoir and watershed conditions, possible alternative measures, benefits to be expected, and probable effects on other authorized and useful purposes will be submitted in writing to SAD along with recommendations for review and approval.

e. **Drought Contingency**. Normal project operating procedures may be altered during critical drought situations to address both upstream and downstream water resource needs and impacts. Detailed instructions on operating procedures during times of drought can be found in the Drought Contingency Plan for John H. Kerr. Guidance on developing Drought Contingency Plans is found in TL 1110-2-335 Development of Drought Contingency Plans dated 01 Apr 93 and ER 1110-2-1941 Drought Contingency Plans dated 15 Sep 81.

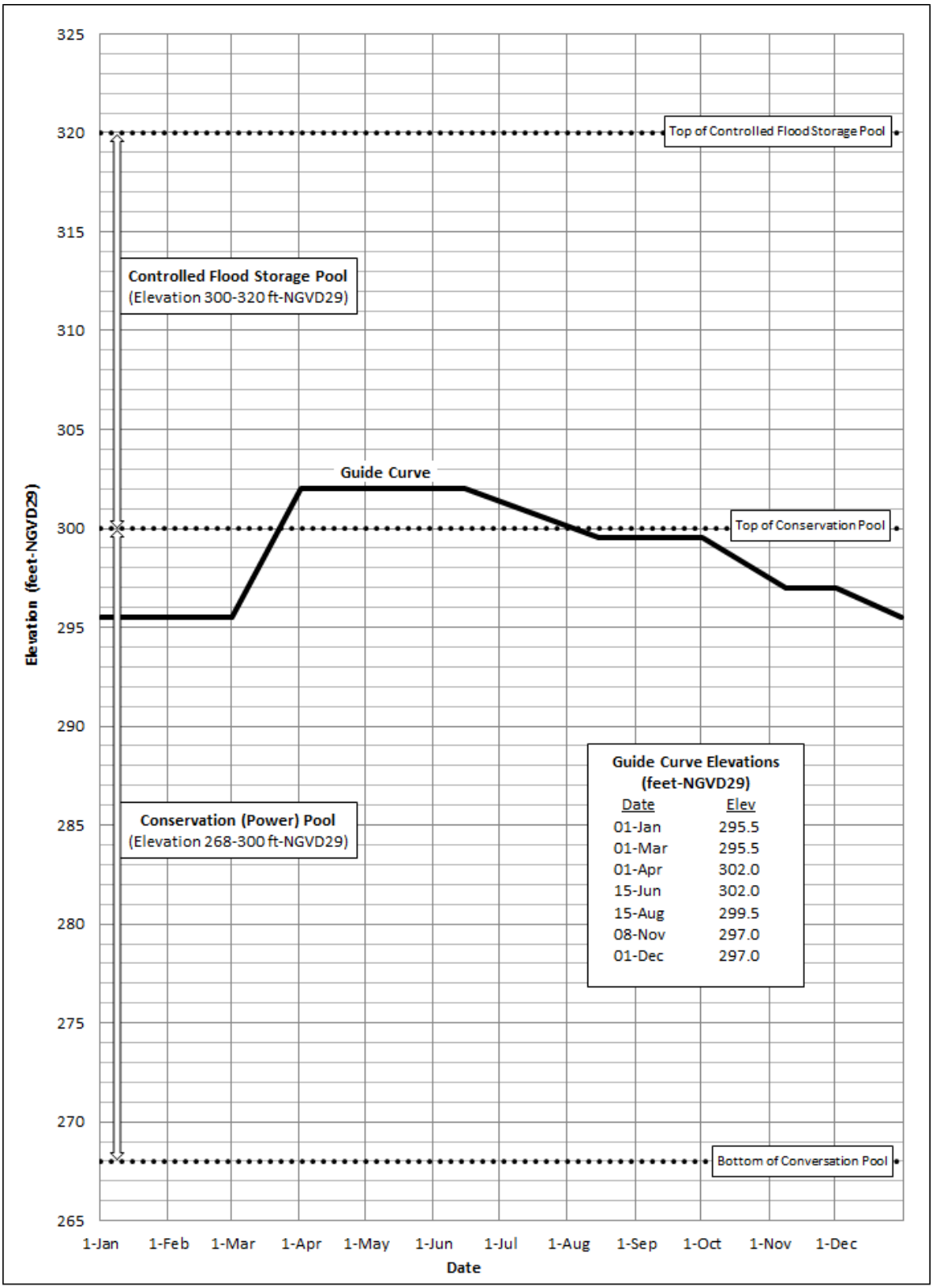

Plate 1. John H. Kerr Reservoir Guide Curve

Appendix B

Cumulative Impacts

John H. Kerr Dam and Reservoir
Water Control Plan Revision

The Council on Environmental Quality (CEQ) defines cumulative impact as:

The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). This analysis follows the 11-step process outlined by the CEQ in their 1997 publication Considering Cumulative Effects Under the National Environmental Policy Ac (Table 1).

Table 1. Steps in the Cumulative Effects Analysis (as adapted from CEQ 1997)

Environmental Impact Assessment Components	CEA Steps
I. Scoping	1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals. 2. Establish the geographic scope for the analysis. 3. Establish the time frame for the analysis. 4. Identify other actions affecting the resources, ecosystems, and human communities of concern.
II. Describing the Affected Environment	5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses. 6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds. 7. Define a baseline condition for the resources, ecosystems, and human communities.
III. Determining the Environmental Consequences	8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities. 9. Determine the magnitude and significance of the cumulative effects. 10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects. 11. Monitor the cumulative effects of the selected alternative and adapt management.

1. Significant Cumulative Effects Issues

This assessment of cumulative impacts will focus on five impacts related to change in releases from John H. Kerr Dam: water quality and fisheries, bottomland hardwoods, agricultural lands, cultural resources, and hydropower. In making this assessment, we have reviewed the following reports:

(1) US Army Corps of Engineers, Norfolk District dated 1961. John H. Kerr Reservoir, Va. – N.C. Supplement to Reservoir Regulation Manual Relative to Flood Operations, Norfolk, NC.

(2) US Army Corps of Engineers, Wilmington District dated 1967. Feasibility Report on Investigation of Abandonment of Island Creek Pumping Station.

(3) US Army Corps of Engineers, Wilmington District dated 1974. Roanoke River Basin, Kerr and Philpott Reservoirs, Power Potential and Reservoir Rule Curves, Wilmington, NC.

(4) US Army Corps of Engineers, Wilmington District . 1974. Reconnaissance Report on John H. Kerr Dam and Reservoir, Virginia and North Carolina (Section 216, Public Law 91-611).

(5) US Army Corps of Engineers, Wilmington District. 1992. Initial Appraisal Report of Island Creek Dam and Pumping Station (Section 216, Public Law 91-611).

(6) US Army Corps of Engineers, Wilmington District. 1996. Initial Appraisal Report for John H. Kerr Dam and Reservoir.

(7) US Army Corps of Engineers, Wilmington District. 1997. Reconnaissance Report John H. Kerr Dam and Reservoir Virginia and North Carolina - Island Creek Pumping Station (Section 216).

(8) Wilder, T. C., C. D. Piercy and T. M. Swannack. 2012a. An Analysis of John H. Kerr Reservoir Operation Alternatives benefits to the Lower Roanoke River Floodplain Ecology. U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS. Final report to the U.S. Army Corps of Engineers - Wilmington District.

(9) Wilder, T. C., C. D. Piercy and T. M. Swannack. 2012b. Review of Flow Regulation Scenarios at John H. Kerr Reservoir and Effects on the Lower Roanoke River Floodplain. U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS. Report to the U.S. Army Corps of Engineers - Wilmington District.

(10) US Army Corps of Engineers, Hydropower Design Center. 2012. Hydropower Impacts of Changes in Water Control Operations John H Kerr-216 Study.

(11) Garcia, Ana Maria. 2011a. Water Quality Modeling of the Lower Roanoke River, North Carolina: Evaluation of scenarios for water quality improvement. USGS, Raleigh, NC

(12) Garcia, Ana Maria. 2011b. Water Quality Modeling of the Lower Roanoke River, North Carolina: Model development and calibration. USGS, Raleigh, NC

(13) US Army Corps of Engineers. 2012. Methodology and Results for Determining Flood Impacts to the Roanoke River Basin*.*

In addition to these documents, many other documents were reviewed and are referenced as appropriate in the remainder of this assessment.

2. Geographic Scope

This analysis will focus on cumulative impacts within two different geographic areas. The first area is the Roanoke River watershed from John H. Kerr Dam and Reservoir downstream to where the river enters the Albemarle Sound (Figures 1 & 2). The discussion on water quality, bottomland hardwoods, fisheries and agriculture will be restricted to those areas since impacts to these resources will not likely be appreciable outside of the watershed.

Figure 1. Location of John H. Kerr Reservoir and Dam and downstream dams.

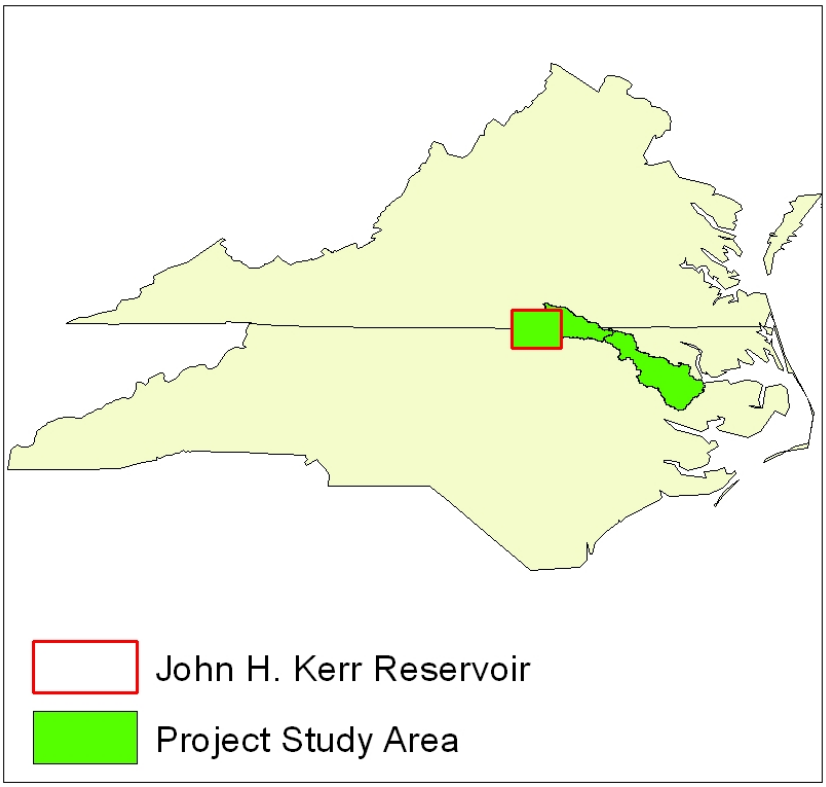

Figure 2. Location of John H. Kerr Reservoir and Dam and downstream dams overall project study.

Hydropower impacts will be related to a much larger area since the hydropower losses are not likely to be replaced from operations within the Roanoke River watershed. The area selected is the Southeastern Electric Reliability Council sub-region of Virginia/Carolina (SRVC) because the three hydropower facilities affected by the Kerr 216 study lie within the center of this sub-region. This sub-region covers North and South Carolinas and much of Virginia (Figure 3.)

3. Time Frame

This analysis considers known past, present and the reasonably foreseeable future projects that have or are proposed to change releases from dams that may impact hydropower, bottomland hardwoods, agriculture, cultural resources or water quality and fisheries. The time frame covers 50 years from 1974 to 2024. Operation began at Kerr Reservoir in 1952, but 1974 was chosen since that is the year when the current reservoir guide curve and release operations began at Kerr. The year 2024 is a reasonable future endpoint due to

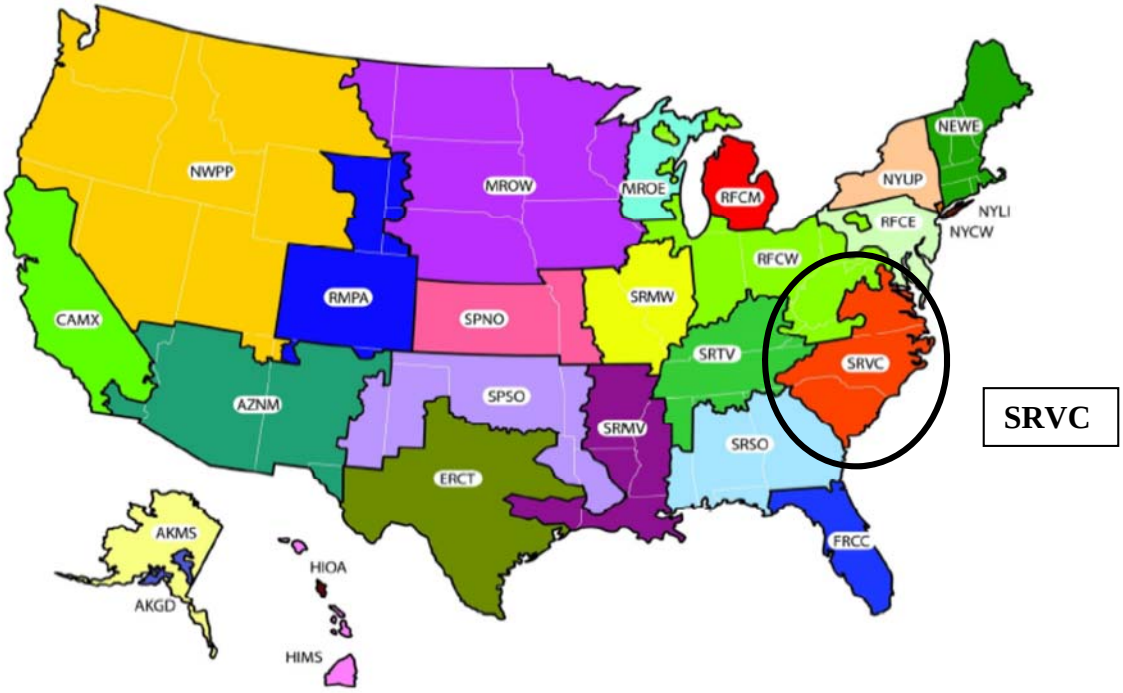

Figure 3. Southeastern Electric Reliability Council sub-region of Virginia/Carolina (SRVC). eGRID2010 Version 1.1, Year 2007 Summary Tables, (created May 2011)
http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

relatively long lead time for changes at hydropower facilities and any other activities large enough to alter the basin conditions.

Project vicinity scale cumulative assessment considers past historic hydrological impacts associated with current operational guidelines of hydropower resources, and any activities within the basin that would impact those same areas. This also assumes both cumulative impacts associated with continuation of current hydropower operational guidelines and impacts associated with alteration of the hydropower operating guidelines and guide curve should the fabric weir or quasi run of river alternatives proposed in the environmental assessment (EA) be implemented. Additional, cumulative impacts within the basin that would affect resources within the basin were also taken into consideration.

4. Actions Affecting Resources of Concern

This analysis of cumulative effects of the proposed action will focus on the change in releases from dams that will impact hydropower to improve downstream ecosystems as well as evaluate other activities within the basin that may affect those same downstream ecosystems. In making this assessment, we have reviewed the reports indicated in Section 1 above along with other

documents referenced in the discussion below. Most of this information regarding impacts are discussed in Section 3 of the EA.
In addition to these sources, the Wilmington District has contacted the other Corps Districts and the FERC licensed projects in SRVC regarding hydropower facilities that had or may change releases that could impact hydropower for the benefit of downstream ecosystems as well as municipalities, environmental resource agencies, industrial facilities, and governmental organizations regarding changes within the basin that may impact river resources.

The resources of concern other than hydropower are divided into two effected reaches: 1) Six miles downstream of Kerr Dam, and 2) Downstream of Roanoke Rapids Dam to Albemarle Sound. For each section below, the discussion will be divided into those two reaches and cover actions regarding this EA and other actions that may affect critical resources.

4.1 Six miles downstream of Kerr Dam

For this reach, there are two potential areas of impact: cultural resources and combined water quality and fisheries.

Cultural Resources: As indicated in Section 2.4 of the EA, the only cultural resource site below the dam is on Buggs Island. This site (state site number 44MC491) is a prehistoric archaeological site near the base of Kerr Dam. This site has been determined to be a historic property eligible for nomination to the National Register of Historic Places. The studies have documented erosion on Buggs Island including the location and nature of that erosion. Buggs Island is frequently inundated because of the releases from Kerr Dam. If the QRR measure is implemented, the potential year-round 33,000 cfs releases that occur now about once every 13 years will increase to a frequency of once every 2 years.

During March 2012, measurements were taken at erosion control stakes on the Buggs Island and it was determined that no appreciable erosion has taken place due to dam releases since the stakes were installed in 1997 . Since no appreciable erosion has occurred since 1997, no action is planned as a part of this EA except to monitor the erosion stakes annually. If erosion is evident as a part of QRR releases, the shoreline will either be armored or appropriate data recovered conducted.

No other cultural resources are known to exist in the 6 miles below Kerr Dam that have been or would be impacted during the 1974 to 2024 evaluation period.

Water Quality and Fisheries: As indicated in Section 2.2.2 of the EA, a weir upstream of Kerr Dam should result in DO concentrations downstream of the dam averaging around 6 mg/l during the summertime. This is above the state standard of an average of 5 mg/l and should preclude the current DO sag at night

which can approach 1 mg/l. This improvement in DO will benefit at least six miles of habitat downstream which covers 501 acres. Also epilimnionic waters are low in oxygen demanding substances (BOD and COD) and are less likely to cause DO levels to sag at night compared to current releases of hypolimnionic waters. Epilimnionic waters are also generally lower in nutrients (e.g. nitrogen and phosphorus) and that would diminish potential occurrences of algal blooms downstream. After large algal blooms, DO levels can be depressed due to the decay of the excessive amount of organic matter resulting from the blooms.

The temperature of the water released from Kerr Dam will increase from about 21^{o}C to 29^{o}C during the summertime because primarily epilimnionic waters will be released downstream. However these are normal summer temperatures for reservoirs in the South and the temperatures that exist below Lake Gaston and Roanoke Rapids Reservoir.

Under current operations during high summertime releases from Kerr Dam, large volumes of low DO water from Kerr could overwhelm the downstream reservoirs and depress the DO concentration of the water released from both Gaston and Roanoke Rapids Dams. With a weir in place at Kerr Dam, this scenario should be precluded.

As indicated in Section 2.2.2 of the EA, in order to improve DO levels downstream of Kerr Dam, the six main turbines have been vented, which allows air to be entrained into the water. This work was completed in January 2012. When venting three of these turbines was completed, this venting helped raise the downstream DO values but not enough to consistently raise DO levels to the state standard. Even if all the turbines were used, DO would probably not improve downstream since venting efficiency greatly diminishes when more than three turbines are used. This is due to a decreased venturi effect of sucking air into the turbines with higher tailwater elevation below Kerr Dam with increased discharge.

As indicated in Sections 2.2.2 and 3.2.2 of the EA, the limiting parameter for enhancing fisheries below Kerr Dam is DO concentrations. If DO levels are improved to consistently meet the state standard via a fabric weir or DO injection upstream of Kerr Dam, fisheries will be substantively improved.

No other appreciable actions have been conducted or are planned within the 50 year period to improve DO or fisheries habitat levels below Kerr Dam.

4.2 Downstream of Roanoke Rapids Dam to Albemarle Sound:

For this reach, there are three potential areas of impact: bottomland hardwoods, water quality and fisheries, and agriculture.

Bottomland hardwoods: As identified in Section 2.3.1 and 3.2.1 of the EA, it is estimated that floodplain forest along the lower Roanoke River, comprised of 92,000 acres, are affected or altered by hydrology due to management operations at the Kerr Reservoir. An extended period of inundation or reduced inundation in some areas during the growing season is causing a reduction in community diversity. Vegetation communities along the Roanoke are becoming increasingly stratified due to the change in the natural flood regime caused by altered flood patterns from regulation by the upstream dams. This change in the natural inundation pattern is allowing for less flood tolerant species to become established in higher elevation areas naturally inhabited by bottomland hardwood species therefore lowering the overall vegetative diversity of the floodplain. Further effects of regulated flow are being documented in a University of North Carolina study that has examined tree seedling survival in the Lower Roanoke under different flooding conditions, and a study by the USACE Engineer Research and Development Center, which has found significantly higher signs of stress in trees in the lower Roanoke as compared to what was found in nearby, unregulated watersheds. According to the Environmental Benefits Analysis performed for the floodplain forest, the habitat value of this resource will decline by about 12 percent over the next 50 years if releases from Kerr Reservoir are not changed.

Some future shifts may be dramatic under current hydrologic guidelines, occurring in a patchy fashion over a few years, or a single season. They may begin with a high mortality event triggered by a wet year or a series of them, as many individuals of a species succumb to the cumulative effects of years of prolonged soil hypoxia. They may come suddenly with the outbreak of a disease or parasite facilitated by many trees in a weakened state. Changes in the vegetation may be more gradual, as species favored by the existing hydrologic conditions out-compete those for whom the areas have become less suitable.

Paper mills located at Roanoke Rapids (Kapstone) and further downstream at Plymouth (Domtar) have been reducing the amount of hardwoods processed over the last several years and both plants have transitioned to utilizing only soft woods such as Southern Pine to produce “fluff”. Additional changes in environmental business practices at Kapstone in Roanoke Rapids and the relocation of the International Paper plant to outside of the Roanoke River Basin to Franklin County should further improve conditions and dependence on the hardwoods within the Roanoke River Basin. ENVIVA, a supplier of sustainably-sourced wood pellets and other processed biomass, is in the process of completing a plant in Ahoskie, NC that will be completed during the period of consideration. The plant is not expected to be in close proximity to water sources directly connecting to the Roanoke River and processes wood by-products such as chips, branches, tree tops, and other forestry debris from removal of primary biomass such as tree trunks. As this utilizes an otherwise untapped resource from current forestry practices, that are not necessarily solely

within the Roanoke Basin, it is not anticipated that plant construction will change the overall conditions of the bottomland hardwoods along the Roanoke River.

Several large tracts of Bottomland hardwoods are owned and maintained by resource agencies. The NC Wildlife Resources Commission has acquired roughly 24,000 acres in game lands to date. Economic constraints are expected to restrict WRC from the purchase of any additional lands during the period of record under consideration. Small scale timber harvest is occurring on upland tracks comprised primarily of loblolly pine plantations with no harvest of bottomland hardwood areas. The Roanoke River National Wildlife Refuge is managed by the Fish and Wildlife Service and currently encompasses 21,000 acres of forest that is accessible to the public. The refuge plan does allow for timber harvest for wildlife purposes but are generally small scale. A refuge expansion plan to connect the Pungo and Roanoke Refuges is being developed internally within the NWR and, if approved, approval would take several years. The Nature Conservancy holds titles or conservation easements privately protecting nearly 91,000 acres designated as the Roanoke River Conservation Area.

Water Quality and Fisheries: As identified in 2.2.2 of the EA, the low DO levels generally do not extend below Lake Gaston Dam, as there is a submerged weir that is located just upstream of Roanoke Rapids Dam which permits only the oxygenated surface waters to flow downstream. There is also a similar weir just upstream of Gaston Dam. However, during flood events in the warmer months under existing conditions, low DO releases from Kerr Dam may overwhelm the system and affect releases from Lake Gaston and Roanoke Rapids Dams.

A major concern for the lower Roanoke River is the effect of low DO concentrations during warm weather. When approximately 20,000 cfs is released over long periods of time, water tends to stand in the downstream swamps and the DO approaches zero due to biochemical oxygen demand (BOD) and chemical oxygen demand (COD). This low DO water eventually drains back into the river when discharge from the dam is reduced and can result in fish kills. A Betterment Plan was developed by a multiagency group in 1998 and was initiated to attempt to reduce this effect by stepping down the release in about 5,000 cfs increments and holding at those increments for several days. Since implementation, this plan has been effective and no fish kills have occurred due to Kerr Reservoir releases.

Paper plants are one of the major industries along the Roanoke River providing a significant portion of water demand and outflows into the river system. Over the last decade changes in product production and business practices such as reduction of processed materials have reduced water demand on the Roanoke River by several millions of gallons of water per day while also reducing the loading back into the river. Plants located in Roanoke Rapids and Plymouth, NC have continued to alter practices to further reduce their impacts on the river

system. The relocation of the International Paper plant outside of the Roanoke River Basin to Franklin County should further reduce reliance on the river by industry and the proposed construction of the ENVIVA plant in Ahoskie, NC is not expected to be provide additional withdrawals or loading into the river as it is not located in the Roanoke River Basin. As industry standards and practices continue to change, the potential for improved water quality should continue to increase.

While some growth of the surrounding community is expected over the next decade and beyond (Section 2.5.1), growth rates are anticipated to be low enough as to have minimal, if any, impacts on the overall composition of the river and should not lead to changes in water quality. The town of Williamson is planning on installation of a small water supply intake in response to growth requiring that the river be re-classified for water supply use in that area. However, the intake quantities are so minimal compared to the flow rates of the Roanoke that the intake will have no impact on the river. No other new major intakes or outflows into the river from the cities, industry, agricultural fields, or private estates are known at this time. However, based on current demographics and growth rates it is expected that if intakes were needed they would be of similar size to that of the Williamson intake and therefore have minimal impacts on the Roanoke River Basin.

In April 2012, Atlantic sturgeons (*Acipenser oxyrinchus)* were classified as an endangered species by the National Marine Fisheries Service and have been documented in the Roanoke River. Based on known activities. The shortnose sturgeon (*Acipenser brevirostrum*) was already listed any may occur in the river. It is not expected that current or future anticipated conditions would negatively impact the sturgeon that may be in the Roanoke River. Other fish species, such as American shad and striped bass, are also not expected to be impacted by changes in water quality over the period of analysis mainly because the spring releases for anadromous fish is not proposed to be changed (Section 2.3.3).

Agriculture: Downstream counties include Halifax, Warren, Northampton, Bertie, Martin, and Washington Counties in North Carolina with farm acreage (cropland, pastureland, and grazing) accounting for 775,679 acres of the downstream counties. As stated in Section 2.5.2 of the main document, much of the remaining downstream area is devoted to commercial forestry management and production, as well as conservation and conservation management. Timber production and management is distributed along both banks of the Roanoke River downstream of Roanoke Rapids with extensive tracts in the downstream counties. Several large forest product firms have plants in Roanoke Rapids and Plymouth that use timber harvested along the river and surrounding areas. While many of these plants have downsized and reduced produced materials there is still a harvest industry present as many of these plants have transitioned away from hardwoods but still require the harvesting of soft woods. See bottomland hardwoods section above for additional information.

Based on historic uses within the basin and the low growth rate of the area as indicated in Section 2.5.2 of the EA, it is expected that agriculture will continue in much the same capacity as it has over the last several decades. Off-loading from adjacent fields into the river and timber harvesting are expected to remain relatively consistent with past trends. Some existing farmland and timberland may eventually be converted to residential or other commercial use, however, large scale urbanization of the area is unlikely to occur. Economic downturns have not resulted in an increase in timber harvested by the agricultural community and the wood processing facility in Roanoke Rapids has not seen nor expects increases in production from local private timber harvests.

Other factors affecting assessment areas: Many factors unrelated to the changes proposed in the EA may affect resources within the Roanoke River basin and, specifically, the resources of concern outlined above. These factors can be a result of natural events such as natural population cycles or weather conditions including La Nina, El Nino, and major storms such as hurricanes that could result in alterations to the current or projected future conditions of the Roanoke River Basin. Anthropogenic impacts associated with unanticipated development, fishing and hunting, or degradation of water quality due to pollution could play a role in the health of the bottomland hardwoods and fisheries resources.

5 & 6. Resource Capacity to Withstand Stress and Regulatory Thresholds

Hydropower: Any changes in hydropower operation at John H. Kerr dam will result in an increase in emission of green house gases since the loss of hydropower generation will likely be replaced by a fossil fuel plant. These emission compared to what is produced in SRVC are indicated below and all the measures investigated indicate a very small percentage change. Full descriptions of the measures that may affect hydropower can be found in the EA Section 2.2.3.

Currently, there are no established thresholds related to greenhouse gas emissions.

Table 2. Annual Regional Power System Non-Base-Load Emissions Increase Over Existing Conditions as a Result of Lost Hydropower (tons)

Alternative	Greenhouse Gases					
	Kerr 216 Carbon Dioxide CO_2	Kerr 216 Methane CH_4	Kerr 216 Nitrogen Oxide N_2O	Kerr 216 Carbon Dioxide Equivalent CO_2e	SRVC Carbon Dioxide Equivalent[2] CO_2e	Kerr 216 Percent Change
MGC_35K	13,717	0.31	0.2	13,783	176,695,590	0.0078
Plan QRR	32,456	0.74	0.48	32,615	176,695,590	0.0185
MGC_35K YR	20,106	0.46	0.3	20,205	176,695,590	0.0114

Alternative	Criteria Pollutants					
	Kerr 216 Nitrous Oxides NO_X	SRVC Nitrous Oxides[2] NO_X	Kerr 216 Percent Change	Kerr 216 Sulfur Dioxide SO_2	SRVC Sulfur Dioxide[2] SO_2	Kerr 216 Percent Change
MGC_35K	17.09	196,705	0.0087	65.79	750,246	0.0088
Plan QRR	40.45	196,705	0.0206	155.66	750,246	0.0207
MGC_35K YR	25.06	196,705	0.0127	96.43	750,246	0.0129

2 eGRID2010 Version 1.1, Year 2007 Summary Tables, (created May 2011)
http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

Other Resources: There are no known thresholds relating to the extent of the Roanoke Basin that can be disturbed without significant impacts to hardwood forests, fisheries, cultural resources, and agriculture. Therefore, a comparison of cumulative impacts to established thresholds is not made.

State water quality regulatory standards has identified 5.0 mg/L as the minimum value for Dissolved oxygen in North Carolina waters. As identified in Section 2.2.2, water quality concerns regarding low dissolved oxygen, especially in the summer months, has lead to proactive measures such as the Betterment Plan to counter the low downstream values below Kerr Dam. It is expected that there is a low risk that the direct and cumulative impacts of the proposed action and other known similar activities would reach a threshold with potential for population adverse level impacts on resources, but should provide substantial benefits.

7. Baseline Conditions

Hydropower: The baseline conditions for hydropower production (annual megawatt hours (AMWH)) as compared to the three potential measures are indicated in Table 3 below.

Alternative	John H Kerr	Gaston	Roanoke Rapids	System Average Annual Generation	Difference from Baseline	
	AMWH	AMWH	AMWH	AMWH	AMWH	%
Baseline	479,008	349,142	356,018	1,184,167	---	---
MGC_35k	473,066	349,127	345,459	1,167,652	16,515	-1.39%
Plan QRR	462,729	349,490	332,870	1,145,090	39,078	-3.30%
MGC_35k_ yr_rnd	471,194	349,303	339,462	1,159,960	24,207	-2.04%

Table 3. Average Annual Power Generation - Baseline and Three Flow Scenarios

Other Resources: The following sections of the EA describe the status of hydropower and other significant resources that may be affected by this and other similar projects that are pertinent to this analysis as well as identify future without project conditions.

Section 2.0 Affected Environment.

Section 2.2.3 Hydropower

8. Cause and Effect Relationships

Hydropower: As indicated in Table 3, if any of the potential measures are implemented there will be a 1.4% to 3.3% loss in hydropower production. This will be directly related to an increase in greenhouse emission because this loss in production will likely be replaced by fossil fuel generation.

Other Resources: The following section of the EA describes impacts of the proposed actions on significant resources. Cause and effect relationships described in the report are consistent with those that would be expected for other similar projects that are pertinent to this analysis.

Section 3.0 Environmental Effects

9. Magnitude and Significance of Resource Impacts

9a. 6 Miles Downstream of Kerr Dam

Cultural Resources: There are no additional cumulative impacts beyond those identified in Section 3.4 of the EA which suggest that alterations in water releases from Kerr should not increase the erosion at the Buggs Island site. Also there should not be any impacts downstream of Roanoke Rapids Dam.

