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An assessment of the Bald Eagle breeding population along Lake Tillery and Blewett Falls Lake in North Carolina: 2003 breeding season

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**AN ASSESSMENT OF THE BALD EAGLE BREEDING
POPULATION ALONG LAKE TILLERY AND BLEWETT FALLS
LAKE IN NORTH CAROLINA: 2003 BREEDING SEASON**



**CENTER FOR CONSERVATION BIOLOGY
COLLEGE OF WILLIAM AND MARY**

Study
Conducted for



CP&L

A Progress Energy Company

AN ASSESSMENT OF THE BALD EAGLE BREEDING POPULATION ALONG LAKE TILLERY AND BLEWETT FALLS LAKE IN NORTH CAROLINA: 2003 BREEDING SEASON

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The Center for Conservation Biology is an organization dedicated to discovering innovative solutions to environmental problems that are both scientifically sound and practical within today's social context. Our philosophy has been to use a general systems approach to locate critical information needs and to plot a deliberate course of action to reach what we believe are essential information endpoints.

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EXECUTIVE SUMMARY

During 2003, a bald eagle survey was conducted in the late spring along the Pee Dee River for Progress Energy Carolinas. This single survey concentrated on areas of documented, or suspected, eagle nesting activity only. Similar to previous years, three occupied territories were determined within the survey area. Two of these territories yielded new nests following damage or destruction of earlier nests.

Productivity for this population was undetermined in 2003 because no survey was conducted during the nesting period earlier in the year. Two of three nests had already fledged young prior to the survey. At least one young was observed in the vicinity of each of these nests suggesting both were successful. A third nest was destroyed with 2 young chicks present. These chicks were lost. Total number of young observed was two in 2003 as compared to four for 2005.

BACKGROUND

Historically, the bald eagle (*Haliaeetus leucocephalus*) was a common breeding species along major river systems, lakes, and coastal areas throughout much of North America. The widespread use of persistent pesticides for crop management in the region resulted in dramatic declines over a 30-40 year period. By the late 1960's, most breeding populations had been decimated by eggshell thinning and associated low productivity. Concern for these populations prompted the elevation of the bald eagle to "Endangered" status and led to a national effort to restore historic populations. Since the nationwide ban on many persistent pesticides in 1972, many populations have experienced gradual recoveries in both productivity and total numbers. The bald eagle's protection status was revised by the U.S. Fish and Wildlife Service (Service) to "Threatened" in 1999 due to continuing recovery. The species may be removed from the Federal Threatened and Endangered Species list by the Service pending further review. The state of North Carolina has seen an increase from no breeding pairs in the late 1960's to approximately 40 nesting pairs in 2003.

Since 2001 The Center for Conservation Biology has conducted aerial surveys for nesting bald eagles on Lake Tillery and Blewett Falls Lake, including riverine portions of the Pee Dee River, at the request of Progress Energy Carolinas (formerly CP&L). Results of those studies have been detailed in Watts and Bradshaw (2001, 2002). For 2003, the survey was limited to a single survey in late spring, a departure from the normal two-survey protocol.

METHODS

Waterways

Waterways covered by the bald eagle survey of 2003 included all, or portions of: (1) Lake Tillery, (2) Blewett Falls Lake, (3) reach of the Pee Dee River from Tillery Hydroelectric Plant Dam (Lake Tillery) to headwaters of Blewett Falls Lake, and (4) the reach of the Pee Dee River from Blewett Falls Lake to Cheraw, SC. The survey of Lake Tillery included the waterways between Falls Dam and Tillery Dam (also known as Norwood Dam).

Nest Survey

All major waterways and tributaries associated with the study system were surveyed for breeding bald eagles. A high-wing Cessna 172 aircraft was used to systematically over-fly the land surface at an altitude of approximately 100 m to detect eagle nests. Flights were flown to systematically move between the shoreline and a distance of approximately 1 km to cover the most probable breeding locations for bald eagles. All nests detected were plotted on 7.5 minute U.S. Geological Survey topographical maps and given a unique alpha-numeric code. Each nest was examined during the aerial survey to determine its structural condition, the type and condition of nest tree, and the condition of the surrounding landscape. In addition to recording all nests detected, the area was searched for mature and immature bald eagles. All bald eagles detected within the survey area were recorded. In addition to recording bald eagles, locations of all Great Blue Heron (*Ardea herodias*) colonies were recorded and mapped. The survey was conducted on June 5, 2003. This time period coincides with the period normally designated for second survey flights to assess nest productivity.

