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An assessment of the bald eagle and great blue heron breeding populations along Lake Tillery and Blewett Falls Lake in North Carolina: 2011 breeding season

B. D. Watts
The Center for Conservation Biology, bdwatt@wm.edu

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AN ASSESSMENT OF THE BALD EAGLE AND GREAT BLUE HERON BREEDING POPULATIONS ALONG LAKE TILLERY AND BLEWETT FALLS LAKE IN NORTH CAROLINA: 2011 BREEDING SEASON

CENTER FOR CONSERVATION BIOLOGY
COLLEGE OF WILLIAM AND MARY
VIRGINIA COMMONWEALTH UNIVERSITY

Study conducted for

Progress Energy

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AN ASSESSMENT OF BALD EAGLE AND GREAT BLUE HERON BREEDING POPULATIONS ALONG LAKE TILLERY AND BLEWETT FALLS LAKE IN NORTH CAROLINA: 2011 BREEDING SEASON

Prepared by:

Bryan D. Watts, PhD
Center for Conservation Biology
College of William and Mary
Virginia Commonwealth University
Williamsburg, VA 23187-8795

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Prepared for:

Progress Energy Carolinas, Inc.
Raleigh, NC 27602-1551

Cover Photo: Adult attending chicks (*photo by Bryan Watts***)**

The Center for Conservation Biology is an organization dedicated to discovering innovative solutions to environmental problems that are both scientifically sound and practical within todays 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

Waterways along the Yadkin-Pee Dee River between Lake Tillery and Blewett Falls Lake were surveyed for nesting bald eagles and great blue herons during the breeding season of 2011. Six bald eagle territories were determined to be active including three on Lake Tillery, two along the Yadkin-Pee Dee River between Tillery Dam and Blewett Falls Lake, and one on Blewett Falls Lake. Collectively, these pairs produced 11 chicks. Five great blue heron colonies were located including three on the lower portion of Lake Tillery and two below the Norwood Dam. These colonies supported 185 nesting pairs.

Populations of both bald eagles and great blue herons continue to increase along the upper Yadkin-Pee Dee River. The river between the town of Yadkin above High Rock Reservoir and Blewett Falls Lake now supports 11 occupied bald eagle territories that produced 17 chicks in 2011. This reach now supports 19 great blue heron colonies that in 2011 contained 1,096 pairs of great blue herons, 71 pairs of great egrets and 85 pairs of double-crested cormorants. In addition to these breeding birds, the system supports large numbers of wintering double-crested cormorants, waterfowl, and a growing number of white pelicans. Activity continues to be focused around hydroelectric dams presumably because the flow conditions below these structures improves food availability and foraging for these bird species.

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 1960s, 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 and was removed from the federal list in 2007. The species is currently listed as Threatened in North Carolina (North Carolina Wildlife Resources Commission 2008). The state of North Carolina has seen an increase from no breeding pairs in the late 1960s to 136 nesting pairs in 2008.

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, Inc. (formerly CP&L). Results of the previous four studies have been detailed in Watts and Bradshaw (2001, 2002, 2003) and Watts (2005).

OBJECTIVES

The objectives of the bald eagle survey on Progress Energy Carolinas, Inc. reservoirs and hydroelectric plant tailwaters were (1) to document the status, distribution and productivity of nesting pairs in association with the reservoirs and associated river corridors and (2) to increase our understanding of bald eagle natural history in interior regions of North Carolina. A third objective was to determine the status and distribution of breeding great blue herons along the Yadkin-Pee Dee River.

METHODS

Waterways

Waterways covered by the bald eagle survey of 2011 included all, or portions of: (1) Lake Tillery, (2) Blewett Falls Lake, and (3) the reach of the Pee Dee River from Tillery Hydroelectric Plant dam (Lake Tillery) to the headwaters of Blewett Falls Lake. The survey of Lake Tillery included the waterways between Falls Dam and Tillery Dam (also known as Norwood Dam).

Bald Eagle

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 overfly 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 min topographic maps and given a unique alpha-numeric code. Each nest was examined 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 bald eagles. All eagles detected within the survey area were recorded. The survey was conducted on 16 March 2011.

Productivity Survey - All active bald eagle nests were rechecked to determine productivity. A Cessna 172 aircraft was used to fly low over nests to allow observers to examine nest contents. The number of eaglets present was recorded along with their approximate ages. Each nest was also examined to determine its structural condition. Observations of all bald eagles detected were recorded. The survey was conducted on 3 May 2011.

Great Blue Herons

All breeding colonies of great blue herons detected during survey flights were mapped and recorded. Colony locations were plotted on 7.5 min topographic quadrangles. Colonies were examined for size, substrate use, and breeding stage. Colony size estimates were rounded off using a graded scale as follows. A total count was made for colonies < 20 pairs. Estimates for colonies > 20 pairs were rounded off using a graded scale: nearest 5 for < 50, nearest 10 for 50 – 200, and nearest 25 for 200 – 450.