Water Quality and Fisheries: Implementation of the proposed project should provide significant increases in habitat value as indicated in Section 3.2.2 of the

EA. Increased releases of higher dissolved oxygen waters will improve water quality conditions, and in turn, improve fisheries habitat. Other impacts that would negatively impact water quality or fisheries have not been identified in waters within the six miles below Kerr dam. Agricultural related runoff is the only other identified potential impact and agriculture is not anticipated to increase significantly during the period of consideration so it is expected that cumulative impacts will result in an overall positive benefit to water quality and fisheries within the local watershed.

9b. Downstream of Roanoke Rapids

Hydropower: The Wilmington District has contacted the other Corps Districts and the FERC licensed projects in SRVC, and American Rivers regarding hydropower facilities that had or may change average annual power production due to facility upgrades, releases for environmental purposes, or the facility being closed. Table 4 summarizes those changes. While Table 4 does not represent an exhaustive study, the table indicates for the projects that involved releases for environmental benefits there was a 0.01 to 9.1% loss in average annual hydropower generation. However even with this loss, there is an approximate 7% net increase due to recent upgrades, new facilities, or an anticipated near term increase in hydropower generation in SRVC.

The associated increase in greenhouse emissions will be around 0.02 percent of the emissions presently occurring in the SRVC which is not considered a significant increase.

Bottomland Hardwoods: Implementation of the proposed project should result in the transition of the floodplains back to vegetation compositions that more historically reflect conditions of an unregulated river. Reduction of timber production of hardwood species in the area by paper mills and no expected increases in harvests by local property owners will further support the establishment of the bottomland hardwoods toward a more natural composition of species. Property acquisitions by State and Federal agencies will promote the

Table 4. Average annual power generation for hydropower facilities in the Virginia/Carolinas subregion that have or are projected to have recent changes

			Annual Mega Watt Hours (AMWH)				
Company or Agency	**Facilitiy/Project**	**State**	**Previous Capacity**	**Existing or Future Capacity**	**Difference**	**% change**	**Remarks**
Corps of Engineers	John H. Kerr Dam	VA	435,000	479,000	44,000	10.11	% gain due to upgrades
	Philpott Dam	VA	24,000	26,000	2,000	8.33	% gain due to upgrades
	Jordan Dam (add-on)	NC		16,900	16,900		
	Falls Dam (add-on)	NC		16,900	16,900		Assumed to be about the same as Jordan
	Gathright Dam (add-on)	VA		16,900	16,900		Assumed to be about the same as Jordan
Dominion	Ronaoke Rapids	NC	356,018	355,982	-36	-0.01	% loss due to environmental and/or recreation releases
Duke	West Fork Dam	NC	95,260	92,800	-2,460	-2.58	% loss due to environmental and/or recreation releases
	East Fork Dam	NC	95,243	91,600	-3,643	-3.82	% loss due to environmental and/or recreation releases
	Nantahala	NC	228,461	207,700	-20,761	-9.09	% loss due to environmental and/or recreation releases
	Dillsboro Dam		918	0	-918		Dam Removal
SC Public Service Authority	Santee Cooper	SC	224,027	220,847	-3,180	-1.42	% loss due to environmental and/or recreation releases
					0		
Progress Energy	Tillery and Blewett Falls	NC	370,100	362,900	-7,200	-1.95	% loss due to environmental and/or recreation releases
Alcoa Generation	Yadkin Project	NC	814,306	940,000	125,694	15.44	% gain due to upgrades
Totals			**2,643,333**	**2,827,529**	**184,196**	**0.07**	**% net increase**

continued establishment of historic conditions. Therefore, it is not expected that there will be negative cumulative impacts associated with the bottomland hardwoods of the Roanoke River Basin.

Water Quality: Reduction in releases of low dissolved oxygen waters from upstream of Roanoke Rapids Dam and reduced inundation times of the bottomland forests should promote an increase in water quality due to higher levels of dissolved oxygen being maintained within the river system as indicated in Section 3.2.2. of the EA. Alterations in business practices by industry, specifically paper mills, in the basin have greatly reduced the amount of loading and withdrawals from the river, improving habitat conditions. In addition, a stable population with very little growth is not expected to greatly contribute to any further decline in water quality. It is not expected that any of the identified changes in water quality within the Roanoke River basin would result in negative cumulative impacts to water quality within the river basin during the period of consideration nor would cumulative impacts negatively impact water quality in the State of North Carolina.

Agriculture: As stated in Section 3.5.2 – Agriculture and Silviculture, agriculture below Roanoke Rapids Dam could be impacted by the project by increasing the amount of flooding that occurs on agricultural land. Additional impacts to silviculture may occur as increased flooding frequency will periodically limit access to harvesting areas. Some urbanization is expected but should remain minimal during the period of analysis. These changes may facilitate some fields being taken out of agriculture due to the increased risk of flooding and some urbanization but generally should not result in any large changes in agriculture within the river basin nor should this appreciably impact overall agriculture within North Carolina.

10. Actions to Reduce Cumulative Impacts

Measure QRR was chosen as the tentatively selected plan because it was the only measure that indicated an ecological benefit to the ecosystem downstream of Roanoke Rapids Dam. Other measures could have be formulated that would have a greater benefit to the ecosystem, but would likely have a greater impact to hydropower and other resources such as agriculture. Therefore other measures were not pursued. Net cumulative benefits suggest that there will be positive impacts on the other environmental resources identified.

11. Monitoring and Adaptive Management

The Corps is not proposing any monitoring due to the ecological changes would be gradual and hard to measure, especially if flooding events are infrequent as they have been since 2003.

Appendix C

Comments and Responses

1. Agency Comments

#	Organization	Comment	Response
1	US Fish and Wildlife Service (USFWS) in NC	We strongly support the revised WCP which is based upon the QRR alternative. This alternative was developed through years of study and coordination by the Wilmington District and the 216 Study partners and stakeholders. This alternative not only will go far toward eliminating adverse impacts of present operations on the entire lower Roanoke River, including Roanoke River National Wildlife Refuge, but will also restore more natural floodplain functionality. Our understanding is implementation of QRR is within the Corps' existing authority and we believe that it is consistent with Section 7 of the Act as it should improve habitat for several species as well as species that are currently being considered for listing.	Thank you for your comment.
2	USFWS in NC	Pg.10. Proposed Water Control Plan Revision (QRR Operational Change) Section: Since river discharge is tied to river stage, we suggest explaining how river stage would change downstream under the QRR scenario. For example, at Williamston, a prolonged 20K event will cause the river stage to top out at about 11.47ft (December 2010 USGS gauge data) and a prolonged 3SK river stage at Williamston will top out at about 12.01(April 2003 USGS gauge data).	River stages will be higher under a prolonged 35,000 cfs release compared to a prolonged 20,000 cfs release. Realtime gage data is not available prior to 2007, however historic event measurements and peak streamflow measurements reported by USGS are consistent with the example given. Estimated stages downstream related to prolonged 20,000 cfs and 35,000 cfs releases from Roanoke Rapids Dam, per USGS peak streamflow measurements January 2016 and April 2003, respectively, are shown below. Local runoff can also affect downstream river stages at gage locations. Oak City, NC (02081022) -- 20.5 ft, 21.9 ft; Hamilton, NC (02081028) -- 17.25 ft, 18.0 ft; Williamston, NC (02081054) -- 11.5 ft, 12.0 ft; Jamesville, NC (02081094) -- 3.5 ft, 4.4 ft.
3	USFWS in NC	Pg. 17, figure 2.2: We suggest you verify land ownership as it appears there may be some discrepancies in the Big Swash area.	Noted. Land ownership depicted in the EA may not be completely accurate; however, any discrepancies are minor and would not affect the impact analysis or the Selected Plan.
4	USFWS in NC	Pg. 21, 1st paragraph: The lower Roanoke River channel conveyance capacity is approximately 20,000 cfs before substantial flooding over the existing natural river levees occurs." At 20,000 cfs, overbank flooding is limited to the area approximately three miles above Williamston. Overbank flooding above this area requires a higher discharge.	Concur that overbank flooding along much of the lower Roanoke River above Williamston requires discharges over 20,000 cfs.
5	USFWS in NC	Pg. 28, 1st full paragraph: "Other nongame species include the Blueback Herring, Gizzard Shad, carp ...' Several species are listed twice in this paragraph.	Concur. Corrections are addressed in the attached Errata Sheet.
6	USFWS in NC	Pg. 35, 3rd paragraph under section 2.5.2: "For Kerr Reservoir levels below 300 feet NGVD 29, discharges are typically limited to 8,000 cubic feet per second (cfs) at Roanoke Rapids Dam to preclude impacting silvicultural operations in the lower Roanoke River floodplain downstream. For reservoir levels between 300 and 312 feet NGVD 29, water releases may be increased to 20,000 cfs which can have major impacts on silvicultural operations." The Service recommends adding the following sentence, "Since the 8000 cfs limitation was put into place, much of the land that was in silvicultural usage and impacted at flows above 8000cfs is now in conservation management."	Concur. The suggested information has been added to the attached Errata Sheet.
7	USFWS in NC	Pg. 47 section 3.3.1: "A slight increase in wetland acreage may be realized if some or all of the 1,560 acres of agricultural land that would ...." 1,560 should be changed to 1,631acres to be consistent with acreages used in other places in the documents.	Acknowledged. Corrections are addressed in the attached Errata Sheet.
8	USFWS in NC	Pg. 48 top of page: In addition to the aquatic species discussion the Service recommends the document note benefits to ground foraging and nesting birds as well as other species of wild life. Eastern Wild turkey, herpetofauna, neotropical migratory birds such as the Swanson's and Kentucky warblers would all benefit, as well as small mammals.	Acknowledged. QRR may result in benefits to ground foraging and nesting birds as well as other species of wild life. Eastern Wild turkey, herpetofauna, neotropical migratory birds such as the Swanson's and Kentucky warblers would all benefit, as well as small mammals.
9	USFWS in NC	Pg. 54 top: "In summary, there will be some loss in hydropower generation, a resultant slight increase in air emissions due to replacement energy efforts, increased impacts to agriculture and silviculture, but a long-term ecological improvement in the lower river ecosystem." The Service recommends including after the word ecosystem, "and the quality of downstream recreational opportunities will also improve."	Acknowledged. QRR may improve the quality of downstream recreational opportunities.
10	USFWS in NC	Pg. 74 paragraph below table 1: The Service suggests working in the following text - Once the weekly average inflows fall below 35,000 cfs, the releases will be an amount greater than the weekly average inflows, not to exceed 35,000 cfs, in order to return to the guide curve as soon as practicable.	Concur. Corrections are addressed in the attached Errata Sheet.
11	USFWS in NC	Pg. 74 section C.2.: "While releases up to 35,000 cfs are possible, planned releases in this range of lake levels will be contingent on inflows and proximity to guide curve to ensure that lake level is not drawn down below guide curve." The Service suggests working the following language into this sentence - While releases up to 35,000 cfs are possible, planned releases in this range of lake levels will be contingent on inflows and proximity to guide curve to ensure that lake level is not drawn down below guide curve.	Concur. Section C-2 of the Water Control Plan now states "While releases up to 35,000 cfs are possible, planned releases in this range of lake levels will be contingent on inflows, proximity to the seasonally-varying guide curve, and intervening local inflows to Lake Gaston and Roanoke Rapids."
12	USFWS in NC	Pg. 75 3rd paragraph under C.3 first sentence: The word "object" should be "objective."	Noted.

	Organization	Comment	Response
13	USFWS in NC	Pg. 96 section 4.2: Proposed Water Control Plan Revision (QRR Operational Change) Section: Since river discharge is tied to river stage, we suggest explaining how river stage would change downstream under the QRR scenario. For example, at Williamston, a prolonged 20K event will cause the river stage to top out at about 11.47ft (December 2010 USGS gauge data) and a prolonged 35K river stage at Williamston will top out at about 12.01 (April 2003 USGS gauge data).	See response to comment #2.
14	USFWS in NC	Pg. 97 under Bottomland hardwoods, 1st paragraph: "An extended period of inundation or reduced inundation in some areas during the growing season is causing a reduction in community diversity." The Service recommends placing the word "forest" before "community" in this sentence. Also in the same paragraph further down the word "Lower" should be lower case for consistency.	Noted.
15	USFWS in NC	Pg. 97, 211d paragraph of Bottomland hardwood heading: The Service recommends including this excellent paragraph in the EA at page 41 under Section 3.1.3 Floodplains No Action.	Noted.
16	USFWS in NC	Pg. 98 paragraph above the Water Quality and Fisheries heading: "A refuge expansion plan to connect the Pungo and Roanoke Refuges is being developed internally with the NWR and, if approved, approval would take several years." Please remove this comment since it is not relevant to WCP revision.	This sentence should not have been included in the EA and is irrelevant to this project. Corrections are addressed in the attached Errata Sheet.
17	USFWS in NC	Pg. 98 paragraph above the Water Quality and Fisheries heading: "The Nature Conservancy holds titles or conservation easements privately protecting nearly 91,000 acres designated as the Roanoke River Conservation Area." There are 92,000 acres of land within the lower Roanoke River floodplain that are under conservation protection: either fee-title or easements with multiple different owners of which are NCWRC, USFWS, TNC, State of NC Department of Corrections, and private. We suggest you contact TNC to verify their specific acreage ownership.	Concur. The Nature conservancy submitted a comment that states, "The Nature Conservancy holds title to 22,900 acres and easement and/or stewardship interest in an additional 13,950 acres of privately-owned property." Corrections are addressed in the attached Errata Sheet.
18	USFWS in NC	Pg. 102 table 3: QRR and Status quo should be the only alternatives presented here. The same comment applies to the text under Section 8 Hydropower heading.	Concur. Corrections are addressed in the attached Errata Sheet.
19	USFWS in VA	We certify that the use of the online project review package results in reaching the appropriate determinations. Therefore, we concur with the "no effect" and "not likely to adversely affect" determinations for listed species and critical habitat and "no Eagle Act permit required" determinations for eagles. Additional coordination with this office is not needed.	Noted.
20	NC Wildlife Resources Commission	Implementation of Quasi Run of River (QRR) operations, when compared to the current management of Roanoke River flows, should allow the lower river system to approach a more natural, pre-dam condition to the benefit of aquatic and terrestrial wildlife as well as their habitats; QRR should also reduce the frequency and duration of flood control events thereby increasing public use opportunities within floodplain habitats. We believe that implementing this QRR operation is congruent with the mission of the NCWRC, and we appreciate the opportunity to provide our agency's support for the EA and proposed WCP revision.	Thank you for your comment.
21	NC Wildlife Resources Commission	Returning the flows in the Roanoke to a more natural state has numerous aquatic benefits and should benefit terrestrial wildlife by reducing long-term inundations on adjacent riparian lands. However, floodplain forest inundation during wet years would occur as it does on natural systems. Wild turkeys and other ground nesting birds may be negatively impacted with the flooding of nesting areas during late March to May while brood impacts may occur during the entire spring and summer growing season. Travel corridors for some game species, such as black bear and white-tailed deer, may be flooded and therefore move these animals into more populated uplands. In addition to potential impacts to terrestrial species during wet years, impaired access to public lands may also occur depending on duration and extent of floodplain inundation. However, these flooding impacts already occur under current operations and can be extensive in duration, often extending 20,000 cfs flood events for months at a time. QRR operations should reduce the flood duration by about 50%, and the frequency of growing season flow events equaling or exceeding 20,000 cfs should be reduced from 12% of the time to 6% as compared to existing management. QRR reduces the duration of the maximum growing season flood from 149 days under present operation to 59 days, which is a 60% reduction. Because of the shorter flood duration, wild turkeys will likely have the opportunity to re-nest if untimely flooding disturbs an initial nesting attempt. Flood events will continue to occur under any water management scenario, and the NCWRC believes that the benefits under QRR of reduced flood duration and frequency will enhance terrestrial wildlife populations and their habitats.	Thank you for your comment.

	Organization	Comment	Response
22	NC Wildlife Resources Commission	Currently the USACE and the NCWRC have a cooperative agreement during the spring anadromous fish spawning season to monitor and provide appropriate outflow from Roanoke Rapids Dam for spawning releases. This cooperation is critical for maintaining an abundant Striped Bass population in the Roanoke River and Albemarle Sound. We support the increase in guide curve during the spawning season to provide adequate storage for spawning flows, and we appreciate the decision to formally include the preferred spawning flow targets as well as the cooperation agreement in the WCP revision. NCWRC also recognizes the importance of the step down procedure following flood control (Betterment Plan) during summer when low dissolved oxygen levels may be present. The Betterment Plan is essential for reducing the likelihood of fish kills following flood events during warm weather. The NCWRC appreciates the careful consideration that USACE has given each operational alternative identified during the 216 process and in the EA. The NCWRC fully supports implementation of the revised WCP; we agree that the QRR alternative is the best method of achieving improvements in environmental quality within the lower Roanoke River floodplain while at the same time striving to mimic more natural flow conditions.	Thank you for your comment.
23	NC Department of Environmental Quality	No Comment.	Noted.
24	NC Division of Parks and Recreation	Based on the available data, the following impacts would occur with the QRR proposal compared to the existing curve: Approximately 7% of KELA's 602 campsites are unusable at 302' msl. 10 are electric hookup sites and 30 are non-electric sites. There is a potential of up to $14,000 in revenue loss from these unusable campsites during the first half of June. There is also a risk of increased damage to these sites associated with longer periods of submersion.	Impacts to recreation within Kerr Lake were included in the Cumulative Impact Analysis. The Corps understands that the extension of the guide curve at elevation 302 ft-msl from May 31 through June 15 under QRR, increases the potential for impacts to some recreation facilities, such as the ones you have mentioned, during a peak visitation season. While many recreation sites will benefit from the quicker return to guide curve and shorter inundation periods under QRR operations, sites within elevations 302 - 303 ft-msl may be available fewer days during summer season. However, from an overall perspective, the lake's recreation and economic benefits associated with QRR were higher than under existing operations. The guide curve rises to this higher elevation (302 ft-msl) during the spring to provide additional storage to support target releases for the striped bass spawn downstream. During normal and dry years, use of this spawning storage during May and June would tend to draw the lake down towards the summer pool level of 299.5 ft; however, during wetter springs, it may be necessary to utilize that higher extended guide curve to avoid higher releases that could be detrimental to the spawn.
25	NC Division of Parks and Recreation	The defined swim area at Satterwhite Point becomes completely unusable at 304' msl. At 302' msl there is very limited beach available between the retaining wall and the water. Additionally, the depth of the water in the swim area would increase by two feet during the first half of June, which would make this facility more hazardous during the peak visitation season. The swim beach area was constructed in 2002 and cost $208,360.	See response to comment #24.
26	NC Department of Cultural Resources	No comment.	Noted.
27	Kerr-Tar Regional Council of Governments	No comment.	Noted.
28	NC Department of Transportation	No comment.	Noted.
29	NC Department of Public Safety, Emergency Management	Proposed changes to the hydrology or hydraulics of Roanoke River and its tributaries associated with the John H. Kerr Dam and Reservoir Water Control Plan should be coordinated with the North Carolina Floodplain Mapping Program (NCFMP). This will help assure that the revised hydrology and hydraulics are appropriately modeled and mapped on future Flood Information Studies.	Noted; proposed changes will be conveyed to NCFMP upon final approval.
30	VA Department of Health Office of Drinking Water	Best Management Practices should be employed on the project site including Erosion & Sedimentation Controls as well as Spill Prevention Controls & Countermeasures.	QRR is an operational change that does not involve any construction activities.
31	VA Department of Health Office of Drinking Water	Care should be taken while transporting materials in and out of the project site, as to prevent impacts to surface water intakes within 5 miles.	Noted.
32	VA Department of Health Office of Drinking Water	The revised Water Control Plan should avoid resulting in detrimental water quality or quantity to the identified downstream drinking water intakes.	No such impacts are expected.
33	VA Department of Health Office of Drinking Water	There may be impacts to public drinking water sources due to this project if the mitigation efforts outlined above are not implemented.	Noted.

	Organization	Comment	Response
34	VA Department of Environmental Quality, Division of Land Protection & Revitalization	When an environmental impact report is written or compiled for specific sites, it should include an environmental investigation on and near the properties selected in order to identify any solid or hazardous waste sites or issues related to the project area. The databases include the Permitted Solid Waste Management Facilities, Virginia Environmental Geographic Information Systems (Solid Waste, Voluntary Remediation Program, and Petroleum Release sites), CERCLA Facilities, and Hazardous Waste Facilities databases.	Noted. QRR is expected to have no effect on HTRW and QRR would not result in the production of HTRW.
35	VA Department of Environmental Quality, Division of Land Protection & Revitalization	The generation or recovery of any hazardous waste materials should be tested and removed in accordance with the Virginia Hazardous Waste Management Regulations (9 VAC 20-60) and/or the Virginia Solid Waste Management Regulations (9 VAC 20-81).	Noted.
36	VA Department of Environmental Quality, Division of Land Protection & Revitalization	It is the generator's responsibility to determine if a solid waste meets the criteria of a hazardous waste and as a result be managed as such.	Noted.
37	VA Department of Environmental Quality, Division of Land Protection & Revitalization	Evaluate the identified petroleum release events to determine if the project will impact or be impacted by the project.	Noted. QRR should not impact or be impacted by petroleum release events.
38	VA Department of Environmental Quality, Division of Land Protection & Revitalization	DEQ encourages all projects to implement pollution prevention principles, including: the reduction, reuse and recycling of all solid wastes generated; and the minimization and proper handling of generated hazardous wastes.	Noted.
39	VA Department of Conservation and Recreation, Division of Planning and Recreation Resources	Please note both the Staunton and the Bannister Rivers have Scenic River designations and both rivers are established water trails.	Noted.
40	VA Department of Conservation and Recreation, Division of Natural Heritage	DCR recommends the development of a plan to detail how and when water level changes will occur and how impacts to these species can be avoided.	QRR would actually reduce the negative impacts to forest diversity caused by prolonged inundation. Reduction of these impacts would provide a benefit to the threatened Northern Long-Eared Bat and the two bats that are a Federal Species of Concern, Rafinesque's bigeared bat and the Southeastern myotis bat. By letter dated December 11, 2014, the USFWS stated that QRR should improve habitat for several listed species as well as species that are currently being considered for listing. The USFWS letter also stated that implementing QRR would reduce impacts of flood control operations on the system and provide benefits to the system's listed species making QRR consistent with Section 7(a)(1) of the ESA.
41	VA Department of Conservation and Recreation, Division of Natural Heritage	DCR recommends coordination with the FWS regarding potential impacts upon Northern Long-eared bats associated with tree removal as applicable.	Coordination has occurred with USFWS in both NC and Virginia. Their comments are included in this section.
42	VA Department of Conservation and Recreation, Division of Natural Heritage	Due to the legal status of the Green floater and the Atlantic pigtoe, coordinate with the Department of Game and Inland Fisheries (DGIF) to ensure compliance with the Virginia Endangered Species Act.	Noted. DGIF had no comment on the project.
43	VA Department of Conservation and Recreation	Contact DCR DNH to re-submit project information and a map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.	Noted.
44	VA Department of Conservation and Recreation, Division of Natural Heritage	The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.	Noted.
45	VA Department of Environmental Quality, Blue Ridge Regional Office	This project is an operational change at the John H. Kerr Reservoir. It does not involve construction. The documents provided states this operational change will improve water quality and have no effect on water supply or air quality. As such, I have no comments to offer concerning this environmental assessment.	Noted.
46	VA Department of Historic Resources	Pursuant to Section 106 of the National Historic Preservation Act, OHR has been in direct consultation with the U.S. Amy Corps of Engineers and its agents and the parties have reached consensus that the referenced project will have no adverse effect on historic properties. OHR has no further comment at this time.	Noted.

	Organization	Comment	Response
47	VA Department of Environmental Quality	The Department of Game and Inland Fisheries, Department of Forestry, Southside Planning District Commission, Commonwealth Regional Commission, Mecklenburg County, Charlotte County, Halifax County and Brunswick County were also invited to comment on the project.	Noted. No comments were received from these entities.

2. Non-Agency Comments

	Organization	Comment	Response
1	Dominion	With implementation of the QRR, flood discharges from Kerr when lake levels exceed the guide curve but remain below elevation 320 will change from 20,000 cubic feet per second (cfs) under the current water control plan up to a maximum of 35,000 cfs. While the new Guide Curve will help mitigate impacts, this increase will have significant operational impacts to Dominion's downstream projects. Most importantly, it will result in the reduction of renewable energy generation, with current modeling estimating that generation at Roanoke Rapids Dam could be reduced as much as 7% per year and result in the spilling of up to 15,000 cfs through the dam's spillway gates. This loss of generation will result in increased cost to ratepayers due to the need to make up the lost megawatts in the electrical system by using other more expensive options, most likely by burning fossil fuel.	Impacts to hydropower were evaluated during the Kerr 216 study by the USACE Hydropower Analysis Center (HAC), incorporating input from Dominion regarding their operations to capture those impacts. It is agreed that Dominion will experience generation losses with the increased potential for spilling at Roanoke Rapids associated with QRR (HAC modeling indicated about 6.5% reduced average annual generation at Roanoke Rapids); however, with Gaston able to generate power up to the full extent of QRR releases from Kerr, Gaston was not shown to experience any hydropower losses. Therefore, Dominion's combined average annual hydropower losses of about 3.2% and Kerr's average annual losses of about 3.4% associated with secondary energy generation are not considered significant enough, relative to the positive overall ecological benefits expected from QRR, to not move forward with implementation of QRR. In addition, the EA acknowledges that at least a portion of the costs for replacement power will likely be borne by power customers.
2	Dominion	Also, fluctuation of flows into the two lakes of Dominion's system will become more frequent and of higher magnitude though of shorter duration. These new conditions may challenge Dominion's ability to meet lake level requirements of the FERC License and to maintain Lake Gaston at a stable level. The higher magnitude flows will require close coordination between Kerr and Dominion to ensure lake levels do not rise at a rate that exceeds the capabilities of the dams, particularly Roanoke Rapids.	Dominion indicates that QRR may challenge their ability to meet lake level requirements of their FERC license and to maintain Gaston at a stable level. The Corps does not anticipate this to be a significant issue for the following reasons: (1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston; (2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal Gaston Lake levels are being maintained; and (3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels. Dominion further states that the higher magnitude flows will require close coordination between the Corps and Dominion to ensure lake levels do not rise at a rate that exceeds the capabilities of their dams. The Corps agrees that real-time operations are often challenging during flood operation, and anticipates that the same coordination that currently takes place between Dominion and the Corps of Engineers whenever lake level issues arise would continue to take place under QRR.
3	Dominion	In addition to complicating maintenance of appropriate lake levels (FERC Operating License Article 406), implementation of the QRR will or is expected to have other effects on Dominion's ability to meet its FERC license requirements. These concerns were brought up early in the Section 216 Study discussions. Article 401 of the license requires Dominion to adhere to the Federal Power Act Section 18 fish passage requirements prescribed by the National Marine Fisheries Service. The prescription has resulted in the construction and operation of American Eel upstream passage facilities in the Roanoke Rapids bypass reach. In Dominion's six years of experience monitoring upstream movement of American Eels, exceptionally large runs of eels have been correlated with increased river flow. This is particularly true of large and sudden increases in bypass flow, as Dominion has witnessed during releases for FERC safety tests. The increased frequency of spills to the bypass reach that will occur with implementation of QRR may result in mass movements of eels that could overwhelm the current holding facilities for eels migrating upstream. This same increased frequency of spills is likely to disrupt the current anadromous fish monitoring program required as part of license Article 413. Weekly sampling is conducted March -May in the bypass reach, and requires collection of boat electrofishing and ichthyoplankton samples. The boat electrofishing cannot safely be performed at bypass flows higher than approximately 700 cfs. A 35,000 cfs declaration from Kerr Reservoir will result in 15,000 cfs being spilled to the bypass. Similarly, there will be difficulties in obtaining ichthyoplankton samples, which are currently obtained by wading in the bypass.	The Corps recognizes that flood releases in excess of 20,000 cfs will require spilling and may occur during Dominion's anadromous fish monitoring program required by their FERC license. However, two-thirds of the target monitoring period, March-May, falls within the striped bass spawning season. During April - June 15, per the Water Control Plan for Kerr, the Corps targets the agreed-upon range of preferred releases to support the striped bass spawning efforts whenever conditions allow. The upper limit of these target flows is 13,700 cfs, which does not require spilling through the bypass channel. If flood operations are necessary in excess of turbine capacity at Roanoke Rapids Dam and significant spilling is necessary, then the Corps will coordinate releases closely with Dominion and will try to accommodate Dominion's required monitoring and sampling efforts to the extent practicable. If problems with eel passage arise, the Corps will coordinate with the appropriate resource agencies to address any issues.

	Organization	Comment	Response
4	Dominion	Of potentially greater concern is the increased probability of Striped Bass stranding in the bypass following spills that occur April -June. Historically, spills to the bypass during this time period have resulted in large Striped Bass moving into the bypass, to be stranded when flows were reduced (historically, to near zero). To some degree these concerns have been mitigated by providing continuous flow to the bypass, and the license requirement to step down bypass flows following spill events (Article 408). However, there have only been two occasions since 1995 when the bypass step down was implemented during the critical April - June time frame. During both of these events there was no evidence of stranded fish; however, this has been a rare occasion in the past. April and May are the months with the highest mean monthly flows at Roanoke Rapids (USGS), and hence are months where spills are likely to occur under QRR. The increased frequency of spills is very likely to result in Striped Bass moving into the bypass reach more frequently, increasing the chances of stranding.	If releases in excess of turbine capacity at Roanoke Rapids are warranted under QRR during the striped bass spawning period, the Corps will take into consideration the step-down of releases from the Roanoke Rapids bypass channel, required by Dominion's FERC license (Article 408) to reduce the potential for stranding.
5	Dominion	Currently, summertime discharges from Kerr Reservoir can create low dissolved oxygen (DO) condition in deeper waters in Lake Gaston and Roanoke Rapids Lake and within the lower Roanoke River. There is an expectation that discharges of 35,000 cfs may create larger pools of this low DO water within the two lower lakes and potentially poorer water quality conditions in the lower Roanoke as well, though if water is spilled through the flood gates at Roanoke Rapids this may serve to oxygenate the water.	While bottom releases will continue under QRR flood operations, the duration of higher flood releases that could have low DO will be reduced compared to existing operations.
6	Dominion	Another potential DO issue could arise from increasing the rate of drainage of the floodplains back into the river if the higher flood conditions have persisted long enough to create low DO in the flooded areas that would drain back to the river. The "Betterment Plan" that is currently used to alleviate this condition may continue to do so; however it is unclear whether this plan will address the changes in conditions.	Under QRR, flood waters would more actively flow through the swamps versus standing and stagnating. QRR operations would reduce the duration that water would stay in the swamp, and therefore the DO concentration of the water draining back into the river from the swamp may be slightly higher than under existing conditions, especially if used in conjunction with the Betterment Plan, benefiting all aquatic wildlife.
7	Dominion	Modeling of a variety of different water control scenarios was conducted to determine the effects on flooding frequency and duration in the river as well as effects on generation at the Kerr, Gaston and Roanoke Rapids dams. This modeling, based on 81 years of Roanoke River hydrology, included existing operations, the QRR and modified QRR scenarios with winter periods of varying lengths during which the existing water control plan was maintained. The results of this modeling, which have been provided to the Corps, show that any of the new scenarios will significantly reduce the maximum duration of floods above 11,000 cfs and that the modified QRR scenarios will have effects very similar to the QRR (See Table 1) and would be identical during the growing season while reducing overall loss of generation by over 20%. Dominion recognizes that potential negative impacts of the QRR flow regime is the purview of the resource agencies, and therefore limits its recommendation to operational impacts to the Roanoke Rapids/Gaston Project. Dominion recommends a modification of the QRR based on independent analysis of the timing and duration of flood events greater than 11,000 cfs. While accepting the findings of the EA that the QRR will result in an improvement in the ecology of the lower Roanoke River, there is little evidence to suggest that the higher flows in the winter will have significant positive effect. Due to demands for residential and commercial heating during the winter months, lost generation from the Roanoke Rapids/Gaston Project is of critical concern. The independent analysis indicates little difference in the frequency and duration of flood events expected to occur when existing rules are applied to the winter months. Therefore, Dominion proposes a modification to the new plan which would maintain the current water control plan with discharge from Kerr being kept to a maximum of 20,000 cfs when lake levels are below elevation 312 between December 15th and February 28th of each year. The operational benefit of this change would be to allow Dominion to more fully optimize power generation at its dams, better control water levels at Lake Gaston, reduce the amount of water spilled from the Roanoke Rapids Dam and more fully realize the benefits of renewable hydropower without detrimental environmental impact.	We do recognize that Dominion Generation has expended serious effort investigating potential modifications to the proposed Quasi Run of River (QRR) plan put forth in the current John H. Kerr Water Control Plan (WCP) Revision and Environmental Assessment. The selection of QRR as the proposed action in the WCP is founded in thorough technical evaluation of a range of alternatives, the outputs of which confirm the ecological benefits of QRR implementation. Additional effort has been expended by the Corps in the technical studies needed to accurately quantify the potential impacts of QRR implementation to hydropower generation. These studies have confirmed that QRR will have no impact on current capabilities at Kerr to meet its minimum energy commitments and will only have modest impacts (-3.4% for Kerr and -3.2% for Dominion) on secondary/excess power generation associated with flood operations, even accounting for spillage from Roanoke Rapids for flood releases greater than 20,000 cfs. Extensive public and resource agency coordination has also confirmed a wide base of stakeholder support for QRR as currently formulated. Accordingly, the Corps has made the decision to proceed with QRR as the recommended Water Control Plan revision.

