1991

Colonial Waterbird Investigations

R. A. Beck

K. Terwilliger

D. S. Bradshaw
The Center for Conservation Biology

J. W. Akers

J W. Via

See next page for additional authors

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Authors

R. A. Beck, K. Terwilliger, D. S. Bradshaw, J. W. Akers, J W. Via, B Williams, S. Rottenborn, T. O'Connell, G. Keller, S. Hayslette, and A. Tipper

PERFORMANCE REPORT

STATE:	VIRGINIA		
PROJECT TITLE:	NONGAME AND ENDANGERED WILDLIFE INVESTIGATIONS	PROJECT NO.:	EW-2-3
STUDY TITLE:	COLONIAL WATERBIRD INVESTIGATIONS	STUDY NO.:	VI
JOB TITLE:	COLONIAL BIRD STUDIES	JOB NO.:	A-G
PERIOD COVERED:	JULY 1, 1990 - JUNE 30, 1991		

JOB VI-A
OBJECTIVE: To coordinate the protection and management of colonial birds in the state.

JOB VI-B
OBJECTIVE: To conduct surveys of colonial breeding birds in Virginia in order to detect changes in population number as well as population shifts.

JOB VI-C
OBJECTIVE: To sample nesting success in colonies of selected species each year.

JOB VI-D
OBJECTIVE: To conduct preliminary studies on the effects and extent of predation on colonial breeders.

JOB VI-E
OBJECTIVE: To locate, map, and describe all existing yellow-crowned night heron colonies and single nests in Tidewater, Virginia.

JOB VI-F
OBJECTIVE: To locate and map all appropriate or potential habitats for future observation and management.

JOB VI-G
OBJECTIVE: To evaluate human impacts on heron populations in residential areas in Tidewater, Virginia.

SUMMARY:

Aerial and ground surveys were conducted for colonial waterbirds, including colonial and solitary beach nesting species along the Virginia barrier islands and the Coastal plain and Piedmont region of Virginia. Management strategies for critical, large, or sensitive colonies were recommended. Management agreements were initiated with federal and state agencies and private landowners. Predation and disturbance factors were identified and investigated at select colonies with target species of common terns, least terns, black skimmers, piping plovers, and Wilson's plovers.

JOB VI-A: To coordinate the protection and management of colonial birds in the state.

To ensure and enhance the protection of colonial birds within the state, several major cooperative management agreements and strategies continued to be implemented from July 1, 1990 to June 30, 1991. The study areas include the Virginia barrier island chain of the Eastern Shore and diverse areas of the river systems of the western shore of the Chesapeake Bay region.

The cooperative agreement has continued among the U.S. Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries, Hampton Parks, College of William and Mary, and the Living Museum to ensure the protection and management of Grandview Beach, Hampton, Virginia. This area is among the areas selected as critical habitat for piping plovers and has provided suitable habitat for a least tern colony for well over 100 years. This agreement includes protection through posting the area, monitoring the success of species utilizing the area, and educating the public to the sensitive nature of the area. The area was monitored 2 - 3 times weekly to determine the status of nesting birds and to determine the disturbance factors within the area. This monitoring was completed by Sandra Hayslette, a William and Mary undergraduate Honors student, receiving additional support from the Fred Wilson Scholarship Program. J. W. Akers and J. W. Via contributed extensively to the monitoring of this area. Andy Gurkin of Dandy Haven Marina assisted in transporting materials for posting the nesting areas.

A second management agreement continues the cooperation among the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, College of William and Mary, and Virginia Department of Game and Inland Fisheries for Craney Island, Portsmouth, Virginia. The new agreement expands the efforts to protect and enhance available habitat and create additional suitable nesting areas. This agreement incorporates protection of all beach nesting species.

This area was monitored twice weekly for colonial bird nesting species by S. Hayslette, J. Akers, and J. Via.

Protection of the barrier island chain is continued through the U.S. Fish and Wildlife Service, The Nature Conservancy, Virginia Heritage Program, Virginia Department of Game and Inland Fisheries, and private landowners. Project personnel assisted the Virginia Coast Reserve of The Nature Conservancy and the Virginia Department of Game and Inland Fisheries in posting selected barrier islands. Work continues with the Natural Heritage program to categorize critical habitat for select beach nesting species on four of the barrier islands.

