

NPLOT7 – GIS Database Development
Mission (2619), Bryson (2601), Franklin (2603), Dillsboro (2602)

Final Report

Introduction

Duke Power – Nantahala Area (Duke) is in the process of relicensing the Mission, Bryson, Dillsboro and Franklin Hydroelectric Projects. The relicensing process requires the applicant to file accurate maps depicting the projects, project features and other geographic features. At the beginning of the relicensing process, Duke had limited electronic maps of the four projects. Accordingly, Duke undertook an effort to develop Geographic Information System (GIS) data for the projects. Duke’s objective was to utilize the GIS data in preparing reports and maps for use in the relicensing process. In addition, Duke will utilize the GIS data in the long-term management of the projects.

Database Development

Duke determined that it would utilize high-resolution, geo-referenced aerial photography of the projects for its base data layer. All other data layers would be built upon this base. The projects were flown in early 2001 during leaf-off conditions. Leaf-off conditions allowed the greatest opportunity to identify individual structures and other features. The data were collected in wide area mosaic 3-foot Ground Sample Distance imagery. See Figure 1 for an example of the aerial images.

The firm Orbis GIS, Inc. was selected to develop the GIS database. Orbis obtained GIS data from a number of sources including the United States Forest Service, local counties, the North Carolina Center for Geographic Information and Analysis (NCGIA) and other sources. The data is in GIS projection North Carolina Stateplane NAD 83 in feet.

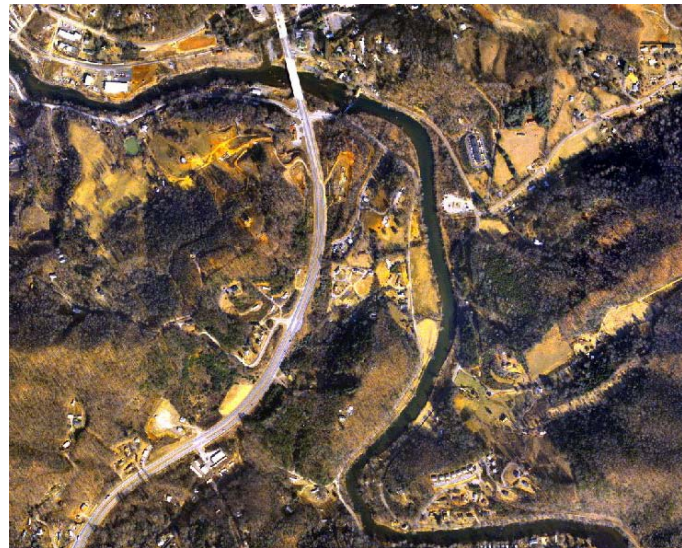
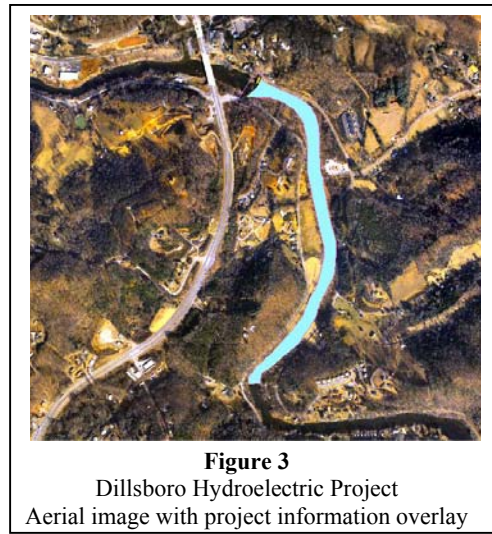
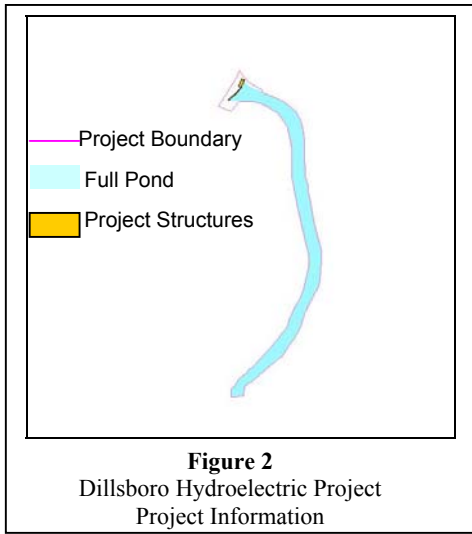


Figure 1
Dillsboro Hydroelectric Project
Aerial Image

Project boundaries were then digitized from FERC exhibit drawings and overlaid on the aerial photography. Where there were obvious discrepancies between the digitized project boundaries and the aerial photography, the project boundary was adjusted to fit the georeferenced aerial photography. For some projects, Duke has proposed to modify portions of the project boundary; the GIS data have been modified to reflect these changes. Full pond boundaries were developed from the aerial photography by photo interpretation of the full pond elevation around each reservoir at the time of the aerial photography. The locations of project structures including dams and powerhouses were developed based upon photo interpretation of the aerial photography. The GIS data developed as part of this effort is not intended to be survey quality. These data layers were reviewed by Lake Management, Hydro Licensing and others

knowledgeable of the projects prior to being completed. See Figures 2 and 3 for examples of the data that was developed.