	Organization	Comment	Response
	John N. Morris	I am writing to express my strong support for the alternative recommended by the Corps of Engineers in this Kerr Dam and Reservoir Environmental Assessment, the Quasi-Run-of-River (QRR) operational plan. I served as Director of the NC Division of Water Resources, the non-federal sponsor of the study that led to this recommendation, during its initiation and first eight years. I am therefore knowledgeable about the intent of the study and the issues involved. As a state partner with the Corps for the study of Kerr Lake operations, I appreciated the wide participation of stakeholders and the high quality of the data collection and scientific analysis that was accomplished. I support the well documented recommendation of the QRR alternative in the EA and recommend its adoption.	Thank you for your comment.
8	John N. Morris	Page 34. The data on unemployment in the region is from 2009 and should be updated.	Acknowledged. Corrections are addressed in the attached Errata Sheet.
9	John N. Morris	Page 45. The reference to "the original QRR" in the last three lines is not appropriate in this document.	Concur. Corrections are addressed in the attached Errata Sheet.
10	John N. Morris	Page 51. Some of the material on QRR recreational benefits has been erroneously left out of the second paragraph, leaving sentences that do not make sense.	Concur. Corrections are addressed in the attached Errata Sheet.
11	Lake Gaston Association	The Lake Gaston Association and its members are concerned about the recent series of high water events in Lake Gaston. While we are aware of the significant rain the area has experienced, these events are the most we have seen in six years. We understand that Dominion and the COE are operating within the current rules. The report documents modeling for Kerr and the downstream areas past Roanoke Rapids, however, no comments discuss what the modeling found for Lake Gaston.	During recent (winter 2015-2016) flood events, flood releases were limited to 20,000 cfs, resulting in extended flood operations which allows Dominion to utilize flood storage in Lake Gaston between elevation 200 and 203 ft-MSL. However, the levels at which Dominion operates Lake Gaston within the 3 ft of flood storage available during flood operations is outside of Corps jurisdiction. The Corps does specify when flood operations are in effect, and under QRR the duration of flood operations will be shorter. This means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more often. Modeling conducted during the John H. Kerr 216 study took into account the capacities for generating/releasing water from Kerr, Gaston, and Roanoke Rapids. Because of the high generating capacity at Gaston Dam, even detailed hourly modeling of releases showed no significant difference in Lake Gaston levels during QRR compared to existing operations. Furthermore, actual operations during past 35,000 cfs sustained flood releases demonstrate that Lake Gaston can be maintained at levels comparable to past 20,000 cfs releases.
12	Lake Gaston Association	Lake Gaston was created by Dominion Power as a power generating pool and as such has always been in a different category from most river reservoirs. The flood control function was not an intended primary use. The local Lake Gaston property owners and the surrounding counties have developed with the assurance the pool is and would remain stable. Kerr Lake by contrast was designed as flood control with the local citizens being aware of the water level fluctuation inherent in this function.	The availability of 3 ft of flood storage in Lake Gaston between 200 and 203 ft-MSL was part of its design and construction as a hydropower lake in series with Kerr and Roanoke Rapids. This storage is necessary to accommodate the local intervening runoff that can occur from the drainage area between Kerr Dam and Roanoke Rapids Dam during a heavy rain event. Dominion's FERC license reinforces the intent and necessity of this flood storage in Lake Gaston. Although there are times when use of this flood storage capacity has and will be necessary, implementation of QRR is not expected to have an adverse effect on Lake Gaston lake levels. A benefit of QRR is shorter periods of flood operations, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time—reducing the number of days that lake levels could be allowed in the 200-203 ft-MSL range that results in the high water impacts that property owners are concerned about. Even the upper limit of flood releases from Kerr under QRR (up to 35,000 cfs), which is equivalent to the upper limit of flood releases under existing operations, is not expected to result in higher lake levels or more fluctuation in Lake Gaston for the following reasons: (1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston; (2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal lake levels are being maintained; and (3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels.

	Organization	Comment	Response
13	Lake Gaston Association	We fear that we are experiencing unintended consequences of what QRR will bring. It appears that a more rapid de-watering of Kerr comes with a potentially severe effect on Lake Gaston: More frequent exposure to lake levels in excess of 201.5. While this level during a flood event keeps Dominion within the FERC guidelines, it puts the shoreline and over 8,000 docks in harms way. We request a pause in implementation until this modeling can be accomplished. We would also encourage the proper involvement of Lake Gaston stakeholders be considered.	Lake Gaston was considered during the John H. Kerr 216 Study and modeling associated with the development of the QRR alternative for flood operations at Kerr. Lake Gaston Association was a member of the Kerr 216 Study Modeling Oversight Working Group. This modeling took into account the capacities for generating/releasing water from Kerr, Gaston, and Roanoke Rapids. Because of the high generating capacity at Gaston Dam, even detailed hourly modeling of releases showed no significant difference in Lake Gaston lake levels during QRR compared to existing operations. No additional modeling is required to substantiate these conclusions. The response to Comment #13, provided by Lake Gaston Association also, offers additional support for the expectation that QRR is not expected to have an adverse effect on Lake Gaston lake levels.
14	Lake Gaston Association	High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area. Counties depend on revenue from the lake area to provide monies for financing education, social services, and law enforcement in these financially strapped areas.	A benefit of QRR is shorter periods of flood operations at Kerr, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time—reducing the number of days that lake levels could be allowed in the 200-203 ft-MSL range that results in the high water impacts that property owners are concerned about. QRR is not expected to increase shoreline erosion. The shoreline is more susceptible to erosion and tree mortality during longer periods of inundation. QRR results in fewer days when shoreline areas above elevation 200 ft-MSL could be inundated, thereby reducing the potential for erosion. QRR is not expected to increase potential for property damage on Lake Gaston. QRR results in fewer days that Lake Gaston could be operated above elevation 200 ft-MSL, thereby reducing the potential for damage to property from higher lake levels. QRR is not expected to have any additional impact on septic systems around Lake Gaston. The reduced days in flood operations under QRR means fewer days when lake levels in the 200-203 ft-MSL range, could contribute to higher water tables. QRR is not expected to result in commercial losses at Lake Gaston. The reduced number of days in flood operations under QRR means fewer days when Lake Gaston could be allowed above 200 ft-MSL, thereby remaining in the preferred range of lake levels more often. This could reduce the potential for commercial losses that property owners expect with lake level fluctuations.
15	The Nature Conservancy	In conclusion, as a stakeholder with ACOE for the study of Kerr Lake operations and a National Partner within the ACOE-TNC Sustainable Rivers Program, I applaud the high quality research, modeling and scientific analysis carried forth under this study. The Conservancy believes this action to be directly in-line and in service to the goals established for the SRP and articulated for ACOE by the recent EAB recommendation. Based on this and all the information on benefits described herein and in the EA, ACOE should move forward with implementation of the QRR alternative as concluded by the EA and codified in the revised Water Control Plan.	Thank you for your comment.
16	The Nature Conservancy	Figure 2.2 of the EA – shows The Nature Conservancy as the Managing Institution for conservation easements on several, privately-owned tracts of land. In these instances, the Clean Water Management Trust Fund, an agency of the State of N.C., not the Conservancy, is the easement holder of record. We would like the opportunity to clarify the specific lands with USACE.	Acknowledged. Corrections are addressed in the attached Errata Sheet.
17	The Nature Conservancy	On Page 26 of the EA, USACE attributes the size of the affected environment to a TNC 2008 reference. I believe the intended reference should be, Wilder, T. C., C. D. Piercy, and T. M. Swannack. 2012. *An analysis of John H. Kerr Reservoir operation alternatives benefits to the lower Roanoke River floodplain ecology - Draft report to the U.S. Army Corps of Engineers – Wilmington District*. Vicksburg, MS: US Army Engineer Research and Development Center, Environmental Laboratory. As that is the boundary condition set for comparison of habitat benefits.	Concur. Corrections are addressed in the attached Errata Sheet.

	Organization	Comment	Response
19	The Nature Conservancy	On Page 50 of the EA, the USACE asserts that there will be an increase in both greenhouse gases and criteria pollutants due to a decrease in hydropower, which is replaced with energy coming in the forms of coal and fossil fuels. The emission increases are less than 2 hundredths of a percent when compared to the total for the Sub Region Virginia/Carolinas. TNC would like to acknowledge this calculation, but add that the electricity portfolio in this region is changing to become cleaner, and USACE's emission assumptions will likely be an overestimate in the near future. For instance, Dominion Power is building a new natural gas combine cycle (NGCC) power plant in Brunswick County, VA, which has fewer greenhouse gas and particulate emissions compared to coal. In Dominion's words, this 1358MW power plant will "serve growing customer demand and replace electricity from aging coal-fired power stations being retired for economic and environmental reasons." TNC recognizes that the electricity grid is connected and complicated, but changes away from coal will reduce greenhouse gas and criteria pollutant emissions.	Noted.
20	The Nature Conservancy	Also, while USACE has considered the increase in greenhouse gases by reducing the secondary hydropower generation, TNC would like USACE to consider the reduction in methane emissions that might occur due to implementation the QRR management strategy. USACE should consider that there will be less methane generated in the flooded riparian areas downstream of the dams. In the current QRR proposal, downstream riparian areas will be flooded with more water, but for a shorter duration. In wetlands, methanogenesis (microbes releasing methane) occurs when there are prolonged periods of anoxic conditions. The QRR proposal reduces the duration of the anoxic events, thereby likely decreasing the generation of methane. Again, TNC recognizes that this would likely require further analysis, but it should be noted as another potential benefit of the QRR proposal.	Acknowledged. Although, no further technical analysis is planned for this project, QRR would be expected to reduce the duration of the anoxic events, thereby likely decreasing the generation of methane.
21	The Nature Conservancy	On Page 98 of the EA WCP revision, USACE asserts that The Nature Conservancy holds title to or conservation easements on 92,000 acres, this should be corrected to reflect that The Nature Conservancy holds title to 22,900 acres and easement and/or stewardship interest in an additional 13,950 acres of privately-owned property.	Concur. Corrections are addressed in the attached Errata Sheet.
22	The Nature Conservancy	The intention of this WCP revision is to codify the Quasi Run of River (QRR) hydrologic alternative as recommended by the 216 Study into the operations at Kerr. Implementation of a revised water control plan should provide for post-action monitoring to assess impacts and benefits to downstream stakeholders and resources. The Nature Conservancy has carried out a long-term floodplain inundation sampling program over the past 6 years as part of our work with Dominion Generation and partners. Drawing upon our experience with this effort, the Conservancy can provide guidance and assistance with continued monitoring at strategic locations. Also, through our history of work with landowners and users of the river, we have developed communication networks that can be employed to make photographic samples during flow events.	Noted.
23	The Nature Conservancy	Additional information should be included regarding the recent outbreaks of Emerald Ash Borer in Halifax Co., Virginia in the Kerr Reservoir headwaters area. It is believed that the extent of the devastation was due to the Ash tree stress from long-term inundation by high water levels in the reservoir. This level of stress occurs in the lower Roanoke due to extended duration flooding and there is a high density of Ash trees in the lower river floodplain. A similar event would be devastating.	Acknowledged. QRR has the potential to reduce outbreaks of the Emerald Ash Borer in the Kerr Reservoir headwaters in Halifax Co., VA by reducing long-term inundation on Ash trees.
24	Kerr Lake Park Watch	As the public comment period, regarding adopting the QRR Plan as part of the Corps' 216 plan for Kerr Lake, comes to an end, we at Kerr Lake Park Watch, respectfully ask to be notified once the Corps of Engineers makes a final decision.	Everyone who commented on the EA will receive a letter informing them of the Corps' final decision.

	Organization	Comment	Response
25	Halifax County Board of Commissioners	The Kerr Lake Water Control Plan will increase water flows into Lake Gaston to a rate that will increase the water levels in and around Lake Gaston to unacceptable levels.	QRR is not expected to have an adverse effect on Lake Gaston lake levels. Even the upper limit of flood releases from Kerr under QRR (up to 35,000 cfs), which is equivalent to the upper limit of flood releases under existing operations, is not expected to result in higher lake levels or more fluctuation in Lake Gaston for the following reasons: (1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston; (2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal lake levels are being maintained; and (3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels.
26	Halifax County Board of Commissioners	The Halifax County Board of Commissioners requests that the US Army Corps of Engineers consider the impact on the shoreline and property adjoining Lake Gaston and Roanoke Rapids Lake and take it into consideration in making the final decision on the Kerr Lake Water Control Plan.	QRR is not expected to increase potential for shoreline damage or property damage on Lake Gaston. On the contrary, QRR results in fewer days when shoreline areas and property such as docks and bulkheads above elevation 200 ft-MSL could be inundated, thereby reducing the potential for erosion and damage. Similar concerns were expressed by many property owners and Lake Gaston Association. The response to Comment #12, by Lake Gaston Association, offers more information
27	County of Brunswick	The implementation of QRR on Kerr Dam would consequently increase water flows into Lake Gaston, thereby, resulting in unacceptable water levels that could have serious and devastating effects to property owners on Lake Gaston (e.g., shore line erosion, home damages, public health issues and commercial losses). As a result of the aforementioned, the Board of Supervisors unanimously voted to request the U.S. Army Corps of Engineers to include the Lake Gaston Association in the decision making process to evaluate the impact of QRR to Lake Gaston before a final decision is made.	Lake Gaston Association and its stakeholders were considered during the studies and modeling associated with the development of the QRR alternative for flood operations at Kerr, during the John H. Kerr 216 Study. Lake Gaston Association was a member of the Kerr 216 Study Modeling Oversight Working Group. This modeling took into account the capacities for generating/releasing water from Kerr, Gaston, and Roanoke Rapids. Because of the high generating capacity at Gaston Dam, even detailed hourly modeling of releases showed no significant difference in Lake Gaston lake levels during QRR compared to existing operations. Similar concerns were expressed by many property owners and Lake Gaston Association. The responses to Comment #12 and Comment #15 provide further explanation as to why QRR is not expected to have an adverse effect on lake levels at Lake Gaston.
28	Buck Spring Plantation Property Owners Association	As the president of Buck Spring Plantation POA and a property owner on Lake Gaston and stake holder in the Roanoke River Basin, we are opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet. High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area.	QRR is not expected to have an adverse effect on Lake Gaston lake levels. A benefit of QRR is shorter periods of flood operations, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time. Therefore there will be fewer days under QRR that lake levels could be allowed in the 200-203 ft-MSL range that results in the high water impacts that property owners are concerned about. Even the upper limit of flood releases from Kerr under QRR (up to 35,000 cfs), which is equivalent to the upper limit of flood releases under existing operations, is not expected to result in higher lake levels or more fluctuation in Lake Gaston for the following reasons: (1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston; (2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal lake levels are being maintained; and (3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels. Similar concerns regarding high lake level impacts as a result of QRR were expressed by other Lake Gaston property owners and the Lake Gaston Association. The response to Comment #15, from the Lake Gaston Association, provides more information regarding concerns related to high water impacts.

	Organization	Comment	Response
29	Jeffrey N Haislip, Commissioner, Town of Oak City, NC	I would like a response as to how the plan will affect the upper side of the dam. I have the data about the lower river, but there are many residents along the lake who might be affected.	QRR is expected to provide a quicker return to normal pool levels in all three lakes - Kerr, Gaston and Roanoke Rapids. With the capability to make higher releases sooner under QRR than is currently allowed under existing operations, Kerr will not rise as high as often and will return to guide curve sooner. Similarly, since QRR will reduce the duration of flood control operations at Kerr, and Dominion is only allowed to operate Lake Gaston and Roanoke Rapids above normal pool when Kerr is in flood control, Lake Gaston and Roanoke Rapids lakes are expected to remain within their respective normal operating levels more often. See comment #12 for additional information.
30	Eaton Ferry Estates Property Owners Association	As a representative on a Property Owner's Board of almost three hundred owners we all are extremely concerned about the impact of the current water level control on our property values, Some of our lower level properties are as we speak are already under water much of the time. We acknowledge that Dominion is operating within their "legal" standards but many of the older homes were built under the old operating mode and the properties evaluated with that in mind. An occasional run because of high rain amounts is acceptable but a lack of consideration of our Lake in the recent modeling will create a situation that will affect thousands of people in and around the Lake. We urge you to reconsider the current QRR plan and remodel the watershed with Lake Gaston as a key element and stakeholder in that model.	During recent (winter 2015-2016) flood events, flood releases were limited to 20,000 cfs, resulting in extended flood operations which allows Dominion to utilize flood storage in Lake Gaston between elevation 200 and 203 ft-MSL. However, the levels at which Dominion operates Lake Gaston within the 3 ft of flood storage available during flood operations is outside of Corps jurisdiction. The Corps does specify when flood operations are in effect, and under QRR the duration of flood operations will be shorter. This means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more often. Lake Gaston was considered during the John H. Kerr 216 Study and modeling associated with the development of the QRR alternative for flood operations at Kerr. Lake Gaston Association was a member of the Kerr 216 Study Modeling Oversight Working Group. Modeling conducted during the John H. Kerr 216 study took into account the capacities for generating/releasing water from Kerr, Gaston, and Roanoke Rapids. Because of the high generating capacity at Gaston Dam, even detailed hourly modeling of releases showed no significant difference in Lake Gaston levels during QRR compared to existing operations. Furthermore, actual operations during past 35,000 cfs sustained flood releases demonstrate that Lake Gaston can be maintained at levels comparable to past 20,000 cfs releases. Similar concerns regarding the potential for higher lake levels were expressed by many Lake Gaston property owners and the Lake Gaston Association. The response to Comment #13 provides additional information.
31	Eaton Ferry Estates Property Owners Association	Another area of concern for me is the additional downstream flooding the QRR will cause. I understand the computer modeling concept, but computer modeling can't defy the physics of volume, gravity and discharge rate. Current discharge rates are based on many years of data and experience and the downstream flooding is a fairly known constant, if the discharge rates are increased under the proposed QRR model, additional flooding and erosion downstream will be the result. The resulting increase in flooding and erosion will far outweigh any positives the model may be predicting. The consequences of the QRR policy will be a significantly detrimental impact downstream for generations to come.	QRR allows for use of a larger range of releases sooner than existing operations, but the flood release limit of 35,000 cfs under QRR is consistent with existing operations. A flood release of 35,000 cfs has occurred several times during the operation of Kerr and is considered the highest non-damage flood release. Furthermore, the intent of QRR is to reduce the damages associated with extended lower level flood releases (20,000 cfs under existing operations). QRR flood operations will result in shorter durations of floodplain inundation in the lower Roanoke River. The benefits associated with this include improve ecosystem health and production, improved water quality and less bank erosion. Please refer to the response to comment #2 of section A-2, Agency Comments, for relative stage differences with prolonged releases of 20,000 cfs and 35,000 cfs for several gages on the lower Roanoke River.

	Organization	Comment	Response
32	Great Creek Landing POA	As the Board of Directors for the Great Creek Landing Property Owners' Association and owners on Lake Gaston and stake holders in the Roanoke River Basin we are opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet. High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area.	The availability of 3 ft of flood storage in Lake Gaston between 200 and 203 ft-MSL was part of its design and construction as a hydropower lake in series with Kerr and Roanoke Rapids. This storage is necessary to accommodate the local intervening runoff that can occur from the drainage area between Kerr Dam and Roanoke Rapids Dam during a heavy rain event. Dominion's FERC license reinforces the intent and necessity of this flood storage in Lake Gaston. Although there are times when use of this flood storage capacity has and will be necessary, implementation of QRR is not expected to have an adverse effect on Lake Gaston lake levels. A benefit of QRR is shorter periods of flood operations, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time—reducing the number of days that lake levels could be allowed in the 200-203 ft-MSL range that results in the high water impacts that property owners are concerned about. Even the upper limit of flood releases from Kerr under QRR (up to 35,000 cfs), which is equivalent to the upper limit of flood releases under existing operations, is not expected to result in higher lake levels or more fluctuation in Lake Gaston for the following reasons: (1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston; (2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal lake levels are being maintained; and (3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels. Similar concerns regarding high lake level impacts as a result of QRR were expressed by other Lake Gaston property owners and the Lake Gaston Association. The response to Comment #15, from the Lake Gaston Association, provides more information regarding concerns related to high water impacts.
33	Lizard Creek Homeowners Association	As a property owner on Lake Gaston and stake holder in the Roanoke River Basin I am opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet. High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area.	Similar concerns were expressed by many property owners on Lake Gaston and the Lake Gaston Association. Please refer to the response to Comment #32, immediately above, which provides information relative to these concerns.
34	Roanoke and Tar River Gun Club	How long will periods of 35,000 cfs be released from the Roanoke Rapids dam.	The releases under QRR will generally be equivalent to the weekly average inflows into Kerr. The duration of any specific release will be typically at least a week, due to the logistics of our weekly energy declarations. Although releases in excess of 20,000 cfs (our most common flood release under existing operations) will occur more frequently, the duration of those higher releases will be shorter.
35	Roanoke and Tar River Gun Club	What will be the level of the river at the Oak City gage (NC Hwy 11 bridge) after 7 days or more of 35,000 cfs?	River stages will be higher under a prolonged 35,000 cfs release compared to a prolonged 20,000 cfs release. Realtime gage data is not available prior to 2007, however historic event measurements and peak streamflow measurements reported by USGS provide estimated stages downstream related to prolonged 20,000 cfs and 35,000 cfs releases from Roanoke Rapids Dam. USGS peak streamflow data for January 2016 and April 2003, associated with a prolonged 20,000 cfs and 35,000 cfs release, respectively, are shown below. Please note that local inflow can cause variations in downstream river stages also. Oak City, NC (02081022) -- 20.5 ft, 21.9 ft; Hamilton, NC (02081028) -- 17.25 ft, 18.0 ft; Williamston, NC (02081054) -- 11.5 ft, 12.0 ft; Jamesville, NC (02081094) -- 3.5 ft, 4.4 ft.

	Organization	Comment	Response
36	Roanoke and Tar River Gun Club	Will our cabins be under water?	QRR allows for the use of a larger range of releases than our existing operation does, but the upper limit of releases remains the same – 35,000 cfs. The conditions observed during these flood releases under QRR will be the same as observed during past 35,000 cfs flood releases under existing operations.
37	Roanoke and Tar River Gun Club	How many of our roads, that we maintain, will be under water?	The response to your concerns about your cabins, above, applies here as well.
38	Roanoke and Tar River Gun Club	After a 35,000 cfs event, how rapidly will the water level in the river be dropped?	Releases following 35,000 cfs will depend on the weekly average inflows into Kerr. However, when appropriate, the Betterment Plan will be activated and releases will be stepped down to balance low DO water draining from the floodplains with releases from Roanoke Rapids to reduce impacts to water quality in the Roanoke River.
39	Roanoke and Tar River Gun Club	What will be the velocity of the water leaving our land after a 35,000 cfs release event and will there be significant erosion with damage to or roads or other areas?	Generally speaking, the gradual nature of river stage decline and associated floodplain drainage in the lower Roanoke should not be expected to result in significant erosion. Water velocities observed following 35,000 cfs flood releases under QRR will be the same as those observed following past 35,000 cfs flood releases under existing operations.
40	Roanoke and Tar River Gun Club	Will there be any effort to vary the flow volume during a mandated 35,000 cfs event to reduce the effect of the flooding? (ie. 35,000cfs for a number of hours followed by reduced cfs for a number of hours, returning to 35,000 cfs and repeating this scheme)	When releases are in excess of the turbine capacity of Roanoke Rapids, 20,000 cfs, releases will be at a constant flow rate from Roanoke Rapids into the lower Roanoke. It should be noted that, by the time releases from Roanoke Rapids reach Oak City, hourly variations in releases are not detectable.
41	Roanoke and Tar River Gun Club	What will be the starting date for implementation of the QRR?	Target implementation date for QRR is early-summer 2016.
42	Roanoke and Tar River Gun Club	Are there plans to evaluate the long term effects of the QRR once it is in place?	The Corps is not proposing a formal monitoring plan. The gradual and long-term nature of ecologic restoration makes it difficult to implement an effective monitoring plan, especially with variations in climatological conditions from year to year.
43	Roanoke and Tar River Gun Club	There were questions about the missing information in the small boxes in the graph on page 14 (figure 1.3) of the Environmental Assessment of the Kerr Dam Water Control Plan Revision, November 2015.	The missing information was fixed and updated in the December 2015 EA.
44	David Bone, Martin County Manager	What effect does QRR's release of 35,000 cfs have at Martin County's Moratoc Park?	The Corps understands the County's concerns for Moratoc Park. This past winter was one of our wetter winters on record, resulting in 20,000 cfs releases from Kerr for the vast majority of the winter. In addition, persistent rain in the lower basin over the winter further exacerbated downstream conditions in the vicinity of Martin County. While QRR would have allowed releases to have been increased to 35,000 cfs this past winter, the outcome would have been a much shorter duration of flood releases and a quicker return to lower river stages that would have allowed the floodplain to drain. Releases greater than 20,000 cfs are allowed under existing operations (up to 35,000 cfs), but not until Kerr Reservoir gets quite high. Under QRR, releases in the higher range of 20,000 to 35,000 cfs would be allowed sooner and more often, but for shorter durations (compared to existing 20,000 cfs releases). As mentioned, this benefits resources along the lower Roanoke River and within the floodplain by allowing a quicker return to lower flow and lower river stages in the lower Roanoke that allow for better draining of the floodplains. As a relative indicator of impacts, historical streamflow data from the US Geological Survey for periods of sustained 20,000 cfs releases (as experienced this winter) and sustained 35,000 cfs releases (as experienced most recently in April 2003) showed a peak stage of 11.5 ft at Williamston streamgage in January 2016 compared to a peak stage of 12.0 ft in April 2003. As a trade-off for this higher river stage, river stages would be at these impactful stages for a much shorter period of time.

	Organization	Comment	Response
45	Southeastern Federal Power Customers, Inc. (SeFPC)	Overall, the SeFPC generally supports the proposed WCPR as the most sensible and well balanced approach to address downstream riverine ecosystem concerns. In reviewing the eliminated alternatives to the proposed action, we believe the Corps of Engineers has arrived at a proposed solution that takes into account multiple interests without asking a particular project purpose to share a disproportionate burden. The proposed Quasi Run of River ("QRR") operations for the Kerr Project will meet this objective.	Thank you for your comment.
46	Southeastern Federal Power Customers, Inc.	We do, however, disagree with the Corps of Engineers depiction of the impact on marketed hydropower from the Kerr Project. As set forth on page 45 of the EA, the Corps of Engineers modeled a 3.4% reduction in "secondary energy" generation. As described in the EA, "[s]econdary energy is excess energy generated during flood operations and is in excess of what is required to meet minimum energy requirements." This statement assumes that energy in excess of energy minimums has less value than energy that is generated to meet a minimum requirement. From a ratemaking perspective, the "excess" or "secondary" energy has value for the power customers who pay for the power pursuant to rates established by SEPA. Energy that is sold in excess of contract minimums provides additional revenue which SEPA may apply to existing revenue requirements. Additional revenues assist SEPA in maintaining lower rates as it is required to repay the Federal investment and related costs of operating the Kerr Project. It is therefore only "secondary" or "excess" energy as measured against contract minimums. It nonetheless remains vital for SEPA as a source of revenue and maintaining rates at the lowest possible level consistent with sound business principles.	While the Corps was particularly concerned with avoiding impacts to minimum energy obligations, the Corps recognizes the value of secondary energy as well. As such, the hydropower analysis conducted by the Corps Hydropower Analysis Center did take into account the realistic value of that secondary energy in estimating those $3.8 million total net energy benefit losses (replacement energy costs) associated with QRR, of which only about $2.5 million are attributable to Kerr. While there is this 3.4% reduction in secondary generation at Kerr, the full extent of releases at Kerr under QRR will still be released via the turbines and used to generate power, and there will be no impact on minimum energy commitments. As such, relative to the positive overall ecological benefits expected from QRR, the Corps agrees that this is not a disproportionate burden to any one project purpose, including hydropower.
47	Southeastern Federal Power Customers, Inc.	Power customers that rely upon hydropower projects recognize that weather patterns will determine the performance of projects and that output will vary from year to year. When drought conditions occur, power customers pay more for replacement sources of energy when hydropower is unavailable. This often leads to rate increases. In contrast, when water is abundant and favorable meteorological conditions provide additional energy, rate structures and repayment studies are better supported. With the predicted loss of 3.4% of secondary energy, the hydropower customers will see real yet hopefully marginal rate impacts. We would encourage a revision in the EA that would note that the slight decrease in hydropower production at the Kerr Project could lead to a slight impact on repayment obligations maintained by SEPA. Including this observation will provide a more accurate accounting of the impact of the QRR on hydropower.	The EA acknowledges that at least a portion of the lost hydropower generation would need to be replaced by more expensive sources of energy, and actually presents the costs associated with full replacement of all lost generation estimated under QRR determined by the Corps Hydropower Analysis Center. While the EA does not explicitly mention impacts to SEPA's rates, it does indicate that replacement energy costs are a portion of what end-users ultimately end up paying, and we concur that these impacts on SEPA's rates and end-user costs should be slight based on the hydropower impact analysis conducted.

	Organization	Comment	Response
48	Summerwood Property Owners Association	The Lake Gaston Association and its members are concerned about the recent series of high water events in Lake Gaston. While we are aware of the significant rain the area has experienced, these events are the most we have seen in six years. We understand that Dominion and the COE are operating within the current rules. The report documents modeling for Kerr and the downstream areas past Roanoke Rapids, however, no comments discuss what the modeling found for Lake Gaston. Lake Gaston was created by Dominion Power as a power generating pool and as such has always been in a different category from most river reservoirs. The flood control function was not an intended primary use. The local Lake Gaston property owners and the surrounding counties have developed with the assurance the pool is and would remain stable. Kerr Lake by contrast was designed as flood control with the local citizens being aware of the water level fluctuation inherent in this function. We fear that we are experiencing unintended consequences of what QRR will bring. It appears that a more rapid de-watering of Kerr comes with a potentially severe effect on Lake Gaston: More frequent exposure to lake levels in excess of 201.5. While this level during a flood event keeps Dominion within the FERC guidelines, it puts the shoreline and over 8,000 docks in harm's way. We request a pause in implementation until this modeling can be accomplished. We would also encourage the proper involvement of Lake Gaston stakeholders be considered. High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area. Counties depend on revenue from the lake area to provide monies for financing education, social services, and law enforcement in these financially strapped areas.	Many Lake Gaston Property owners and the Lake Gaston Association expressed the very same concerns regarding "recent high water events in Lake Gaston" and QRR. The responses to Comments #12, #13, #14 and #15 address these concerns.
49	Timbuctu Property Owners' Association	As property owners on Lake Gaston and stake holder in the Roanoke River Basin we are strongly opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet.	The availability of 3 ft of flood storage in Lake Gaston between 200 and 203 ft-MSL was part of its design and construction as a hydropower lake in series with Kerr and Roanoke Rapids. This storage is necessary to accommodate the local intervening runoff that can occur from the drainage area between Kerr Dam and Roanoke Rapids Dam during a heavy rain event. Dominion's FERC license reinforces the intent and necessity of this flood storage in Lake Gaston. Although there are times when use of this flood storage capacity has and will be necessary, implementation of QRR is not expected to have an adverse effect on Lake Gaston lake levels. A benefit of QRR is shorter periods of flood operations, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time—reducing the number of days that lake levels could be allowed in the 200-203 ft-MSL range that results in the high water impacts that property owners are concerned about. Even the upper limit of flood releases from Kerr under QRR (up to 35,000 cfs), which is equivalent to the upper limit of flood releases under existing operations, is not expected to result in higher lake levels or more fluctuation in Lake Gaston for the following reasons: (1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston; (2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal lake levels are being maintained; and (3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels.
50	Wildwood Point Homeowners Association	I represent the 554 property owners at Wildwood Point here at Lake Gaston and I am writing to express my support for the QRR flow plan that will benefit the entire Roanoke River Basin. The benefits that were shown to water and wildlife and land owners by the 216 study were significant. As a graduate of the University of Wisconsin at Stevens Point with degrees in environmental science and Biology I was quite impressed with the science behind your decision to modify the flood management plan. This is a great thing for the Basin, you have our complete support here.	Thank you for your comment.