Urban colonies of great egrets, great blue herons, and yellow-crowned night herons present challenging management problems due to their location within developed areas. Relocation and abandonment result from human disturbance. Management agreements with private landowners are a feasible step in protection of these species.

RECOMMENDATION:

Management agreements provide the key steps for protection of the habitat needed for the continuation and success of colonial nesting species. Establishment of such agreements is recommended for large and critical colonies throughout the state. The next target species for management agreements should involve the landowners of Great Blue Heron colonies within the state.

JOB VI-B: To conduct surveys of colonial breeding birds in Virginia in order to detect changes in population number as well as population shifts.

Flights were conducted mainly on the Piedmont and Coastal Plain of Virginia and the Virginia barrier islands. Flight operations were conducted principally along the major river systems and adjacent forested areas; and the rivers, streams, and barrier islands of the Eastern Shore.

Areas of Greatest Activity - The primary areas frequently surveyed were as follows:

The James River from Goochland County to the James River Bridge including all tributaries and adjacent forest within ten miles of the shore line;

The Chickahominy River from the James River to Mechanicsville including all tributaries and adjacent forest within ten miles of the shore line;

The York River from the Town of West Point to

Yorktown including all tributaries and adjacent forest within ten miles of the shore line;

The Mattoponi River from the Town of West Point to Aylett including all tributaries and adjacent forest within ten miles of the shore line;

The Pamunkey River from the Town of West Point to Tunstall including all tributaries and adjacent forest within ten miles of the shore line;

The Piankatank River/Dragon Swamp from Deltaville to Ino including all tributaries and adjacent forest within ten miles of the shore line;

The Rappahannock River from Stingray Point to Fredericksburg including all tributaries and adjacent forest within ten miles of the shore line;

The Potomac River from Smith Point to Masons Neck including all tributaries and adjacent forest within ten miles of the shore line on the Virginia side of the River;

The North Landing River within the City of Virginia Beach including all tributaries within two miles of the River;

The Eastern Shore of Virginia including all shore lines, forests, and barrier islands;

Western shore line of the Chesapeake Bay from Smith Point to New Point Comfort including all inlets and adjacent forest within five miles of the shore;

Mobjack Bay and adjacent forest within five miles of the shore line.

Areas Surveyed Once Per Year:

Nattoway River;

Nansemond River.

For these areas, aerial observations were normally conducted within five miles of the shore line.

Infrequent Surveys - Occasionally, there were reports of colonial nesters and other species of interest in areas beyond their normal nesting range. If these reports were deemed credible, and the area was not readily accessible by surface

transportation, the reported location was searched by air to confirm the sighting and to accurately locate the nest on the appropriate Topographical Chart for future observations.

Recommendations:

Continue annual monitoring of known colonies. Search for new colonies as time and funds dictate.

COLONIAL BIRD SURVEYS ON THE EASTERN SHORE OF VIRGINIA:

Colonial bird surveys were flown over the barrier island chain. The numbers of colonies and locations were recorded on 7 1/2 minute topographic maps. In addition, an annual comprehensive ground survey was conducted in mid-June by J. W. Williams, J. W. Akers, J. W. Via, and R. A. Beck through the coordination and support of the Virginia Coast Reserve of The Nature Conservancy. This census has been conducted for seventeen consecutive years by the same personnel using the same census techniques. Each barrier island was walked from north to south with all locations, numbers, and statuses recorded for avian colonial and solitary beach nesting species. Although the breeding population number of many species has fluctuated, certain species merit attention including the little blue heron, gull-billed tern, black skimmer, brown pelican, and white ibis. The first three species merit attention because of the apparent decline in numbers while the last two species show an increase in number.

In 1991, the little blue heron population was recorded at a total of 138 adults. Of this total, 71 were located during the mid June, Williams, et. al survey. Sixty-seven adults were surveyed in the Chincoteague Bay area by staff personnel (S. Rottenborn, M. Erwin, R. Beck). There is a decrease of 11 adults since 1990. Continued monitoring of all areas should provide the necessary additional information to determine a probable population shift or decline. Table 1 indicates the total number of adult little blue herons for Virginia for 90 - 91.