SURVEY FINDINGS

The reservoir system between the town of Yadkin above High Rock Reservoir and the town of Cheraw, SC near the NC/SC state boundary was found to support six occupied bald eagle territories and 8 Great Blue Heron colonies with an estimated 760 pairs. Progress Energy waterways between Falls Dam and Cheraw, SC, supported three occupied bald eagle territories and one Great Blue Heron colony with 78 pairs.

Lake Tillery

A single bald eagle nest was discovered late in the season following the destruction of the original nest located along the west shoreline of Lake Tillery below Tater Top Mountain and within the Morrow Mountain State Park boundary (see details below). Large blocks of land along the lake's east shoreline have been converted to residential development in recent years. Development is particularly widespread in the lower section of the reservoir; a considerable distance downstream of this nest. Much of the shoreline in this area of the lake is unlikely to attract additional eagle pairs. However, several sections of shoreline remain relatively undisturbed, and contain trees capable of supporting nest structures; particularly along the area associated with Morrow Mountain State Park. Development is sparse in the upper reaches of the lake. The extreme upper portion of the lake seems to support the greatest concentration of breeding habitat. Extensive sections of timber that are of the age and size class capable of supporting nest structures remain in this area. The current breeding territory is positioned within this general area. Whether or not additional territories will be formed in this section will depend on food availability.

Nest: ST-01-04

Nest Location

This nest is located along the west shoreline below Tater Top Mountain and within the Morrow Mountain State Park boundary (Figure 1). The nest tree is within a cluster of older trees positioned near a ridge top. The nest tree is dead and recessed within the tree cluster such that it is difficult to observe the nest except from directly above. The nest may be visible from the water within adjacent cove.

Nesting Activity

Bird Activity – On April 2, 2003, a single adult bird was observed standing on the edge of the nest attending 2 chicks estimated to be 25-30 days old. This tree was observed by biologists to have been blown down by storms on April 2 or 3 and chicks were observed dead on the ground. On June 4, 2003, a new nest (ST-03-01) was located and mapped within a short distance of this nest.

Nest Condition – Nest structure was of moderate size and had been built up from the previous year. The nest was shallow and wide with a well-formed cup that was lined.

Nest Substrate

Substrate Type – Dead loblolly pine.

Nest Position – Nest was positioned in a shallow top crotch. Surrounding trees were live and taller than the nest tree. Nest tree appeared to be recessed in tree cluster. Exposure of the nest surface was 100%.

Substrate Condition – Nest tree was dead and missing several lateral limbs. Limbs forming top crotch were present but not complete. Tree was missing nearly all of its bark indicating that it has likely been dead more than 2 years. Main stem of tree appeared to be sound and protected by surrounding trees.

Potential Disturbance

Nest tree was positioned with a good visual buffer. The nest was in a fairly remote location with a considerable buffer on the upland side. Access is easiest from adjacent cove. Disturbance appears to be limited.

Figure 1. Aerial photograph of Nest ST-01-04 in dead pine tree. Photo by Bryan Watts.