SURVEY FINDINGS

The Yadkin-Pee Dee River reservoir system between the town of Yadkin above High Rock Reservoir and through Blewett Falls Lake was found to support 11 occupied bald eagle territories that produced 17 chicks, 19 great blue heron colonies that supported 1,096 pairs of great blue herons, 71 pairs of great egrets, and 85 pairs of double-crested cormorants. Progress Energy Carolinas, Inc. waterways between Falls Dam and Blewett Falls Dam supported 6 bald eagle territories that produced 11 chicks and 5 great blue heron colonies with 185 pairs.

Lake Tillery

Three active bald eagle territories were located with Lake Tillery during the 2011 breeding season. Two active nests (ST-10-01, ST-06-01) were located within the upper reaches of the lake and one active nest (MO-05-01) was located within the lower reach. Collectively, pairs produced 7 chicks. Three great blue heron colonies were located on the lake including one near Tater Top Mountain, one near the mouth of Mountain Creek, and one along the shoreline east of Route 1111. These colonies supported 30 pairs.

Bald Eagle

Three active bald eagle territories were located within Lake Tillery during the 2011 breeding season. Collectively, these territories produced seven chicks.

Nest: ST-06-01

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 is located just north of west of the previous nests (ST-01-04 and ST-03-1) within this territory. The nest tree is fairly close to the shoreline of the cove and may be visible from the water.

Nesting Activity

Bird Activity - On 16 March 2011, a single adult was on the nest brooding three small chicks. Based on size and feather condition, the chicks appeared to be approximately 20 days old. On 3 May 2011, three chicks were standing in the nest. A single adult was perched in the nest tree.

Nest Condition - On 16 March 2011, nest was in good structural condition had a well-formed cup and fresh lining. The nest was of moderate size and had been rebuilt on previous structure that was wind damaged.

Nest Substrate

Substrate Type - Loblolly pine.

Nest Position - Nest was positioned in a top crotch below the crown with perching limbs above and around the sides. Surrounding trees were live and of similar height as the nest tree. Nest tree was embedded within a cluster of pines surrounded by hardwoods. Sky exposure of the nest surface was 50%.

Substrate Condition - Nest tree was in good condition.

Potential Disturbance

Nest tree was positioned with a good forest buffer on the upland side. Nest is in a fairly remote location with poor access from upland but is near the shoreline and could be accessed from the water. Potential for disturbance appears to be limited.