	Organization	Comment	Response
51	Hydrologics (Brian McCrodden)	Page 74 of the EA, Appendix A, Section C 1. Should include the following, "Once the weekly average inflows fall below 35,000 cfs, the releases will be an amount greater than the weekly average inflows, not to exceed 35,000 cfs, in order to return to the guide curve as soon as practicable."	This issue has been addressed by changes to Section C.1 of the Water Control Plan. Corrections are addressed in the attached Errata Sheet.
52	Hydrologics (Brian McCrodden)	Page 75 of the EA, Appendix A, Section C 2. Should include the following, "When the guide curve is declining (October 1 through November 30), the releases will be an amount greater than the weekly average inflows, not to exceed 35,000 cfs, in order to return to the guide curve as soon as practicable."	This issue has been addressed by changes to Section C.2 of the Water Control Plan. Corrections are addressed in the attached Errata Sheet.

3. PUBLIC COMMENT CATEGORIES AND INDEX OF COMMENTERS

Many Lake Gaston property owners and the Lake Gaston Association expressed similar concerns regarding high lake level impacts as a result of QRR. As such, the comments have been organized by category:

LL = lake level concerns (higher lake levels, variability of lake levels, damage associated with higher lake levels, etc.);

SE = concerns regarding shoreline erosion;

LM = concern that Lake Gaston was not appropriately modeled during the development of the QRR alternative; and

PH = public health issues, such as compromised septic

QRR = Opposed to QRR

SQRR = Support for QRR

Responses to the Comment Categories Above:

LL

QRR is not expected to have an adverse effect on Lake Gaston lake levels. A benefit of QRR is shorter periods of flood operations, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time. Therefore there will be fewer days under QRR that lake levels could be allowed in the 200-203 ft-MSL range that results in the high water impacts that property owners are concerned about.

Even the upper limit of flood releases from Kerr under QRR (up to 35,000 cfs), which are equivalent to the upper limit of flood releases under existing operations, are not expected to result in higher lake levels or more fluctuation in Lake Gaston for the following reasons:
(1) Generating capacity at Lake Gaston (about 44,000 cfs) exceeds generating capacity at Kerr (about 40,000 cfs), allowing any QRR release from Kerr to be passed through Lake Gaston;
(2) hourly releases up to 35,000 cfs from Kerr into Lake Gaston for much of the day are already being commonly handled by Dominion, even during non-flood operations when normal lake levels are being maintained; and
(3) Dominion is responsible for scheduling the hourly generation at all 3 projects (including Kerr), so they can coordinate releases from each project to manage their lake levels.

SE

QRR is not expected to increase shoreline erosion in Lake Gaston. The shoreline is more susceptible to erosion and tree mortality during longer periods of inundation. QRR results in shorter durations of flood operations at Kerr, which means fewer days when shoreline areas above elevation 200 ft-MSL could be inundated, thereby reducing the potential for erosion.

LM

Modeling conducted during the John H. Kerr 216 study took into account the capacities for generating/releasing water from Kerr, Gaston, and Roanoke Rapids. Because of the high generating capacity at Gaston Dam, even detailed hourly modeling of releases showed no significant difference in Lake Gaston lake levels during QRR compared to existing operations. Furthermore, actual operations during past 35,000 cfs sustained flood releases have demonstrated that Lake Gaston can be maintained at levels comparable to past 20,000 cfs releases.

PH

QRR is not expected to have any additional impact on septic systems around Lake Gaston. A benefit of QRR is shorter periods of flood operations, which means that lake levels in Lake Gaston would be maintained in the normal range of 199-200 ft-MSL more of the time—reducing the number of days that lake levels in the 200-203 ft-MSL range could contribute to higher water tables.

Commenter Name	Comment Category
Adams, John	QRR, LL, SE, PH
Addesso, Gene	SQRR
Albiston, George T.	QRR, LL, SE, PH
Alexander, Laura Sanders	QRR, LL, SE, PH
Alexander, Williams James	QRR, LL, SE, PH
Allegoud,Kathy	QRR, LL, SE, PH
Allem, Francois and Judy	QRR, LL, SE, PH
Allen, James & Karen	SQRR
Allen, John & Brenda	QRR, LL, SE, PH
Ammons, Andrew L.	QRR, LL, SE, PH
Appleman, Mary Ellen	QRR, LL, SE, PH
Arcudi, A.	QRR, LL, SE, PH
Arnold, Larry	QRR, LL, SE, PH
Ascolese, Barbara B.	QRR, LL, SE, PH
Bacon, Harris	QRR, LL, SE, PH
Badura, Rory	QRR, LL, SE, PH
Bagwell, Mr. & Mrs. William A.	QRR, LL, SE, PH
Bagwell, Robert E.	QRR, LL, SE, PH
Baker, Cassandra	QRR, LL, SE, PH
Baker, Kathy	QRR, LL, SE, PH
Baker, William & Mary	QRR, LL, SE, PH
Baltes, Jerry	QRR, LL, SE, PH
Bankard, Don and Mary Jo	QRR, LL, SE, PH
Barber, Clyde M.	LL
Barber, Dallas H.	SQRR
Barbour, Gerald	SQRR
Bareis, Diana	QRR, LL, SE, PH
Barfield, David	SQRR
Barltett, Randall G. & Donna S.	QRR, LL, SE, PH
Barner, David	QRR, LL, SE, PH
Barnes, Gregory & Brenda	QRR, LL, SE, PH
Barnitt, Scott and Felicia	QRR, LL, SE, PH
Barr, James	QRR, LL
Barton, Max & Kathryn	QRR, LL, SE, PH
Bauer, Rob and Mary	QRR, LL, SE, PH
Beall, Brooke & Judy	QRR, LL, SE
Beaman, Mike	QRR, LL, SE, PH
Bednarek, Tom	QRR, LL, SE, PH
Beil, Jerome J. & Kathleen M.	QRR, LL, SE, PH
Benfield, Dan	SQRR
Berkau, Tom	QRR, LL, SE, PH
Bersch, Mattie	QRR, LL, SE, PH
Bersch, Susan	QRR, LL, SE, PH
Biggs, Bob	QRR, LL, SE, PH
Billet, Robert	QRR, LL, SE, PH
Billet, Robert & Maxine	QRR, LL, SE, PH
Black, Kimberly A. & David M.	QRR, LL, SE, PH
Blakes	QRR, LL, PF
Blanchard, John & debbie	SQRR
Blauvelt, Bruce and Phoebe	QRR, LL, SE, PH
Blazek, Richard & Ellen	QRR
Boelte, Pete	SQRR
Boone, James R.	QRR, LL, SE, PH
Borghese, Rene	QRR, LL, SE, PH
Borngesser III, Bert V.	QRR, LL, SE, PH
Boyce, John And Elizabeth	QRR, LL, SE, PH
Boyd, Steve	SQRR
Bradley, Michael & Dale	QRR, LL, SE, PH
Brady, Marion & Millard	QRR, LL, SE, PH
Bralley, Bob	QRR, LL, SE, PH
Branch, Sylvia	QRR, LL, SE, PH
Brannan, Jesse	QRR, LL, SE, PH
Brassley, Raymond	QRR, LL, SE, PH
Braswell, Kent	QRR, LL, SE, PH
Bredland, Bruce and Kathy	QRR, LL, SE, PH
Breitenbach, Norman	QRR, LL, SE, PH

Commenter Name	Comment Category
Brennan, Mary and Bill	QRR, LL, SE, PH
Bridges, Linda	QRR, PD
Briggs, Mitch	QRR, LL, SE, PH
Brittingham, Edward M.	QRR, LL, SE, PH
Brothers, Stanley	QRR, LL, SE, PH
Brown, Carol & Ed	SQRR
Brown, Chris and Jennifer	QRR, LL, SE, PH
Brown, Cindy	QRR, LL, SE, PH
Brown, Darlene	QRR, LL, SE, PH
Brown, J. Michael	QRR, LL, SE, PH
Browne, Linda & Chuck	QRR, LL, SE, PH
Bryant, Adele	QRR, LL, SE, PH
Bryant, Ken	QRR, LL, SE, PH
Bryant, Vernon J.	LL, SE, LM
Buchan, Joseph T. & Annette	QRR, LL, SE, PH
Burch, Kelley	QRR, LL, SE, PH
Burden, Mary	QRR, LL, SE, PH
Burke, Griz	QRR, LL, SE, PH
Burke, Jim	SQRR
Burke, L	QRR, LL, SE
Burnette, Joyce & Stephen	QRR, LL, SE, PH
Burns, John B.	QRR, LL, SE, PH
Burton, Jeff and Paula	QRR, LL, SE, PH
Byler, Patrick	QRR, LL, SE, PH,
Bynum, Donald	QRR, LL, SE, PH
Calisto, Linda	QRR, LL, SE, PH
Calisto, Thomas J. & Linda G.	QRR, LL, SE, PH
Callahan, Alanson & Linda	QRR, LL, SE
Camp, Carey	QRR, LL, SE, PH
Campbell, Phillip & Diana	QRR, LL, SE, PH
Carbo, Butch & Fay	QRR, LL, SE, PH
Carne, Doug	QRR
Carroll, S. William	QRR, LL, SE
Cartaino, Christopher	QRR, LL, SE, PH
Cash, James Bryan	QRR, LL, SE, PH
Cash, Williams Bo	SQRR
Caviness, Marvin & Teresa	QRR, LL, SE, PH
Cecil, David	QRR, LL, SE, PH
Cesar, Bonnie L.	QRR, LL, SE, PH
Chappell, Rodney	SQRR
Charrier, Patty	QRR, LL, SE, PH
Cherok, Michael	QRR, LL, SE, PH
Chitsaz, Kaye	QRR, LL, SE, PH
Chupka, Michael	QRR, LL, SE, PH
Chylack, Leo T.	QRR, LL, SE, PH
Cisar, Lynn	QRR, LL, SE, PH
Clarke, James V.	QRR, LL, SE, PH
Clemmer, Jerry	SQRR
Cobb, Rochelle	QRR, LL, SE, PH
Cobb, Steve	QRR, LL, SE, PH
Coffey, Bryan	QRR, LL, SE, PH
Coil, Tracy	QRR, LL, SE, PH
Coldsmith, Arthur & Cheryl	QRR, LL, SE, PH
Collins, Jeff	QRR, LM
Conley, Brian	QRR, LL, SE, PH
Conly, Debbie & Brian	QRR, LL, SE, PH
Conroy, Carol	QRR, LL, SE, PH
Cook, Walter	SQRR
Cooley, Joy	QRR, LL, SE, PH
Cooper, Bill	QRR, LL, SE, PH
Cooper, Susan	QRR, LL, SE, PH
Corns, Steven G.	QRR, LL, SE, PH
Courtney, Newton & Evelynn	QRR, LL, SE, PH
Craddock, Dennis	SQRR
Cram, Brian S. Sr.	QRR, LL
Cree, William R.	QRR, LL, SE

Commenter Name	Comment Category
Creglow, Larry and Marcia	QRR, LL, SE, PH
Croisetiere, William & Patricia	QRR, LL, SE, PH
Crosby, Tony	QRR, LL, SE, PH
Crossman, Joyce A.	QRR, LL, SE, PH
Cude, William	SQRR
Cullen, Lidia	SQRR
Culy, Jeff	QRR, LL, SE, PH
Culy, Terri	QRR, LL, SE, PH
Cunningham, Sherrie	QRR, LL, SE, PH
Cutler, Judy	QRR, LL, SE, PH
Daigre, Darrell	QRR, LL, SE, PH
Davis, grady	SQRR
Davis, James	QRR, LL, SE
Davis, Mike	QRR, LL, SE, PH
Davis, Rick	QRR, LL, SE, PH
Day, Skipper	QRR, LL, SE, PH
Dayberry, Carol	QRR, LL, SE, PH
Deal, Daniel	SQRR
DeJesu, Frank and Pat	QRR, LL, SE, PH
Dement, John	QRR, LL, SE, PH
Dennery, Patricia & Patrick	QRR, LL, SE, PH
Deschenes, Pete & Susie	QRR, LL, SE, PH
DiCarlo, John	QRR, LL, SE, PH
DiCarlo, Rhonda	QRR, LL, SE, PH
Dick, Kevin	QRR, LL, SE, PH
Dickens, Howard	SQRR
Dieckmann, Merwin	QRR, LL, SE, PH
Dikeman, Randi	QRR, LL, SE, PH
Dillard, Barbara & Rawleigh	QRR, LL, SE, PH
Dillard, Sandra J.	QRR, LL, SE, PH
Dolecheck, Brett	SQRR
Donaghy, Joe	QRR, LL, SE
Donochod, Daniel & Margaret	QRR, LL, SE, PH
Dowhan, Jeffrey & Jodie	QRR, LL, SE, PH
Dowless, Jerry	QRR, LL, SE, PH
Drawas, Randy	QRR, LL
Duckett, Margie	QRR, LL, SE, PH
Dunmire, Mike & Katie	QRR, LL, SE, PH
Durkee, Lance	QRR, LL, SE, PH
Dusenberry, Linda	QRR, LL, SE, PH
Earley, Tom	QRR, LL, SE, PH
Eatmon, Blake	QRR, LL, SE, PH
Eckert, Fritz	QRR, LL, SE, PH
Edwards, Jean	QRR, LL SE, PH
Edwards, Lonnie	QRR, LL, SE, PH
Edwards, Perry & Anita	QRR, LL, SE, PH
Eilerson, Thomas D.	QRR, LL, SE, PH
Elder, Michael	QRR, LL
Eller, Randall & Marilyn	QRR, LL, SE, PH
Elliott, Chris	QRR, LL, SE, PH
Ellis, Gerald	QRR, LL, SE, PH
Elmore, Tom	SQRR
Emerson, Beth	QRR, LL, SE, PH
Eubanks, James O.	QRR, LL, SE, PH
Evans, Andrew and Sarah	QRR, LL, SE, PH
Evans, Andy	QRR, LL, SE, PH
Evans, Pam and Len	SQRR
Evans, Willie Ray & Betty Scott	QRR, LL, SE, PH
Fenner, Mary B.	QRR, LL, SE, PH
Fenz, Randy and Karen	QRR, LL, SE, PH
Ferraro, Patricia L.	QRR, LL, SE, PH
Field, Brian	QRR, LL, SE, PH
Field, Tonya McBride	QRR, LL, SE, PH
Field, Tonyia	QRR, LL, SE, PH
Fischbach, Roger E.	QRR, LL, SE, PH
Fitzgerald, Don & Barbara	QRR, LL, SE, PH

Commenter Name	Comment Category
Fletcher, Randy M.	QRR, LL, SE, PH
Fondren, Thomas	QRR, LL, SE, PH
Ford, Elizabeth Y.	QRR, LL, SE, PH
Foster, Paul	QRR, LL, SE, PH
Fowler, Richard E.	QRR, LL, SE, PH
Fowler, Walter & Cynthia	QRR, LL, SE, PH
Francis, Gary and Marg	QRR, LL, SE, PH
Franz, John A.	QRR, LL, SE, PH
Freeman, Hugh and Teresa	QRR, LL, SE, PH
Freeman, Tom	QRR, LL, SE, PH
Freuler, William D.	QRR, LL, SE
Funk, KC	QRR, LL, SE, PH
Galatis, Nick	QRR, LL, SE, PH
Garner, Liza	SQRR
Garner, Tracy	QRR, LL, SE, PH
Gates, Mr & Mrs E. Jack	QRR, LL, SE, PH
Gaudette, Roy P.	QRR, LL, SE, PH
George, Elise	QRR, LL, SE, PH
George, Ronald R.	QRR, LL, SE, PH
Gerbing, Fred	QRR, LL, SE, PH
Gestwicki, Tim	SQRR
Giamportone, Jack	QRR, LL, SE, PH
Gibbs, John	QRR, LL, SE, PH
Gibbs, Susan	QRR, LL, SE, PH
Gibson, Michael D.	QRR, LL, SE, PH
Glen, Roger	QRR, LL, SE, PH
Glova, Marc A. & Vanessa J.	QRR, LL, SE, PH
Godoy, Elias	QRR, LL, SE, PH
Godwin, Andrew	QRR, LL, SE, PH
Goeken, Deborah	QRR, LL, SE, PH
Golashesky, Kris	QRR, LL, SE, PH
Goodwin, Sue	QRR, LL, SE, PH
Gootee, Robin	QRR, LL, SE, PH
Goss, Julius and Donna	QRR, LL, SE, PH
Gould, Charles T & Helen H.	QRR, LL, SE, PH
Granger, Terry	QRR, LL, SE, PH
Graver, Cheryl	SQRR
Graver, Jerold L.	SQRR
Gravins III, John J.	QRR, LL, SE, PH
Gray, Richard	QRR, LL, SE, PH
Green, Michael	QRR, LL, SE, PH
Gregg, Susan D.	Other, LL, SE, PH
Greguire, Bradford	QRR
Griffin, Burges U. Jr.	QRR, LL
Groch, Henry	QRR, LL, SE, PH
Grover, Allen	QRR, LL, SE,
Grover, Allen	QRR, LL, SE, PH
Gruber, Shellie	QRR, LL, SE, PH
Grueneich, Myron	QRR, LL, SE, PH
Gucwa, Christopher A.	QRR, LL, SE, PH
Guertler, Catherine	QRR, LL, SE, PH
Haeussler, Dave	QRR, LL, SE, PH
Hagan, Carl L.	QRR, LL
Hairston, Mike & Chuckie	QRR, LL, SE, PH
Hall, Randy	QRR, LL, SE, PH
Hamilton, Hannah	SQRR
Hamilton, Richard	SQRR
Hamrick, Roger H.	QRR, LL, SE, PH
Hanson, Linda	QRR, LL, SE, PH
Hardin, James	SQRR
Harrell, Loren	QRR, LL, SE, PH
Harris, John	QRR, UL, LS
Harrison, Dallas	QRR, LL, SE, PH
Harsh, Jack	QRR, LL, SE, PH
Hasse, Joseph & Barbara	QRR, LL, SE, PH
Hatchell, Corry	QRR, LL, SE, PH

Commenter Name	Comment Category
Healy, Steve	QRR, LL, SE, PH
Heaney, joe	QRR, LL, SE, PH
Hedrick, Bernice	QRR, LL, SE, PH
Heflin, Bill	QRR, LL, SE, PH, LM
Henderson, Thomas H.	QRR, LL, SE, PH
Hendricks, Robert & Barbara	QRR, LL, SE, PH
Henry, Blair	QRR, LL, SE, PH
Henry, Karin	QRR, LL, SE, PH
Henry, Tim	QRR, LL, SE, PH
Henson, Kim	QRR, LL, SE, PH
Herbstreit, David	QRR, LL, SE, PH
Hergenrader, Tim	SQRR
Herman, Alan	QRR, LL, SE, PH
Herman, Mike	QRR, LL, SE, PH
Herring, Cindy	QRR, LL, SE, PH
Herring, Elaine	SQRR
Heston, Grant	QRR, LL, SE, PH
Heustess, Patsy	QRR, LL, SE, PH
Hill, Beverly	QRR, LL, SE, PH
Hill, Charles	QRR, LL, SE, PH
Hillard, Conley	QRR, LL, SE, PH
Hodges, Christy	QRR, LL, SE, PH
Hodges, Mitchell	QRR, LL, SE, PH
Hoffman, Charles	SQRR
Hoffman, George C.	QRR, LL, SE, PH
Holder, Gary & Georgia	QRR, LL, SE, PH
Holland, Catherine D.	QRR, LL, SE, PH
Honeycutt, Billy & Cheryl	QRR, LL, SE, PH
Hoofnagle, Bill	QRR, LL, SE, PH
Hoofnogle, William B.	QRR, LL, SE, PH
Hoover, Mont	QRR, LL, PH,
Hortensius, Peter	QRR, LL, SE, PH
Houck, Jim & Pat	QRR, LL, SE, PH
Hoyt, David and Kim	QRR, LL, SE, PH, LM
Hresko, Ursula	QRR, LL
Hubbard, Franklin	QRR, LL, SE, PH
Hubbard, Gwendolyn	QRR, LL, SE, PH
Hucks, Terry & Heidie	QRR, LL, SE, PH
Hudson, Glenn	QRR, LL,
Huebner, Doris	QRR, LL, PF
Hughes, G. Theodore	QRR, LL, SE, PH
Hughes, Mary K.	QRR, LL, SE, PH
Hunt, Adam	QRR, LL, SE, PH
Hunter, Vernon	SQRR
Hurd, Sue	QRR, LL, SE, PH
Hurst, Rita	QRR, LL, SE, PH
Hutchison, Gray	QRR, LL, SE, PH
Hyson, Angela	SQRR
Ihly, kurt	QRR, LL, SE, PH
Jackson, Bob	QRR, LL, SE, PH
Jackson, Donna	QRR, LL, SE, PH
Jacobs, Becky	QRR, LL, SE, PH
Jacobs, Daniel	QRR, LL, SE, PH
Jacques, Holly	SQRR
James, Robert & Janice	QRR, LL, SE, PH
Jamison, Robert L.	QRR, LL, SE, PH
Janousek, John	QRR, LL, SE, PH
Jennings, Allan E. Jr.	QRR, LL, SE, PH
Jennings, Jack & Charlotte	QRR, LL, SE, PH
Jensen, Richard & Deborrah	QRR, LL, SE, PH
Johnson, James	QRR, LL, SE, PH
Johnson, Margaret H.	QRR, LL, SE, PH
Johnson, Sandri	QRR, LL, SE, PH
Johnston, William R.	SQRR
Jones, Jennifer	QRR LL, SE

Commenter Name	Comment Category
Jones, Peggy	QRR, LL, SE, PH
Joyner, Glenn	QRR, LL
Kay, Stratford	SQRR
Keating, Rickey	QRR
Keefe, John B.	QRR, LL, SE, PH
Keener, Grant	SQRR
Keener, Jack	SQRR
Kelliher, Dan	QRR, LL, SE, PH
Kelly, Josh	SQRR
Kelly, Timothy & Milinda	QRR, LL, SE, PH
Kendall, Rosemary	QRR, LL
Kennedy, Kate	QRR, LL, SE, PH
Kerins, Timothy	QRR, LL, SE, PH
Kimble, George P.	QRR, LL, SE
King, Maurine	QRR, LL, SE, PH
King, William	QRR, LL, SE, PH
Kinner, Laura	QRR, LL, SE, PH
Kinton, Debbie	SQRR
Kinton, Wayne	SQRR
Kleinert, Linda	QRR, LL, SE, PH
Kleu, Jon and Kim	QRR, LL, SE, PHI
Kobs, Jeffrey and Kathryn	QRR, LL, SE, PH
Kolbe, Kent	QRR, LL, SE, PH
Koonce, Jim	SQRR
Kovacs, Kitty	QRR, LL, SE, PH
Kuykendall, R.E.	QRR, LL, SE, PH
Lamm, Wooten	SQRR
Lampley, Gerald	QRR, LL, SE, PH
Lancaster, Vikki B.	QRR, LL, SE, PH
Lang, Eric	QRR, LL, SE, PH
Langford, Richard	QRR, LL, SE, PH
Langford, Wanda	QRR, LL, SE, PH
Langston, Randall L. & Barbara A.	QRR, LL, SE, PH
Lanning, Bobby	SQRR
LaRosa, Francis	QRR, LL, SE, PH
larson, Lane	QRR, LL, SE, PH
Lathers, Jack & Judy	QRR, LL, SE, PH
Lawson, James K.	QRR, LL, SE, PH
Leal, Tony & Laura	QRR, LL, SE, PH
Leavitt, Laurence D.	QRR, LL, SE, PH
Lee, Mike	QRR, LL, SE, PH
Leigh, Laurie	QRR, LL, SE, PH
Lenahan, Robert P.	QRR, LL, SE, PH
Lenfant, Phil	QRR, LL, SE, PH
Leon, John & Jennifer	QRR, LL, SE, PH
Levandoski, Michael	SQRR
Lewis, Michael A.	QRR, LL, SE, PH
Lewis, Neal	QRR, LL, SE, PH
Light, Peggy	QRR, LL, SE, PH
Lilley, Frank	QRR, LL, SE, PH
List, Vickie & Jim	QRR, LL, SE, PH
Little, Kel	QRR, LL, SE, PH
Long, Bobby	QRR, LL, SE, PH
Long, Laura	QRR, LL, SE, PH
Loy, James M.	QRR, LL, SE, PH
Lugani, Robert L.	QRR, LL, SE, PH
Lynch, Jim	SQRR
Mackay, Trudy	QRR, LL, SE, PH
Madison, Molly	QRR, LL, SE, PH
Magee, Becky	QRR, LL, SE, PH
Maguire, Nancy & Edward	QRR, LL, SE, PH
Majoros, Robert	QRR, LL
Malone, Marshall	QRR, LL, SE, PH
Maloney, A. Wayne	SQRR
Mannheimer, David & Patricia	QRR, LL, SE, PH

Commenter Name	Comment Category
Maready, Charles & Lucy	QRR, LL
Marks, Gary	QRR, LL, SE, PH
Marsh, Ron	QRR, LL, SE, PH
Marshall, Bob & Phyllis	QRR, LL
Marshall, John & Christie	QRR, LL, SE, PH
Masson, Jo	QRR, LL, SE, PH
Matteo, Tracy	SQRR
Matthews, Larry	SQRR
Mauzy, Scott	QRR, LL, SE, PH
Maxfield, David & Karen	QRR, LL, SE,
McBride, Franklin	SQRR
McBride, Joyce	QRR, LL, SE, PH
McClarnon, Keith	QRR, LL, SE, PH
McCoid, Michael E.	QRR, LL, SE, PH
McCulloch, Dr. Margaret	QRR, LL, SE, PH
McCullough, Gail	QRR, LL, SE, PH
McDonald, Brad	SQRR
McDonald, Mike	QRR, LL, SE, PH
MCDonnell, Nancy & Mike	QRR, LL, SE, PH
McElroy, Greig	QRR, LL, SE, PH
McEwen, Tom & Patty	QRR, LL, SE, PH
McGee, Neil	QRR, LL, SE, PH
McKillips, Lee	QRR, LL, SE, PH
McLaughlin, Teresa	QRR, LL, SE, PH
McLennan, Alex	SQRR
McMann, John & Elna	QRR, LL, SE, PH
McPeters, Ann	QRR, LL, SE, PH, LM
McQuade, Ken	QRR, LL, SE, PH
McRackan, Deborah W.	QRR, LL, SE, PH
McRackan, Robert S.	QRR, LL, SE, PH
McWhinney, Bruce	QRR, LL
Mead, Glenn	QRR, LL, SE, PH
Meakem, Timothy	QRR, LL, SE, PH
Medlin, Phillip & Rebecca	QRR, LL, SE, PH
Megalos, Mark	SQRR
Melhinch, Charlie	QRR, LL, SE, PH
Mercurio, Allison S.	QRR, LL, SE, PH
Merwarth, Mike	QRR, LM, LL
Meyers, William	QRR, LL, SE, PH
Mickelson, Barb	QRR, LL, SE, PH
Miller, John & Lauren	QRR, LL, SE, PH
Miller, Michael & Dayna	QRR, LL, SE, PH
Miller, Scott	QRR, LL, SE, PH
Miller, William	QRR, LL, SE, PH
Miller-Bass, Sharon	SQRR
Minton, W. Franklin Jr.	QRR, LL, SE, PH
Mitchell, Howard	QRR, LL, SE, PH
Mock, Conrad	QRR, LL, SE, PH
Modrow, Michael	QRR, LL
Modrow, Peter	QRR, LL, SE, PH
Montague, James	QRR, LL, SE, PH
Montross, Patricia	QRR, LL, SE, PH
Moore, Catherine S.	QRR, LL, SE, PH
Moore, H.B.	QRR, LL, SE, PH
Moore, Peter & Heidi	QRR, LL, SE, PH
More, Mary	QRR, LL, SE, PH
Morris, Daniel S.	QRR, LL, SE, PH
Morris, Janet	QRR, LL, SE, PH
Morris, John N.	SQRR
Mould, Tom & Brenda	SQRR
Moye, Douglas	QRR, LL, SE, PH, LM
Moyles, Patricia	QRR, LL, SE, PH
Mull, Mike	SQRR
Mullane, Kenneth & Eileen	QRR, LL, SE, PH
Mulligan, Pete	QRR, LL, SE, PH
Mumma, Mitch	QRR, LL, SE, PH

Commenter Name	Comment Category
Munsch, Diana	QRR, LL, SE, PH
Murphy, David	QRR, LL, SE, PH
Murphy, David P.	QRR, LL, SE, PH
Murphy, James & Theresa	QRR, LL, SE, PH
Murrell, Al	QRR, LL, SE, PH
Myers, David & Deborah	QRR, LL, SE, PH
Myrick, Maynard & Jean	QRR, LL, SE, PH
Nance, Stan & Gail	QRR, LL, SE, PH
Neil, William	QRR, LL, SE, PH
Nelson, Todd	SQRR
Netherwood Jr, William	QRR, LL, SE, PH
newman, Tim	QRR, LL, SE, PH
Newsom III, Marvin	LL
Neyens, Janice	QRR, LL, SE, PH
Nolan, Richard T.	QRR, LL, SE, PH
Nold, James B.	QRR, LL, SE, PH
Norris, Kelly	QRR, LL, SE, PH
Norris, Michele	QRR, LL, SE, PH
North, Chris	SQRR
Nowell, Tarra	QRR, LL, SE, PH
Nystrom, Jonathan & Cheryl	QRR, SE, LL
Oates, Russell	SQRR
Oberton, Brent H & Phillis D.	QRR, LL, SE, PH
Odenkirk, Donald	QRR, LL, SE, PH
O'Donnell, Kim	QRR, LL
Oliver, Eddie A.	QRR, LL, SE, PH
Oschwald, Kathryn K.	QRR, LL, SE, PH
O'Sullivan, Jan	QRR, LL, SE, PH
Oveerton, Charles	SQRR
Overton, Chip & Carolyn	SQRR
Padgett, Thomas B.	QRR, LL, SE, PH
Palya, Dottie	SQRR
Pamplin, Deborah	QRR, LL, SE, PH
Pamplin, William	QRR, LL, SE, PH
Paplow, Caroline	QRR, LL, SE, PH
Paris, Anne	QRR, LL, SE, PH
Paris, Gary	QRR, LL, SE, PH
Patterson, Lisa	QRR, LL, SE, PH
Patton Jr., Dennis V.	QRR, LL, SE, PH
Paxton, Doug & Nicole	QRR, LL, SE
Payne, David & Amy	QRR, LL, SE, PH
Pearce, W. S.	QRR, LL, SE, PH
Peet, Robert K.	SQRR
Perdue, Chris	QRR, LL, SE, PH
Pernell, Effie	QRR, LL, SE, PH
Perry, John	QRR, LL, SE, PH
Pesteanu, Diana	QRR, LL, SE, PH
Phelps, Charles	QRR, LL, SE, PH
Phelps, Gerald E.	QRR, LL, SE, PH
Phillips Sr., Will A.	QRR, LL, SE, PH
Phillips, Jim and Diane	QRR
Pick, James	SQRR
Poll, Jack	QRR, LL, SE, PH
Poole, Michael F.	QRR, LL, SE, PH
Poole, Patricia H.	QRR, LL, SE, PH
Pospisil, Donna	QRR, LL, SE, PH
Potter, Al	QRR, LL, SE, PH
Powell, C.L.	QRR, LL, SE, PH
Powell, Chris	SQRR
Powell, Clarence H.	QRR, LL, SE, PH
Powell, Kaye	QRR, LL, SE, PH
Powell, Susan P.	QRR, LL, SE, PH
Price, Craig	SQRR
Proefrock, Myron & Karen	QRR, LL, SE, PH
Pucci, Mike	SQRR
Pulley, Joyce	QRR, LL, SE, PH

