

FINAL ANNUAL PERFORMANCE REPORT

South Carolina Grant T-6

Census and Monitoring of Waterbird Nesting on the SC Coastal Plain

October 1, 2004 – September 30, 2005

Note: This grant is a continuation of South Carolina Grant R-3, which was funded by WCRP funds and is attached to the end of this grant report. This grant picks up where Grant R-3 left off, with the exception that the Bald Eagle work initiated under R-3 continues under that grant and is excluded from this grant.

OBJECTIVES

- 1) Monitor nesting wading birds (n=190 colonies) and nesting seabirds (n=75colonies) during each annual breeding season.

Three hundred and thirty five wading bird nesting records were entered into the South Carolina Colonial Waterbird Database for the 2005-nesting season. A total of 187 wading bird-nesting sites were surveyed this year, 117 were active, and 70 were not. A total of 181 sites were checked during six aerial surveys and ground surveys were conducted at 23 sites. Thirteen new sites were documented.

Censuses of seabird nesting were conducted on 11 barrier and estuarine islands including one newly constructed spoil island and two islands in a spoil disposal impoundment. The statewide totals were black skimmers (1,208 nests at ten sites), gull-billed terns (244 nests at eight sites), royal terns (7,895 nests at four sites), sandwich terns (2,425 nests at three sites), common terns (23 nests at three sites) and Forester's terns (14 nests at one site) and Eastern brown pelicans (2,631 nests at three sites). Brown pelican nest numbers continue to decline and were the lowest since 1976 (Figure1). A total of 154 seabird-nesting records were added to the South Carolina Colonial Waterbird Database.

At the Savannah Harbor Confined Disposal Facilities two new mitigation islands (12A, north & 12A, south) were completed within a disposal impoundment. The impoundment was flooded in the spring and these islands were successfully used for nesting by black skimmers (95 nests), gull-billed terns (150 nests), least terns (373 nests) and black-necked stilts (81 nests). A total of 165 black-necked stilt nests were counted at the Savannah harbor spoil site impoundments. The least terns nesting at these sites are believed to be terns that had been using roofs for many years. The Army Corps of Engineers also completed construction of a near-shore nesting island near the Savannah River jetty prior to this nesting season. Royal terns (1,701 nests), sandwich terns (78 nests) and black skimmers (54 nests) utilized this new nesting site.

A total of 50 historic (used for nesting since 1999) least tern-nesting sites were surveyed this season, 28 were active, and 22 were not. Seventeen (61%) of the active sites were rooftops, eight (28%) were beach sites, and three (11%) were man-made or spoil sites. Four new sites were documented; one roof-nesting site, two beach sites and two islands within the Savannah harbor spoil impoundments. Censuses were conducted at three Cape Romain beach sites (475 nests) and the spoil site islands (373 nests). Letters were sent to all building managers with terns nesting on the roof prior to the season to encourage them to perform roof maintenance prior to the nesting season.

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Roped and posted as “CLOSED” seabird nesting areas on 3 SCDNR Heritage preserves. Assisted in identifying and posting important seabird nesting areas in Cape Romain National Wildlife Refuge.

Cooperated with Clemson University study to identify causes of South Carolina’s declining brown pelican population. Specifically, tested at three SCDNR Heritage preserves the effectiveness of a pesticide on avian ticks that parasitize brown pelican nestlings. Also, collected avian ticks from these seabird colonies for the Center for Disease Control. Tests were conducted on the ticks for the presence of harmful viruses.

Wrote an assessment of South Carolina’s red knots and marbled godwits, two declining shorebirds, for the USFWS’s species status report.

Authored or co-authored ten species or guild accounts for the State Wildlife Comprehensive Plan.

Significant Deviations: None

2) Conduct complete ground census of wood stork nesting and estimate chick production (13 colonies).

Wood storks were documented nesting at 13 sites this year. One historic wading bird-nesting site was used by wood storks for the first time and a new nesting colony was located in Horry County. A total of 1,419 nests were counted. Wood stork productivity estimates were obtained from 682 nests sampled at 12 sites. An increasing nesting population with high productivity has continued since nesting was first documented in the state in 1981 (Figure2).