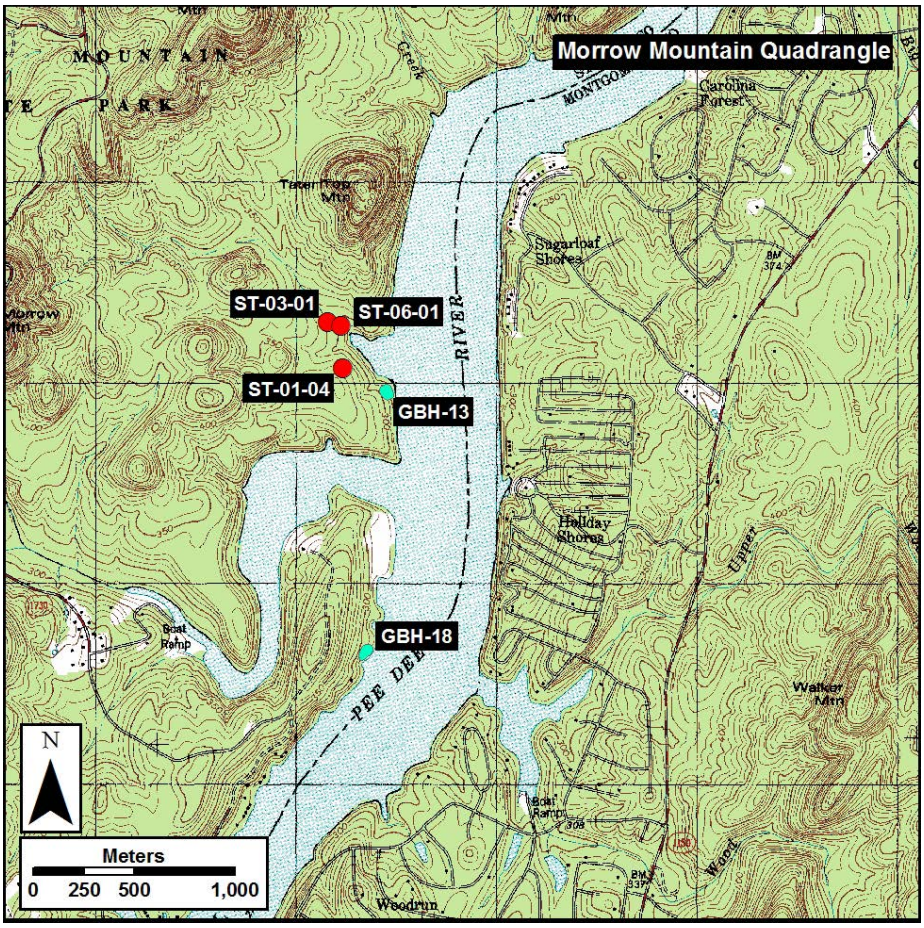

Figure 1. Map of bald eagle territory location with current nest ST-06-01 and great blue heron colonies GBH-13 and GBH-18.

Figure 2. Aerial photograph of bald eagle nest ST-06-01 (2011; B. Watts).

NEST: ST-10-01

Nest Location

This nest was located within a stand of mixed forest near the shoreline on Morrow Mountain State Park. The nest was in a forest stand with buffers on all sides. The nest is likely visible during the winter months from both the water and the parking lot.

Nesting Activity

Bird Activity – On 16 March 2011 an adult was standing on the nest with two chicks approximately 12 days old. On 3 May 2011, two chicks were standing in the nest and a single adult was perched in an adjacent tree.

Nest Condition – On 16 March, 2011 this nest was in good structural condition with a well-formed cup and lining. The nest was of moderate size.

Nest Substrate

Substrate Type – The nest was built in a supercanopy loblolly pine in a cluster of similar sized trees.

Nest Position – The nest was built in a spray of limbs surrounding a single-leader top. The nest surface had less than 30% sky exposure.

Substrate Condition – The nest tree was in good condition.

Potential Disturbance

Nest tree was protected by a forest buffer on all sides. The nest is close to the water and may be visible during the winter. Even so, given the location, potential for human disturbance seems low.

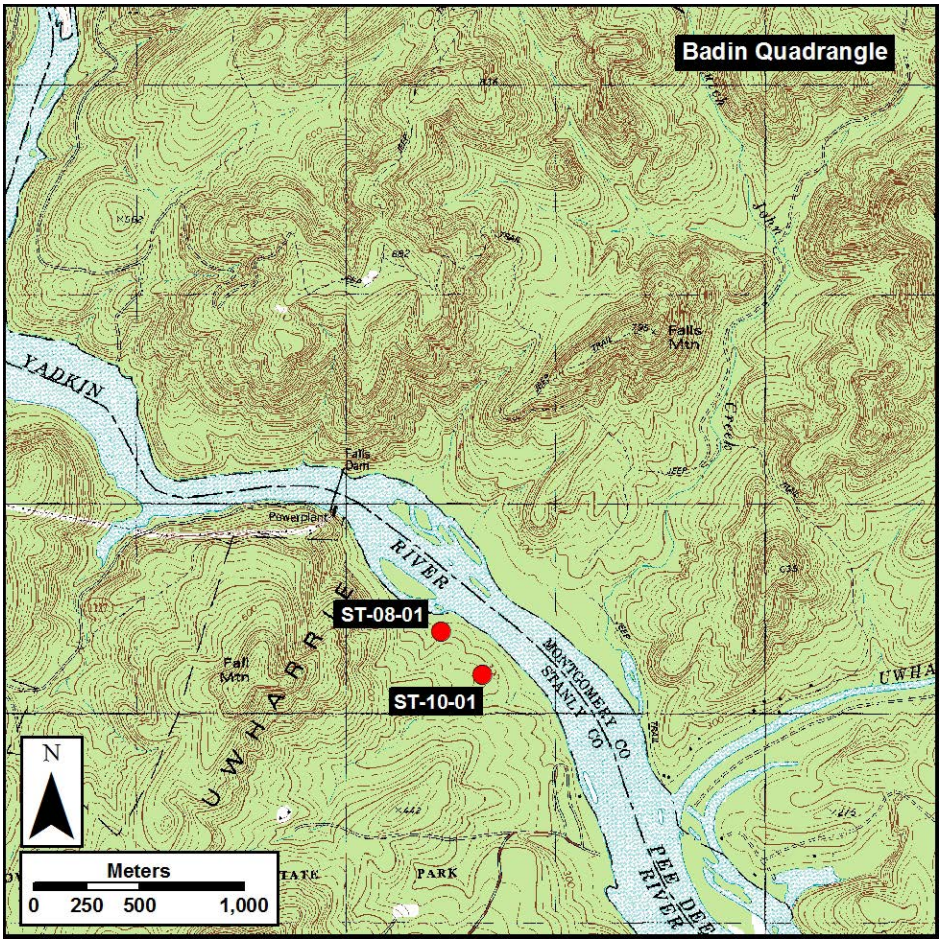

Figure 3. Map of bald eagle territory location with current nest ST-10-01.