Commenter Name	Comment Category
Putman, Shawn	QRR, LL, SE, PH
Quigley, Brian	QRR
Quigley, Shawn	QRR, LL, SE, PH
Raabe, Peter	SQRR
Rachow, Mike	QRR, LL, SE, PH
Rajan, Natarajan & Saratha	QRR, LL, SE, PH
Ransdell, Dan	QRR, LL, SE, PH
Raub, James A.	SQRR
Read, Steven	QRR, LL, SE, PH
Reames, Marilyn H.	QRR, LL, SE, PH
Reams, Susan	QRR, LL, SE, PH
Rebne, Ross	QRR, LL, SE, PH
Redman Jr., Robert C.	QRR, LL, SE, PH
Redneck Flyers LLC	QRR, LL, SE, PH
Reed, Joanna	SQRR
Reilly, Mr. & Mrs. John K.	QRR, LL, SE, PH
Reinard, Phylis	QRR, LL, SE, PH
Reinhardt, Diane	QRR, LL, SE, PH
Reinhardt, Gary	QRR, LL, SE, PH
Reynolds, Gregory A.	QRR, LL, SE, PH
Rhodes, Susan	QRR, LL, SE, PH
Rice, Fred and Ella	QRR, LL, SE, PH
Richardson, Greg & Julie	QRR, LL, SE, PH
Rigling, Jeffrey L.	QRR, LL, SE, PH
Roberson, Greg	QRR, LL, SE, PH
Robertson, Rick	QRR, LL, SE, PH
Robertson, Scott	QRR, LL, SE, PH, LM
Rockwell, Trudy	QRR, LL, SE, PH
Rodriguez, Jane	QRR, LL, SE, PH
Rodriguez, Rubi	QRR, LL, SE, PH
Rogers, Dianne & Bruce	QRR, LL
Rogers, Frank	SQRR
Romano, Joe	QRR
Rose, Candace	QRR, LL, SE, PH
Rosenberger, Mark	QRR, LL, SE, PH
Roughton, Angela	SQRR
Rountree, Dianne	QRR, LL, SE, PH
Rountree, Jane & Don	QRR, LL, SE, PH
Rudd, Mark	QRR, LL, SE, PH
Rusk, David	QRR, LL, SE, PH
Sadler, Steve	QRR, LL, SE, PH
Sanford, Robert	QRR, LL, SE, PH
Santhouse, Beverly	QRR, LL, SE, PH
Satchell, Marj	SQRR
Saunders, Jack D.	QRR, LL, SE, PH
Sawaya, Mike	SQRR
Sawyer, Wilbur K.	QRR, LL, SE, PH
Schaech, John & Elice	QRR, LL, SE, PH
Schaeffer, Mark	QRR, LL, SE, PH
Schenk, Ed	SQRR
Scherpich, Donald & Annette	QRR, LL, SE, PH
Schnieder, Kathy	QRR, LL, SE, PH
Schroeder, Fred and Sue	QRR, LL, SE, PH
Seamster, Chris	QRR, LL, SE, PH
Seamster, Michael	SQRR
Searles, David	QRR, LL, SE, PH
Seaton, Joe	QRR, LL, SE, PH
Seaton, Joe	QRR, LL, SE, PH
Secrest, Dave and Christie	QRR, LL, SE,
Sever, Ed	QRR, LL, SE, PH
Seymour, Robert	QRR, LL, SE, PH
Shelton, Steve	QRR, LL, SE, PH
Shore, Gary	QRR, LL, SE, PH
Short, Wayne	SQRR
Showers, Craig	QRR, LL, SE, PH
Shugart, Ken & Nancy	QRR, LL, SE, PH, LM

Commenter Name	Comment Category
Shuman, Mary & Carter	QRR, LL, SE, PH
Sibiga, Martin & Christina	QRR, LL, SE, PH
Skulina, Russ	QRR, LL, SE, PH
Smathers, Lenny	SQRR
Smiegiel, Barbara	QRR, LL, SE, PH
Smigiel, Paul	QRR, LL, SE, PH
Sminkey, Kimberly	QRR, LL, SE, PH
Smith, Carl B.	QRR, LL, SE, PH
Smith, Harry F. & Debora R.	QRR, LL, SE, PH
Smith, J. Craig	QRR, LL, SE, PH
Smith, Rich	QRR, LL, SE, PH
Smith, Robert	QRR, LL, SE, PH
Smith, Shelton	SQRR
Smith, Wes	QRR, LL, SE, PH
Smith, William G.	QRR, LL, SE, PH
Snell, Leslie	SQRR
Sobey, Doug	QRR, LL, SE, PH
Solari, Sylvia & William	QRR, LL SE,
Solt, Jan and Dennis	QRR, LL, SE, PH
Soyka, Michael	QRR, LL, SE, PH
Soyka, Teresa J.	QRR, LL, SE, PH
Spates, Steve	QRR, LL, SE, PH
Sprapins, Brenda	QRR, LL, SE, PH
Stafford, Anthony	QRR, LL, SE, PH
Stallworth, Robb	QRR, LL, SE, PH
Stanek, Wencil & Rosemary	QRR, LL, SE, PH
Stanley, John	QRR, LL, SE, PH,
Starmer, Richard	SQRR
Starr, Brad	QRR, LL, SE, PH, LM
Steelman, Jennifer & Paul	QRR, LL, SE, PH
Stefanadis, James	QRR, LL, SE, PH
Steigerwald, Marirose	QRR, LL, SE, PH
Steigerwald, Steve	QRR, LL, SE, PH
Stewart, James	QRR, LL, SE, PH
Stoneburner, Francis Kathlene	QRR, LL, SE, PH
Stoner, John B.	QRR, LL, SE, PH
Stough, Paul	QRR, LL, SE, PH
Stovic, Jane	QRR, LL, SE, PH
Strickland, Jill	QRR, LL, SE, PH
Strickland, Jon	QRR, LL, SE, PH
Sullivan, Mike	QRR, LL, SE, PH
Sutton, Greg	QRR, LL, SE, PH
Szmagalski, Andrew M.	QRR, LL, SE, PH
Tarplee, William	SQRR
Tashima, Alan & Pat	QRR, LL, SE, PH
Taylor, Jerry W.	QRR, LL, SE, PH
Taylor, Robert D.	QRR, LL, SE, PH, LM
Taylor, Willie G. & Ann R.	QRR, LL, SE, PH
Tedrick, John	QRR, LL, SE, PH
Teter, Robert W.	QRR, LL, SE, PH,
Tetterton, Charles F.	QRR, LL, SE, PH
Tetterton, James H.	QRR, LL PH,
Tetteton, Charles F.	QRR, LL, SE, PH,
Tharrington, David	QRR, LL, SE, PH
Thiede, Brad	SQRR
Thomas, Mary	QRR, LL, SE, PH
Thomas, Richard E.	QRR, LL, SE, PH
Thompson, Christine	QRR, LL, SE, PH
Thompson, Sherron L.	QRR, LL, SE, PH
Thompson, Vicki	QRR, LL, SE, PH
Thorn, Allen	QRR, LL, SE, PH
Thorn, Kim	QRR, LL, SE, PH
Thorpe, Dick	QRR, LL, SE, PH
Thorpe, Howard R	QRR, LL, SE, PH
Tierney, Bob	QRR, LL, SE, PH
Tiffany III, Robert S.	SQRR

Commenter Name	Comment Category
Tillman, Betty A.	QRR, LL, SE, PH
Timberlake, Frank	SQRR
Tinsley, Will	SQRR
Tobey, Bob	SQRR
Tomazic, James and Joanne	QRR, LL, SE, PH
Townsend, Richard	QRR, LL, SE, PH
Trainum, Pat	QRR, LL, SE, PH
Trawick, David	QRR, LL, SE, PH
Tripp, Charles L.	QRR, LL, SE, PH
Tripp, Debbie	QRR, LL, SE, PH
Tucker, Shanna	QRR
Tuite, Bob	QRR, LL, SE, PH
Turnage, Michelle & Brian	QRR, LL, SE, PH
Vanarsdale, Dewitt	SQRR
Vann, Cynthia D.	LL, SE, PH
Vann, George	QRR, LL, SE, PH
Veeck, Al	QRR, LL, SE, PH
Vetreno, Nancy	QRR, LL, SE, PH
Vick, Jeff & Patricia	QRR, LL, SE, PH
Vincent, Tony	QRR, LL, SE, PH
Vinson, Britt D.	QRR, LL, SE, PH
Wadford, Dwight jr.	SQRR
Waggy, Joanne	QRR, LL, SE, PH
Wagner, Bryan	QRR, SE, LL
Walker, Jay	SQRR
Walker, William	QRR, LL, SE, PH
Walsh, Chris	QRR, LL, SE, PH
Walsh, Karen H.	QRR, LL, SE, PH
Walsh, William F.	QRR, LL, SE, PH
Walston, Stuart	QRR, LL, SE, PH
Walthorn, Allean	QRR, LL, SE, PH
Waltson, Jim	QRR, LL, SE, PH
Warfel, Jay	QRR, LL, SE, PH
Warren, Jim & Laura	QRR, LL, SE, PH
Warren, Laura	QRR, LL, SE, PH
Warren, Will H.	QRR, LL, SE, PH
Watson, Barney	QRR, LL, SE, PH
Watts, Frank	SQRR
Watts, Holt F.	QRR, LL, SE, PH
Watts, Shelton	QRR, LL, SE, PH
Weaver, Trish	QRR, LL, SE, PH
Webb, Jeff	QRR, LL, SE, PH
Webb, Sharon	QRR, LL, SE, PH
Weingarten, Bob	QRR, LL, SE, PH
Wendt, Libby	QRR, LL, SE, PH
West, Roger S.	QRR, LL, SE, PH
Westervelt, Pete and Juli	QRR, LL
Wetsel, Pete	SQRR
White, Frank Skip	QRR, LL, SE, PH
White, Jim	SQRR
Whitehead, Robert	QRR, PD
Wickens, Derrill	QRR, LL, SE, PH
Wicker, Shawn	SQRR
Wiegel, Carol	QRR, LL, SE, PH
Wilder, Ronald L. & Deborah L.	QRR, LL, SE, PH
Will, Aaron	QRR, LL, SE, PH
Williams, Cynthia	QRR, LL, SE, PH
Williams, Joe	QRR, LL, SE, PH
Williams, John	QRR, LL, SE, PH
Williams, Larry K.	QRR, LL, SE, PH
Williams, Nancy	QRR, LL, SE, PH
Williams, Royl And Sue	QRR, LL,
Williams, Sherry	QRR, LL, SE, PH
Williet, Douglas	QRR, LL, SE, PH
Wilson, Nancy F.	SQRR

Commenter Name	Comment Category
Wilson, Rick	QRR, LL, SE, PH
Winslow, Lloyd	SQRR, LL, SE,
Winston, Kenneth H.	QRR, LL, SE, PH
Winters, Jim	QRR,, SE, PH, LL
Wood, Thomas	QRR, LL, SE, PH
Wood, Thomas C.	QRR, LL, SE, PH
Woods, Harry And Patricia	SQRR
Woolridge, Charletee T.	QRR, LL
Work, Nancy & Robert	QRR, LL, SE, PH
Wright, Jim W. & Brenda A.	QRR, LL, SE, PH
Youmans, David L.	QRR, LL, SE, PH
Youmans, Jim	QRR, LL, SE, PH
Youngblood, Wilson	QRR, LL, SE, PH
Youse, Chuck and Marge	QRR, LL, SE, PH
Zeno, Joe	QRR, LL, SE, PH
Zimmerman, Robert	QRR, LL, SE, PH

Appendix D

Correspondence

County of Brunswick

OFFICE OF THE COUNTY ADMINISTRATOR

POST OFFICE BOX 399
LAWRENCEVILLE, VA 23868
PHONE - (434) 848-3107
FAX - (434) 848-0424

January 21, 2016

Mr. Eric Gasch
U.S. Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

Dear Mr. Gasch:

Subject: Quasi Run-of-River (QRR)

On January 20, 2016, a member of the Lake Gaston Association appeared before the Brunswick County Board of Supervisors to express the Association's concern about the Army Corp of Engineers' proposed recommendation to implement QRR, a process that will release volumes of water in John H. Kerr Dam (Kerr Dam) in an effort to maintain reservoir levels as close as possible to the guide curve. The implementation of QRR on Kerr Dam would consequently increase water flows into Lake Gaston, thereby, resulting in unacceptable water levels that could have serious and devastating effects to property owners on Lake Gaston (e.g., shore line erosion, home damages, public health issues and commercial losses).

As a result of the aforementioned, the Board of Supervisors unanimously voted to request the U.S. Army Corps of Engineers to include the Lake Gaston Association in the decision making process to evaluate the impact of QRR to Lake Gaston before a final decision is made. Your consideration of the Board's request is greatly appreciated.

If you have questions, do not hesitate to contact me. Thank you.

Sincerely,

Charlette T. Woolridge, Ph.D.
County Administrator

cc: Board of Supervisors

Mr. Eric Gasch (via email: eric.k.gasch@usace.army.mil)
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

As the president of Buck Spring Plantation POA and a property owner on Lake Gaston and stake holder in the Roanoke River Basin, we are opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet. High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area.

Regards,

Mike

Michael L. Herman, President
Buck Spring Plantation Property Owners Association
Hubquarter Creek, Lake Gaston, NC

Pamela F. Faggert
Chief Environmental Officer and
Vice President-Corporate Compliance

Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
Phone: 804-273-3467

January 28, 2016

Eric Gasch
Biologist
Wilmington District
U.S. Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

RE: COMMENTS ON JOHN H. KERR DAM AND RESERVIOR WATER CONTROL PLAN REVISION AND ENVIRONMENTAL ASSESSMENT

Dear Mr. Gasch,

Virginia Electric and Power Company, dba as Dominion/North Carolina Power (Dominion), has a major stake in potential changes to the operation of the John H. Kerr Project (Kerr). Dominion owns and operates two large hydroelectric developments immediately downstream of Kerr Dam. Together these developments constitute the Roanoke Rapids and Gaston Hydroelectric Project (Roanoke Rapids/Gaston). By necessity, Dominion must closely coordinate its operations at Roanoke Rapids/Gaston with those of Kerr. Dominion was fully involved in the Kerr Section 216 of the River and Harbor and Flood Control Act of 1970 (Section 216 Study) program, and is familiar with the studies conducted as part of the Section 216 Study, as well as related studies conducted on effects of the dams on the Roanoke River. With this background, Dominion has assessed the Environmental Assessment (EA) and proposed changes to Kerr's operations in terms of effects on the downstream environment and Dominion's operations. Dominion offers the following comments regarding the Water Quality, Riparian Ecosystem, and Operating Policy study as well as the proposed changes to the guide curve and water control plan at the Kerr Project known as the Quasi Run of River (QRR) plan.

Operations

With implementation of the QRR, flood discharges from Kerr when lake levels exceed the guide curve but remain below elevation 320 will change from 20,000 cubic feet per second (cfs) under the current water control plan up to a maximum of 35,000 cfs. While the new Guide Curve will help mitigate impacts, this increase will have significant operational impacts to Dominion's downstream projects. Most importantly, it will result in the reduction of renewable energy generation, with current modeling estimating that generation at Roanoke Rapids Dam could be reduced as much as 7% per year and result in the spilling of up to 15,000 cfs through the dam's spillway gates. This loss of generation will result in increased cost to ratepayers due to the need to make up the lost megawatts in the electrical system by using other more expensive options, most likely by burning fossil fuel.

Also, fluctuation of flows into the two lakes of Dominion's system will become more frequent and of higher magnitude though of shorter duration. These new conditions may challenge

Dominion's ability to meet lake level requirements of the FERC License and to maintain Lake Gaston at a stable level. The higher magnitude flows will require close coordination between Kerr and Dominion to ensure lake levels do not rise at a rate that exceeds the capabilities of the dams, particularly Roanoke Rapids.

Fisheries Resources

In addition to complicating maintenance of appropriate lake levels (FERC Operating License Article 406), implementation of the QRR will or is expected to have other effects on Dominion's ability to meet its FERC license requirements. These concerns were brought up early in the Section 216 Study discussions. Article 401 of the license requires Dominion to adhere to the Federal Power Act Section 18 fish passage requirements prescribed by the National Marine Fisheries Service. The prescription has resulted in the construction and operation of American Eel upstream passage facilities in the Roanoke Rapids bypass reach. In Dominion's six years of experience monitoring upstream movement of American Eels, exceptionally large runs of eels have been correlated with increased river flow. This is particularly true of large and sudden increases in bypass flow, as Dominion has witnessed during releases for FERC safety tests. The increased frequency of spills to the bypass reach that will occur with implementation of QRR may result in mass movements of eels that could overwhelm the current holding facilities for eels migrating upstream. This same increased frequency of spills is likely to disrupt the current anadromous fish monitoring program required as part of license Article 413. Weekly sampling is conducted March – May in the bypass reach, and requires collection of boat electrofishing and ichthyoplankton samples. The boat electrofishing cannot safely be performed at bypass flows higher than approximately 700 cfs. A 35,000 cfs declaration from Kerr Reservoir will result in 15,000 cfs being spilled to the bypass. Similarly, there will be difficulties in obtaining ichthyoplankton samples, which are currently obtained by wading in the bypass.

Of potentially greater concern is the increased probability of Striped Bass stranding in the bypass following spills that occur April – June. Historically, spills to the bypass during this time period have resulted in large Striped Bass moving into the bypass, to be stranded when flows were reduced (historically, to near zero). To some degree these concerns have been mitigated by providing continuous flow to the bypass, and the license requirement to step down bypass flows following spill events (Article 408). However, there have only been two occasions since 1995 when the bypass step down was implemented during the critical April – June time frame. During both of these events there was no evidence of stranded fish; however, this has been a rare occasion in the past. April and May are the months with the highest mean monthly flows at Roanoke Rapids (USGS), and hence are months where spills are likely to occur under QRR. The increased frequency of spills is very likely to result in Striped Bass moving into the bypass reach more frequently, increasing the chances of stranding.

Water Quality

Currently, summertime discharges from Kerr Reservoir can create low dissolved oxygen (DO) condition in deeper waters in Lake Gaston and Roanoke Rapids Lake and within the lower

Roanoke River. There is an expectation that discharges of 35,000 cfs may create larger pools of this low DO water within the two lower lakes and potentially poorer water quality conditions in the lower Roanoke as well, though if water is spilled through the flood gates at Roanoke Rapids this may serve to oxygenate the water.

Another potential DO issue could arise from increasing the rate of drainage of the floodplains back into the river if the higher flood conditions have persisted long enough to create low DO in the flooded areas that would drain back to the river. The "Betterment Plan" that is currently used to alleviate this condition may continue to do so; however it is unclear whether this plan will address the changes in conditions.

Modeling Results

Modeling of a variety of different water control scenarios was conducted to determine the effects on flooding frequency and duration in the river as well as effects on generation at the Kerr, Gaston and Roanoke Rapids dams. This modeling, based on 81 years of Roanoke River hydrology, included existing operations, the QRR and modified QRR scenarios with winter periods of varying lengths during which the existing water control plan was maintained. The results of this modeling, which have been provided to the Corps, show that any of the new scenarios will significantly reduce the maximum duration of floods above 11,000 cfs and that the modified QRR scenarios will have effects very similar to the QRR (See Table 1) and would be identical during the growing season while reducing overall loss of generation by over 20%.

Recommendation

Dominion recognizes that potential negative impacts of the QRR flow regime is the purview of the resource agencies, and therefore limits its recommendation to operational impacts to the Roanoke Rapids/Gaston Project. Dominion recommends a modification of the QRR based on independent analysis of the timing and duration of flood events greater than 11,000 cfs.

While accepting the findings of the EA that the QRR will result in an improvement in the ecology of the lower Roanoke River, there is little evidence to suggest that the higher flows in the winter will have significant positive effect. Due to demands for residential and commercial heating during the winter months, lost generation from the Roanoke Rapids/Gaston Project is of critical concern. The independent analysis indicates little difference in the frequency and duration of flood events expected to occur when existing rules are applied to the winter months. Therefore, Dominion proposes a modification to the new plan which would maintain the current water control plan with discharge from Kerr being kept to a maximum of 20,000 cfs when lake levels are below elevation 312 between December 15th and February 28th of each year. The operational benefit of this change would be to allow Dominion to more fully optimize power generation at its dams, better control water levels at Lake Gaston, reduce the amount of water spilled from the Roanoke Rapids Dam and more fully realize the benefits of renewable hydropower without detrimental environmental impact.

Thank you for allowing Dominion to submit these comments and if you have any questions, please contact Corey Chamberlain at corwin.d.chamberlain@dom.com or (804) 273-2948.

Sincerely,

Pamela Faggert

Table 1. Frequency and duration of flood events consisting of 11,000 cfs for five or more consecutive days under various operational scenarios.

Scenario	Max (days)	Min (days)	Median (days)	Average (days)	Total Events (1930 – 2011)
Existing	155	7	20	30	236 (106 from Apr - Oct)
QRR	123	7	17	23	291 (115 from Apr - Oct)
QRR – except Nov – Jan	128	7	18	24	282 (115 from Apr - Oct)
QRR – except Dec – Feb	139	7	18	25	276 (113 from Apr – Oct)
QRR – except Jan – Feb	139	7	18	24	280 (113 from Apr – Oct)
QRR – except mid-Dec – Feb	139	7	18	25	278 (114 from Apr – Oct)
QRR – except mid-Dec – mid-Feb	137	7	18	24	282 (112 from Apr – Oct)
Unregulated	182	8	17	30	202 (73 from Apr to Oct)

Eaton's Ferry Estates
Property Owners Association,
P.O. Box 625 Littleton. N. C. 27850

To: Mr. Eric Gasch (email: eric.k.gasch@usace.army.mil)
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

As a property owner on Lake Gaston and stake holder in the Roanoke River Basin I am opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet

High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area. The current high levels are already flooding many of the small islands and it will destroy the vegetation on these islands.

As a representative on a Property Owner's Board of almost three hundred owners we all are extremely concerned about the impact of the current water level control on our property values, Some of our lower level properties are as we speak are already under water much of the time. This potential for reductions in property values will have a significant negative impact on the economy of Warren County, which is already one of the poorest counties in North Carolina. We acknowledge that Dominion is operating within their "legal" standards but many of the older homes were built under the old operating mode and the properties evaluated with that in mind. An occasional run because of high rain amounts is acceptable but a lack of consideration of our Lake

Eaton's Ferry Estates
Property Owners Association,
P.O. Box 625 Littleton. N. C. 27850

in the recent modeling will create a situation that will affect thousands of people in and around the Lake. We urge you to reconsider the current QRR plan and remodel the watershed with Lake Gaston as a key element and stakeholder in that model.

Another area of concern for me is the additional downstream flooding the QRR will cause. I understand the computer modeling concept, but computer modeling can't defy the physics of volume, gravity and discharge rate. Current discharge rates are based on many years of data and experience and the downstream flooding is a fairly known constant, if the discharge rates are increased under the proposed QRR model, additional flooding and erosion downstream will be the result. The resulting increase in flooding and erosion will far outweigh any positives the model may be predicting. The consequences of the QRR policy will be a significantly detrimental impact downstream for generations to come.

I urge you to not proceed with the QRR proposal.

Respectfully;

Robert L Johnson
President Eaton Ferry Estates Property Owners Association
!92 Parkway Drive
Littleton, NC 27850

From:	David Bone
To:	Gasch, Eric K SAW
Cc:	"Barney Conway"; "Lynn Whitehurst"; "Al Cochran"; "Justin Harrison"; "Carol J. Shields"
Subject:	[EXTERNAL] Effect of QRR on Martin County"s Moratoc Park
Date:	Tuesday, January 12, 2016 3:46:07 PM
Attachments:	image002.jpg Moratoc Park - flooded canoe launch - 16.01.12.jpg Moratoc Park - flooded canoe launch.2 - 16.01.12.jpg
Importance:	High

Eric,

It was good talking with you at the information meeting last night, as well as by phone earlier today. As we discussed today, one of my concerns about the QRR is the effect 35,000 cfs may have at Martin County's Moratoc Park (Blockedhttp://www.martincountyncgov.com/MoratocPark) , which is located at 102 River Road in Williamston. If you scroll down the webpage, you will see how the main building is right on the river.

Additionally, attached are a couple of pictures taken today of our canoe / kayak launch, which is flooded and has been flooded for a few weeks. I believe you said the current flow is either 20,000 or 25,000 cfs.

We are very proud of Moratoc Park. We invested about $700,000 at the park through a grant just a few years ago. We did raise the main building almost two feet 4 years ago, so it is in better shape than it was, but I do want to make sure I understand the effect the QRR will have at the park.

You stated your GIS Tech may be able to show the effect 35,000 cfs may have at Moratoc Park. I am very interested to see this information, so please send this information to me as soon as you can.

Thank you.

David B. Bone

County Manager

305 East Main Street

P.O. Box 668

Williamston, NC 27892-0668

Halifax County Board of Commissioners

Halifax County Historic Courthouse
10 North King Street, Post Office Box 38, Halifax, North Carolina 27839
252-583-1131 · Fax: 252-583-9921
www.halifaxnc.com

January 26, 2016

Mr. Eric Gasch
United States Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403

Dear Mr. Gasch:

On behalf of the Halifax County Board of Commissioners, it has come to our attention that a proposed revision to the Kerr Lake Water Control Plan is open to public comment until Friday, January 29, 2016.

The Kerr Lake Water Control Plan will increase the water flows into Lake Gaston to a rate that will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a hydro-generation pool that has a historically mandated stable water level. Also, Lake Gaston properties are extremely vulnerable to level deviations as small as 1.5 feet. It is our understanding that the detrimental impacts on Lake Gaston shorelines and docks have not been appropriately considered in the proposed revision.

The Halifax County Board of Commissioners requests that the US Army Corps of Engineers consider the impact on the shoreline and property adjoining Lake Gaston and Roanoke Rapids Lake and take it into consideration in making the final decision on the Kerr Lake Water Control Plan. The Board further requests that the United States Army Corps of Engineers research and evaluate the concerns expressed herein.

With kindest regards, I am

Sincerely,

Vernon J. Bryant, Chairman
Halifax County Board of Commissioners

614 Beechtree Court
Chapel Hill, NC 27514
January 26, 2016

Mr. Eric Gasch
US Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

Subject: Environmental Assessment - John H. Kerr Dam and Reservoir Water Control Plan Revision, December 2015

Dear Mr. Gasch:

I am writing to express my strong support for the alternative recommended by the Corps of Engineers in this Kerr Dam and Reservoir Environmental Assessment, the Quasi-Run-of-River (QRR) operational plan. I served as Director of the NC Division of Water Resources, the non-federal sponsor of the study that led to this recommendation, during its initiation and first eight years. I am therefore knowledgeable about the intent of the study and the issues involved.

The State of North Carolina, in partnership with the Corps, has invested millions of dollars and thousands of hours of effort into this study of the effects of the current operational plan for Kerr Lake. The State and the Corps organized work groups on all aspects of Kerr Lake operations, involving all state and federal agencies and private interests who are stakeholders in the Roanoke basin. Together, we carried out valuable data collection and scientific studies, which have substantially improved our knowledge of the basin's natural resources and social and economic conditions.

The well documented conclusion of the EA is that the operation of Kerr Lake has been favoring marginal increases in power generation at the Dominion power projects to the extent that much greater benefits to the basin have been foregone. Specifically, the policy of avoiding any spilling of water at Roanoke Rapids Lake has resulted in long periods of flows of 20,000 cfs downstream from Roanoke Rapids, which have damaged forest health and productivity, wildlife resources, river bank stability, and access to the floodplain for forest management and recreation. The same policy has caused longer periods of high water at Kerr lake, with significant resulting economic losses of recreation benefits.

As our understanding of the natural resources of the basin has increased and as social and economic needs have changed, the operation of Kerr lake needs to evolve to maximize the benefits of the project under current conditions. In particular, the use of the 92,000 acres of forested floodplain in the lower basin has evolved to emphasize

conservation, forestry, hunting, and tourism. There are now about 52,000 acres of publicly owned conservation lands in the lower Roanoke, plus 39,000 acres of privately owned conservation lands. All of these land uses have substantial and growing economic as well as environmental benefits, which are being damaged by the current Kerr Lake Water Control Plan.

Adopting the QRR operating policy at Kerr Lake will bring increased environmental and economic benefits from improved forest productivity and wildlife reproduction, reduced bank erosion and land loss, and better access to the floodplain for recreation, hunting, and forest management.

In addition to these benefits to the lower Roanoke, Kerr Lake will have shorter periods of high water and the resulting loss of use of recreation sites. Improved recreation conditions at the Lake will generate an additional $525,000 per year in sales and services related to recreation and a net national economic benefit of $2,370,000 per year in aggregate recreation value.

The recommended QRR operating policy will bring Kerr Lake up to date and maximize benefits under current conditions. This change in Kerr Lake policies will be parallel to that achieved during the relicensing of the Dominion projects on the Roanoke, completed in 2003. Under the new license issued by the Federal Energy Regulatory Commission for Lake Gaston and Roanoke Rapids Lake, Dominion adjusted its power generation operations to provide a number of environmental and public benefits, such as improved flows for fish habitat and restrictions on hydropower peaking to improve spawning conditions for striped bass and other anadromous fish.

As a state partner with the Corps for the study of Kerr Lake operations, I appreciated the wide participation of stakeholders and the high quality of the data collection and scientific analysis that was accomplished. I support the well documented recommendation of the QRR alternative in the EA and recommend its adoption.

I have attached some detailed comments on the EA.

Sincerely,

John N. Morris

Comments on the John H. Kerr Water Control Plan Revision EA, December 2015

Page 34. The data on unemployment in the region is from 2009 and should be updated.

Page 45. The reference to “the original QRR” in the last three lines is not appropriate in this document.

Page 51. Some of the material on QRR recreational benefits has been erroneously left out of the second paragraph, leaving sentences that do not make sense.

Lake Gaston Association

Your primary VOICE on lake issues
Since 1989

(252) 586-6577
Toll free 1-888-586-6577
P. O. Box 656 ✦ Littleton, NC 27850

www.LakeGastonAssoc.com

January 15, 2016

TO: Commander, U.S. Army Engineers Wilmington District
Eric Gasch, US Army Corps of Engineers Wilmington District

SUBJECT: Quasi Roanoke River (QRR)

The Lake Gaston Association and its members are concerned about the recent series of high water events in Lake Gaston. While we are aware of the significant rain the area has experienced, these events are the most we have seen in six years. We understand that Dominion and the COE are operating within the current rules. The report documents modeling for Kerr and the downstream areas past Roanoke Rapids, however, no comments discuss what the modeling found for Lake Gaston.

Lake Gaston was created by Dominion Power as a power generating pool and as such has always been in a different category from most river reservoirs. The flood control function was not an intended primary use. The local Lake Gaston property owners and the surrounding counties have developed with the assurance the pool is and would remain stable. Kerr Lake by contrast was designed as flood control with the local citizens being aware of the water level fluctuation inherent in this function.

We fear that we are experiencing unintended consequences of what QRR will bring. It appears that a more rapid de-watering of Kerr comes with a potentially severe effect on Lake Gaston: More frequent exposure to lake levels in excess of 201.5. While this level during a flood event keeps Dominion within the FERC guidelines, it puts the shoreline and over 8,000 docks in harms way. We request a pause in implementation until this modeling can be accomplished. We would also encourage the proper involvement of Lake Gaston stakeholders be considered.

High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area. Counties depend on revenue from the lake area to provide monies for financing education, social services, and law enforcement in these financially strapped areas.

Sincerely.

Bill Heflin
LGA President

cc: Michael A. (Tony) Young, P.E., Water Management Wilmington District
Corey Chamberlain, Technical Consultant, Dominion Generation

Catherine S. Moore, President
Lizard Creek Homeowners Association
P. O. Box 478
Gasburg, VA 23857
(434) 636-4296

January 26, 2016

To: Mr. Eric Gasch (email: eric.k.gasch@usace.army.mil)
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

Dear Mr. Gasch:

As a property owner on Lake Gaston and stake holder in the Roanoke River Basin I am opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet.

High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area.

I would appreciate your consideration of our concerns laid out in this letter. I, along with so many others have much invested in our property here on Lake Gaston.