Table 1.
Total Number of Adult Little Blue Herons in Virginia, 1990-91

Location	Number of Adults 1990	1991
Cords Marsh, Chincoteague Bay	40	1
Willis Marsh, Chincoteague Bay	12	29
Farmouth, Chincoteague Bay	55	33
Wreck Island	14	18
Fisherman Island	14	41
Chimney Pole Island	2	4
Club House Point, southwest of Wachapreague Inlet	16	12
Total:	153	138

For comparative purposes, (Williams, *et. al.*, 1990) documents a count of 326 adult little blue herons, excluding any of the Chincoteague Bay area, in 1982. It is not clear whether this represents a genuine decline or merely a shift in population location.

The gull-billed tern population was monitored combining two basic habitat types; an expanded marsh/shell bank census was added to the barrier island surveys. The combined total of individuals of the two general habitat types was 699. Chart 1 compares the number of adult gull-billed terns within each habitat type. Of this total, 46% or 324 were found utilizing the shell bank habitat. In general, these shell banks are higher points within a marsh and may have provided additional protection from high water inundation. The beach nesting colonies (375 individuals, 54%) had

limited nesting success due to severe washing.

There were a total of 4,236 skimmers in Virginia in 1991, and 85% of black skimmer adults nested in the barrier islands compared to 15% on the Hampton Roads Tunnel. Weekly monitoring at Hog, Cobb, Little Cobb, Metompkin, and Cedar Extension Islands indicated 3 separate renesting attempts for the black skimmers and nesting success was hampered by continual flooding. During a two-year period, project personnel have observed less than 55 fledged young for the barrier island area. During the same time period of 1990-91, 138 fledged young were observed on the Hampton Roads Bridge Tunnel Island. One of the major concerns at this time (from observation of the past 2 years, 1990-91), is the fact that the number of observed fledged young is only 201.

Each area has different factors influencing productivity. The barrier island colonies were effected by severe flooding on three separate occasions, causing three different renesting attempts. The Hampton Roads Bridge Tunnel Island is not influenced by high water flooding. The tunnel area is, however, exposed to human and vehicular disturbance due to the construction crews and their heavy equipment.

Chart 2 compares the 1990 Hampton Roads Bridge Tunnel Island adult/fledged population with the eastern shore adult/fledged population. Chart 3 compares the same for 1991. The Hampton Roads Bridge Tunnel Island population is approximately 25% of the total Virginia Black Skimmer population. Even though the number of young produced is highest at Hampton Roads, neither area is producing young at a level that will maintain a stable population.

Continued monitoring and further study should determine if this is a downward trend or the result of a normal fluctuation in the Virginia population.

The brown pelican population continues to expand. In early June, a total of 194 free flying birds were observed within and around the colony on Fisherman's Island. A comprehensive nest count resulted in a total of 94 active nests. The colony has been monitored regularly and young have fledged from the area. Closely associated with the pelican colony is the largest royal tern colony in Virginia. Approximately 4,500 adults were counted at peak hatching. Also associated with the area is a large gull colony of both herring and black-backed gulls. The gull colony is increasing. There were 1851 herring gulls in 1991 as compared to 575 in 1990. Great Black-backed gull numbers increased to 42 in 1991 as compared to 20 in 1990. There is a concentration of herring gulls within the immediate boundaries of the pelican/tern colony. This encroachment of nearby gulls is of specific concern as the pelican colony continues to expand. Gull nesting may displace the pelicans, and gulls are potential predators of both

pelican eggs and young. For similar reasons, the effect of the gulls on the royal terns is also of special interest. The royal tern young were corralled and banded in July of 1991. Additional visits to the pelican/tern colony in mid July resulted in counts of 568 juveniles still within a well-formed creche. A total of 173 dead young were observed, 10 of which were banded. One hundred fifty of these young were found dead prior to banding activities. The young were in various stages of decomposition.

The white ibis was first observed as a breeding bird in Virginia in 1977 (Frohring and Beck, 1978). A total of 13 adults and 3 immatures were observed during the 1991 breeding season. This small population should continue to slowly increase in the future.

The cooperative monitoring project established under the auspices of The Nature Conservancy/Virginia Coast Reserve, Virginia Department of Game and Inland Fisheries, William and Mary Department of Biology, University of Virginia/Virginia Coast Reserve/Long-term Ecological Research, and the Virginia Natural Heritage Department, monitors a select group of colonial beach nesting birds. This project includes black skimmers, common terns, least terns, gull-billed terns, piping plovers, and Wilson's plovers that nest on Hog, Cobb and Little Cobb islands in the Virginia Coast Reserve. Weekly visits are made to the three islands by project personnel. Suitable habitat is categorized for each species. Meteorological factors, predation and disturbance are researched for their effects on colony success. The results of this project are undergoing analysis. Table 2 summarizes the composition and numbers of bird species utilizing Little Cobb Island.