These data layers and associated metadata files are currently maintained by the Lake Management organization within Duke Power and will be utilized in administering Duke’s Lake Management Policies and Procedures. The data is also being utilized in relicensing reports. Some of the additional data currently available is listed in Table 1.

Data	Source
National Wetlands Inventory	US Fish & Wildlife Service
National Register Sites	North Carolina Department of Cultural Resources
Federal Land Ownership	NCGIA
Clay County Tax Parcels	Clay County
Macon County Tax Parcel	Macon County
Indian Lands and Native Entities	US Bureau of Indian Affairs
Natural Heritage Sites	North Carolina Department of Environment and Natural Resources
Significant Natural Heritage Areas	North Carolina Department of Environment and Natural Resources
US Forest Service Land Ownership	US Forest Service
US Forest Service Management Areas	US Forest Service
Trails	US Forest Services

Table 1
Western North Carolina GIS Data and Sources

Appendix 1: Study Plan

Action #: NPLOTH7

Prerequisite Action #'s: NPL_____

Action Description:

Develop a GIS-based mapping system to support cataloging and data presentation and analysis for several other studies.

Applicable Hydro Projects/Developments:

Bryson, Dillsboro, East Fork (Wolf Creek, Bear Creek, Tennessee Creek, Cedar Cliff), Franklin, Mission, Nantahala (Nantahala, Diamond Valley, White Oak Creek, Dicks Creek), West Fork (Thorpe, Tuckasegee)

I. Objective

Develop GIS-based maps of projects and project lands that can be utilized for data presentation, analysis and cataloging.

II. Basis

FERC requires applicants to provide accurate maps of projects as part of the license application. Duke Power – Nantahala Area does not currently have GIS-based maps of the projects. Development of accurate maps will facilitate the presentation of data collected during the relicensing studies and facilitate the analysis of such data.

III. Geographic and Temporal Scope

GIS data for all Duke Power - Nantahala Area projects referenced above will be compiled. Where data is already existing and available, the GIS database may include data that extends beyond the project boundary. Where data layers must be developed, efforts will focus on developing such data within the project boundaries.

IV. Approach and Analysis

Geo-referenced aerial photographs of the projects will serve as a backdrop for the GIS-database. The photographs will be obtained from a consultant selected through a competitive bidding process. Duke Power's GIS consultant will develop the GIS database by obtaining existing GIS-data layers from state and federal agencies or developing other data layers. The consultant will be selected through a competitive bidding process. GIS data will be accessible through ArcView software.

Duke Power's GIS database will meet or exceed the standards developed by the Federal Geographic Data Committee.

The following list includes data layers that will be included in the GIS database:

- Project boundaries
- Project structures
- Wetlands
- Natural heritage sites
- Federal lands
- Native American lands
- Hydrologic features
- FERC-required recreation areas
- Parks (local, state and federal)
- Roads, railroads
- Political boundaries (counties, cities)
- Relicensing study information like sampling locations, data points, etc.
- Archaeological sites (Note: access to data will be restricted)

Schedules and Required Conditions

- 1st quarter, 2001
- Obtain aerial photographs of projects.
 - Submit Request for Services (RFS) for GIS database development.
- 3rd quarter, 2001
- Initiate development of GIS database. Project would continue throughout 2002 with additional data layers added as information becomes available from the various relicensing studies.

V. Results

The GIS mapping system will be a tool for use in other relicensing studies. Development of the GIS mapping information will provide a way to spatially examine, describe and depict relationships between the projects and adjoining lands.

VI. Participants

	<u>Organization</u>	<u>Name</u>	<u>Phone #</u>	<u>E-Mail</u>
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	USFS	Ray Johns	828.257.4859	Rayjohns@fs.fed.us
	USFWS	Mark Cantrell	828.258.3939	Mark_a_cantrell@fws.gov
NP&L Supporting Consultant	Orbis GIS, Inc.			