Very truly yours,

Catherine S. Moore,
President, Lizard Creek Homeowners Association

Armycorpsengineerslet2016

State Environmental
Review Clearinghouse
ADMINISTRATION

Bill Daughtridge, Jr.
Secretary

William W. Peaslee
General Counsel

February 16, 2016

Mr. Eric Gasch
Department of the Army
Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Re: SCH File # 16-E-0000-0202; EA; Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

Dear Mr. Gasch:

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are comments made by the agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Crystal Best
State Environmental Review Clearinghouse

Attachments
cc: Region K

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WARREN
VANCE
GRANVILLE

H12: OTHER

STATE NUMBER: 16-E-0000-0202
DATE RECEIVED: 01/12/2016
AGENCY RESPONSE: 02/08/2016
REVIEW CLOSED: 02/11/2016

MS LYN HARDISON
CLEARINGHOUSE COORDINATOR
DEPT OF ENVIRONMENTAL QUALITY
GREEN SQUARE BUILDING - MSC # 1601
RALEIGH NC

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KERR TAR REGIONAL COG

PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment
DESC: Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

CROSS-REFERENCE NUMBER: 16-E-0000-0144

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☑ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: Lyn B Hardison DATE: 2-15-16

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WARREN
VANCE
GRANVILLE

H12: OTHER

STATE NUMBER: 16-E-0000-0202
DATE RECEIVED: 01/12/2016
AGENCY RESPONSE: 02/08/2016
REVIEW CLOSED: 02/11/2016

MS RENEE GLEDHILL-EARLEY
CLEARINGHOUSE COORDINATOR
DEPT OF CULTURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
MSC 4617 - ARCHIVES BUILDING
RALEIGH NC

ER 09-2910

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DPS - DIV OF EMERGENCY MANAGEMENT
KERR TAR REGIONAL COG

P- See letter

PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment

Due 2/8/16

DESC: Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

CROSS-REFERENCE NUMBER: 16-E-0000-0144

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: Renee Gledhill-Earley DATE: 2.8.16

North Carolina Department of Natural and Cultural Resources

Pat McCrory
Governor

Susan Kluttz
Secretary

February 2, 2015

MEMORANDUM

TO: Renee Gledhill-Earley, Environmental Review Coordinator, North Carolina State Historic Preservation Office

FROM: Justin Williamson, Environmental Review Coordinator, North Carolina Division of Parks and Recreation

SUBJECT: Project #16-0202, Environmental Assessment John H. Kerr Dam and Reservoir Water Control Plan Revision, Virginia and North Carolina

The North Carolina Division of Parks and Recreation (DPR) have conducted a review of SEPA Project #16-0202 in Warren, Vance and Granville counties in North Carolina. DPR supports the effort to improve the bottomland forests of the lower Roanoke River Basin. Kerr Lake State Recreation Area (KELA) staff have reviewed the Quasi Run of River (QRR) proposal as discussed in the Environmental Assessment provided by the United States Army Corps of Engineers to the State Clearinghouse for SEPA review. Based on available facility data it appears that while some impacts that were discussed in the SEPA Gold Model from 2008 have been resolved, there still appear to be potential impacts to recreational facilities.

After review of the aforementioned Environmental Assessment this division has indicated potential impacts to facilities during the 15 day period at the beginning of June when the proposal indicated a guide curve of 302' msl. These impacts would occur during the peak season for KELA which includes Memorial Day Weekend. Based on the available data, the following impacts would occur with the QRR proposal compared to the existing curve:

- Approximately 7% of KELA's 602 campsites are unusable at 302' msl. 10 are electric hookup sites and 30 are non-electric sites. There is a potential of up to $14,000 in revenue loss from these unusable campsites during the first half of June. There is also a risk of increased damage to these sites associated with longer periods of submersion.

- The defined swim area at Satterwhite Point becomes completely unusable at 304'msl. At 302' msl there is very limited beach available between the retaining wall and the water. Additionally, the depth of the water in the swim area would increase by two feet during the first half of June, which would make this facility more hazardous during the peak visitation season. The swim beach area was constructed in 2002 and cost $208,360.

Thank You for the opportunity to provide comments on this project. For any questions please contact Justin Williamson at (919) 707-9329 or justin.williamson@ncparks.gov.

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WARREN
VANCE
GRANVILLE

H12: OTHER

STATE NUMBER: 16-E-0000-0202
DATE RECEIVED: 01/12/2016
AGENCY RESPONSE: 02/08/2016
REVIEW CLOSED: 02/11/2016

MS RENEE GLEDHILL-EARLEY
CLEARINGHOUSE COORDINATOR
DEPT OF CULTURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
MSC 4617 - ARCHIVES BUILDING
RALEIGH NC

ER 09-2910

No Comment Needed

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KERR TAR REGIONAL COG

PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment

DESC: Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

CROSS-REFERENCE NUMBER: 16-E-0000-0144

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: [X] NO COMMENT [ ] COMMENTS ATTACHED

SIGNED BY: Renee Gledhill-Earley DATE: 1-19-16

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WARREN
VANCE
GRANVILLE

H12: OTHER

STATE NUMBER: 16-E-0000-0202
DATE RECEIVED: 01/12/2016
AGENCY RESPONSE: 02/08/2016
REVIEW CLOSED: 02/11/2016

CLEARINGHOUSE COORD REGION K
KERR TAR REGIONAL COG
P.O. BOX 709
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PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment

DESC: Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

CROSS-REFERENCE NUMBER: 16-E-0000-0144

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If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☒ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: Gina Parham DATE: 2-10-16

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

Rupal Desai

COUNTY: WARREN
VANCE
GRANVILLE

H12: OTHER

STATE NUMBER: 16-E-0000-0202
DATE RECEIVED: 01/12/2016
AGENCY RESPONSE: 02/08/2016
REVIEW CLOSED: 02/11/2016

MS CARRIE ATKINSON
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC

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PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment

DESC: Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

CROSS-REFERENCE NUMBER: 16-E-0000-0144

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: [X] NO COMMENT [ ] COMMENTS ATTACHED

SIGNED BY: Rupal DATE: 01/28/16

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WARREN
VANCE
GRANVILLE

H12: OTHER

STATE NUMBER: 16-E-0000-0202
DATE RECEIVED: 01/12/2016
AGENCY RESPONSE: 02/08/2016
REVIEW CLOSED: 02/11/2016

MS CAROLYN PENNY
CLEARINGHOUSE COORDINATOR
DPS - DIV OF EMERGENCY MANAGEMENT
FLOODPLAIN MANAGEMENT PROGRAM
MSC # 4218
RALEIGH NC

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PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment

DESC: Corrected - Proposal is for the John H. Kerr Dam and Reservoir Water Control Plan Revision.

CROSS-REFERENCE NUMBER: 16-E-0000-0144

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: John D Barnhardt DATE: 22 JAN 2016

JAN 14 2016

North Carolina Department of Public Safety

Emergency Management

Pat McCrory, Governor
Frank L. Perry, Secretary

Michael A. Sprayberry, Director

January 25, 2016

State Clearinghouse
N.C. Department of Administration
1301 Mail Service Center
Raleigh, North Carolina 27699-1301

Subject: Intergovernmental Review State Number: 16-E-0000-0202
Kerr Water Control Plan Revision

As requested by the North Carolina State Clearinghouse, the North Carolina Department of Public Safety Division of Emergency Management Risk Management reviewed the John H. Kerr Dam and Reservoir Water Control Plan Revision. We offer the following comment:

Proposed changes to the hydrology or hydraulics of the Roanoke River and its tributaries associated with the John H. Kerr Dam and Reservoir Water Control Plan should be coordinated with the North Carolina Floodplain Mapping Program (NCFMP). This will help assure that the revised hydrology and hydraulics are appropriately modeled and mapped on future Flood Information Studies.

Thank you for your cooperation and consideration. If you have any questions concerning the above comments, please contact me at (919) 825-2300, by email at dan.brubaker@ncdps.gov or at the address shown on the footer of this document.

Sincerely,

John D Brubaker

John D. Brubaker, P.E., CFM
NFIP Engineer
Risk Management

cc: Tom Langan, Engineering Supervisor
John Gerber, NFIP State Coordinator
Charley Banks, Virginia Department of Conservation and Recreation

File

MAILING ADDRESS:
4218 Mail Service Center
Raleigh NC 27699-4218
www.ncdps.gov
www.ncfloodmaps.com

GTM OFFICE LOCATION:
4105 Reedy Creek Road
Raleigh, NC 27607
Telephone: (919) 825-2341
Fax: (919) 825-0408

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
January 29, 2016

Colonel Kevin P. Landers Sr., Commander
US Army Corps of Engineers Wilmington District
69 Darlington Avenue
Wilmington, NC 28403-1308

Attention: Eric Gasch

Dear Colonel Landers:

The U. S. Fish and Wildlife Service (Service) has reviewed the December 2015, Environmental Assessment, John H. Kerr Dam and Reservoir Water Control Plan Revision, Virginia and North Carolina (EA) and offers these comments. The Service has been involved in the John H. Kerr Section 216 Study which led to the development of this revised plan since its inception in 2000 and we support the Quasi Run-of-River (QRR) Alternative. Studies conducted by the Corps suggest that implementing the QRR Alternative would reduce the impacts of prolonged flooding on the lower Roanoke River floodplain. This is the largest remaining intact bottomland hardwood system on the Atlantic coast and contains the Roanoke River National Wildlife Refuge, State gamelands managed by the NC Wildlife Resources Commission, and privately owned lands, all of which support a great variety and abundance of fish and wildlife resources. Implementing QRR would reduce impacts of flood control operations on this system, and provide benefits to the system's federally-listed species, making the QRR alternative consistent with Section 7(a)(1) of the Endangered Species Act (Act). Studies conducted by the Corps also showed that QRR would not impact the Corps' ability to meet the power commitments to its customers. Furthermore, the existing guide curve was changed to minimize hydroelectric production impacts for Dominion Resources. For these reasons, the Service strongly supports the Corps' preferred alternative and encourages the Corps to begin utilizing the revised Water Control Plan (WCP) as soon as possible.

Implementation of QRR will mitigate the loss of forest diversity and resiliency which should have positive impacts upon the Federally threatened Northern Long-eared Bat, the Southeastern Myotis and Rafinesque's Big-eared Bat, both Federal Species of Concern, as well as several bird species of high priority to the Service due to declines in their populations including the Wood Thrush, Prairie Warbler, Cerulean Warbler, Kentucky Warbler, Swainson's Warbler and the Prothonotary Warbler. QRR should also, by reducing streambank erosion, lessen degradation of streamside and aquatic habitat for aquatic species such as the Atlantic Pigtoe and Green Floater

mussels and the Choanoke Crayfish all which the Service has been petitioned to list under the Endangered Species Act (Act).

Under existing operations, extended floods during the summer months lead to water stagnation on the floodplain and significant reductions of dissolved oxygen (DO) due to decomposition of leaves and other organic matter accompanied by high temperatures. When flood control ceases, this water drains back into the river, lowering DO levels in the river. There have been notable fish kills reported after the end of extended periods of flood control. At a release of 35,000 cfs the water will be flowing through more of the floodplain, reducing stagnation. The revised flow regime provided by QRR will reduce the duration of flood releases thus decreasing the time the water is on the floodplain as well, which should improve water quality during and after flood events.

Reducing prolonged flooding during the spring and summer as a result of implementing QRR should also serve to benefit diadromous fish species including the Striped Bass, American Eel (Federal Species of Concern) American Shad, Hickory Shad, Alewife (Federal Species of Concern), Blueback Herring (Federal Species of Concern) and the Federally endangered Atlantic and Shortnose sturgeons. Preliminary analysis of the relationship between Striped Bass spawning success and river discharge has shown that high volume, long duration flood control releases during late May through July often lead to poor year class survival. The revised WCP maintains the current spawning releases and coordination provisions between the Corps and the N. C. Wildlife Resources Commission.

Implementation of the revised WCP will also have long term positive effects on game species such as Wood Duck, White-tailed Deer, Black Bears, and Eastern Wild Turkeys as well as many nongame species. Hunting land along the lower Roanoke River has some of the highest lease prices per acre in the state. The more than 70,000 acres of State and Federal conservation lands along the river provide affordable opportunities for people from across the state that do not have access to private hunt clubs, to hunt these properties. One could extrapolate that as game populations decline, land values may decline as well as visitation to public lands. The extended flooding also impacts access to the floodplain by both animals and humans. Under current operations terrestrial wildlife such as the Eastern Wild Turkey and Swainson's Warbler lose nesting and foraging habitat due to extended periods of inundation. Prolonged inundation also precludes nonconsumptive human uses such as birdwatching, and hiking. Implementation of the QRR will reduce the period of time that access is impaired.

We strongly support the revised WCP which is based upon the QRR alternative. This alternative was developed through years of study and coordination by the Wilmington District and the 216 Study partners and stakeholders. This alternative not only will go far toward eliminating adverse impacts of present operations on the entire lower Roanoke River, including Roanoke River

National Wildlife Refuge, but will also restore more natural floodplain functionality. Our understanding is implementation of QRR is within the Corps' existing authority and we believe that it is consistent with Section 7 of the Act as it should improve habitat for several species as well as species that are currently being considered for listing. Attached are technical comments and edits regarding the EA and WCP we feel should be considered. Should you have any questions regarding this letter, please contact John Ellis (John_Ellis@fws.gov) of my staff.

Sincerely,

John Ellis for

Pete Benjamin
Field Supervisor

cc: NMFS, Beaufort, NC
NCWRC, Raleigh, NC
NCDWR, Raleigh, NC

Attachment

TECHNICAL COMMENTS AND RECOMMENDED EDITS TO JOHN H. KERR DEC. 2015 ENVIRONMENTAL ASSESSEMENT

Pg.10. Proposed Water Control Plan Revision (QRR Operational Change) Section: **Since river discharge is tied to river stage, we suggest explaining how river stage would change downstream under the QRR scenario. For example, at Williamston, a prolonged 20K event will cause the river stage to top out at about 11.47ft (December 2010 USGS gauge data) and a prolonged 35K river stage at Williamston will top out at about 12.01 (April 2003 USGS gauge data).**

Pg. 17 figure 2.2: **We suggest you verify land ownership as it appears there may be some discrepancies in the Big Swash area.**

Pg. 21 1st paragraph: The lower Roanoke River channel conveyance capacity is approximately 20,000 cfs before substantial flooding over the existing natural river levees occurs." **At 20,000 cfs, overbank flooding is limited to the area approximately three miles above Williamston. Overbank flooding above this area requires a higher discharge.**

Pg. 28 1st full paragraph: "Other nongame species include the Blueback Herring, Gizzard Shad, carp...." **Several species are listed twice in this paragraph.**

Pg. 35 3rd paragraph under section 2.5.2: "For Kerr Reservoir levels below 300 feet NGVD 29, discharges are typically limited to 8,000 cubic feet per second (cfs) at Roanoke Rapids Dam to preclude impacting silvicultural operations in the lower Roanoke River floodplain downstream. For reservoir levels between 300 and 312 feet NGVD 29, water releases may be increased to 20,000 cfs which can have major impacts on silvicultural operations." **The Service recommends adding the following sentence, "Since the 8000 cfs limitation was put into place, much of the land that was in silvicultural usage and impacted at flows above 8000cfs is now in conservation management."**

Pg. 47 section 3.31: "A slight increase in wetland acreage may be realized if some or all of the 1,560 acres of agricultural land that would...." **1,560 should be changed to 1,631 acres to be consistent with acreages used in other places in the documents.**

Pg. 48 top of page: **In addition to the aquatic species discussion the Service recommends the document note benefits to ground foraging and nesting birds as well as other species of wildlife. Eastern Wild turkey, herpetofauna, neotropical migratory birds such as the Swainson's and Kentucky warblers would all benefit, as well as small mammals.**

Pg. 54 top: "In summary, there will be some loss in hydropower generation, a resultant slight increase in air emissions due to replacement energy efforts, increased impacts to agriculture and silviculture, but a long-term ecological improvement in the lower river ecosystem." **The Service**

recommends including after the word ecosystem, "and the quality of downstream recreational opportunities will also improve."

TECHNICAL COMMENTS AND RECOMMENDED EDITS TO JOHN H. KERR DEC. 2015 WATER CONTROL PLAN

Pg. 74 paragraph below table 1: **The Service suggests working in the following text - Once the weekly average inflows fall below 35,000 cfs, the releases will be an amount greater than the weekly average inflows, not to exceed 35,000 cfs, in order to return to the guide curve as soon as practicable.**

Pg. 74 section C.2.: "While releases up to 35,000 cfs are possible, planned releases in this range of lake levels will be contingent on inflows and proximity to guide curve to ensure that lake level is not drawn down below guide curve." **The Service suggests working the following language into this sentence - While releases up to 35,000 cfs are possible, planned releases in this range of lake levels will be contingent on inflows and proximity to guide curve to ensure that lake level is not drawn down below guide curve.**

Pg. 75 3rd paragraph under C.3 first sentence: **The word "object" should be "objective."**

Pg. 96 section 4.2: Proposed Water Control Plan Revision (QRR Operational Change) Section: **Since river discharge is tied to river stage, we suggest explaining how river stage would change downstream under the QRR scenario. For example, at Williamston, a prolonged 20K event will cause the river stage to top out at about 11.47ft (December 2010 USGS gauge data) and a prolonged 35K river stage at Williamston will top out at about 12.01 (April 2003 USGS gauge data).**

Pg. 97 under Bottomland hardwoods, 1st paragraph: "An extended period of inundation or reduced inundation in some areas during the growing season is causing a reduction in community diversity." **The Service recommends placing the word "forest" before "community" in this sentence. Also in the same paragraph further down the word "Lower" should be lower case for consistency.**

Pg. 97, 2nd paragraph of Bottomland hardwood heading: **The Service recommends including this excellent paragraph in the EA at page 41 under Section 3.1.3 Floodplains No Action.**

Pg. 98 paragraph above the Water Quality and Fisheries heading: "A refuge expansion plan to connect the Pungo and Roanoke Refuges is being developed internally with the NWR and, if approved, approval would take several years." **Please remove this comment since it is not relevant to WCP revision.**

Pg. 98 paragraph above the Water Quality and Fisheries heading: "The Nature Conservancy holds titles or conservation easements privately protecting nearly 91,000 acres designated as the

Roanoke River Conservation Area." **There are 92,000 acres of land within the lower Roanoke River floodplain that are under conservation protection: either fee-title or easements with multiple different owners of which are NCWRC, USFWS, TNC, State of NC Department of Corrections, and private. We suggest you contact TNC to verify their specific acreage ownership.**

Pg. 102 table 3: **QRR and Status quo should be the only alternatives presented here. The same comment applies to the text under Section 8 Hydropower heading.**

North Carolina Wildlife Resources Commission

Gordon S. Myers, Executive Director

January 29, 2016

Mr. Eric Gasch
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

Subject: Comments on QRR operations in the Roanoke River

Dear Mr. Gasch:

The North Carolina Wildlife Resources Commission (NCWRC) has reviewed the Environmental Assessment (EA) for the John H. Kerr Dam and Reservoir Water Control Plan (WCP) Revision. Implementation of Quasi Run of River (QRR) operations, when compared to the current management of Roanoke River flows, should allow the lower river system to approach a more natural, pre-dam condition to the benefit of aquatic and terrestrial wildlife as well as their habitats; QRR should also reduce the frequency and duration of flood control events thereby increasing public use opportunities within floodplain habitats. We believe that implementing this QRR operation is congruent with the mission of the NCWRC, and we appreciate the opportunity to provide our agency's support for the EA and proposed WCP revision.

The mission of the NCWRC is to conserve North Carolina's wildlife resources and their habitats by providing programs and opportunities that allow hunters, anglers, boaters and other outdoor enthusiasts to enjoy wildlife-associated recreation. The NCWRC owns approximately 29,000 acres and manages an additional 2,800 acres of game lands in the lower Roanoke River basin. These game lands provide unique and essential habitats for a multitude of wildlife species and also provide abundant public use opportunities for hunting, fishing, trapping, and wildlife viewing. The NCWRC also maintains multiple Boating Access Areas in the Kerr Reservoir, Lake Gaston, Roanoke Rapids Lake and the lower Roanoke River basin to provide boating and fishing opportunities. NCWRC is also tasked with management of the state's freshwater fisheries resources, including those populations in the lower Roanoke River as well as Kerr Reservoir, Lake Gaston and Roanoke Rapids Lake.

The lower Roanoke River and its riparian areas provide important habitat for numerous aquatic and terrestrial wildlife species. Several diadromous fish species, including Striped Bass (*Morone saxatalis*), Alewife (*Alosa pseudoharengus*), Blueback Herring (*Alosa aestivalis*), American

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

Shad (*Alosa sapidissima*), Hickory Shad (*Alosa mediocris*), American Eel (*Anguilla rostrata*), and the federally endangered Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) utilize these waters. Popular resident sportfish like Largemouth Bass (*Micropterus salmoides)* also thrive in Roanoke River. The lower Roanoke River basin contains some of the best examples of levee forest, cypress-gum swamps, and bottomland hardwoods in the Atlantic Coast, and important game species such as wild turkey (*Meleagris gallopavo*), American black bear (*Ursus americanus*), and white-tailed deer (*Odocoileus virginianus*) use the adjacent floodplains and uplands during various life stages. At least 220 bird species, of which 88 are residents, also inhabit the lower Roanoke River floodplain. High quality, diverse terrestrial habitats and adequate water quality and quantity are critical to conserving the terrestrial and aquatic resources in the basin. Therefore, we agree with the EA that the more natural conditions resulting from the proposed WCP and QRR operations should improve terrestrial and aquatic habitats in the basin.

Returning the flows in the Roanoke to a more natural state has numerous aquatic benefits and should benefit terrestrial wildlife by reducing long-term inundations on adjacent riparian lands. However, floodplain forest inundation during wet years would occur as it does on natural systems. Wild turkeys and other ground nesting birds may be negatively impacted with the flooding of nesting areas during late March to May while brood impacts may occur during the entire spring and summer growing season. Travel corridors for some game species, such as black bear and white-tailed deer, may be flooded and therefore move these animals into more populated uplands. In addition to potential impacts to terrestrial species during wet years, impaired access to public lands may also occur depending on duration and extent of floodplain inundation. However, these flooding impacts already occur under current operations and can be extensive in duration, often extending 20,000 cfs flood events for months at a time. QRR operations should reduce the flood duration by about 50%, and the frequency of growing season flow events equaling or exceeding 20,000 cfs should be reduced from 12% of the time to 6% as compared to existing management. QRR reduces the duration of the maximum growing season flood from 149 days under present operation to 59 days, which is a 60% reduction. Because of the shorter flood duration, wild turkeys will likely have the opportunity to re-nest if untimely flooding disturbs an initial nesting attempt. Flood events will continue to occur under any water management scenario, and the NCWRC believes that the benefits under QRR of reduced flood duration and frequency will enhance terrestrial wildlife populations and their habitats.

Currently the USACE and the NCWRC have a cooperative agreement during the spring anadromous fish spawning season to monitor and provide appropriate outflow from Roanoke Rapids Dam for spawning releases. This cooperation is critical for maintaining an abundant Striped Bass population in the Roanoke River and Albemarle Sound. We support the increase in guide curve during the spawning season to provide adequate storage for spawning flows, and we appreciate the decision to formally include the preferred spawning flow targets as well as the cooperation agreement in the WCP revision. NCWRC also recognizes the importance of the step down procedure following flood control (Betterment Plan) during summer when low dissolved oxygen levels may be present. The Betterment Plan is essential for reducing the likelihood of fish kills following flood events during warm weather.

The NCWRC appreciates the careful consideration that USACE has given each operational alternative identified during the 216 process and in the EA. The NCWRC fully supports

implementation of the revised WCP; we agree that the QRR alternative is the best method of achieving improvements in environmental quality within the lower Roanoke River floodplain while at the same time striving to mimic more natural flow conditions. Please do not hesitate to contact Jeremy McCargo, Anadromous Research Coordinator, (252-339-5348, jeremy.mccargo@ncwildlife) for additional information.

Sincerely,

Shannon Deaton

Shannon L. Deaton, Chief
Habitat Conservation Division

cc: Christian Waters, Inland Fisheries
David Cobb, Wildlife Management Division
Brian McRae, Lands and Water Access Section

From: Mason Cox Jr.
To: Gasch, Eric K SAW
Subject: [EXTERNAL] QRR
Date: Wednesday, January 06, 2016 11:43:43 AM

January 6, 2016

To: Mr. Eric Gasch
U.S. Army Corps of Engineers
Wilmington District

Re: Roanoke and Tar River Gun Club concerns about QRR Proposal

We are the Roanoke and Tar River Gun Club, established in 1890 with the primary purpose of providing dog driven deer hunts for our membership. We are located on the Roanoke River in Bertie County, Woodville township, east of NC Hwy 11 and north of the Roanoke River bridge. We have 90 members, most of whom have cabins located on Big Field Road at 77*1451W and 36*0227N. We leased our land from various timber companies and local farmers over the years until The Nature Conservancy purchased a large tract on the Roanoke River.

In 2009 we purchased 4919 acres from The Nature Conservancy and continue to lease an additional 2,500 acres from local land owners. We have been long term good stewards of this land and have a strong stake in its future. Under the current system of flood control we have not been forced to cancel a scheduled hunt since hurricane Floyd until this year. Due to the excessive rain this year and 20,000 cfs flow from the Roanoke Rapids dam for 14 days we have been forced to hunt only a small area of higher ground available to us and to completely cancel some scheduled hunts.

We have studied the proposed QRR method of flood control and have concerns as to how we will be affected by the change. Having experience with what occurs on our land during 20,000 cfs for 14 days, we are more than anxious as to what will occur with 35,000 cfs for any significant period of time.

The club board met December 17 to discuss the QRR Proposal and many concerns were expressed. The membership is interested in answers to the following questions:

1. How long will periods of 35,000 cfs be released from the Roanoke Rapids dam.

2. What will be the level of the river at the Oak City gage (NC Hwy 11 bridge) after 7 days or more of 35,000 cfs?

3. Will our cabins be under water?

4. How many of our roads, that we maintain, will be under water?

5. After a 35,000 cfs event, how rapidly will the water level in the river be dropped?

6. What will be the velocity of the water leaving our land after a 35,000 cfs release event and

will there be significant erosion with damage to or roads or other areas?

7. Will there be any effort to vary the flow volume during a mandated 35,000 cfs event to reduce the effect of the flooding? (ie. 35,000cfs for a number of hours followed by reduced cfs for a number of hours, returning to 35,000 cfs and repeating this scheme)

8. What will be the starting date for implementation of the QRR?

9. Are there plans to evaluate the long term effects of the QRR once it is in place?

10. There were questions about the missing information in the small boxes in the graph on page 14 (figure 1.3) of the Environmental Assessment of the Kerr Dam Water Control Plan Revision, November 2015.

I appreciate any information you can provide. We do plan to attend the meeting on January 11 in Williamston and I look forward to meeting you.

Thank you for your help

Mason Cox
President, Roanoke and Tar River Gun Club
919-818-5868
masoncoxjr@gmail.com

Southeastern Federal Power Customers, Inc.

January 29, 2016

VIA EMAIL

Mr. Eric Gasch
U.S. Army Corps of Engineers
Wilmington District
60 Darlington Avenue
Wilmington, North Carolina 28403

RE: John H. Kerr Dam and Reservoir Water Control Plan Revision

Dear Mr. Gasch:

On behalf of the Southeastern Federal Power Customers, Inc. ("SeFPC" or "Customers") whose members represent the majority of electric consumers who benefit from hydropower produced at U.S. Army Corps of Engineers ("Corps of Engineers") projects in the Southeast, I am providing comments on the Environmental Assessment ("EA") for the John H. Kerr Dam and Reservoir ("Kerr Project") Water Control Plan Revision ("WCPR"). The SeFPC thanks the Wilmington District Staff for the opportunity to share some additional thoughts on the proposed changes to the operations of the Kerr Project.

The members of the SeFPC either directly purchase capacity and energy marketed by the Southeastern Power Administration ("SEPA") or represent municipally owned utilities and rural electric cooperatives that have power purchase agreements with SEPA. Certain of the SeFPC members receive the benefit of capacity and energy that is provided by the Kerr Project and the Philpott Project which is located upstream of the Kerr Project. Because of this relationship, the SeFPC has a specific interest in the operation of the Kerr Project.

Overall, the SeFPC generally supports the proposed WCPR as the most sensible and well balanced approach to address downstream riverine ecosystem concerns. In reviewing the eliminated alternatives to the proposed action, we believe the Corps of Engineers has arrived at a proposed solution that takes into account multiple interests without asking a particular project purpose to share a disproportionate burden. The proposed Quasi Run of River ("QRR") operations for the Kerr Project will meet this objective.

We do, however, disagree with the Corps of Engineers depiction of the impact on marketed hydropower from the Kerr Project. As set forth on page 45 of the EA, the Corps of Engineers modeled a 3.4% reduction in "secondary energy" generation. As described in the EA, "[s]econdary energy is excess energy generated during flood operations and is in excess of what is required to meet minimum energy requirements." This statement assumes that energy in excess of energy minimums has less value than energy that is generated to meet a minimum requirement.

From a ratemaking perspective, the "excess" or "secondary" energy has value for the power customers who pay for the power pursuant to rates established by SEPA. Energy that is sold in excess of contract minimums provides additional revenue which SEPA may apply to existing revenue requirements. Additional revenues assist SEPA in maintaining lower rates as it is required to repay the Federal investment and related costs of operating the Kerr Project. It is therefore only "secondary" or "excess" energy as measured against contract minimums. It nonetheless remains vital for SEPA as a source of revenue and maintaining rates at the lowest possible level consistent with sound business principles.

Power customers that rely upon hydropower projects recognize that weather patterns will determine the performance of projects and that output will vary from year to year. When drought conditions occur, power customers pay more for replacement sources of energy when hydropower is unavailable. This often leads to rate increases. In contrast, when water is abundant and favorable meteorological conditions provide additional energy, rate structures and repayment studies are better supported.

With the predicted loss of 3.4% of secondary energy, the hydropower customers will see real yet hopefully marginal rate impacts. We would encourage a revision in the EA that would note that the slight decrease in hydropower production at the Kerr Project could lead to a slight impact on repayment obligations maintained by SEPA. Including this observation will provide a more accurate accounting of the impact of the QRR on hydropower.

Please let me know if you have any questions.

Sincerely,

/S/

Richard M. Feathers
Chairman
Water Storage Reallocation Committee
Southeastern Federal Power Customers, Inc.

TO: Army Corps of Engineers

SUBJECT: Quasi Roanoke River (QRR)

The Lake Gaston Association and its members are concerned about the recent series of high water events in Lake Gaston. While we are aware of the significant rain the area has experienced, these events are the most we have seen in six years. We understand that Dominion and the COE are operating within the current rules. The report documents modeling for Kerr and the downstream areas past Roanoke Rapids, however, no comments discuss what the modeling found for Lake Gaston.

Lake Gaston was created by Dominion Power as a power generating pool and as such has always been in a different category from most river reservoirs. The flood control function was not an intended primary use. The local Lake Gaston property owners and the surrounding counties have developed with the assurance the pool is and would remain stable. Kerr Lake by contrast was designed as flood control with the local citizens being aware of the water level fluctuation inherent in this function.

We fear that we are experiencing unintended consequences of what QRR will bring. It appears that a more rapid de-watering of Kerr comes with a potentially severe effect on Lake Gaston: More frequent exposure to lake levels in excess of 201.5. While this level during a flood event keeps Dominion within the FERC guidelines, it puts the shoreline and over 8,000 docks in harms way. We request a pause in implementation until this modeling can be accomplished. We would also encourage the proper involvement of Lake Gaston stakeholders be considered.

High water in Lake Gaston (over 201.5) has serious consequences for home owners on Lake Gaston. Shore line erosion, property damage, public health issues (septic fields compromised by high water tables), and commercial losses, could devastate this area. Counties depend on revenue from the lake area to provide monies for financing education, social services, and law enforcement in these financially strapped areas.

Ed Sever
President,
Summerwood Property Owners Assn
Littleton, NC 2780

To: Mr. Eric Gasch (email: eric.k.gasch@usace.army.mil)
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

I am writing on behalf of the Board and Property Owners of the Timbuctu Property Owners' Association (TPOA).