Table 2. Summary: Little Cobb Island 1991

Species	Number of Adults
Common Tern	950
Gull-billed Tern	337
Royal Tern	61
Sandwich Tern	2
Caspian Tern	2
Black Skimmer	1245

Gull-billed and common terns successfully fledged young after the second renesting in 1990. Little Cobb was one of the most successful areas through June 31, 1991.

Continuation of this project is recommended.

COLONIAL BIRD SURVEYS ON THE WESTERN SHORE OF THE CHESAPEAKE BAY:

Great Blue Herons

Great blue heron colonies were located by aerial surveying. In general, the great blue heron colonies were established early during the breeding season. The 1990-91 winter was mild and several colonies had nest construction by late February. A preliminary study of habitat characterization included the colony on Hog Island in Surry County which has been actively increasing in size since 1986. Hog Island is a State Waterfowl Refuge. Of the 279 nests in 1990, about 55 trees were marked sequentially. Habitat parameters were recorded within the colony. Preliminary analysis of the data suggest that this type of information will be helpful in development of management recommendations for great blue heron colonies within the state. Appendix 1 summarizes the locations, and total numbers of adults.

The nesting success of the great blue heron is dependent on food supply, meteorological factors and human disturbance. During the 1989 and 1990 breeding seasons, inclement weather affected many colonial nesters. However, no obvious overwhelming detrimental effect was observed within the surveyed great blue heron colonies in 1991. The great blue heron population has increased from 4,453 in 1990, to 5,017 in 1991.

Least Terns

The least tern population on the Western shore totaled 876 adults. Table 3 lists the least tern sites, the number of adults, and the colony status. The colonies at Grandview beach, Craney Island, and Bethel Beach were checked at least twice weekly. The Craney Island colony was the largest colony within the state, with 450 adult birds and a nest count of 218 before the peak hatching date, which generally is the week of June. The areas supporting the tern colonies were posted. Dike roads were closed as necessary. Full cooperation with the staff of U. S. Army Corps of Engineers under the direction of Bill Rawls was instrumental in creating and protecting the areas. Project personnel included: J. Akers, J. Via, and S Hayslette, who visited these areas regularly.

Table 3. Least Tern Populations 1991

Area	Number of Adults	Colony Status
Grandview Beach Hampton, VA	250	Colony abandoned btwn. May 22 and 24.
Craney Island Portsmouth, Va	450	Nest Count: 218 80 - 100 Yng. Fledged
New Point Comfort	30	Colony abandoned by May 30.
Bethel Beach	160 (before May 20)	Colony washed on 23 June. J. Bazuin and K. Clark contributing.
Sandy Island	0	Aerial data late May - no ground data
Willoughby Spit	0	
	Total: 876	

For comparative purposes, the eastern shore least tern population totaled 837 (excluding Assateague Island numbers). The western shore least tern locations are important to the stability of the least tern population as a whole. The population as a whole is declining in the state of Virginia (Beck, *et. al.*, 1990).

Piping Plovers

The piping plover population on the Western shore of the Chesapeake Bay was again concentrated at Craney Island and Grandview beach. The areas were visited by S. Hayslette, J. Akers, and J. Via at least 2-3 times weekly to monitor and patrol the sites. The combination of both areas supported a total of 6 pairs of piping plovers at the beginning of the breeding season. Two pairs nested successfully and fledged 6 young at Craney Island. At Grandview Beach, two pair attempted nesting, but only one pair nested successfully and fledged 2 young.

In general, the Craney Island area provided a more protected habitat with less human disturbance than the Grandview beach area. Both areas were exposed to various types of vertebrate predation. Red fox, northern harrier, American kestrel, and peregrine falcon

were predators at Craney. In addition to northern harrier, and black-back gull, boat-tail grackle were observed at both Craney and Grandview. Grandview beach had the added pressure of extensive human activity, including: boaters (high count 41 boats) and beach visitors (189 on July 14th). Grandview beach also had a four-wheel-drive vehicle transverse the area at least 6 different times.

