

ROANOKE RAPIDS AND GASTON
FERC PROJECT 2009
RELICENSING STUDY LIST
ISSUES RELATED TO ACOE KERR RESERVOIR 216 STUDY

1. *Draft Applicant Prepared Environmental Assessment*, January 1999, Dominion. Analyzes and evaluates environmental effects associated with issuing a new operating license for FERC project 2009. Generally considers seven environmental alternatives and the effect of each on the environment.
2. *Supplement to Draft Applicant Prepared Environmental Assessment*, April 2001, Dominion. Supplements and completes studies of issues raised in the DAPEA. Generally summarizes results from studies that continued past the submission of the DAPEA.
3. *Shoreline Management Plan*, March 2001, Dominion. Document develops methods and practices to protect and enhance Roanoke Rapids Lake and Lake Gaston's natural resources while encouraging economic development activities that compliment or have neutral effects on those natural resources.
4. *Roanoke River Unsteady Flow Model*, March 2001, Harza. A one-dimensional unsteady flow model of the Roanoke River developed to address:
 - Potential effects of alternative project operations on whitewater recreation in the rapids below the Roanoke Rapids dam;
 - Potential effects of alternative project operations on stranding of resident fish;
 - Potential effects of alternative project operations on fishery habitat; and
 - Potential effects of alternative project operations on vegetation in low-lying areas near and below Scotland Neck.
5. *Effects of Load Following at Roanoke Rapids Power Station on Lower Roanoke River Mainstem and Floodplain Water Quality*, September 2000, Graham and Cannon. (A second study performed in July of 2001 adds supplemental information to this study, a written report should be distributed by the end of 2001.)

The results of the two studies should:

 - Determine the rate of change in water quality of floodplain waters over the duration of a flood event;
 - Identify effects of floodplain drainage on river water quality; and
 - Identify effects of load following operations on flood initiation, duration and backswamp drainage.
6. Instream Flow Incremental Methods (IFIM) Studies. (Ongoing)

The relicensing Fisheries Technical Committee has built a considerable file of information related to aquatic habitat using the IFIM model. Seven fish species and 33 life stages were evaluated after performing habitat analysis on 5 river reaches below the Roanoke Rapids dam.

7. *Characteristics of American Eel in the Lower Roanoke River*, April 2001, Graham.
Evaluates the abundance of eels in the lower Roanoke in comparison with eel abundance in other nearby rivers.
8. *Cumulative Impacts Assessment Studies*, April 2001, Graham and Cannon, revised October 2001.
A phased approach to assess and predict the reasonably foreseeable impacts of continued impoundment of the two Dominion reservoirs. Issues addressed in the studies are:
 - Habitat changes with impoundment;
 - Lotic and Lentic Fishes;
 - Tributary Fishes
 - Riverine Fishes and floodplain interactions (Floodplain study #5 above);
 - Littoral Zone effects (Continuing erosion study); and
 - Factors influencing Mussels.
9. *Angler Creel and General Recreational User Survey Draft Final Report*. August 1997, Meredith, Malvestuto and Steeger.
February 1996 through January 1997 survey provides angling and general recreational use estimates and fishery descriptors and factors relating to recreational use and user's preferences.
10. *A QUAL2E-UNCAS Application to the Roanoke River From Roanoke Rapids Dam to Hamilton in North Carolina* – NCDENR, June 1996
Details the development and calibration of a water quality model to simulate instream dissolved oxygen concentrations for 70 miles of the river and to examine the interaction of oxygen consuming wastes on a broad scale such that fate and transport are more accurately represented.
11. *Aquatic Resources of the Lower Roanoke River* – Updated Version of 1996 Year-End Report, October 1997, Knutzen.
Results of aquatic studies conducted in the Roanoke River downstream of the Roanoke Rapids Dam.
 - Anadromous Fish Surveys
 - Resident Fish Survey
 - Lower Roanoke River Backwater and Swamp Survey
 - Mussel Survey
 - Historical Anadromous Fish Distribution and Dam Passage

12. *Factors Regulating the Dynamics of Anadromous Fishes in the Roanoke River, North Carolina* (Annual Report on Roanoke River Sturgeon and Shad Monitoring) March 1997, Hightower and Sparks.
13. *Literature-Based Evaluation of Potential Fish Entrainment and Turbine Passage Mortality*, December 1996, Knutzen.
14. *Utilization of Backwater Habitats on the Lower Roanoke River by Anadromous Clupeids*, August 1998, Walsh, Peters, Holloman and Richter
15. *Recreational Resources Year-End Report*, January 1997, Lawson and Greenig. Documents recreation studies for 1996. Includes:
 - Resources Inventory;
 - Needs Assessment; and
 - Project Operations and Facilities Effects.
16. *Terrestrial Resources Report*, January 1997, Cannon and Fischl. Field investigations of the project area covering the following topics:
 - Vegetation and wetland mapping;
 - Wildlife Habitat Inventory;
 - Threatened and Endangered Species Surveys;
 - Shoreline Wetland Survey;
 - Hydroecologic Model of Lower Roanoke River;
 - Ecosystem Indicator Species of the Lower Roanoke River;
 - Productive Hardwood Forrest of the Lower Roanoke River; and
 - Influence of Beaver expansion in the Lower Roanoke River.
17. *Water Quality Year-End Report*, January 1997, Knutzen and Rogers. Results of the 1996 water quality studies and a summary of the 1994 and 1995 temperature and dissolved oxygen data for the study area. Tasks of the study include:
 - Dissolved oxygen and temperature of the Lakes and lower Roanoke River;
 - Assessment of general water quality conditions;
 - Effects of peaking on river bank stability and sediment transport;
 - Reservoir fluctuation effects on bank Stability;
 - Sediment Contamination Sampling;
 - NPDES permits;
 - BOD; and
 - Non-point source pollution.
18. *Aquatic Resources of Lake Gaston and Roanoke Rapids Lake, Year End Report*, January 1997. Knutzen
Summarizes results of studies conducted on the two lakes in 1996. Coves lake fish populations, walleye reproduction and natural and fishing mortality of stocked striped bass in Lake Gaston.