Significant Deviations: None

5) Document major population demographics and develop management techniques to monitor and enhance the American oystercatcher population.

Color banding continued in the state bringing the total to 193 color-banded oystercatchers in South Carolina.

A total of 544-banded birds were sighted this year including multiple sightings of the same individual. Birds from North Carolina, Georgia, Virginia, New Jersey and Massachusetts were seen, documenting the importance of South Carolina as a wintering area. The mean distance between re-sightings of the same bird was 2.6 +/- 0.1 kms based on 1645 sightings of color-banded birds. Color-banded juvenile birds from out of state have been seen during winter and through the nesting season. If similar to juvenile European oystercatchers, these juveniles will remain in South Carolina until reaching maturity. This documents the importance of the state as developmental habitat for oystercatchers from breeding populations north of South Carolina.

We continued to monitor color-banded resident breeding adults on nesting territories annually in order to determine adult mortality rates. Based on 64 bird years of monitoring, a 20.3% maximum annual adult mortality rate has been documented.

Mortality rates may be slightly lower as band loss of the early style of bands may confuse the issue. Banding of additional adults with engraved bands will resolve this issue.

Adult mortality is a critical statistic in understanding the demographics of this species.

An estimated 2607 oystercatchers migrate into the state each winter to flock with an estimated 929 resident birds for a mean of 3536 wintering birds. Approximately one third of the entire eastern population winters in the state.

Participated in an American oystercatcher workshop that set region wide conservation and research goals for this shorebird. Completed a statewide winter survey for color-banded oystercatchers. This survey contributed to region wide understanding of migratory patterns and identified important juvenile winter roost sites.

Significant Deviations: None

6) Provide technical guidance to land owners and implement management as needed to enhance the status of coastal water bird populations.

Technical guidance was provided to three communities with wading bird colonies on golf course ponds. Technical guidance was given to three landowners with nesting storks and all landowners were informed of our survey results by letter. Participated in U.S. Army Corps of Engineers, wood stork and piping plover symposiums. Identified important shorebird habitat in South Carolina that would be impacted by future dredging projects. Participated in a statewide piping plover survey. Participated in wood stork, oystercatcher and royal tern regional working groups. Coordinated with and provided survey results to the USFWS offices in Charleston and Jacksonville.

Significant Deviations: None

Project Cost: \$55,200.70

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South Carolina Project R-3

South Carolina Department of Natural Resources

October 1, 2003– September 30, 2004

Title: Monitoring and management of waterbirds nesting on the South Carolina coastal plain.

Objective 1: Monitor wading bird (n=190 colonies) and seabird nesting colonies (n=75) during each annual breeding season.

Accomplishments:

Three hundred and twenty seven wading bird nesting records were entered into the South Carolina Colonial Waterbird Database for the 2004-nesting season. A total of 185 wading bird-nesting sites were surveyed this year, 127 were active, and 58 were not active. A total of 181 sites were checked during six aerial surveys and ground surveys were conducted at 18 sites. Nineteen new sites were documented.

These surveys are not accurate enough to analyze increases or declines, but it appears overall that nesting continues to slowly rebound from the effects of the drought. In 2002 only 51% of the wading bird sites surveyed were active, this year 69%. White ibis is one

species that has not rebounded.

Censuses of seabird nesting were conducted on nine barrier and estuarine islands and one spoil area. Black skimmers (991 total nests) and gull-billed terns (289 total nests), nested at eight sites. Eastern brown pelicans (3,045 total nests) nested at six sites, royal terns (6,726 total nests) and sandwich terns (1,674 total nests) nested at three sites. Forester's terns (11 total nests) and common terns (five total nests) nested at two separate sites. Seventy-seven of the total gull-billed tern nests and 11 of the total black skimmer nests were counted on five areas within the spoil site. One hundred and nine black-necked stilt nests were also counted in these five spoil site impoundments.