Figure 4. Aerial photograph of bald eagle nest ST-10-01 (2011; B. Watts).

Nest: MO-05-01

Nest Location

This nest is located along the east shoreline of Lake Tillery west of Route 1111 and directly across the lake from the mouth of Jacobs Creek (Figure 5, Figure 6). The nest tree is a relatively small, live loblolly pine that is surrounded by hardwoods. The nest is likely visible from the lake before leaves emerge in spring.

Nesting Activity

Bird Activity –On 16 March 2011, two chicks were present on the nest and a single adult was perched along the shoreline. Based on plumage and posture the chicks appeared to be approximately 44 days of age.

Nest Condition – On 16 March 2011, nest was in good structural condition had a well-formed cup and lining. The nest is of moderate size but shallow due to its position within the tree.

Nest Substrate

Substrate Type – Nest tree was a relatively small, double-trunk, live loblolly pine.

Nest Position – The nest was positioned between the two trunks of a small loblolly on lateral limbs. Construction of nests between two trunks is typically unstable and is a rare position for bald eagles because of their nest size requirements. Nest position was low in the tree with considerable canopy coverage. Sky exposure was low.

Substrate Condition – Nest tree appeared to be in good health.

Potential Disturbance

This nest is likely visible from the water in early spring before leaf out of hardwoods. The nest is not easily accessible from the water due to embankment. The nest is very close to a cul-de-sac that has been built in the past couple of years and is surrounded by a small development. The nest is easily accessible from the road.

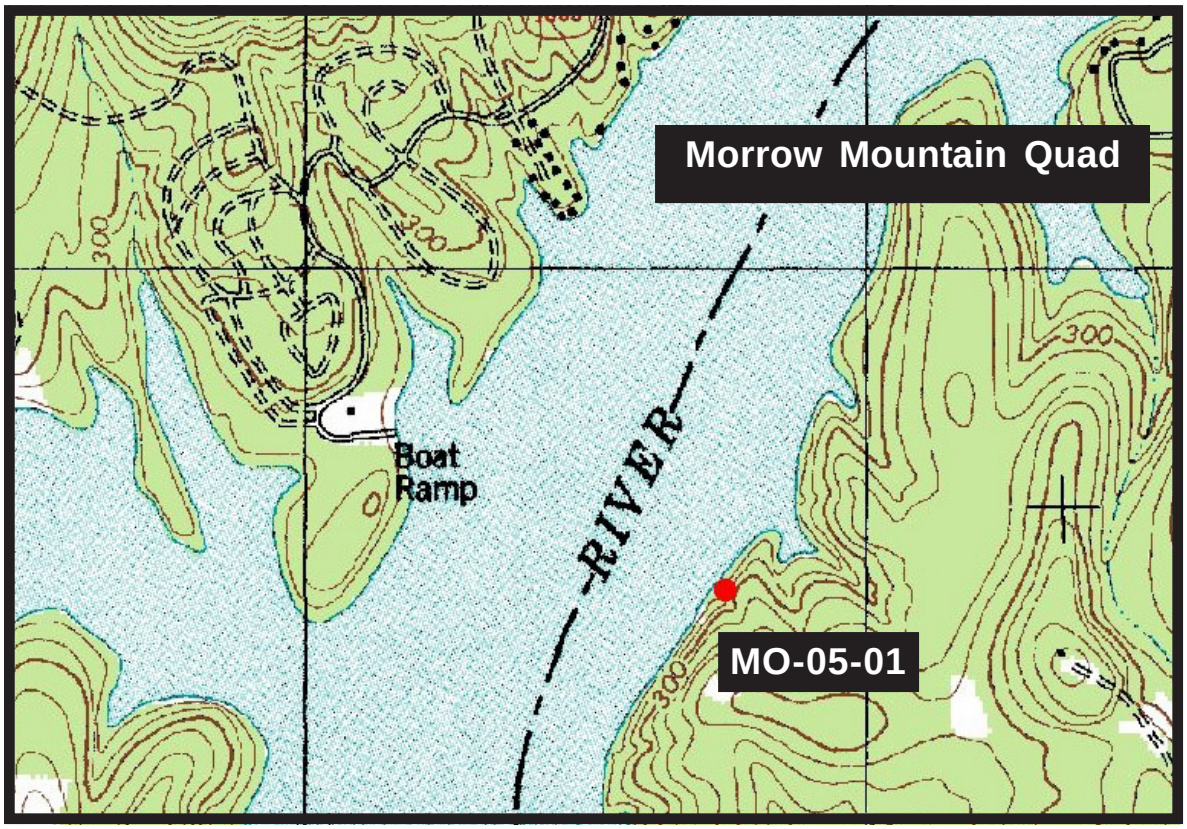

Figure 5. Map location bald eagle nest MO-05-01 on lower Lake Tillery.