Common Terns and Black Skimmers

The south end of the Hampton Roads Bridge-Tunnel continues to support the largest common tern colony in Virginia. The estimated number of adult common terns for 1991 was 5580 adults. Of the 8334 common terns surveyed in Virginia, 67 percent were on the tunnel island (Chart 4). A definitive nest count of 2790 nests was conducted in early June, 1991. In general, the common terns are successful because this site is well protected from the influence of tidal action. The substrate also allows for efficient drainage of water resulting from heavy rains. Table 4 lists the locations of common terns in Virginia.

Table 4. Summary: Common Terns in Virginia 1991

Island	Number of Adults	Percent of Total Adults
Metompkin	103	1
Cedar (and C. Ext.)	672	8
Dawson Shoals	39	0.5
Sandy	2	(0.02)
Hog	61	0.7
Cobb	31	0.4
Little Cobb	1510	18
Wreck	71	0.8
Ship Shoal	9	0.1
Marsh - Shell Banks	246	3
Hampton Roads Bridge Tunnel	5580	67
Total:	8334	

The black skimmer adult count was 647 with an average clutch size of 2.53 eggs per nest.

The population of Norway rats (Rattus norvegicus) has been reduced. Tunneling was minimal during 1991 throughout the nesting area. However, the Norway rat is capable of producing twelve litters per year with an average of eight to ten young per litter. The rat removal program must continue in order to control the rat population.

Vehicular traffic traveling through the tunnel reached a record high of 100,000 vehicles in one day in mid July. With this additional traffic, more disabled vehicles were brought through the access road of the nesting area in 1991. Construction vehicles, including heavy equipment and large trucks, utilize the area extensively. The posted speed limit was reduced to 5 mph since 1990, but the speed of the traffic has been observed in excess of 25 miles per hour. Rapidly moving trucks do not allow ample time for the young terns and skimmers to move out of the road. Dead young terns and skimmers totaled about 100 in a 10 day period, with an average of 10 per day.

Vegetation control was necessary to continue to attract terns and skimmers to the area. In March, select areas had vegetation manually removed. A study undertaken by Greg Keller, a graduate student at the College of William and Mary, is in progress to determine the optimal substrate conditions by manipulating the amount of vegetation within 7 experimental plots on the island. The results of this study should provide the necessary information to develop management recommendations for future manmade sites in Virginia.

Continued cooperation between the Virginia Department of Transportation, Ruth Beck of the College of William and Mary (principle investigator), and the Virginia Department of Game and Inland Fisheries is expected and is necessary to protect this area for common terns and black skimmers.

Double-crested Cormorants and Cattle Egrets

An active mixed colony of approximately 125 pairs of double-crested cormorants and 100 pairs of cattle egrets continue to nest on one of several artificial islands in the James River as reported by Game Department personnel. Within the last three years great egrets and green-backed herons have also taken up residence on the island. There were approximately ten pairs of great egrets nesting there this year. The island is actually the grown over remains of a sunken barge west of the Benjamin Harrison Bridge. It was uninhabited by nesting colonial birds as recently as 1984. Then in 1985 a pair of double-crested cormorants took up residence there

followed by numerous cattle egrets. Initially, the small island of less than a quarter of an acre in size was densely covered in shrubs and small trees. Cattle egrets reached a peak population of approximately 250 pairs by 1987 at which time the birds' waste material was abundant enough to begin killing much of the green vegetation. The resultant dead branches however are preferred by cormorants so a population shift began and cormorants appear to be displacing the cattle egrets now.

Within the last two years double-crested cormorants have taken up residence in at least one other location in eastern Virginia. In 1990, 14 cormorant nests were discovered on a Virginia Power transmission line tower in the James River adjacent to the James River Bridge from Newport News to Isle of Wight County. This year 26 nests were recorded on the same tower.

RECOMMENDATIONS:

Monitoring the populations of colonial nesting species through aerial and ground surveying to determine trends and shifts should continue. Avian and mammalian predator control, limitation of human disturbance, and protection of the habitat for colonial beach nesting species should be included in management recommendations for each colony site. Recognition of the volunteers who donate hundreds of hours of field expertise to the collection of data and ultimately to the protection of the species should be instated.

JOB VI-C: To sample nesting success in colonies of selected species each year.