A total of 56 least tern-nesting sites were surveyed this season, 26 were active, and 30 were not. Thirteen (50%) of the active sites were rooftops, nine (35%) were beach sites, and four (15%) were man-made or spoil sites.

During the 2003 season, 33 sites were active, 18 rooftops, 10 beach sites, and five spoil disposal sites. Three of these rooftop colonies and three beach sites were not active in 2004 due to construction or other disturbance. Two new beach-nesting sites were documented and two historic sites were used as a result of the relocation of beach colonies.

All seabird colonies were posted with appropriate signs and critical areas were roped off.

A soft tick infestation (*Ornithodoros* sp.) was documented at several pelican nesting sites. A single nest can contain hundreds of adult or larval ticks and can result in nest abandonment, anemia in chicks or disease. The Center for Disease Control is currently looking for viruses in a sample of ticks. A Clemson graduate student is monitoring the effects of ticks on pelicans and the effectiveness of chemical treatment of nests.

NEST TOTALS FOR 2004 SEASON

BLACK SKIMMER	991
COMMON TERN	5
EASTERN BROWN PELICAN	3,045
GULL-BILLED TERN	289
ROYAL TERN	6,726
SANDWICH TERN	1,674
TOTALS	12,730

Management Implications:

Wading bird aerial surveys are not accurate enough to analyze increases or declines, but it appears overall that nesting is rebounding from the effects of the drought. During 2002 only 51% of the wading bird sites surveyed were active, this year the number was 69%. We have seen a shift from natural water bodies to manmade water bodies by nesting wading birds. Many have moved to ponds in housing developments. This has created a concern about odors and human health issues. Suitable nesting sites appear to be a limiting factor and have forced the birds into poor sites.

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Management of human visitation at seabird colonies requires continuous attention, and opportunities for habitat enhancements through deposition of appropriately composed dredging spoil should be pursued.

Several sea bird nesting sites continue to be impacted by an infestation of soft ticks, which will require treatment in the future.

Although nesting of Least Terns on rooftops appears to be stable, in the long term this is a poor substitute for natural habitat. Enhancement and/or creation of suitable habitat should be pursued.

Construction of islands inside the Savannah River Spoil Disposal Impoundments has provided needed nesting habitat for seabirds and the recent construction of a nesting island near the mouth of the Savannah River should further enhance nesting. These projects are part of the mitigation associated with the Savannah ship channel.

Significant Deviations: None.

Objective 2: Document bald eagle nesting activity, chick production and adult mortality using aerial surveys and ground visits as needed (n=190 breeding area).

Accomplishments:

Monitoring

Fourteen survey flights were conducted to monitor 238 breeding territories in 33 counties of South Carolina. A record number of 190 occupied territories were documented to produce 238 young. Fourteen new territories were located. Letters were sent to 228 landowners to inform them of the nesting activity of the pair(s) on their property as well as the general status of the bald eagle in SC.

Three bald eagles were found dead from July 2003 – June 2004. The carcass of one was sent to Southeastern Cooperative Wildlife Disease Study in Athens, GA for further testing and was confirmed as barbiturate poisoning at a landfill. We continue to document eagle mortality at landfills as birds feed on euthanized carcasses. The other two carcasses were too decomposed to determine cause of death.

Seven sick or injured bald eagles were recovered and transported to the International Center for Birds of Prey in Awendaw, SC, for treatment. Two of these died and two are still recovering. Three eagles were banded and released. Documenting baseline sources of eagle injury and mortality is essential to evaluating the effects of removing the species from the protection of the Endangered Species Act, which may be proposed in the near future.

Adult Mortality Rate

Observations were conducted to confirm the survival of seven banded adult eagles in the breeding population. Six were confirmed at their breeding areas. This long term monitoring program has documented an average 13% annual mortality rate for adult

eagles. The oldest known breeder in the population was a 25-year-old who did return this season. Mortality rates are the most important demographics in determining the status of a population. These rates need to be monitored before and after de-listing.