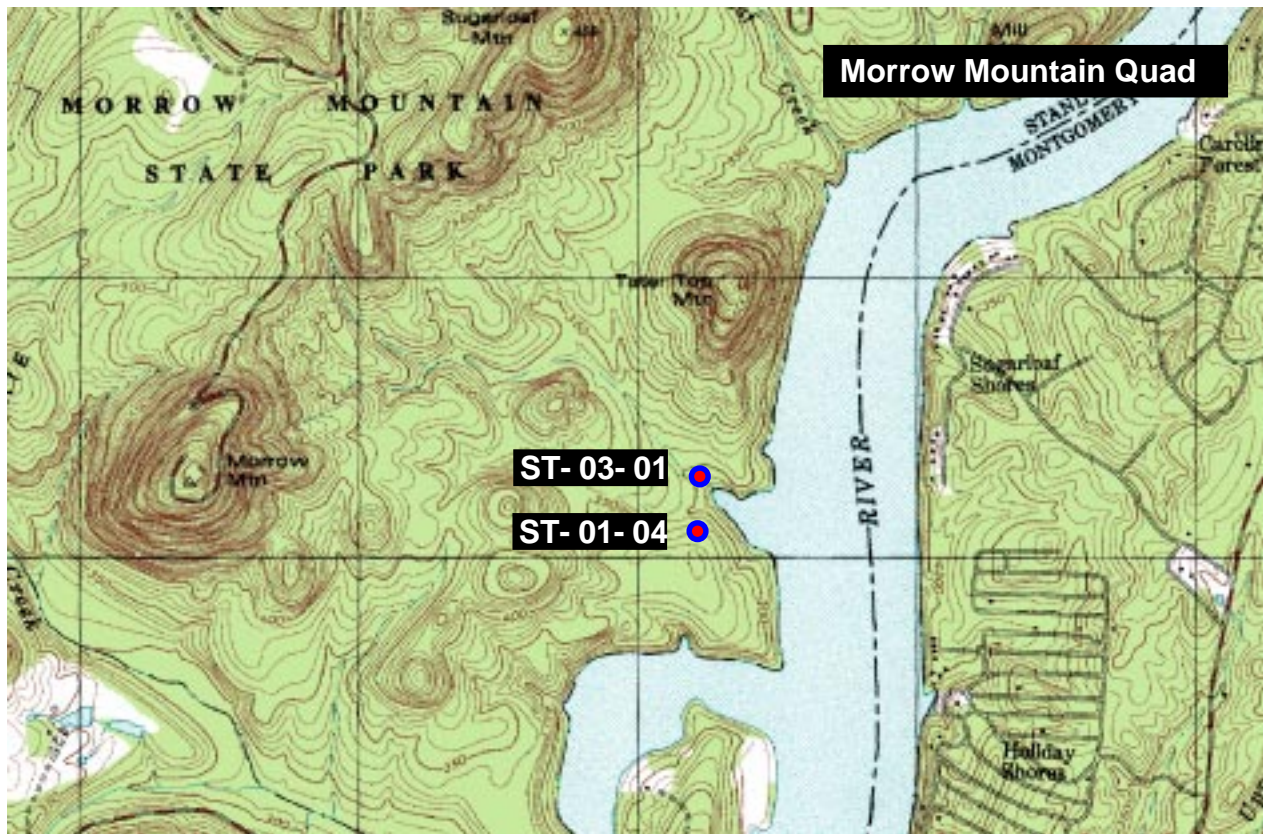


Figure 2. Map location for Nest ST-01-04 and replacement nest ST-03-01.

Nest: ST-03-01

Nest Location

This nest is located along the west shoreline below Tater Top Mountain and within the Morrow Mountain State Park boundary (Figure 2). The nest is located just north of the wind-thrown Nest ST-01-04 along the creek draining into adjacent cove. This nest appears to be a replacement nest within the territory of Nest ST-01-04. The nest tree is dead and recessed within moderate sized hardwoods. The nest does not appear to be visible from the water.

Nesting Activity

Bird Activity – This nest was not present on April 2, 2003. At that time there were 2 chicks present in ST-01-04. This nest appears to have been built between April 3 and June 4, 2003.

Nest Condition – Nest structure was of moderate diameter but was shallow. This nest saucer shape is very common in a new or first-year nest. On June 4, 2003 this nest had a partial lining.

Nest Substrate

Substrate Type – Dead loblolly pine.

Nest Position – Nest was positioned in a shallow top crotch. Surrounding trees were live and of similar height as the nest tree. Nest tree was embedded within a cluster of live hardwoods. Exposure of the nest surface was 100%.

Substrate Condition – Nest tree was dead but maintained most lateral limbs and had most of its bark remaining suggesting that it had been dead less than 1 year. Limbs forming top crotch were present and nearly complete.

Potential Disturbance

Nest tree was positioned with a good visual buffer. Nest is in fairly remote location but is closer to the shoreline than Nest ST-01-04. Potential for disturbance appears to be limited.

Pee Dee River Reach from Tillery Dam to Blewett Falls Lake

A single occupied territory was located within this reach of the river. The original nest from 2001 within this territory was damaged by windthrow during the nonbreeding season. Progress Energy Carolina's biologists reported a pair within this territory building a new nest in close proximity to the damaged nest in 2002. That nest was never located during aerial surveys. A third nest within the same territory was located in 2003 as reported below. Neither a breeding attempt or young were documented in 2003.