Figure 6. Photograph of MO-05-01 nest tree (lft) and proximity to cul-de-sac (rf) (2011; B. Watts).

Great Blue Heron

Three great blue heron colonies were located within Lake Tillery supporting 28 pairs.

GBH-13

Description

This colony was located in loblolly pines along the shoreline of Lake Tillery below Tater Top Mountain (Figure 1, Figure 7). The colony is completely visible from the water. On 16 March 2011, both pairs were building nests.

Figure 7. Aerial photograph of great blue heron colony GBH-13 on lower Lake Tillery (2011; B. Watts).

GBH-18

Description

This colony was located in loblolly pines along the shoreline of Lake Tillery near the mouth of Mountain Creek (Figure 1, Figure 8). The colony is completely visible from the water. On 16 March 2011, the colony supported 18 pairs and all were incubating.

Figure 8. Aerial photograph of a portion of great blue heron colony GBH-18 on lower Lake Tillery (2011; B. Watts).

GBH-19

Description

This colony was located in loblolly pines along the north shoreline of Lake Tillery east of Route 1111 and downstream of nest MO-05-01 (Figure 9, Figure 10). The colony is completely visible from the water. On 16 March 2011, the colony supported eight pairs and all were incubating.

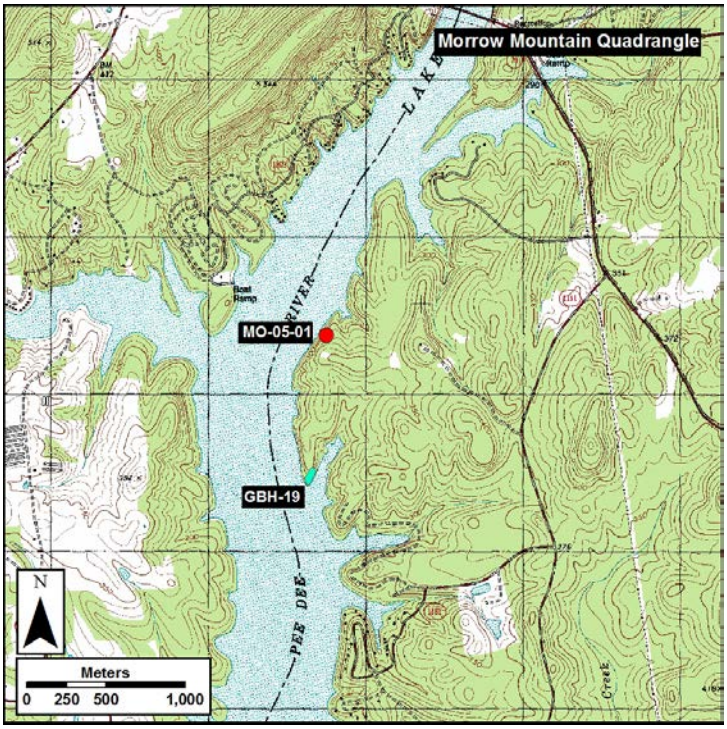

Figure 9. Map of location for GBH-19 near bald eagle nest MO-05-01.

Figure 10. Aerial photograph of a portion of great blue heron colony GBH-19 on lower Lake Tillery (2011; B. Watts).

Pee Dee River Reach from Tillery Dam to Blewett Falls Lake

This waterway supported two active bald eagle territories that produced four chicks. This stretch of river also supported two great blue heron colonies with an estimated 157 breeding pairs.

Bald Eagle

Nest: MO-08-01

Nest Location

This nest is located along the east shoreline of the Pee Dee River below Norwood Dam, south of N.C. Highway 731 (Figure 11, Figure 12). The nest is in the center of a stand of even-height loblolly pines and is not likely visible from the surrounding landscape. The stand appears to be managed like a park with low understory vegetation and even spacing of stems.

Nesting Activity

Bird Activity – On 16 March 2011, a single adult was brooding two chicks. Based on size and plumage chicks appeared to be 10-14 days old. On 3 May 2011, two chicks were standing in the nest.

Nest Condition – On 16 March 2011, the nest was in good structural condition with a well-formed cup and fresh lining. This nest is moderate to large and in a solid position.

Nest Substrate

Substrate Type – Live loblolly pine. Nest tree is in an even-height stand.

Nest Position – Nest was in a deep top crotch well under the crown. This is a very stable position with numerous surrounding limbs. Sky exposure was approximately 15%.