Management Implications:

The nesting population continues to show a continued long-term recovery with continued high productivity. Mortality rates have continued to be 13% per year for adult eagles. A relatively small increase in mortality rates could slow or reverse the long-term increases documented for the state. Additional mortality from West Nile Virus and from Avian Vacuolar Myelinopathy continues to be of concern.

Significant Deviations: None.

Objective 3: Conduct and coordinate Mid Winter Eagle counts as part of the national monitoring effort. Coordinate approximately 100 volunteers and conduct standardized survey routes.

Accomplishments:

The 26th annual Midwinter Eagle Survey was coordinated for the state as a part of a national survey coordinated by USGS. One hundred twenty six participants assisted with the counts conducted during the first two weeks of January. Staff and volunteers surveyed 40 standardized routes consisting of 1,607 miles where four hundred eighty one bald eagles were counted. Of the eagles reported, there were 420 adults, 58 immatures and three were of unknown age.

Management Implications:

The total number of eagles seen during the winter survey continues to increase. This is the only documentation of the status of the juvenile segment of the population.

Significant Deviations: None.

Objective 4: Census the endangered wood stork nesting effort and estimate chick production (11 colonies).

Accomplishments:

Wood storks were documented to have nested at 14 sites this year. Two historic wading bird-nesting sites were used by wood storks for the first time and a new nesting colony was located in the Piedmont region on the shore of the Saluda River.

The White Hall colony was the largest stork colony in the US during 2004 with 537 nests. This site was sprayed with herbicide to control aquatic vegetation that was providing raccoons access to nesting storks.

A record high 2,069 nests were counted statewide. Wood stork productivity estimates were obtained from 956 nests sampled at 12 sites. A total of 5,016 young were estimated to have fledged statewide. During the 2002-nesting season, under extreme drought conditions, a total of 879 nests were counted and 1,468 young were estimated to have fledged. Also during 2002, 119 nests were recorded as abandoned.

Management Implications:

During both wet and dry years, chick production has remained above the 1.5 young per nest estimated to be required in a stable population. This suggests that adequate foraging habitat is available. This is unlike the south Florida colonies where nesting success is closely tied to rainfall. Active management of colonies will be required to maintain nesting at most sites.

Significant Deviations: None.

Objective 5: Review the status of the American oystercatcher by monitoring nesting and wintering activities.

Accomplishments:

Surveys of winter oystercatcher (AMOY) flocks were conducted to document the presence of color banded AMOYs. Surveys of breeding territories were also conducted to document color-banded breeding birds. We had 472 observations of banded birds recorded in 2004.

Winter surveys covered most of the SC coast. Complete surveys occurred from Charleston to the NC border, where most of the oystercatchers that winter in SC occur. Many of the flocks in the south part of the State were also surveyed for banded birds. During the winter, location and flock size was recorded for locally banded birds and migrants banded on breeding grounds in Northern states. Breeding birds from Massachusetts, New Jersey, Virginia, Maryland and North Carolina were seen during surveys of wintering flocks. Multiple re-sightings of individuals (adult and juvenile, resident and migratory) during the winter were used to determine within season movements.

During the breeding season, the Cape Romain area was thoroughly searched for color-banded birds. Special attention was given to areas where color banded birds were seen on breeding territories in 2003. AMOYs are believed to return to the same breeding territory every spring, thus re-sighting banded birds on breeding territories for multiple years can be used to determine adult survival. Re-sighting color banded birds in 2004, that were seen in 2003, documented adult survival of 80% (mortality 20%). Thirty-six banded oystercatchers bred in SC in 2004 and will be relocated in 2005.

DNR assisted Dr. Terry Norton DVM, from the St. Catherines Island Wildlife Survival Center in the project, "The American Oystercatcher (*Haematopus palliatus*)-A Bioindicator Species for Assessing Ecosystem Health along the Georgia and South Carolina Coasts and Barrier Islands." DNR collected from the Cape Romain area the most common AMOY prey items (oysters, clams and mussels) during 4 months from 2 sites for nutritional and toxicological analysis. DNR collected 1 egg from 4, 3-egg clutches for toxicological analysis. DNR captured oystercatchers for evaluation of seasonal and age related changes of baseline health, contaminant, and reproductive parameters.

