

**Yadkin Project (FERC No. 2197)
Sediment Fate and Transport
Final Study Plan
August, 2003**

Background

Alcoa Power Generating Inc. (APGI) is the licensee for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2197. This license expires in 2008 and APGI must file a new license application with FERC on or before April 30, 2006 to continue operation of the Project.

The Yadkin Project consists of four reservoirs, dams, and powerhouses (High Rock, Tuckertown, Narrows, and Falls) located on a 38-mile stretch of the Yadkin River in central North Carolina. The Project generates electricity to support the power needs of Alcoa's Badin Works, to support its other aluminum operations, or is sold on the open market.

As part of the relicensing process, APGI prepared and distributed, in September 2002, an Initial Consultation Document (ICD), which provides a general overview of the Project. Agencies, municipalities, non-governmental organizations and members of the public were given an opportunity to review the ICD and identify information and studies that are needed to address relicensing issues. To further assist in the identification of issues and data/study needs, APGI has formed several Issue Advisory Groups (IAGs) to advise APGI on resource issues throughout the relicensing process. IAGs will also have the opportunity to review and comment on Draft Study Plans. This Final Study Plan has been developed in response to comments on the Draft Study Plan and through discussions with the Water Quality IAG, to provide additional necessary information for consideration in the relicensing process.

Overview

The Yadkin Division of APGI (Yadkin) has begun the process of preparing for the relicensing of the Yadkin Project, located on the Yadkin River in North Carolina. The watershed area above the lowest dam in the Project encompasses 4,200 square miles. This river is a part of the larger Yadkin/Pee Dee River Basin that extends from the eastern slopes of the Blue Ridge Mountains to the Atlantic coast. As part of this effort, Yadkin is collecting baseline information on resources at the Yadkin Project. In particular, Yadkin is interested in characterizing the fate and transport of sediment in the Project area.

As noted above, the Yadkin Project consists of a system of four reservoirs, dams and powerhouses. From upstream to downstream the reservoirs are: High Rock , Tuckertown , Narrows and Falls. The High Rock Reservoir covers approximately 15,180 acres and has a shoreline length of 360 miles and is the largest of the four reservoirs. Tuckertown Reservoir covers 2,560 acres and has a shoreline length of 75 miles. Narrows Reservoir covers 5,355 acres and has a shoreline length of 115 miles. Falls Reservoir, the smallest of the four reservoirs covers 204 acres and has a shoreline length of 6 miles. Both High Rock and Narrows Reservoirs and to a lesser extent Tuckertown are highly dissected with numerous side channels and bays. Forest and residential land uses predominate the shorelines of High Rock and Narrows reservoirs, while the shoreline zone of Tuckertown and Falls reservoirs is mostly undeveloped and forested. There are 31 National Pollutant Discharge Elimination System (NPDES) permitted discharges to High Rock Reservoir or tributaries to High Rock, 5 NPDES discharges to Tuckertown Reservoir or its tributaries, 2 discharges to Narrows Reservoir or its tributaries and 1 discharge to Falls

Reservoir or its tributaries. These discharges range from small to medium sized wastewater treatment systems to industrial discharges, and are significant sources of nutrients and other pollutants to the Yadkin Project.