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

Potential Disturbance

This nest tree does not appear to be visible from the surrounding landscape due to its position in the middle of an even-height stand. The nest has a good forest buffer on all sides but is easily accessible by walking in from an access road to the north.

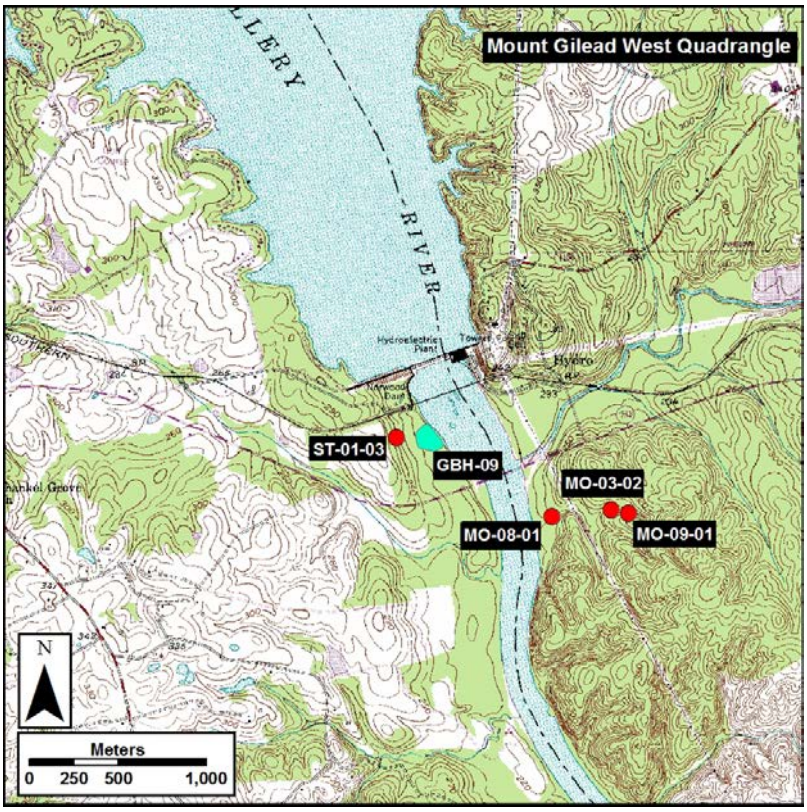

Figure 11. Map location of bald eagle territory with current nest MO-08-01 and great blue colony GBH-09.

Figure 12. Aerial photographs of bald eagle nest MO-08-01 (lft) and forest stand (rt) (2011; B. Watts).

Nest: AN-11-01

Nest Location

This nest is located along the south shoreline across from Buzzard Island and downstream of Old Leak Ferry (Figure 13, Figure 14). The nest is within a patch of relatively young, even-height loblolly pines. The nest is situated approximately 50 m back from the shoreline.

Nesting Activity

Bird Activity – On 16 March 2011, an adult was brooding two chicks. Based on size and plumage the chicks appeared to be less than 10 days old. On 3 May 2011, two chicks were standing on the nest and no adults were present.

Nest Condition – On 16 March 2011, the nest was in good structural condition and had a well-formed cup and a fresh lining. This nest was of moderate diameter but was shallow with ragged edges indicating it was likely a first-year nest.

Nest Substrate

Substrate Type – Loblolly pine that is similar in height to the surrounding trees.

Nest Position – Nest was positioned on a spray of lateral limbs against the dominant leader. An opening on one side of the tree allows for crown access into the nest. Crown limbs are widely spaced such that nest had approximately 30% sky exposure.

Substrate Condition – Live loblolly pine in good condition. Tree is positioned within a relatively even-height stand.

Potential Disturbance

The nest tree was protected by considerable forest buffer on the upland side and a thin forest buffer on the water side. There does not appear to be access from the upland side and it is not clear if the nest is visible from the water. From the water side, the nest is only a short distance from the shoreline.