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DNR banded 6 adult AMOYs and 19 almost fledged young with color bands. Each bird was measured and photographed.

Eight radio- instrumented oystercatchers were monitored in the Cape Romain Region during the winter of 2003. For the first time a large (approximately 1000 oystercatchers) nocturnal roost site was identified by following radio instrumented birds at night.

Two DNR employees attended an AMOY working group meeting at St Catherine's Island, GA where representatives from Atlantic states from NJ to FL were present. The meeting was important for coordinating banding schemes, re-sighting surveys and for sharing capture techniques. A talk on the South Carolina oystercatcher project was presented.

Management Implications:

South Carolina has been shown to be an important area for both wintering and nesting oystercatchers. Low productivity resulting from an apparent lack of suitable nesting sites suggests a declining population. Nesting sites along the Intra-coastal Waterway have consistently low productivity due in part to the effects of boat wakes and mammalian predation. South Carolina winters a large proportion of the AMOYs nesting to the north of the state and may be an important site for juvenile birds.

Night roost sites are different from roost sites used during the day and may be a key component in habitat suitability.

Significant Deviations: None.

Objective 6: Provide technical guidance to land owners and implement management as needed to enhance the status of coastal waterbird populations.

Accomplishments:

Thirty site visits or meetings with US Fish and Wildlife Service were requested to provide specific technical guidance for bald eagle territory management. As the human and eagle populations increase, the frequency and intensity of interaction has increased. Approximately fifty DHEC and COE permits were reviewed to identify the effects of habitat alterations on bald eagle nesting habitat, wading bird rookeries or shorebird nesting sites. Coastal development is having a substantial impact on the avifauna of the coast.

Letters were sent to building managers before the Least Tern nesting season to request that roof maintenance be performed before the nesting season. All significant ground nesting sites were posted with appropriate signs to minimize disturbance.

Management Implications:

With rapid coastal development, there is an increasing need to manage and protect significant wildlife areas.

Significant Deviations: None.

Objective 7:

Conduct aerial and boat surveys as needed on AVM suspect and control reservoirs throughout the Bald Eagle nesting season to document the abundance of eagles, coots, waterfowl and hydrilla. This information will be used to document the severity of the disease in the State and to document factors leading to outbreaks of the disease.

Accomplishments:

We worked with SCDNR-MRD, SCDNR-LW&CD, Clemson University, USC, USFS, NOS, SWDS, COE on a variety of surveys relating to the occurrence of Avian Vacuolar Myelinopathy (AVM) disease. A total of twenty-four boat surveys and seven flights were conducted to monitor conditions associated with AVM on Lake Thurmond, Lake Murray, Lake Russell, Lake Juliette and Emerald Lakes, GA and Woodlake, NC. In collaboration with Dr. Susan Wilde (MRD) we collected samples of submerged aquatic vegetation to document a correlation between the disease and a species of epiphytic blue-green algae found on the vegetation. A sentential trial was conducted on the a small (4 ha) farm pond that had an abundance of the suspect blue green algae (*Stigonematales* sp.) All 15 sentential ducks recovered were confirmed AVM positive. This is the first occurrence of AVM documented on a body of water less than 1030 acres and was selected based on the presence of the candidate blue green algae.

Surveys were conducted to monitor the effects of the Lake Murray draw down (to repair the dam) on the occurrence of AVM. These areas were surveyed to document the extent of use by eagles and coots, search for previously unknown bald eagle nests and record the distribution of submerged aquatic vegetation. These thirteen surveys were conducted in an attempt to evaluate the potential for AVM disease on this reservoir. The reservoir was returned to flood stage this year and grass carp were stocked. This resulted in a substantial reduction in hydrilla growth and a reduced likelihood of disease.

Management Implications:

Documentation of AVM disease in smaller bodies of water extends the threat of the disease from 19 reservoirs to thousands of ponds in the state. Each year additional disease sites are documented as this disease continues to emerge.

Significant Deviations: None.

Cost : \$122,154