Nest: ST-01-03

Nest Location

This nest is located along the west shoreline between the Norfolk Southern Railway trestle and NC Highway 731 and just below the Tillery Hydroelectric Plant Dam (Figures 3 and 4). The nest is approximately 150 m inland from the shoreline. This nest is placed low in a tree below an even age/height canopy and is difficult to locate from the air. The nest would be easier to observe from the ground looking up under the canopy.

Nesting Activity

Bird Activity – No eagles were observed in association with this nest site on June 4, 2003. New nest located across the river (Nest MO-03-02) is believed to be replacement nest within this territory.

Nest Condition – Nest structure not detected on June 4, 2003. This nest was believed to be absent (J. Cruthcfield, personal communication).

Nest Substrate

Substrate Type – Live loblolly pine.

Nest Position – Nest appeared to be absent.

Substrate Condition – Nest tree was live and appeared to be in good condition.

Potential Disturbance

Nest tree was positioned within loblolly pine stand with a good visual buffer. Proximity to major roadway suggests that access to tree is high. However, dense forest stand appears to provide adequate buffer from disturbance. Nest does not appear to be visible from the roadway or water.

Nest: ST-02-01

Nest Location

This nest was located along the edge of a field near NC Highway 731 just below the Tillery Hydroelectric Dam (J. Crutchfield, personal communication). The nest was within the breeding territory of the pair utilizing Nest ST-01-03 in 2001 and was thought to have been a replacement for that nest (Figure 3). Over winter damage to the tree made it inaccessible to nest building.

Nesting Activity

Bird Activity – No nest or bird activity could be determined in the vicinity of Nest ST-02-01

Nest Condition – Nest could not be located during June 2003 survey flight.

Nest Substrate

Substrate Type – Damaged loblolly pine.

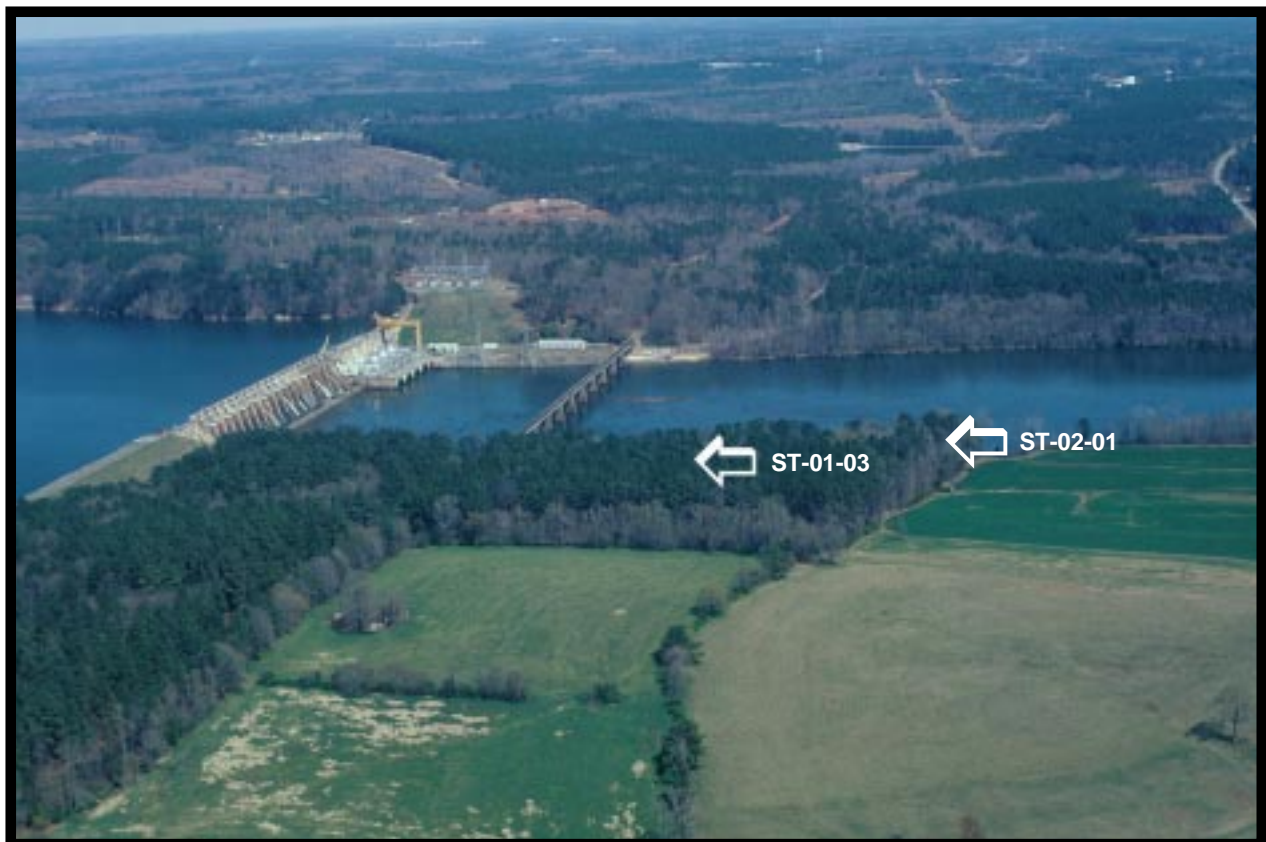
Nest Position – Nest was absent in 2003.