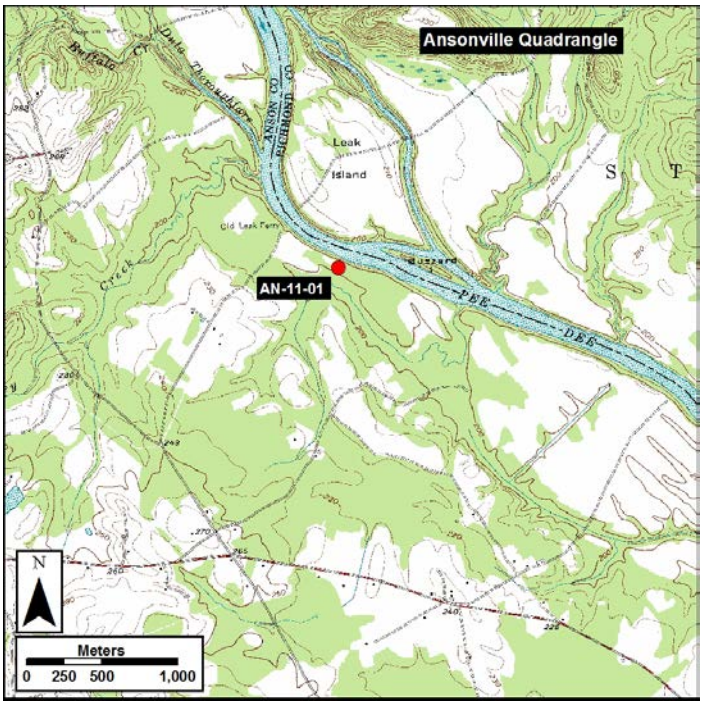

Figure 13. Map location of bald eagle nest AN-11-01.

Figure 14. Aerial photograph of bald eagle nest AN-11-01 (2011; B. Watts).

Great Blue Heron

Two colonies of great blue herons were located along the Pee Dee River below the Norwood Dam.

GBH-09

Description

This colony was positioned along the west shoreline below the Tillery Hydroelectric Plant (Figure 11, 15). The colony contained 147 pairs of great blue herons. Virtually all of these pairs were nesting in loblolly pines. On 16 March 2011, 90% of pairs were incubating and the remaining 10% were building nests. The colony appears to be completely visible and accessible from the water.

Figure 15. Aerial photographs of great blue heron colony GBH-09 (2005, 2011; B. Watts).

GBH-20

Description

This colony was positioned along the east shoreline of the Pee Dee River just down river of its confluence with Little River (Figure 16, Figure 17). The colony was in a cluster of loblolly pines surrounded by swamp. along the west shoreline below the Tillery Hydroelectric Plant (Figure 11, Figure 15). The colony contained ten pairs of great blue herons. On 16 March 2011, all were incubating.

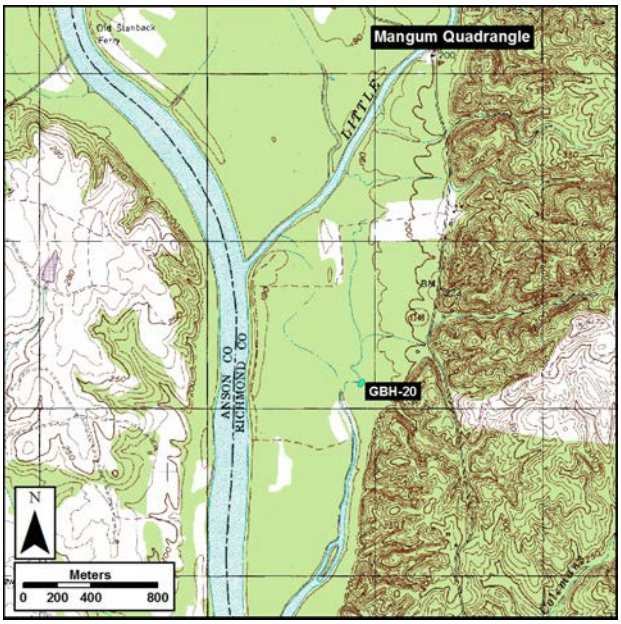

Figure 16. Map location of great blue heron colony GBH-20.

Figure 17. Aerial photograph of a portion of great blue heron colony GBH-20 (2011; B. Watts).

Blewett Falls Lake

One bald eagle nest was located along the shoreline of Blewett Falls Lake. The nest was located just above the Blewett Falls Hydroelectric Plant dam. It was empty but believed to have been active earlier. There are several large blocks of land along Blewett Falls Lake 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 Falls 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.

Bald Eagle

Nest: AN-01-01

Nest Location

This nest is located on a short peninsula along the west shoreline just above the Blewett Falls Hydroelectric Plant dam (Figure 18, Figure 19). 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

Bird Activity – On 16 March 2011, the nest was empty with a single adult perched two trees away. The nest had been lined and had fresh pine bows indicating that it was maintained and likely a nesting attempt was made that failed early. On 3 May 2011, the nest was empty.

Nest Condition – On 16 March 2011, the nest was in good structural condition and had a fresh lining. The nest had clearly been maintained and had fresh pine bows. On 3 May 2011, the nest was empty with no further signs of maintenance.

Nest Substrate

Substrate Type – Supercanopy loblolly pine.

Nest Position – Nest was positioned on a spray of lateral limbs against the dominant leader. 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 good condition. 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 the lake.