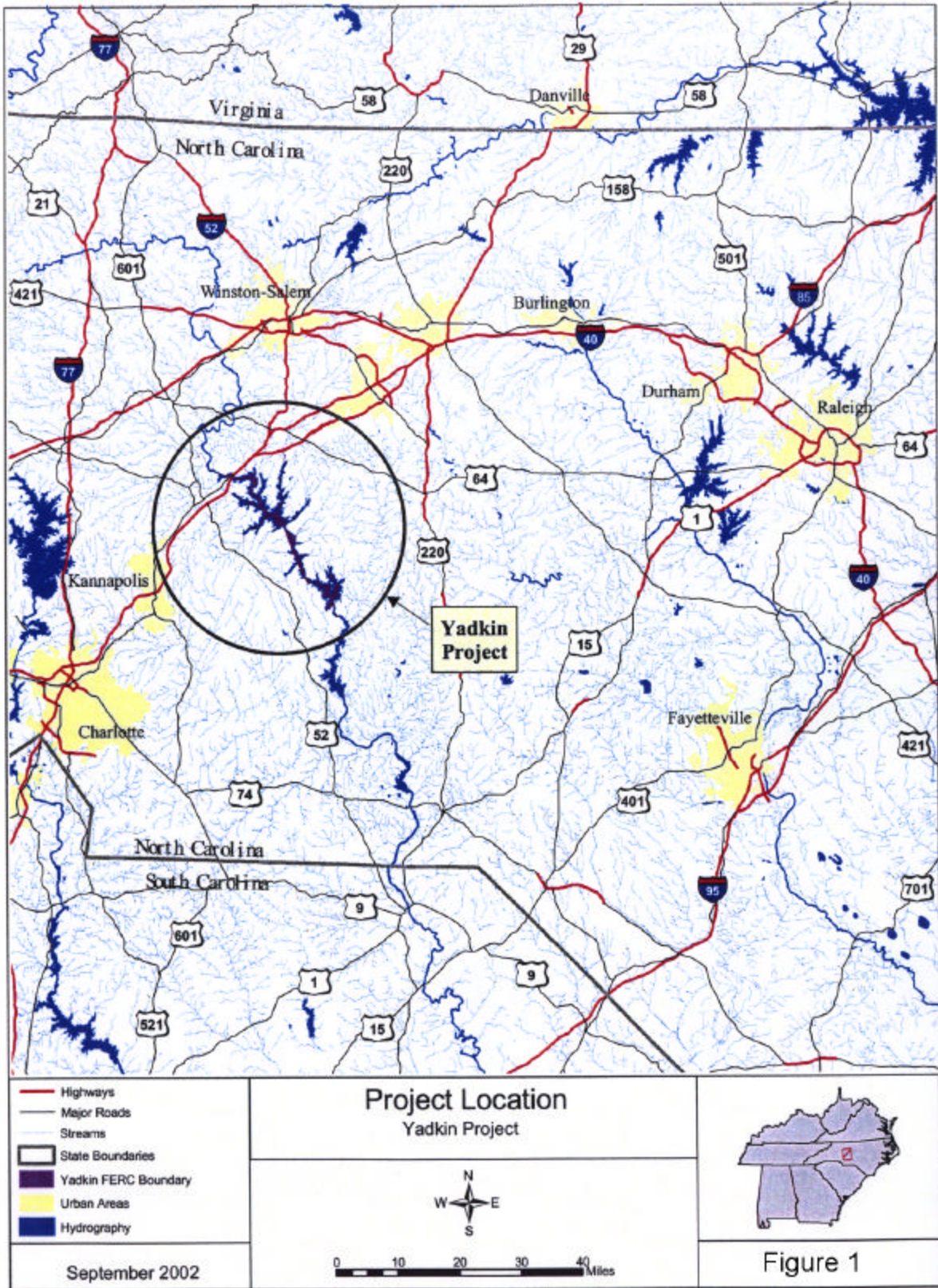
Historic water quality throughout the Yadkin Project has been evaluated through several studies conducted by the North Carolina Division of Water Quality (NCDWQ) and Yadkin. Data collected during these studies is summarized in the Yadkin Project ICD (September, 2002). Recent water quality data suggest that eutrophication is a problem for both High Rock and Tuckertown reservoirs. Sedimentation, turbidity and a large load of incoming sediment, primarily from upstream sources has also been identified as a water quality problem in the Yadkin reservoir system, particularly at High Rock.

Issues

The following issues were raised during initial consultation regarding sediment transport, sediment load and sedimentation at the Yadkin Project:

- Current status of sedimentation and sediment load entering and leaving the Yadkin Project
- Effects of sediment deposition on reservoir habitats and other resources
- Effects of dams and reservoirs on sediment transported to the lower river
- Physical characteristics of sediments

Figure 1. Yadkin Project



Objectives

On March 13, 2003 the Water Quality IAG met and discussed objectives for the sedimentation study. Over the course of those discussions the following objectives were identified for the study.

- To the extent possible, utilize existing data and literature sources to estimate the current sediment load to the Yadkin Project reservoir system and identify the sources of sediment.
- Estimate the sediment load being retained within the Yadkin Project reservoir system and identify patterns of sedimentation within High Rock Reservoir. Evaluate how sediment deposition patterns in High Rock may be impacting (negatively or positively) aquatic habitats and municipal water supply intakes.
- Characterize the physical characteristics (particle size, etc.) of the sediments within High Rock reservoir and those being transported downstream.
- Evaluate sediment fate and transport qualitatively under existing and potential future operating scenarios.

Sediment Fate and Transport

This study will involve a review of available literature and existing data on sedimentation, sediment transport and physical characteristics of sediment of the Yadkin impoundments and a discussion of the findings as well as a discussion of the possible sources of sediment. Of particular interest to this study are reports of recent significant investigations conducted by the University of North Carolina and Duke University (Richter et. al. 1995) and related reports. Related research from the Alcoa Power Generating Inc. (APGI), USGS, TVA, USACE and NCDEM will be included where appropriate. As discussed at the 5/20/03 Water Quality IAG meeting, other related data such as bathymetry, aerial photos, and sediment accumulation calculations being completed by PB Power for APGI as a part of this licensing effort will be incorporated into the discussion as appropriate. Results of the shoreline erosion study conducted under the fisheries and aquatic life study plans will be incorporated as appropriate along with relevant sections of the Shoreline Management Plan (Yadkin, Inc. 1999). A review report will be prepared which documents the source of sediments to the Project, the sediment load and the distribution of sediment among the four Project reservoirs and within each reservoir, particularly High Rock.

Once the sources and distribution of sediment have been established from the literature, any impact of those sediment deposits on aquatic habitat, aquatic plant growth, recreation, water quality, municipal water supply intakes and other resources will be discussed. The transport of sediments downstream of the four projects will also be evaluated qualitatively. The influence of Project operation and potential future Project operations on sediment fate and transport will be discussed.

References

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