Substrate Condition – Nest tree was broken off with no remaining limbs in 2003. (J. Crutchfield personal communication).

Potential Disturbance

The nest was located at the edge of an active agricultural field and is approximately 180 m from NC Hwy 731. The nest was visible from the highway and often observed by birders stopping along the roadside (R. Bryson, personal communication).

Figure 3. Aerial photograph of locations of Nests ST-01-03 and ST-02-01. Photo by B.Watts.



Nest: MO-03-02

Nest Location

This nest is located along the east shoreline of the Pee Dee River below Norwood Dam. The nest appears to be a replacement nest within the territory of Nest ST-01-03. It is located within a strip of trees along a drainage from an extensive clear cut. The tree strip extends northeast from a transmission line. This nest is not visible from the river but may be seen from the power line right-of-way or during winter from NC Highway 731.

Nesting Activity

Bird Activity – This nest was located on June 4, 2003. No birds were present on the nest on that date. A single adult and a single young of the year were observed along the east shoreline of the PeeDee below the Norwood Dam.

Nest Condition – Nest structure was of moderate diameter and was shallow. This nest saucer shape is very common in a new or first-year nest. On June 4, 2003 this nest was lined and appeared to have been in use this breeding season. The edges of the nest and the surrounding limbs exhibited whitewash characteristic of recent or ongoing use.

Nest Substrate

Substrate Type – Live loblolly pine.

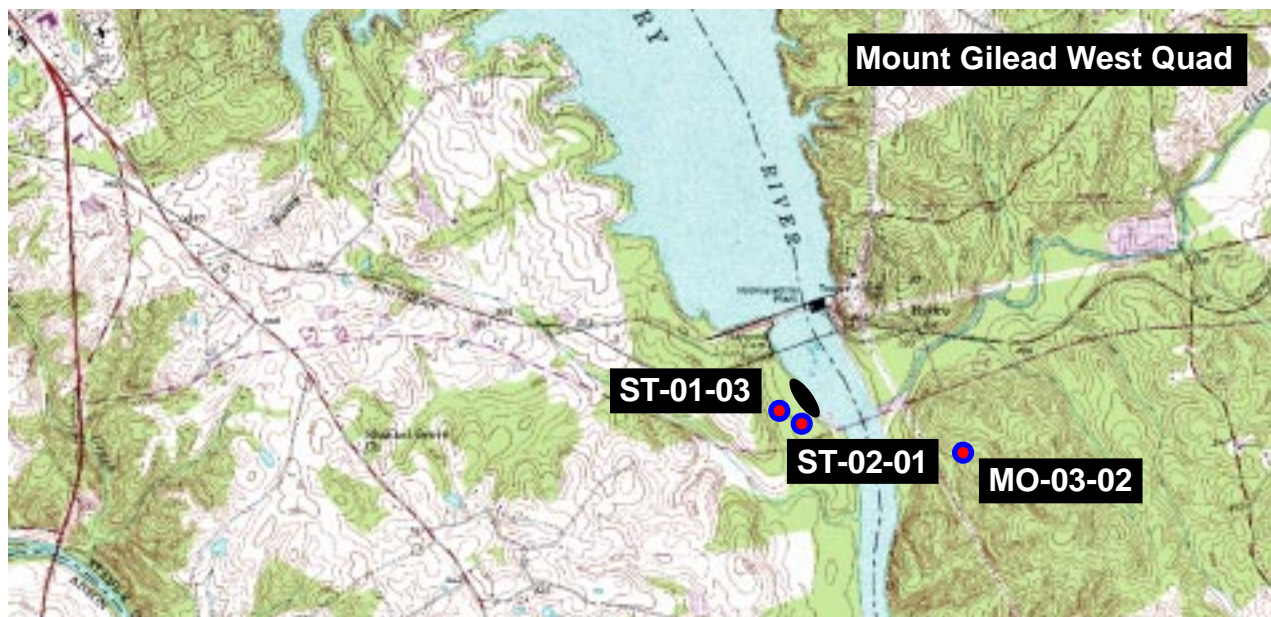
Nest Position – Nest was positioned on a later limb up against main trunk. Nest tree was within a row of trees extending out into a recent clearcut. This configuration is very common and allows good crown access to the nest. Exposure of the nest surface was approx. 80%.