VII. Expected Benefits

Duke Power – Nantahala Area does not currently have tools to effectively depict the projects and their locations. The development of the GIS mapping system will provide an effective tool for doing so. The GIS mapping system will also prove useful in lake management activities that take place after the relicensing effort.

VIII. List of Attachments

Request for Services for aerial photography

IX. List of References

*GUIDELINES FOR ACQUIRING DIGITAL AERIAL PHOTOGRAPHY FOR THE NANTAHALA
HYDROELECTRIC PROJECTS*

January 9, 2001

INTRODUCTION

The purpose of this document is to provide a set of guidelines to acquire a cost proposal to:

1. Collect digital aerial photography for Duke Power's Nantahala Hydroelectric Projects. The projects are distributed across the southwestern area of North Carolina.
2. Process the data to where it is compatible for use as backdrop in development of Geographic Information System (GIS) Data.
3. Certify the data is at a quality suitable to use in performing heads up digitizing of natural features such as lakes, rivers, roads and other aspects of infrastructure in the Nantahala area. The image data will eventually be incorporated as a back drop for the GIS data to a degree sufficient to view all amenities that are along the shorelines of the Nantahala lakes, i.e. private piers, commercial facilities, transmission lines, distribution lines, communication lines, environmental areas, etc.

PROJECT NECESSITY

Nantahala Power and Light, a division of Duke Energy Corporation is the licensee for the Nantahala Hydroelectric Project. The projects are licensed by the Federal Energy Regulatory Commission (FERC) as Project 2694 (Queens Creek), Project 2692 (Nantahala), 2601 (Bryson), 2602 (Dillsboro), 2603 (Franklin), 2619 (Mission), West Fork (2686), East Fork (2698). This work is being performed to support development of the GIS database to support ongoing activities to meet the FERC requirements at the Nantahala projects. There is an immediate need to gather the aerial data in February 2001 because there is an interest to gather the data with the larger lakes drawn down approximately 20 feet. Historically, the lakes start filling up due to seasonal rains in February. Consultant is requested to arrange schedule with communication from Duke personnel to collect photography in manner to meet the time frame requirements at the optimum depth levels. The data will eventually need to be passed on to a GIS consultant hired by Duke Power to begin the process of developing the full GIS database.

SCOPE OF WORK FOR CONSULTANT

This section provides a summary of expectations to be completed to acquire the digital aerial photography in preparation to use the data for developing a GIS database for the Nantahala Projects.

SCOPE:

1. Utilize the attached USGS 1:24000 North Carolina Quad Maps to locate the area Duke Power is requesting to be flown. The areas are outlined in red ink on the maps. The following North Carolina Quad Maps are included: Peachtree, Topton, Hewitt, Bryson City, Whittier, Greens Creek, Sylva South, Tuckasegee, Glenville, Big Ridge, Lake Toxaway, Franklin, and Corbin Knob. This will cover areas for lake and riverine areas known as Mission, Nantahala, Queens Creek, Bryson, Dillsboro, Franklin, Thorp, Tuckasegee, Cedar Cliff, Bear Cliff, Wolf Creek and Tennessee Creek. Duke Power Lake Management personnel shall be provided opportunity to critique flight lines prior to collection of data to certify the coverage area is accurate.

2. Plans should be coordinated to collect the data near the beginning of February. The primary idea is to collect the data when Lake Nantahala and Lake Glenville are in the 20 foot drawdown range. This criteria is not applicable to the other lakes that are to be flown. Consultant should include in the cost a separate breakout to collect the data a second time for Nantahala Lake and Thorp Lake when they approach the 10 foot drawdown. The time period for these conditions can be predicted but it is difficult to say exactly what day they will occur due to weather conditions. The 20 foot drawdown range at Nantahala Lake is expected to occur near the first of February so that is the time frame Emerge should plan to collect the first pass.
3. GIS Projection shall be North Carolina Stateplane Nad 83 in feet. Data is requested to be wide area mosaic 3'GSD imagery. This is same as that collected for the Duke Power Catawba/Wateree system.
4. After the area is flown and data is processed the data shall be delivered on CDROM in TIFF format to Duke Power or a designated GIS consultant vendor to be determined in the future.
5. Duke Power, plus any other division of Duke Energy reserves the right to share the data in digital or hard copy format between internal divisions in the day to day business of the corporation as deemed necessary.

TERMS:

1. Consultant shall assume responsibility for meeting all dates as requested.
2. Project is dependent on approval of quotation of fees and signing of contract between consultant and Duke Energy.
3. In the future it is probable that Duke Power or other parties involved with Duke Power on Nantahala projects may request additional copies of the aerial data. Upon such request it is expected that consultant will make copies of the data as requested in return for a nominal fee.