19. *Effects of Water Level Fluctuations on Largemouth Bass Spawning*, December 1996, Knutzen.
20. *Roanoke River Studies*, (Annual), Weyerhaeuser. Lebo. Lower Roanoke water quality and flow studies.
21. *Striped Bass Egg Abundance and Viability in the Roanoke River, North Carolina and Young of Year Survivorship* for 1993, Rulifson and Isely.
22. *Movement, Habitat Selection and Growth of Early-Juvenile Atlantic Sturgeon in Albemarle Sound, North Carolina*, April 1999, Armstrong and Hightower.
23. *Spawning Habitat of American Shad in the Roanoke River, North Carolina*, November 1999, Hightower.
24. *Assessment of the Striped Bass Spawning Stock in the Roanoke River, North Carolina*, April 1995 – September 1996, Kornegay.
25. *Roanoke River Basin Consumptive Use Study*, August 1994, August 1999 (VA Beach).
26. *Economic Impact of the Lake Gaston Sub Regional Economy*, December 1998, McLollum.
27. *Roanoke Rapids and Gaston Project: Cultural Resources Overview*, December 1998, Abbott and Siegel.
28. *Comparison of the Health and Status of Resident Fishes of the Lower Roanoke, Neuse and James Rivers*, May 2001, Fogarty.
29. *Status Review of Atlantic Sturgeon*, 1998, NMFS.
30. *Stock Assessment of Atlantic Striped Bass*, 1997, Atlantic States Marine Fisheries Commission.
31. *Molluscan Survey of the Roanoke River Between Roanoke Rapids and Weldon*, 1997, Rennington Associates.
32. *Distribution of Sturgeon in the Roanoke River and Albemarle Sound*, 1997, Hightower.
33. *Natural Mortality of a Reservoir Population of Striped Bass*, 1998, Hightower.
34. *Historical Trends in Abundance of American Shad and River Herring, Albemarle Sound, North Carolina*, 1996, Hightower.

35. *A Report on the Roanoke River Fish Kills, 25 July – 2 August 1995*, Kornegay, NCWRC.
36. *Basinwide Wetland and Riparian Restoration Plan for the Roanoke River, 1998*, NCDENR, Division of Water Quality.
37. *Vegetation of the Lower Roanoke River, 1997*, Rice and Peet.
38. *Factors Regulation the Dynamics of Anadromous Fishes in the Lower Roanoke River, NC, 1997*, Sparks and Hightower.
39. *The Roanoke River Bio Reserve: A Preliminary Assessment of Flow Modification on Hydrology, Geomorphological Processes and Vegetation, 1997*, Walsh, Butler, Konrand and Townsend.
40. *Historical Distribution of Anadromous Fishes within the Roanoke River Basin, 1997*, Zarecki and Hightower.
41. *Survey of Lake Gaston and Roanoke Rapids Reservoir, 1997*, Byrd. Bald eagle survey. (Second survey conducted in 1999).
42. *Influence of Beaver Expansion – Lower Roanoke River, 1997* Fischel.
43. *Amphibians and Reptiles of the Roanoke Rapids and Lake Gaston Hydropower Project, 1997*, Gaul.
44. *Breeding Bird Report, Second Field Season Report and Two-Year Summary, 1998*, Stinson.
45. *Studies Needed to Determine Impacts (Including Cumulative Impacts) of Altered Hydro-Regime on Terrestrial Ecosystems and Organisms, 2000*, Roanoke Rapids and Gaston Relicensing Terrestrial Study Committee. (Flow chart summarizes suggested study and whether study address Dominion or Corps downstream influence).
46. *Potential for Restoration for the Roanoke River / Albemarle Sound Population of Atlantic Sturgeon, Roanoke River, North Carolina, 2001*, Armstrong and Hightower, 2001 (Draft report in review).
47. *Migration and Spawning Habitat of American Shad in the Roanoke River, North Carolina, Hightower and Sparks, 2001*, (Draft report in review).
48. *Roanoke River Tributary Mussel Inventory, Alderman, 2001*. Results of surveys of tributary streams to Lake Gaston and Roanoke Rapids Lake.
49. *Roanoke River Basinwide Water Quality Plan, July 2001*, NCDENR, Division of Water Quality.