Substrate Condition – Nest tree was live and in good condition.

Potential Disturbance

Nest tree was exposed to an extensive visual field with a poor buffer. Nest was relatively remote but could be accessed on foot from transmission line right-of-way.

Figure 4. Map location for Nests ST-01-03, ST-02-01 and new Nest MO-03-02.



Blewett Falls Lake

One bald eagle nest was located along the shoreline of Blewett Falls Lake. The nest was located just above the Blewett Hydroelectric Plant Dam. It was determined to be active. There are several large blocks of land along Blewett Falls shoreline that, from a nesting substrate perspective, have the potential to support bald eagle territories. One of the most promising locations lies along the east shoreline near the Blewett Dam. Recent forestry activity within this location has opened up many potential nest trees with good crown access. Many of these trees have ideal structure to support eagle nests.

Nest: AN-01-01

Nest Location

This nest is located on a short peninsula along the west shoreline just above the Blewett Hydroelectric Plant Dam (Figure 5). The nest is situated approximately 100 m back from the shoreline in a pine stand that has been thinned and contains scattered pines.

Nesting Activity

Activity – On June 4, 2003, a single chick was standing on the nest. This chick flew off the nest when the survey plane circled the forest patch. This chick was a minimum of 12 weeks old. Search of the surrounding landscape did not reveal additional young of the year. A single adult was perched along the west shoreline of the river below the dam.

Condition – The nest structure used in 2002 was lost during the breeding season. A new nest was built in the same location and position. This new nest was better constructed and in better condition than in the previous 2 years. On June 4, 2002, this nest had a good grass lining.

Nest Substrate

Substrate Type – Supercanopy loblolly pine.

Nest Position – Nest was positioned in a multiple-prong top crotch. Wide spacing of trees around nest appeared to allow for good crown access. Crown limbs are widely spaced such that nest had approximately 50% sky exposure.

Substrate Condition – Live loblolly pine in fair condition. Foliage appeared to be somewhat yellow and crown foliage was sparse. Tree may have experienced previous crown damage. Tree is positioned within older loblolly stand among scattered trees.

Potential Disturbance

The nest tree was protected by considerable forest buffer on the upland side but it was within a relatively short distance of power line right-of-way and plant. Nest was likely visible from dam as well as from lake surface.

Pee Dee River Reach from Blewett Falls Dam to Cheraw, SC

In general, availability of nesting substrate suitable for bald eagle use was high within this stretch of river. Long sections of shoreline do not appear to be impacted by human disturbance and contain large stands of relatively old-growth pine that are suitable for nesting. Progress Energy Carolinas biologists observed a mature bald eagle flying in the vicinity of Mill Creek on July 29, 2003, similar to past observations, but no nests have been identified in this area.

Figure 5. Map location for Nest AN-01-01.