The Timbuctu subdivision is one of the most sought after properties on Lake Gaston. Our very active POA has paid attention to all issues that would affect the value of the property and the enjoyment of lake living. Our members feel that they have paid a premium to live on a lake with controlled lake levels and that the proposed changes are a threat to those of property value preservation and enjoyment of the lake. As such, the POA will be an active participant in any opposition to the QRR plan.

As property owners on Lake Gaston and stake holder in the Roanoke River Basin we are strongly opposed to the proposed QRR plan. This plan will increase the water flows into Lake Gaston (a power generating pool) to a rate which will increase the water levels in and around Lake Gaston to unacceptable levels. Lake Gaston is a Hydro-Generation pool which has a historically mandated stable water level. Our property is extremely vulnerable to level deviations as small as 1.5 feet.

Everyone who invests in property on Lake Gaston does so because of the stable water levels, and the property values on Lake Gaston as compared to adjacent lakes has reflected that important difference. Because this fundamentally changes how the lake is managed, I foresee further action by lake property owners in order to protect our property values and the investments made in good faith in our docks and property /shoreline.

We are prepared to engage all means at our disposal to fight any change that threatens property values and/or enjoyment of that property.

Laurie Leigh
President
Timbuctu Property Owners Association
37 Nutcracker Lane, Boydton, VA 23917

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January 28th, 2016

Colonel Kevin P. Landers, Sr., Commander
U.S. Army Corps of Engineers Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403-1398

Subject: Environmental Assessment - John H. Kerr Dam and Reservoir Water Control Plan Revision, December 2015

Attention: Eric Gasch

Dear Colonel Landers:

The Nature Conservancy (TNC) has reviewed and appreciates the opportunity to comment on the *Environmental Assessment, John H. Kerr Dam and Reservoir Water Control Plan Revision, Virginia and North Carolina* (EA) dated December 2015 and prepared by the U.S. Army Corps of Engineers (USACE) – Wilmington District. The EA provides background on and documents the significant and comprehensive undertaking USACE and partners invested into the John H. Kerr Dam and Reservoir Section 216 feasibility study. The purpose of this study was an operational review of J.H. Kerr to determine advisability of modifications for the purpose of improving the quality of the environment under Section 216 of Public Law 91-611, the River and Harbor and Flood Control Act of 1970. Research and evaluations conducted within the 216 Study revealed environmental degradation from current reservoir flood control operations on downstream natural resources and identified one management alternative, Quasi-Run-of-River (QRR), as providing significant improvement. The EA describes the environmental consequences of the No Action (status quo) alternative and the QRR, which is the Wilmington District's preferred alternative. The Nature Conservancy submits these comments in full support of QRR as the preferred alternative documented within the above referenced Study and EA and for execution of the associated Revised Water Control Plan as the means for QRR implementation.

The Nature Conservancy's Mission and Investment in the Lower Roanoke - The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends. The Conservancy is a leading conservation organization working in all 50 states and more than 35 countries. We have helped conserve nearly 15 million acres of land in the United States and more than 118 million acres with partner organizations globally. The TNC Roanoke River Project officially started in 1982 with a donation from Union Camp Corporation of 176 acres of land. Since that time, TNC working with partners has helped conserve approximately 95,000 acres along the river, its floodplain and in the surrounding watershed.

Conservation Significance of The Lower Roanoke River Region - The Roanoke is one of the largest alluvial rivers on the eastern slope of North America. It provides habitat for a very large and relatively unfragmented system of bottomland hardwood and swamp forests and the most diverse and numerous population of diadromous fishes on the Atlantic slope south of the St. Lawrence River. The Nature Conservancy's Roanoke River Conservation Area is considered to begin at the fall line and extend to Albemarle Sound and to include the immediate floodplains of the river and its tributaries, comprising roughly 250,000 acres. The North Carolina Natural

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Heritage Program includes in its inventory of rare and vulnerable species and natural communities in the RRCA, habitat for two federally listed animals, 16 additional state-listed animals, and 13 state-listed plants. Thirty-one natural communities are known to occur in the RRCA, of which 16 are listed as exemplary by the North Carolina Natural Heritage Program. Of 214 bird species found in the RRCA, 88 are known to nest there, including 44 neo-tropical migrants, many of which are thriving in the RRCA while they decline throughout most of the rest of their ranges. One of America's "Great Rivers", the Roanoke flows over 400 miles from its headwaters in the Blue Ridge Mountains of Virginia, across the Piedmont, and into the Coastal Plain where, at its delta, becomes the Albemarle Sound. Freshwater traveling down the Roanoke is he source for over 60% of the water flow into the Albemarle-Pamlico Sounds, a National Estuary Partnership site designated by the United States Congress as an "estuary of national significance" in 1987.

The U.S. Army Corps of Engineers and The Nature Conservancy Sustainable Rivers Program (SRP) - The Roanoke River is one of the eight original rivers enrolled in the Sustainable Rivers Program, a joint effort between USACE and TNC. In 2015, USACE and TNC initiated work on six additional rivers. TNC would like to acknowledge that the USACE has been formally working on e-flows nationwide with our organization since 2000. In April of 2014, the USACE Environmental Advisory Board (EAB) recognized the many benefits of e-flows at dams, and sent a letter to USACE to recommend the consideration of e-flows within their operations. EAB highlighted that there are low cost opportunities to incorporate e-flows into USACE dam operations, and USACE has the authority to make these operational changes. These changes involve water releases that are designed to provide variable flows that are more like pre-dam flows, creating ecological and economic benefits downstream. In a response letter, USACE headquarters committed to pursuing even more opportunities to implement e-flows. The QRR operational changes to Kerr Lake reservoir are exactly the type of strategies embraced by the EAB and USACE headquarters and fitting a signature river in the SRP.

Further, general policy requires periodic revision of Water Control Plans to assure optimum benefits. Under standard procedures established by ER 1110-2-240 and other policy, the Corps will take "necessary actions" to keep each Water Control Plan (and Manual) up-to-date. Specifically, a plan will be "…revised as necessary to conform with changing requirements resulting from developments in the project area and downstream, improvements in technology, new legislation and other relevant factors, provided such revisions comply with existing Federal regulations and established Corps of Engineers policy. The Corps is responsible for insuring the maximum sustained public benefits from each of its projects for all desirable purposes.

We view the Kerr 216 study and implementation of QRR as an opportunity to pursue the shared goals of the Corps and Conservancy to balance flood control, reservoir management, hydropower, natural resource conservation, economic development and other resources along the lower Roanoke River in sustainable ways. Operating the reservoir under the QRR alternative shifts the structure of the water control plan (WCP) to employ outflows that more closely mimic inflows resulting in a downstream flow regime more resembling natural river flow while still providing flood control and hydropower benefits. Short duration releases of 35,000 cubic feet per second (cfs) would become more frequent while long duration releases of 20,000 cfs would become less frequent. There are significant downstream, flood risk reduction and in-reservoir benefits associated with such a change.

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The QRR Alternative Impacts on Downstream Flows - Based on analyses conducted by USACE and other study participants, and relying on outputs from the Roanoke River Basin Reservoir Operations Model maintained by the NC Dept. of Environmental Quality, the proposed alternative will reduce flood durations downstream of the dam by about 50% and growing season flow events equaling or exceeding 20,000 cfs from 12% of the time to 6% as compared to existing management. The QRR Alternative reduces the duration of the maximum growing season flood from 149 days under present operation to 59, a 60% reduction. Reducing the duration of growing season floods, according to USACE and other studies, will benefit the quality and availability of wildlife habitat.

Benefits of the QRR Alternative for Downstream Landowners - According to recent research, continuing with the existing management will so severely impact the ability of valuable hardwood species (e.g., oaks, hickories) to reproduce that they will gradually disappear from most of the floodplain, being replaced by low-value species like red maple and sweet gum. Reducing flood durations on timberlands in the QRR Alternative will greatly reduce this severe economic impact and help maintain these valuable timber types.

Sustained growing season floods under existing operations inhibit reproduction of ground-nesting and ground-foraging birds, e.g., quail and wild turkey, and other species, such as box turtles, deer and rabbit, which are driven off flooded lands by the high water. QRR will significantly reduce the loss of diversity and abundance of wildlife species that the current Kerr Lake operating policy is causing in the Lower Roanoke.

Reducing the duration of floods by about 50% with the QRR Alternative also will reduce the frequency and severity of bank collapse, preventing further degradation of fish and aquatic habitat and reducing the rate of shoreline land loss.

QRR increases the number of non-flood events (flows less than 7,500 cfs in the lower river) by 6% over of the period of record, based on modeled results. This increase in non-flood days coupled with the reduction in flood events results in over 4,000 acre-days of non-flood time and area per year. By substantially reducing high water periods that block access to the floodplain, QRR will significantly increase angler, hunter and outdoor enthusiast use of the floodplain and the associated economic benefits.

The QRR Alternative Impacts on Kerr Lake - At Kerr Reservoir, the entire flood control storage space is required to satisfy current criteria established for flood purposes. In four separate flood events between 1975 and 1996 over ninety percent of the controlled flood storage at Kerr was utilized. The April 1987 event pushed the reservoir level to less than six inches away from the point at which releases downstream would have to equal eighty-five percent of the computed inflow (a volume of approximately 100,000 cfs). Between 1975 and 2009, 8 flood events occurred where lake levels equaled or exceeded 316' and utilized 75% or greater of the controlled flood storage capacity. This means there was only remaining storage at that time for less than ¾" of rain in the watershed. QRR evacuates the flood storage volume 1.8 times faster than Status Quo meaning that to drop the reservoir from 308' to 300' would require only 6 days under QRR versus 11 under Status Quo.

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Based on analyses conducted by USACE and other study participants, and relying on modeled outputs from the Roanoke River Basin Reservoir Operations Model maintained by the NC Dept. of Environmental Quality, under the status quo, 305 feet or more elevation is reached in Kerr Lake 6% of the time. The proposed alternative will reduce 305 foot or more elevations to 1% of the time, an 83% improvement.

Benefits of the QRR Alternative for Kerr Lake Landowners - When Kerr Reservoir reaches 302 feet above MSL, public campsites and beaches begin to close. At 304 feet, boat ramps begin to close. At 305 feet, most shore-based recreation facilities are closed, and marinas begin to shut down. At these elevations, recreational equipment and utilities are at risk and are frequently removed at significant public expense to avoid substantial losses. These risks and costs will be reduced by QRR. Long periods of inundation cause shoreline erosion in the reservoir. At high elevations, public beaches wash away and have to be replaced. The QRR Alternative will greatly reduce high water damage to shorelines.

Based on recent studies, shorter periods of high water in Kerr Reservoir will improve recreation conditions at the and generate an additional $525,000 per year in sales and services related to recreation and a net national economic benefit of $2,370,000 per year in aggregate recreation value.

In conclusion, as a stakeholder with ACOE for the study of Kerr Lake operations and a National Partner within the ACOE-TNC Sustainable Rivers Program, I applaud the high quality research, modeling and scientific analysis carried forth under this study. The Conservancy believes this action to be directly in-line and in service to the goals established for the SRP and articulated for ACOE by the recent EAB recommendation. Based on this and all the information on benefits described herein and in the EA, ACOE should move forward with implementation of the QRR alternative as concluded by the EA and codified in the revised Water Control Plan.

Sincerely,

Jason C. "Chuck" Peoples

Jason C. "Chuck" Peoples
Director of Conservation Programs

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Suggested Edits and Additions to the EA and WCP –

Figure 2.2 of the EA – shows The Nature Conservancy as the Managing Institution for conservation easements on several, privately-owned tracts of land. In these instances, the Clean Water Management Trust Fund an agency of the State of N.C., not the Conservancy, is the easement holder of record. We would like the opportunity to clarify the specific lands with USACE.

On **Page 26** of the EA, USACE attributes the size of the affected environment to a TNC 2008 reference. I believe the intended reference should be, Wilder, T. C., C. D. Piercy, and T. M. Swannack. 2012. *An analysis of John H. Kerr Reservoir operation alternatives benefits to the lower Roanoke River floodplain ecology - Draft report to the U.S. Army Corps of Engineers – Wilmington District.* Vicksburg, MS: US Army Engineer Research and Development Center, Environmental Laboratory. As that is the boundary condition set for comparison of habitat benefits.

On **Page 50** of the EA, the USACE asserts that there will be an increase in both greenhouse gases and criteria pollutants due to a decrease in hydropower, which is replaced with energy coming in the forms of coal and fossil fuels. The emission increases are less than 2 hundredths of a percent when compared to the total for the Sub Region Virginia/Carolinas. TNC would like to acknowledge this calculation, but add that the electricity portfolio in this region is changing to become cleaner, and USACE's emission assumptions will likely be an overestimate in the near future. For instance, Dominion Power is building a new natural gas combine cycle (NGCC) power plant in Brunswick County, VA, which has fewer greenhouse gas and particulate emissions compared to coal. In Dominion's words, this 1358MW power plant will "serve growing customer demand and replace electricity from aging coal-fired power stations being retired for economic and environmental reasons." TNC recognizes that the electricity grid is connected and complicated, but changes away from coal will reduce greenhouse gas and criteria pollutant emissions.

Also, while USACE has considered the increase in greenhouse gases by reducing the secondary hydropower generation, TNC would like USACE to consider the reduction in methane emissions that might occur due to implementation the QRR management strategy. USACE should consider that there will be less methane generated in the flooded riparian areas downstream of the dams. In the current QRR proposal, downstream riparian areas will be flooded with more water, but for a shorter duration. In wetlands, methanogenesis (microbes releasing methane) occurs when there are prolonged periods of anoxic conditions. The QRR proposal reduces the duration of the anoxic events, thereby likely decreasing the generation of methane. Again, TNC recognizes that this would likely require further analysis, but it should be noted as another potential benefit of the QRR proposal.

On **Page 98** of the EA WCP revision, USACE asserts that The Nature Conservancy holds title to or conservation easements on 92,000 acres, this should be corrected to reflect that The Nature Conservancy holds title to 22,900 acres and easement and/or stewardship interest in an additional 13,950 acres of privately-owned property.

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In **Part C** of the WCP Operation for Flood Control, recommend USACE include language allowing for releases greater than weekly average inflows (not to exceed 35,000 cfs), once average inflows have fallen below 35,000 cfs, but while reservoir levels remain above guide curve.

Additions Requested –

The intention of this WCP revision is to codify the Quasi Run of River (QRR) hydrologic alternative as recommended by the 216 Study into the operations at Kerr. Implementation of a revised water control plan should provide for post-action monitoring to assess impacts and benefits to downstream stakeholders and resources. Examples of monitoring that should prove informative and not overly burdensome include:

- Use of continuous recording floodplain gages and photo monitoring at strategic locations to track floodplain inundation;
- Utilizing landowners, hunters, etc , to collect photographic information during significant flow events;
- Tracking dissolved oxygen levels via U.S. Geological Survey gages with DO equipment at Oak City, Jamesville, and NC Highway 45;
- Assessments of forest composition changes by resampling of Carolina Vegetation Survey (CVS) permanent vegetation plots that were established in 1995 and sampled again in 2009;
- Models of hydrologic indicators to assess river flow variation; and
- Tracking and reporting lake levels to assess reduction of impacts to recreational and other infrastructure resources.

The Nature Conservancy has carried out a long-term floodplain inundation sampling program over the past 6 years as part of our work with Dominion Generation and partners. Drawing upon our experience with this effort, the Conservancy can provide guidance and assistance with continued monitoring at strategic locations. Also, through our history of work with landowners and users of the river, we have developed communication networks that can be employed to make photographic samples during flow events.

Invasive and pest species – Additional information should be included regarding the recent outbreaks of Emerald Ash Borer in Halifax Co., Virginia in the Kerr Reservoir headwaters area. It is believed that the extent of the devastation was due to the Ash tree stress from long-term inundation by high water levels in the reservoir. This level of stress occurs in the lower Roanoke due to extended duration flooding and there is a high density of Ash trees in the lower river floodplain. A similar event would be devastating.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

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December 31, 2015

U.S. Army Engineer District, Wilmington
Attention Mr. Eric Gasch, CESAW-ECP-PE
69 Darlington Avenue
Wilmington, North Carolina 28403

RE: Department of Army, U.S. Army Corps of Engineers, John H. Kerr Dam and Reservoir, Water Control Plan Revision, Virginia and North Carolina (DEQ 15-189F)

Dear Mr. Gasch:

The Commonwealth of Virginia has completed its review of the Environmental Assessment (EA) for the above-referenced project. The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act (NEPA) and responding to appropriate federal officials on behalf of the Commonwealth. The following agencies participated in this review:

Department of Environmental Quality
Department of Conservation and Recreation
Department of Health
Department of Transportation
Marine Resources Commission

The Department of Game and Inland Fisheries, Department of Forestry, Southside Planning District Commission, Commonwealth Regional Commission, Mecklenburg County, Charlotte County, Halifax County and Brunswick County were also invited to comment on the project.

PROJECT DESCRIPTION

The U.S. Army Corps of Engineers is proposing a revision to the existing water plan for the John Kerr Reservoir. A study evaluated several alternatives to benefit downstream resources, and the recommended plan was an operational change referred to a Quasi-Run-of-River (QRR). This operational change would allow the weekly volume of inflow in Kerr Reservoir to be released from Roanoke Rapids Dam up to 35,000 cubic feet per second (cfs) and down to the required Federal Energy Regulatory Commission (FERC) drought minimum release at Roanoke Rapids Dam (the minimum flow varies seasonally between 1,500 and 2,000 cfs). This release scenario would more closely mimic the unregulated river discharges and would be considered the maximum extent of what could be changed operationally, without drastically altering reservoir levels and the flood footprint. QRR would restore about 92,000 acres of bottomland hardwoods in the lower Roanoke River by reducing the duration of flooding events. The recommended plan would not involve any construction components.

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Wetlands and Water Quality. According to the EA (page 47), the project would likely not result in a loss of wetlands. In addition, the EA (page 42) states that the proposed change would result in a slightly higher downstream dissolved oxygen concentration.

1(a) Agency Jurisdiction. The State Water Control Board promulgates Virginia's water regulations covering a variety of permits to include the Virginia Pollutant Discharge Elimination System Permit regulating point source discharges to surface waters, Virginia Pollution Abatement Permit regulating sewage sludge, storage and land application of biosolids, industrial wastes (sludge and wastewater), municipal wastewater, and animal wastes, the Surface and Groundwater Withdrawal Permit, and the Virginia Water Protection (VWP) Permit regulating impacts to streams, wetlands, and other surface waters. The VWP permit is a state permit which governs wetlands, surface water, and surface water withdrawals and impoundments. It also serves as §401 certification of the federal Clean Water Act §404 permits for dredge and fill activities in waters of the U.S. The VWP Permit Program is under the Office of Wetlands and Stream Protection, within the DEQ Division of Water Permitting. In addition to central office staff that review and issue VWP permits for transportation and water withdrawal projects, the six DEQ regional offices perform permit application reviews and issue permits for the covered activities:

- Clean Water Act, §401;
- Section 404(b)(i) Guidelines Mitigation Memorandum of Agreement (2/90);
- State Water Control Law, Virginia Code section 62.1-44.15:20 et seq.; and
- State Water Control Regulations, 9VAC25-210-10.

1(b) Agency Findings. The DEQ Piedmont Regional Office (PRO) has concerns about water resources that may be impacted by the proposed plan. High flows have the potential to negatively impact aquatic life communities and scour the benthic environment. The operational changes mentioned a potential downstream impact of wetlands over time. The DEQ Blue Ridge Regional Office has no comments on the proposed change.

1(c) Agency Recommendations.

- Ensure that water quality standards are attainable under all flow conditions and aquatic life uses are protected in accordance with State Water Control Law.
- Ensure that Best Management Practices and other control measures are in place to prevent stream bank erosion in the vicinity of the flood stage releases.
- Avoid impacts to wetlands to the maximum extent possible.
- Coordinate with DEQ PRO to determine if a VWP Permit is necessary.

1(d) Requirement. A VWP Permit from DEQ may be required should impacts to surface waters be necessary.

2. Air Quality. The EA (page 51) states that since this alternative would decrease hydropower generation, energy needs would need to be met through other sources, such as fossil fuels or coal, resulting in increased greenhouse gas and criteria pollutants.

2(a) Agency Jurisdiction. The DEQ Air Division, on behalf of the State Air Pollution Control Board, is responsible for developing regulations that implement Virginia's Air Pollution Control Law (Virginia Code §10.1-1300 et seq.). DEQ is charged with carrying out mandates of the state law and related regulations as well as Virginia's federal obligations under the Clean Air Act as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. The division ensures the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. The appropriate DEQ regional office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources in the region as well as monitoring emissions from these sources for compliance. In the case of certain projects, additional evaluation and demonstration must be made under the general conformity provisions of state and federal law. The Air Division regulates emissions of air pollutants from industries and facilities and implements programs designed to ensure that Virginia meets national air quality standards. The most common regulations associated with major projects are:

- Open burning: 9VAC5-130 et seq.
- Fugitive dust control: 9VAC5-50-60 et seq.
- Permits for fuel-burning equipment: 9VAC5-80-1100 et seq.

2(b) Ozone Attainment Area. According to the DEQ Air Division, the project site is located in an ozone attainment area.

3. Solid and Hazardous Waste Management. The EA (page 52) indicates that the proposed change would have no effect on hazardous wastes.

3(a) Agency Jurisdiction. On behalf of the Virginia Waste Management Board, the DEQ Division of Land Protection and Revitalization is responsible for carrying out the mandates of the Virginia Waste Management Act (Virginia Code §10.1-1400 et seq.), as well as meeting Virginia's federal obligations under the Resource Conservation and Recovery Act and the Comprehensive Environmental Response Compensation Liability Act , commonly known as Superfund. The DEQ Division of Land Protection and Revitalization also administers those laws and regulations on behalf of the State Water Control Board governing Petroleum Storage Tanks (Virginia Code §62.1-44.34:8 et seq.), including Aboveground Storage Tanks (9VAC25-91 et seq.) and Underground Storage Tanks (9VAC25-580 et seq. and 9VAC25-580-370 et seq.), also known as Virginia Tank Regulations, and § 62.1-44.34:14 et seq. which covers oil spills.

Virginia:

- Virginia Waste Management Act, Virginia Code § 10.1-1400 et seq.
- Virginia Solid Waste Management Regulations, 9VAC20-81
  - (9VAC20-81-620 applies to asbestos-containing materials)
- Virginia Hazardous Waste Management Regulations, 9VAC20-60
  - (9VAC20-60-261 applies to lead-based paints)
- Virginia Regulations for the Transportation of Hazardous Materials, 9VAC20-110.

Federal:

- Resource Conservation and Recovery Act (RCRA), 42 U.S. Code sections 6901 et seq.
- U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 Code of Federal Regulations, Part 107
- Applicable rules contained in Title 40, Code of Federal Regulations.

3(b) Database Search. DEQ's Division of Land Protection and Revitalization (DLPR) identified six petroleum releases in possible close proximity to the project area:

- ID# 20142461 – Kevin Gregory residence, 1073 Buffalo Creek Road, Mecklenburg County, VA 24529. Event Date: 9/8/2014. Status: Closed.
- ID# 20057060 – Virginia DGIF Field Office, 7646 Highway 15, Clarksville, VA 23927. Event Date: 9/19/2006. Status: Closed.
- ID# 19900177 – Waterside Deli, 8815 Highway 15N, Clarksville, VA 23927. Event Date: 6/14/2007. Status: Closed.
- ID# 20047041 - Waterside Deli, 8815 Highway 15N, Clarksville, VA 23927. Event Date: 6/12/2007. Status: Closed.
- ID# 19910661 – Driftwood Superette, 6267 Buggs Island Road, Boydton, VA 23917. Event Date: 6/18/2007. Status: Closed.
- ID# 19910730 – North Bend Park Marina, Rt 4 and Highway 678, Boydton, VA 23917. Event Date: 6/18/2007. Status: Closed.

3(c) Requirements.

- The generation or recovery of any hazardous waste materials should be tested and removed in accordance with the Virginia Hazardous Waste Management Regulations (9 VAC 20-60) and/or the Virginia Solid Waste Management Regulations (9 VAC 20-81).
- It is the generator's responsibility to determine if a solid waste meets the criteria of a hazardous waste and as a result be managed as such.

3(d) Agency Recommendations.

- Evaluate the identified petroleum release events to determine if the project will impact or be impacted by the project.
- DEQ encourages all projects to implement pollution prevention principles, including:
    - the reduction, reuse and recycling of all solid wastes generated; and
    - the minimization and proper handling of generated hazardous wastes.

4. Natural Heritage Resources. The EA (page 54) states that the proposed change may include beneficial habitat diversification.

4(a) Agency Jurisdiction.

4(a)(i) The Virginia Department of Conservation and Recreation's (DCR) Division of Natural Heritage (DNH): DNH's mission is conserving Virginia's biodiversity through inventory, protection and stewardship. The Virginia Natural Area Preserves Act (Virginia Code §10.1-209 through 217), authorized DCR to maintain a statewide database for conservation planning and project review, protect land for the conservation of biodiversity, and to protect and ecologically manage the natural heritage resources of

Virginia (the habitats of rare, threatened and endangered species, significant natural communities, geologic sites, and other natural features).

4(a)(ii) The Virginia Department of Agriculture and Consumer Services (VDACS): The Endangered Plant and Insect Species Act of 1979 (Virginia Code Chapter 39 §3.1-1020 through 1030) authorizes VDACS to conserve, protect and manage endangered and threatened species of plants and insects. Under a Memorandum of Agreement established between VDACS and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

4(b) Agency Findings – Natural Heritage Resources.

4(b)(i) Conservation Areas. According to the information currently in DCR DNH's files, the Roanoke River – Dan River Stream Conservation Unit (SCU), Aarons Creek SCU and Difficult Creek – Partridge Branch SCU are all located within the project site. The Roanoke River – Dan River SCU has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources of concern associated with this SCU are:

- *Elliptio roanokensis*, Roanoke slabshell, G3/S1/NL/NL
- *Lasmigona subviridis*, Green floater, G3/S2/NL/LT
- *Lipocarpha micrantha*, Small-flower halfchaff sedge, G3/S2/NL/NL

The Aarons Creek SCU has been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resource of concern associated with this site is:

- *Fusconaia masoni*, Atlantic Pigtoe, G2/S2/SOC/LT

The Difficult Creek - Partridge Branch SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern associated with this site is:

- *Eliiptio roanokensis*, Roanoke slabshell, G3/S1/NL/NL

In addition, the Eastland Creek Landing Conservation Site, the Lower Roanoke (Staunton) River Conservation Site and the Dan River Islands Conservation Site are all located within the project site. Eastland Creek Landing Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource of concern at this site is:

- *Oldenlandia boscii*, Bosc's bluet, G5/S1/NL/NL

The Lower Roanoke (Staunton) River Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

- *Rorippa sessiliflora*, Stalkless yellow cress, G5/S2/NL/NL
- *Paspalum dissectum*, Walter's paspalum, G4?/S2?NL/NL
- *Sagittaria calycina*, Long-lobed arrowhead, G5?S1?NL/NL

The Dan River Islands Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern at this site are Stalkless yellow cress and Long-lobed arrowhead.

4(b)(ii) Water Level Change Impacts. DCR DNH states that the changes in water levels due to an alteration of the draw-down regime could adversely affect these natural heritage resources. Some mussels and plants may adjust and move provided the changes are gradual. With more information DCR can more accurately evaluate potential impacts to natural heritage resources and offer specific recommendations for minimizing impacts to the documented resources.

4(b)(iii) Northern Long-eared Bat. There is potential for the Northern Long-eared bat (*Myotis septentrionalis,* G1G3/S3/LT/NL) to occur within the project area. Due to the decline in population numbers, the Northern Long-eared bat has been federally listed as threatened by the U.S. Fish and Wildlife Service (FWS).

4(c) Agency Findings – Threatened and Endangered Plant and Insect Species. DCR states that the current activity will not affect any documented state-listed plant and insect species.

4(d) Agency Findings – Natural Area Preserves. The Difficult Creek Natural Area Preserve has been documented within two miles of the project boundary. However, due to the scope of the activity proposed, DCR does not anticipate any negative impacts to the natural area preserve and associated natural heritage resources.

4(e) Agency Recommendations.

- Develop a plan to detail how and when water level changes will occur and how impacts to species identified by DCR DNH can be avoided. Submit the plan to DCR DNH for review and comment.
- DCR recommends coordination with the FWS regarding potential impacts upon Northern Long-eared bats associated with tree removal as applicable.

- Due to the legal status of the Green floater and the Atlantic pigtoe, coordinate with the Department of Game and Inland Fisheries (DGIF) to ensure compliance with the Virginia Endangered Species Act.
- Contact DCR DNH to re-submit project information and a map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

5. Planning and Recreational Resources. The EA (page 40) states that a more stable Kerr Reservoir level would benefit recreation features such as boat ramps, swim beaches and camp sites.

5(a) Planning and Recreational Resources. DCR's Division of Planning and Recreational Resources (DPRR) administers the Virginia Scenic Rivers (Virginia Code § 10.1-200), Virginia Byways (Virginia Code §33.2-405 through 33.2-408), and state trails programs (Virginia Code §10.1-204) and is responsible for developing the Virginia Outdoors Plan (VOP), the state's comprehensive outdoor recreation and open space plan (Virginia Code §10.1-200). The VOP recognizes the importance of scenery to Virginians and many of the top ten activities are water based.

5(b) Agency Finding. The DCR DPRR states that both the Staunton and the Bannister Rivers have Scenic River designations and both rivers are established water trails.

5(c) Agency Recommendation. Contact DCR DPRR (Lynn Crump at 804-786-5054 or Lynn.Crump@dcr.virginia.gov) regarding the Scenic River designations.

6. Water Supply. According to the EA (page 40), there would be no effect on water supplies.

6(a) Agency Jurisdiction. The Virginia Department of Health (VDH) Office of Drinking Water reviews projects for the potential to impact public drinking water sources (groundwater wells, springs and surface water intakes). VDH administers both federal and state laws governing waterworks operation.

6(b) Agency Findings. VDH ODW states that there may be impacts to public drinking water sources due to this project if the mitigation efforts outlined below are not implemented. There are no public groundwater wells within a 1-mile radius of the project site. The Roanoke River Service Authority's Lake Gaston Intake is within a 5-mile radius of the project site within the watershed.

6(c) Agency Recommendations.

- Implement best management practices, including erosion and sedimentation controls as well as spill prevention controls and countermeasures, should be employed on the project site as applicable.
- Take care while transporting materials in and out of the project site, as to prevent impacts to surface water intakes within 5 miles.
- Ensure that the revised water control plan does not result in detrimental water quality or quantity to the identified downstream drinking water intakes.

6(d) Requirements. Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

7. Subaqueous Land Impacts. The EA does not directly address subaqueous lands.

7(a) Agency Jurisdiction. The Virginia Marine Resources Commission (VMRC) regulates encroachments in, on or over state-owned subaqueous beds as well as tidal wetlands pursuant to Virginia Code §28.2-1200 through 1400. For nontidal waterways, VMRC states that it has been the policy of the Habitat Management Division to exert jurisdiction only over the beds of perennial streams where the upstream drainage area is 5 square miles or greater. The beds of such waterways are considered public below the ordinary high water line.

7(b) Agency Finding. If any portion of the subject project involves any encroachments channelward of ordinary high water along natural rivers and streams above the fall line or mean low water below the fall line, a permit may be required from VMRC. Any jurisdictional impacts will be reviewed by VMRC during the Joint Permit Application (JPA) process.

7(c) Agency Recommendation. Coordinate with VMRC as necessary regarding the submission of a JPA.

8. Historic Resources. The EA (page 4) indicates that the proposed increased water releases may affect a site on Buggs Island.

8(a) Agency Jurisdiction. The Virginia Department of Historic Resources (DHR) conducts reviews of both federal and state projects to determine their effect on historic properties. Under the federal process, DHR is the State Historic Preservation Office, and ensures that federal undertakings – including licenses, permits, or funding – comply with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation at 36 CFR Part 800. Section 106 requires federal agencies to consider the effects of federal projects on properties that are listed or eligible for listing on the National Register of Historic Places.

8(b) Agency Finding. Pursuant to Section 106 of the National Historic Preservation Act, DHR has been in direct consultation with the U.S. Amy Corps of Engineers and its agents and the parties have reached consensus that the referenced project will have no adverse effect on historic properties. DHR has no further comment at this time.