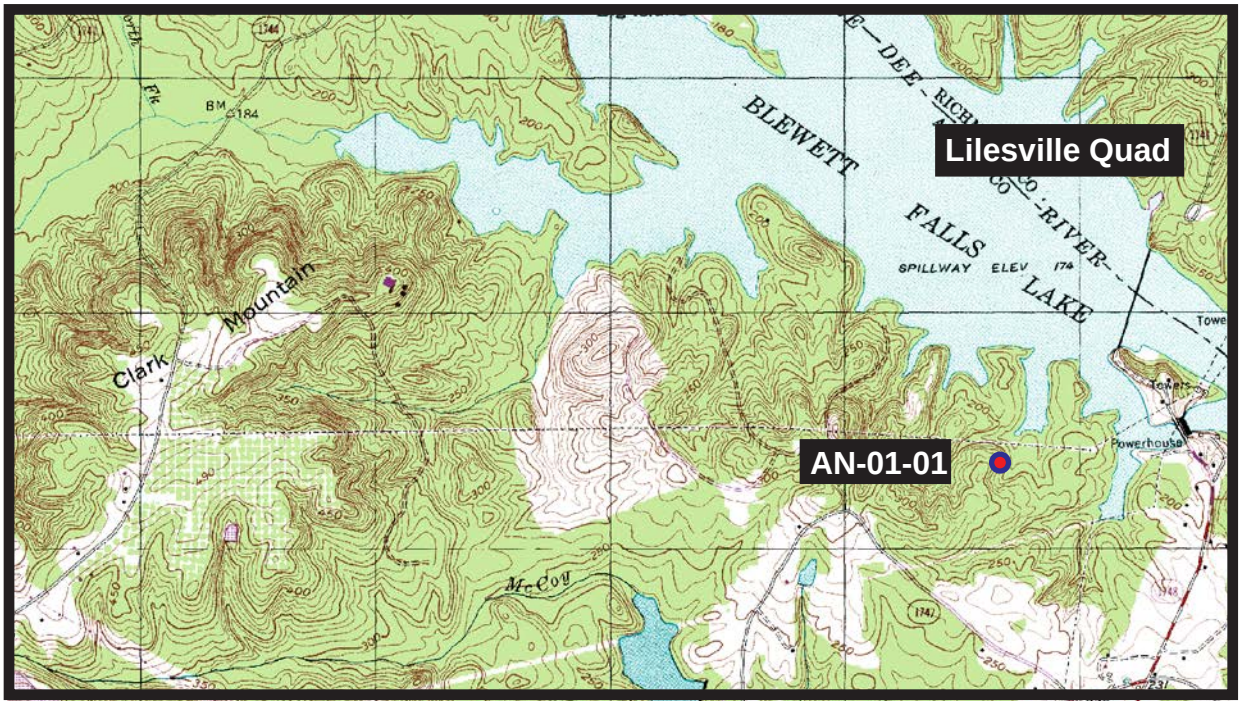

Figure 18. Map location of bald eagle nest AN-01-01.

Figure 19. Aerial photograph of bald eagle nest AN-01-01 (2005; B. Watts).

Summary Table

Table 1. Results of bald eagle surveys for 2001-2011.

River Reach	Year	Pairs	Nests	Status	Young
Lake Tillery					
	2001	1	ST-01-04	Active	1
	2002	1	ST-01-04	Active	1
	2003	1	ST-01-04 ST-03-01	Active Constructed	2 -----
	2005	2	ST-03-01 MO-05-01	Active Active	3 2
	2011	3	ST-06-01 ST-10-01 MO-05-01	Active Active Active	3 2 2
Tillery Dam to Blewett Falls Lake					
	2001	1	ST-01-03	Active	2
	2002	1	ST-02-01	Active	0
	2003	1	MO-03-02	Active	1
	2005	1	MO-03-02	Active	2
	2011	2	MO-08-01 AN-11-01	Active Active	2 2
Blewett Falls Lake					
	2001	1	AN-01-01	Active	2
	2002	1	AN-01-01	Active	2
	2003	1	AN-01-01	Active	1
	2005	1	AN-01-01	Active	3
	2011	1	AN-01-01	Active	0

Table 2. Results of great blue heron surveys for 2001-2011.

River Reach	Year	Sites	Colonies	Pairs
Lake Tillery				
	2001	0	-----	-----
	2002	0	-----	-----
	2003	0	-----	-----
	2005	1	GBH-12	3
	2011	3	GBH-13 GBH-18 GBH-19	2 18 8
Tillery Dam to Blewett Falls Lake				
	2001	1	GBH-09	30
	2002	1	GBH-09	39
	2003	1	GBH-09	78
	2005	1	GBH-09	85
	2011	2	GBH-09 GBH-20	147 10
Blewett Falls Lake				
	2001	0	-----	-----
	2002	0	-----	-----
	2003	0	-----	-----
	2005	0	-----	-----
	2011	0	-----	-----

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