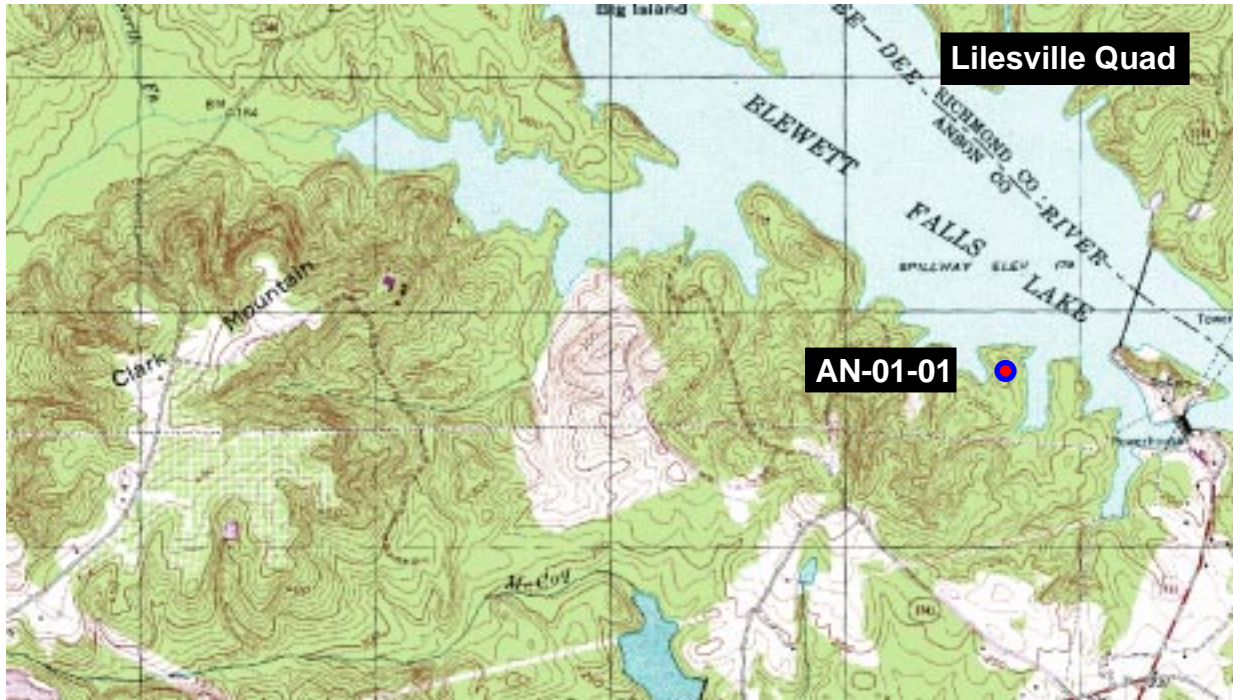


Figure 6. Aerial photograph of the location of Nest AN-01-01. Photos by Bryan Watts.



Miscellaneous Observations

A single great blue heron colony was again located along the west shoreline below Tillery Hydroelectric Plant (indicated by black polygon on Figure 4). This colony was positioned along the shoreline on the edge of a loblolly pine stand (Figure 7). The colony contained 78 pairs on June 5, 2003, with chicks nearing fledging age.

This nesting colony has been active in both 2001 and 2002 as well. Colony size has doubled in 2003 from the 39 pairs counted in 2002.



Figure 7. Great Blue Heron nesting colony located on west shoreline below the Tillery Hydroelectric Plant. Note nesting activity in pine trees. *Photo courtesy of PEC*

Summary Table

Table 1. Comparison of eagle survey results 2001-2003.

River Reach	Year	Occupied Territories	Nests Identified	Status	Young Produced
Lake Tillery	01	1	ST-01-04	Active	1
	02	1	ST-01-04	Active	1
	03	1	ST-01-04 ST-03-01	Active Active	2* 0
Tillery Dam to Blewett Falls Lake	01	1	ST-01-03	Active	2
	02	2**	ST-01-03 ST-02-01	Inactive Active	- 0***
	03	1	ST-01-03 ST-02-01 MO-03-02	Not found Not found Active	- - 1****
Blewett Falls Lake	01	1	AN-01-01	Active	2
	02	1	AN-01-01	Active	2*****
	03	1	AN-01-01	Active	1

* Nest fell from tree with 2 young chicks on April 2 or 3.

** Adult pair with fledged young located in vicinity of Leak Island, but nest never found.

*** Nest abandoned near end of incubation period. Cause unknown.

**** Single adult with fledged young located near nest site. Total number of young unknown.

***** Fate of nestlings unknown. Nest blown out during nestling stage.

References Cited

- Watts, B.D. and D.S. Bradshaw. 2001. An Assessment of the bald eagle breeding population along Lake Tillery and Blewett Falls Lake in North Carolina: 2001 breeding season. Center for Conservation Biology Research Report Series, CCBR-01-04. College of William and Mary, Williamsburg, VA.
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