9. Pesticides and Herbicides. In general, when pesticides or herbicides must be used, their use should be strictly in accordance with manufacturers' recommendations. In addition, to the extent feasible, DEQ recommends that the responsible agent for the project use the least toxic pesticides or herbicides effective in controlling the target species. For more information on pesticide or herbicide use, please contact the Virginia Department of Agriculture and Consumer Services at (804) 786-3501.

REGULATORY AND COORDINATION NEEDS

1. Subaqueous Lands Impacts. Pursuant to section 28.2-1204 of the Code of Virginia, the VMRC has jurisdiction over any encroachments in, on or over any state-owned rivers, streams or creeks in the Commonwealth. Contact VMRC (Mike Johnson at Mike.Johnson@mrc.virginia.gov) regarding the submittal of a JPA.

2. Natural Heritage Resources.

- Contact the DCR DNH (804-371-2708) to re-submit project information and a map for an update on natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.
- Contact DCR DNH (Rene Hypes at Rene.Hypes@dcr.virginia.gov) regarding DCR's request for additional coordination.
- Coordinate with FWS (804-693-6694) due to the legal status of the northern long-eared bat.
- Coordinate with DGIF (Amy Ewing at Amy.Ewing@dgif.virginia.gov) regarding the potential impacts to protected species.
- Contact the DCR Division of Planning and Recreation (Lynn Crump at 804-786-5054 or Lynn.Crump@dcr.virginia.gov) regarding the Scenic River status of the Staunton and Bannister Rivers.

3. Waterworks. Contact VDH ODW (Roy Soto at Roy.Soto@vdh.virginia.gov) for additional information about its comments and recommendations.

4. Wetlands and Water Quality. Coordinate with DEQ PRO (Allison Dunaway at Allison.Dunaway@deq.virginia.gov) to ensure compliance with the VWPP Program.

Thank you for the opportunity to comment on this EA. The detailed comments of reviewers are attached. If you have questions, please do not hesitate to call me at (804) 698-4204 or Julia Wellman at (804) 698-4326.

Sincerely,

Bettina Sullivan, Manager
Environmental Impact Review and Long Range Priorities Program

Enclosures

ec:

Amy Ewing, DGIF
Robbie Rhur, DCR
Roy Soto, VDH
Roger Kirchen, DHR
Greg Evans, DOF
Mike Johnson, VMRC
Eric Gasch, Army Corps
Gail Moody, Southside Planning District Commission
Mary Hickman, Commonwealth Regional Commission
Wayne Carter, Mecklenburg County
Russell Clark, Charlotte County
James Halasz, Halifax County
Charlette Woolridge, Brunswick County

Wellman, Julia (DEQ)

From: Kojan, Kyle (VDH)
Sent: Tuesday, December 22, 2015 3:12 PM
To: Wellman, Julia (DEQ)
Cc: Warren, Arlene (VDH); Soto, Roy (VDH)
Subject: 15-189F John H. Kerr Dam and Reservoir Water Control Plan Revision Project Review

Project Name: **John H. Kerr Dam and Reservoir Water Control Plan Revision**
Project #: 15-189F
UPC #: N/A
Location: Mecklenburg, Charlotte, Halifax, and Brunswick Counties

VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they **relate to proximity to public drinking water sources pertaining to surface water intakes.** Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

There are no public groundwater wells within a 1 mile radius of the project site.

The following surface water intakes are located within a 5 mile radius of the project site:

PWSID	SYSNAME	FACNAME
5117707	ROANOKE RIVER SERVICE AUTHORITY	LAKE GASTON INTAKE

The project is within the watershed of the following public surface water sources (intakes where the project falls within 5 miles into their watershed are formatted in **bold**):

PWSID	SYSNAME	FACNAME
5117707	**ROANOKE RIVER SERVICE AUTHORITY**	**LAKE GASTON INTAKE**

Best Management Practices should be employed on the project site including Erosion & Sedimentation Controls as well as Spill Prevention Controls & Countermeasures.

Care should be taken while transporting materials in and out of the project site, as to prevent impacts to surface water intakes within 5 miles.

The revised Water Control Plan should avoid resulting in detrimental water quality or quantity to the identified downstream drinking water intakes.

There may be impacts to public drinking water sources due to this project if the mitigation efforts outlined above are not implemented.

Best Regards,

Kyle Kojan
Program Support Technician

Office of Drinking Water
Virginia Department of Health
109 Governor Street
Richmond, VA 23220
(804) 864-7201

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR PROGRAM COORDINATION

ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

TO: Julia H. Wellman **DEQ - OEIA PROJECT NUMBER: 15 – 189F**

PROJECT TYPE: ☐ STATE EA / EIR **X FEDERAL EA / EIS** ☐ SCC

☐ CONSISTENCY DETERMINATION

PROJECT TITLE: ACOE JOHN H. KERR DAM

PROJECT SPONSOR: ARMY / ARMY CORPS OF ENGINEERS

PROJECT LOCATION: ☐ OZONE ATTAINMENT AREA

REGULATORY REQUIREMENTSMAY BE APPLICABLE TO: **X CONSTRUCTION**
☐ OPERATION

STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-45-760 et seq. – Asphalt Paving operations
3. **X 9 VAC 5-130 et seq. – Open Burning**
4. **X 9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
5. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to_____
6. ☐ 9 VAC 5-60-300 et seq. – Standards of Performance for Toxic Pollutants
7. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the_____
8. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
9. ☐ 9 VAC 5-80-1605 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____
10. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
11. ☐ 9 VAC 5-80-800 et seq. Of the regulations – State Operating Permits. This rule may be applicable to _____

COMMENTS SPECIFIC TO THE PROJECT:

K S. Narasimhan

(Kotur S. Narasimhan)
Office of Air Data Analysis

DATE: December 3, 2015

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

TO: Julia Wellman, Environmental Program Planner

FROM: Steve Coe, Division of Land Protection & Revitalization Review Coordinator

DATE: December 7, 2015

COPIES: Sanjay Thirunagari, Division of Land Protection & Revitalization Review Manager; file

SUBJECT: Environmental Impact Report: 15-189F – John H. Kerr Dam and Reservoir Water Control Plan Revision (DOD/Army Corps of Engineers)

The Division of Land Protection & Revitalization has completed its review of the John H. Kerr Dam and Reservoir Water Control Plan Revision (SMP) for sites in Mecklenburg, Charlotte, Brunswick and Halifax Counties, Virginia.

> The project scope: proposed operational change at the John H. Kerr Dam through the revision of the Water Control Plan to offset adverse impacts to the downstream riverine ecosystem.

The DEQ DLPR staff has reviewed the submittal, conducted a cursory review of Federal and State databases, and have identified some solid or hazardous waste sites which might impact the project. We offer the following comments concerning possible waste issues associated with this area and the proposed program/project:

> When an environmental impact report is written or compiled for specific sites, it should include an environmental investigation on and near the properties selected in order to identify any solid or hazardous waste sites or issues related to the project area. The databases include the Permitted Solid Waste Management Facilities, Virginia Environmental Geographic Information Systems (Solid Waste, Voluntary Remediation Program, and Petroleum Release sites), CERCLA Facilities, and Hazardous Waste Facilities databases.

DEQ staff conducted a cursory database search under zip codes 24529, 23927, and 23917, with results shown below:

> ***Cerclis - no sites were identified in the area of the project.***
>
> ***RCRA - 15 RCRA sites were identified, but none in close proximity to the project areas.***
>
> ***FUDS – none***

Solid Waste – none in close proximity to the project areas.

VRP – none

Petroleum Releases – 6 sites in possible close proximity to the project areas.

1) *ID# 20142461 – Kevin Gregory residence, 1073 Buffalo Creek Road, Mecklenburg County, VA 24529. Event Date: 9/8/2014. Status: Closed.*
2) *ID# 20057060 – Virginia DGIF Field Office, 7646 Highway 15, Clarksville, VA 23927. Event Date: 9/19/2006. Status: Closed.*
3) *ID# 19900177 – Waterside Deli, 8815 Highway 15N, Clarksville, VA 23927. Event Date: 6/14/2007. Status: Closed.*
4) *ID# 20047041 - Waterside Deli, 8815 Highway 15N, Clarksville, VA 23927. Event Date: 6/12/2007. Status: Closed.*
5) *ID# 19910661 – Driftwood Superette, 6267 Buggs Island Road, Boydton, VA 23917. Event Date: 6/18/2007. Status: Closed.*
6) *ID# 19910730 – North Bend Park Marina, Rt 4 and Highway 678, Boydton, VA 23917. Event Date: 6/18/2007. Status: Closed.*

Please note that the DEQ's PC case files of the PC Case numbers are identified above and these petroleum releases should be evaluated by the project engineer or manager to establish the exact location of the release and the nature and extent of the petroleum release and the potential to impact the proposed project. The facility representative should contact the DEQ's Blue Ridge Regional Office at 540-562-6700 (Tanks Program) for further information and the administrative records of the PC cases which are in close proximity to the proposed project.

GENERAL COMMENTS:

Soil, Sediment, and Waste Management

Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.*; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.*, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous materials, 49 CFR Part 107.

Asbestos and/or Lead-based Paint

All structures being demolished/renovated/ removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed. Questions on these topics may be directed to Aziz Farahmand in our Blue Ridge Regional Office at 540-562-6872.

Pollution Prevention – Reuse - Recycling

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

If you have any questions or need further information, please contact Steve Coe at (804) 698-4029.

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

MEMORANDUM

DATE: December 14, 2015

TO: Julia Wellman, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 15-189F, John H Kerr Dam and Reservoir Water Control Plan Revision

Division of Planning and Recreation Resources

The Department of Conservation and Recreation (DCR), Division of Planning and Recreational Resources (PRR), develops the *Virginia Outdoors Plan* and coordinates a broad range of recreational and environmental programs throughout Virginia. These include the Virginia Scenic Rivers program; Trails, Greenways, and Water trails; Virginia State Park Master Planning and State Park Design and Construction.

Please note that both the Staunton and the Bannister Rivers have Scenic River designation and both rivers are established water trails. If you have any questions regarding this river status, please contact Lynn Crump of the DCR-Division of Planning and Recreation at 804-786-5054 or Lynn.Crump@dcr.virginia.gov.

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Roanoke River – Dan River Stream Conservation Unit (SCU), Aarons Creek SCU and Difficult Creek – Partridge Branch SCU are all located within the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Roanoke River – Dan River SCU has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources of concern associated with this SCU are:

Elliptio roanokensis	Roanoke slabshell	G3/S1/NL/NL
Lasmigona subviridis	Green floater	G3/S2/NL/LT
Lipocarpha micrantha	Small-flower halfchaff sedge	G3/S2/NL/NL

The Aarons Creek SCU has been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resource of concern associated with this site is:

Fusconaia masoni	Atlantic Pigtoe	G2/S2/SOC/LT

The Difficult Creek - Partridge Branch SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern associated with this site is:

Eliiptio roanokensis	Roanoke slabshell	G3/S1/NL/NL

In addition, the Eastland Creek Landing Conservation Site, the Lower Roanoke (Staunton) River Conservation Site and the Dan River Islands Conservation Site are all located within the project site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Eastland Creek Landing Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource of concern at this site is:

Oldenlandia boscii	Bosc's bluet	G5/S1/NL/NL

The Lower Roanoke (Staunton) River Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Rorippa sessiliflora	Stalkless yellow cress	G5/S2/NL/NL
Paspalum dissectum	Walter's paspalum	G4?/S2?NL/NL
Sagittaria calycina	Long-lobed arrowhead	G5?S1?NL/NL

The Dan River Islands Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern at this site are Stalkless yellow cress and Long-lobed arrowhead.

The changes in water levels due to an alteration of the draw-down regime could adversely affect these natural heritage resources. DCR recommends the development of a plan to detail how and when these changes will occur and how impacts to these species can be avoided. Some mussels and plants may adjust and move provided the changes are gradual. With more information DCR can more accurately evaluate potential impacts to natural heritage resources and offer specific recommendations for minimizing impacts to the documented resources.

There is potential for the Northern Long-eared bat (*Myotis septentrionalis,* G1G3/S3/LT/NL) to occur within the project area. The Northern Long-eared bat is a small insect-eating bat characterized by its long-rounded ears that when folded forward extend beyond the tip of the nose. Hibernation occurs in caves, mines and tunnels from late fall through early spring and bats occupy summer roosts comprised of older trees including single and multiple tree-fall gaps, standing snags and woody debris. Threats include white nose syndrome and loss of hibernacula, maternity roosts and foraging habitat (NatureServe, 2014). Due to the decline in population numbers, the Northern Long-eared bat has been federally listed as "threatened" by the United States Fish and Wildlife Service (USFWS).

Due to the legal status of the Green floater, and the Atlantic pigtoe, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 - 570). DCR also recommends coordination with the USFWS regarding potential impacts upon federally threatened Northern Long-eared bats associated with tree removal.

The Difficult Creek Natural Area Preserve has been documented within two miles of the project boundary. However, due to the scope of the activity proposed, DCR does not anticipate any negative impacts to the natural area preserve and associated natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov. This project is located within 2 miles of documented occurrences of state listed animals. In addition, Aarons Creek, Buffalo Creek, Beech Creek, Butcher Creek, Dan River, Kettles Creek, Mines Creek, and Unnamed Tributaries to Kettles Creek, Kettles Creek HW and Mines Creek which have been designated by VDGIF as "Threatened and Endangered Species Waters" for several state listed species, are within 2 miles of the project area. Therefore, DCR recommends coordination with the VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 - 570).

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Cc: Ernie Aschenbach, VDGIF
Troy Andersen, USFWS

Literature Cited

NatureServe, 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe. Arlington, Virginia. Available http://explorer.natureserve.org (Accessed: December 22, 2014).

Wellman, Julia (DEQ)

From: Sexton, Michael (DEQ)
Sent: Monday, December 14, 2015 3:32 PM
To: Wellman, Julia (DEQ)
Cc: Hurst, Jeffrey (DEQ); Farahmand, Aziz (DEQ)
Subject: RE: NEW PROJECT ACOE John H Kerr Dam 15-189F

Julia,

This project is an operational change at the John H. Kerr Reservoir. It does not involve construction. The documents provided states this operational change will improve water quality and have no effect on water supply or air quality. As such, I have no comments to offer concerning this environmental assessment.

If you have any questions, let me know

Michael Sexton

From: Fulcher, Valerie (DEQ)
Sent: Tuesday, November 24, 2015 4:02 PM
To: dgif-ESS Projects (DGIF); Rhur, Robbie (DCR); odwreview (VDH); Coe, Stephen (DEQ); Narasimhan, Kotur (DEQ); Gavan, Larry (DEQ); Sepety, Holly (DEQ); Sexton, Michael (DEQ); West, Kelley (DEQ); Kirchen, Roger (DHR); Evans, Gregory (DOF); Watkinson, Tony (MRC); gmoody@southsidepdc.org; mhickman@virginiasheartland.org; Carter III , H. Wayne; Clark, Russell B.; Halasz, Jim; Woolridge, Charlette T.
Cc: Wellman, Julia (DEQ)
Subject: NEW PROJECT ACOE John H Kerr Dam 15-189F

Good afternoon - this is a new OEIR review request/project:

Document Type: Draft Environmental Assessment
Project Sponsor: Army/U.S. Army Corps of Engineers
Project Title: John H. Kerr Dam and Reservoir Water Control Plan Revision
Location: Mecklenburg, Charlotte, Halifax, & Brunswick Counties
Project Number: DEQ #15-189F

The document is available at www.deq.virginia.gov/fileshare/oeir in the ACOE folder.

The due date for comments is DECEMBER 14, 2015. You can send your comments either directly to Julia by email (Julia.Wellman@deq.virginia.gov), or you can send your comments by regular interagency/U.S. mail to the Department of Environmental Quality, Office of Environmental Impact Review, 629 E. Main St., 6th Floor, Richmond, VA 23219.

If you cannot meet the deadline, please notify the project coordinator prior to the comment due date. Arrangements may be made to extend the deadline for comments if possible. An agency will be considered to have no concerns if comments are not received (or contact is made) within the review period. However, it is important that agencies consistently participate in accordance with Virginia Code Section 10.1-1192.

REVIEW INSTRUCTIONS:

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road **Glen Allen, VA 23060** **804/527-5020**

To: Julia Wellman
Environmental Program Planner

From: Kelley West
Environmental Planner

Date: December 14, 2015

Subject: John H. Kerr Dam and Reservoir Water Control Plan Revision (15-189F).

I have reviewed the Environmental Assessment for the above referenced project, by which a proposed operational change at John H. Kerr through the revision of the water control plan. This plan is an update from a previous plan that was completed in October 1995. As a general comment, PRO recommends that the operators pursue the most environmentally protective alternative, taking into consideration existing state and federal environmental laws and regulations. My comments are as follows:

Water: DEQ has concerns about water resources that may be impacted by the proposed plan. High flows have the potential to negatively impact aquatic life communities and scour the benthic environment. Please ensure that in accordance with State Water Control Law, water quality standards are attainable under all flow conditions and aquatic life uses are protected. We also recommend that Best Management Practices and other control measures are in place to prevent stream bank erosion in the vicinity of the flood stage releases.

The operational changes mentioned a potential downstream impact of wetlands over time. DEQ-PRO recommends that all activities avoid wetlands to the maximum extent possible. Please coordinate with DEQ-PRO to determine if a Virginia Water Protection (VWP) is necessary, contact Allison Dunaway at (804) 527-5086.

Air: DEQ-PRO recommends the proposed actions shall operate in a manner consistent with air pollution control practices for minimizing emissions, especially during periods of high ozone. Fugitive dust should be kept to a minimum, (9 VAC5-50-60). For further questions concerning air quality issues, please contact James Kyle at (804) 527-5047.

Waste: During the selection of alternatives please be aware the generation or recovery of any hazardous waste materials should be tested and removed in accordance with the Virginia Hazardous Waste Management Regulations (9 VAC 20-60) and/or the Virginia Solid Waste Management Regulations (9 VAC 20-81). Please understand that it is the generator's responsibility to determine if a solid waste meets the criteria of a hazardous waste and as a result be managed as such. In addition, asbestos waste, lead waste, or contaminated residues generated must be handled and disposed of in accordance with the VSWMR or VHWMR as applicable. DEQ recommends that pollution prevention principles be implemented to reduce the amount of wastes at the source, such as the re-use and recycling of construction waste materials. If you have any questions concerning hazardous/solid waste management, please contact Jason Miller at (804)527-5028.

Wellman, Julia (DEQ)

From: LaBudde, Gregory (DHR)
Sent: Wednesday, December 23, 2015 11:18 AM
To: Wellman, Julia (DEQ)
Subject: RE: NEW PROJECT ACOE John H Kerr Dam 15-189F (DHR File No. 2011-1684)

Dear Ms. Wellman,

Pursuant to Section 106 of the National Historic Preservation Act, DHR has been in direct consultation with the U.S. Amy Corps of Engineers and its agents and the parties have reached consensus that the referenced project will have no adverse effect on historic properties. DHR has no further comment at this time.

Thank you for your consideration of historic resources. Please accept my apologies for this late response.

Sincerely,

Greg LaBudde, Archaeologist
Review and Compliance Division
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221
phone: 804-482-6103
fax: 804-367-2391
gregory.labudde@dhr.virginia.gov

From: Fulcher, Valerie (DEQ)
Sent: Tuesday, November 24, 2015 4:02 PM
To: dgif-ESS Projects (DGIF); Rhur, Robbie (DCR); odwreview (VDH); Coe, Stephen (DEQ); Narasimhan, Kotur (DEQ); Gavan, Larry (DEQ); Sepety, Holly (DEQ); Sexton, Michael (DEQ); West, Kelley (DEQ); Kirchen, Roger (DHR); Evans, Gregory (DOF); Watkinson, Tony (MRC); gmoody@southsidepdc.org; mhickman@virginiasheartland.org; Carter III , H. Wayne; Clark, Russell B.; Halasz, Jim; Woolridge, Charlette T.
Cc: Wellman, Julia (DEQ)
Subject: NEW PROJECT ACOE John H Kerr Dam 15-189F

Good afternoon - this is a new OEIR review request/project:

Document Type: Draft Environmental Assessment
Project Sponsor: Army/U.S. Army Corps of Engineers
Project Title: John H. Kerr Dam and Reservoir Water Control Plan Revision
Location: Mecklenburg, Charlotte, Halifax, & Brunswick Counties
Project Number: DEQ #15-189F

The document is available at www.deq.virginia.gov/fileshare/oeir in the ACOE folder.

Wellman, Julia (DEQ)

From: Johnson, Mike (MRC)
Sent: Monday, December 07, 2015 3:33 PM
To: Wellman, Julia (DEQ)
Subject: NEW PROJECT ACOE John H Kerr Dam 15-189F

Please be advised that the Commission, pursuant to Section 28.2-1200 et seq of the Code of Virginia, has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth. Accordingly, if any portion of the subject project involves any encroachments channelward of ordinary high water along natural rivers and streams above the fall line or mean low water below the fall line, a permit may be required from our agency. Any jurisdictional impacts will be reviewed by VMRC during the Joint Permit Application process. Thank you for the opportunity to comment

Mike Johnson
Habitat Management Division
VMRC
2600 Washington Ave.
Newport News, Va 23607
757-247-2255

Wellman, Julia (DEQ)

From: Mary Hickman [MHickman@virginiasheartland.org]
Sent: Tuesday, December 29, 2015 8:48 AM
To: Wellman, Julia (DEQ)
Subject: RE: NEW PROJECT ACOE John H Kerr Dam 15-189F

Good Morning,

Unfortunately, this was not received in time to be included on the Commonwealth Regional Council December Meeting Agenda (Intergovernmental Review Process). It was planned to have it considered under the Intergovernmental Review Process by the Council during its January 7, 2016 meeting. However, due to an anticipated lack of a quorum, the January Meeting has been cancelled. Therefore, this will be included on the February 4, 2016 Council Agenda for review/comment.

If you should have any questions, please do not hesitate to contact me. Thank you.

Mary S. Hickman

Executive Director
Commonwealth Regional Council
One Mill Street, Suite 101
P.O. Box P
Farmville, Virginia 23901
434-392-6104 VOICE
434-392-5933 FAX
MHickman@virginiasheartland.org

From: Wellman, Julia (DEQ) [mailto:Julia.Wellman@deq.virginia.gov]
Sent: Monday, December 28, 2015 3:33 PM
To: dgif-ESS Projects (DGIF); Evans, Gregory (DOF); gmoody@southsidepdc.org; mhickman@virginiasheartland.org; Carter III , H. Wayne; Clark, Russell B.; Halasz, Jim; Woolridge, Charlette T.
Subject: RE: NEW PROJECT ACOE John H Kerr Dam 15-189F

If you would like to comment on the above-referenced environmental assessment, please respond by tomorrow (12/29) morning.

Thank you.

From: Fulcher, Valerie (DEQ)
Sent: Tuesday, November 24, 2015 4:02 PM
To: dgif-ESS Projects (DGIF); Rhur, Robbie (DCR); odwreview (VDH); Coe, Stephen (DEQ); Narasimhan, Kotur (DEQ); Gavan, Larry (DEQ); Sepety, Holly (DEQ); Sexton, Michael (DEQ); West, Kelley (DEQ); Kirchen, Roger (DHR); Evans, Gregory (DOF); Watkinson, Tony (MRC); gmoody@southsidepdc.org; mhickman@virginiasheartland.org; Carter III , H. Wayne; Clark, Russell B.; Halasz, Jim; Woolridge, Charlette T.
Cc: Wellman, Julia (DEQ)
Subject: NEW PROJECT ACOE John H Kerr Dam 15-189F

Good afternoon - this is a new OEIR review request/project:

Document Type: Draft Environmental Assessment
Project Sponsor: Army/U.S. Army Corps of Engineers

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Date: November 5, 2015

Online Project Review Certification Letter

Project Name: John H. Kerr Dam and Reservoir Water Control Plan Revision

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in "no effect" and/or "not likely to adversely affect" determinations for listed species and critical habitat and/or "no Eagle Act permit required" determinations for eagles regarding potential effects of your proposed project. We certify that the use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the "no effect" and "not likely to adversely affect" determinations for listed species and critical habitat and "no Eagle Act permit required" determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of listed species, critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for one year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Kimberly Smith of this office at (804) 693-6694, extension 124.

Sincerely,

/s/ Cynthia A. Schulz

Cindy Schulz
Supervisor
Virginia Field Office

Enclosures - project review package

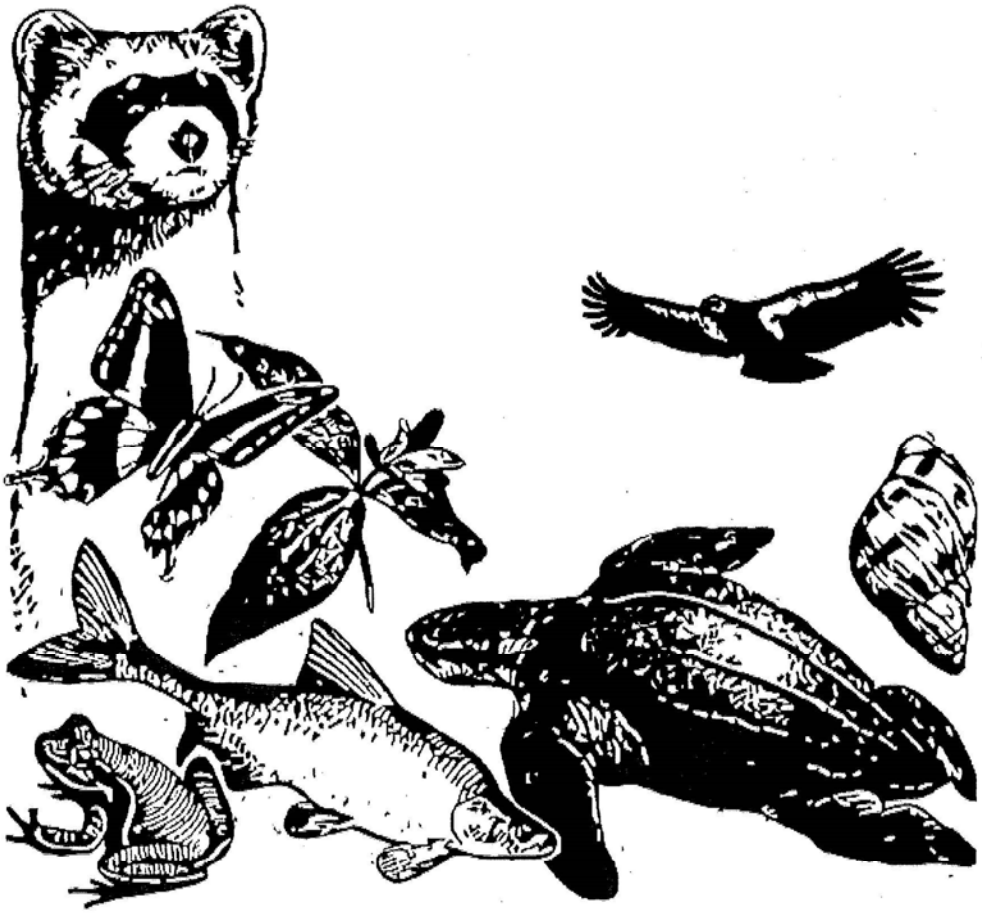
U.S. Fish & Wildlife Service

John H. Kerr Dam and Reservoir Water Control Plan Revision

IPaC Trust Resource Report

Generated November 05, 2015 12:15 PM MST

This report is for informational purposes only and should not be used for planning or analyzing project-level impacts. For projects that require FWS review, please return to this project on the IPaC website and request an official species list from the Regulatory Documents page.



US Fish & Wildlife Service

IPaC Trust Resource Report

Project Description

NAME

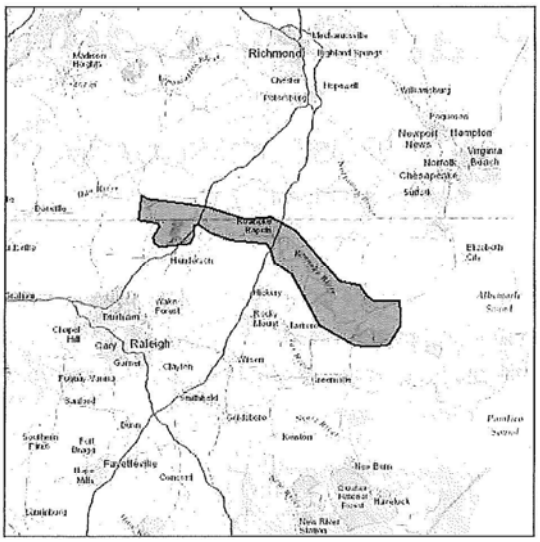
John H. Kerr Dam and Reservoir Water Control Plan Revision

PROJECT CODE

NWLB3-OKTFB-C7LA7-ECBVF-TFAZ4E

LOCATION

North Carolina and Virginia



DESCRIPTION

This EA addresses the proposed modification to the current Water Control Plan (WCP) for ecosystem restoration in the overall public interest. The impact area of the proposed WCP revision includes the Kerr Reservoir project and the Roanoke River Basin from Kerr Dam downstream to the Albemarle Sound.

U.S. Fish & Wildlife Contact Information

Species in this report are managed by:

Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
(804) 693-6694

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Endangered Species

Proposed, candidate, threatened, and endangered species that are managed by the Endangered Species Program and should be considered as part of an effect analysis for this project.

This unofficial species list is for informational purposes only and does not fulfill the requirements under Section 7 of the Endangered Species Act, which states that Federal agencies are required to "request of the Secretary of Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action." This requirement applies to projects which are conducted, permitted or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can be obtained by returning to this project on the IPaC website and requesting an official species list on the Regulatory Documents page.

Birds

Red Knot Calidris canutus rufa — Threatened

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0DM

Red-cockaded Woodpecker Picoides borealis — Endangered

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B04F

Clams

Dwarf Wedgemussel Alasmidonta heterodon — Endangered

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=F029

Tar River Spinymussel Elliptio steinstansana — Endangered

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=F015

Fishes

Atlantic Sturgeon Acipenser oxyrinchus oxyrinchus — Endangered

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E0A7

Shortnose Sturgeon Acipenser brevirostrum — Endangered

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E00B

Flowering Plants

Harperella Ptilimnium nodosum — Endangered

MANAGED BY
Virginia Ecological Services Field Office
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2H9

Smooth Coneflower Echinacea laevigata — Endangered

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q293

Mammals

Northern Long-eared Bat Myotis septentrionalis — Threatened

MANAGED BY
Raleigh Ecological Services Field Office
Virginia Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0JE

Red Wolf Canis rufus — Experimental Population, Non-Essential

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A00F

Reptiles

American Alligator Alligator mississippiensis Similarity of Appearance (Threatened)

MANAGED BY
Raleigh Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C000

Critical Habitats

Potential effects to critical habitat(s) within the project area must be analyzed along with the endangered species themselves.

There is no critical habitat within this project area

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

You are responsible for complying with the appropriate regulations for the protection of birds as part of this project. This involves analyzing potential impacts and implementing appropriate conservation measures for all project activities.

American Kestrel Falco sparverius paulus — Bird of conservation concern
Year-round

American Oystercatcher Haematopus palliatus — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B008

Black Rail Laterallus jamaicensis — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B09A

Black Skimmer Rynchops niger — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0EO

Black-throated Green Warbler Dendroica virens — Bird of conservation concern
Season: Breeding

Brown-headed Nuthatch Sitta pusilla — Bird of conservation concern
Year-round

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B09I

Chuck-will's-widow Caprimulgus carolinensis — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Gull-billed Tern Gelochelidon nilotica — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0JV

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
Season: Migrating

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Least Tern Sterna antillarum — Bird of conservation concern
Season: Breeding

Lesser Yellowlegs Tringa flavipes — Bird of conservation concern
Season: Wintering

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0FY

Marbled Godwit Limosa fedoa — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0JL

Nelson's Sparrow Ammodramus nelsoni — Bird of conservation concern
Season: Wintering

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
Season: Wintering

Red Knot Calidris canutus rufa — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0DM

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
Season: Wintering

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
Year-round

Sedge Wren Cistothorus platensis — Bird of conservation concern
Seasons: Wintering, Migrating

Short-billed Dowitcher Limnodromus griseus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0HD

Swainson's Warbler Limnothlypis swainsonii — Bird of conservation concern
Season: Breeding

Whimbrel Numenius phaeopus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0JN

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Yellow Rail Coturnicops noveboracensis — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0JG