Least terns, common terns, gull-billed terns, and black skimmers were selected as the initial species to be monitored on Hog, Cobb, and Little Cobb islands on the Virginia Coast Reserve. A visit to the islands in early May provided an overview of potential habitat. In mid-May, the colony location, nest building initiation, and estimated number of adults were recorded. From late May to early June, the perimeter of each colony was defined. The contents and number of each active nest were recorded when feasible. Each area was visited weekly, and the number of young was recorded in each area. All observations were made from a distance greater than fifty meters to avoid disturbing the young. In late July, counts of fledged young and adults were made to establish an adult/young ratio.

Preliminary analysis of data collected indicates a reduced colony success predominately due to nest failure by flooding, predation, and human disturbance.

RECOMMENDATIONS:

The monitoring of select colonies for reproductive success is recommended to continue through at least another breeding season. Cooperation among the Virginia Department of Game and Inland Fisheries, Virginia Coast Reserve/The Nature Conservancy, Long-term Ecological Monitoring Program/University of Virginia, and the Heritage Program should continue. These agencies provide the necessary steps for the success of the project including boat transport to study areas, gathering of data, comparison of meteorological data with nest failure sequences, and analysis of habitat parameters.

JOB VI-D: To conduct preliminary studies on the effects and extent of predation on colonial breeders.

During the 1991 breeding season, a concentrated effort was initiated to observe the effects of predation on colonial breeders. The study areas on the barrier islands of the Eastern Shore and the study areas on the western shore of the Chesapeake Bay were censused for potential predators of colonial nesters. Each area had a combined set of confirmed predators. The Eastern Shore colonial bird populations were subjected to avian and mammalian predators. Avian species observed taking and harassing various tern species included the northern harrier, peregrine falcon, boat-tailed grackle, fish crow, great black-backed gull and herring gull. Mammalian predators included red foxes, raccoons, and rats which are prevalent on many of the barrier islands. The Norway rat is predominantly found at the Hampton Roads Bridge-Tunnel site. Due to removal activity by the Hampton Roads Bridge Tunnel personnel of the Virginia Department of Transportation, the rats are currently under control. This breeding season, there has been a drastic reduction of rat predation at the Hampton Roads Bridge Tunnel Island colony. Of the three barrier islands surveyed weekly, the north end of Cobb Island had evidence of red foxes and rats going into the colonies regularly. Raccoon tracks were observed in the colonies on both Hog and Cobb islands. Little Cobb was the only island free of mammalian predators. The future of these colonial nesters will be dependent upon control of these predators.

A study involving the effects of gull predation on the reproductive success of nesting terns and skimmers is in progress, by William and Mary graduate student Timothy J. O'Connell. Specific tern and skimmer colonies were selected based on the presence or absence of gull nesting activity. Over the course of two years, approximately 400 nests have been monitored and observed. Data analysis should be complete by January 1, 1992.

RECOMMENDATION:

Continue to target select colonial nesters, i.e. common terns, gull-billed terns, and black skimmers, and determine the effect and extent of predation. Removal of predation at specific sites in cooperation with the Department of Game and Inland Fisheries and various land owners.

JOB VI-E: To locate, map, and describe all existing yellow-crowned night heron colonies and single nests in Tidewater, Virginia.

Urban yellow-crowned night heron surveys were conducted on foot through appropriate nesting habitat in residential areas. As in previous years survey effort was concentrated in Hampton and Norfolk for nesting yellow-crowned night herons. However, one new colony that was discovered in Portsmouth last year continues to be monitored. Nest survey results are presented below in Table 5.

Table 5. Yellow-crowned Night Heron Nest Survey Results.

	Number Active Nests				
	1987	1988	1989	1990	1991
Hampton	79	64	65	62	68
Norfolk	62	42	64	53	49
Portsmouth	-	-	13	11	14
Totals:	141	106	129	126	131

JOB VI-F: To locate and map all appropriate or potential habitats for future observation and management.

As in the past, over 90% of active nests were located in loblolly pines of intermediate age. Based on recent publications regarding yellow-crowned populations in eastern Virginia it is apparent that this species is tied closely to crustacean prey populations endemic to coastal marshes. This has made it much easier to evaluate upland habitat with respect to its potential for harboring nesting yellow-crowneds. As a result upland pine stands in association with productive marshes appear to be the limiting factor in this species local distribution. Unfortunately, the only remaining pine stands in the Tidewater area are largely confined to residential neighborhoods and public parks. Therefore this species appears forced to share nesting habitat with humans and subsequently suffer the consequences of the usual human discontent.

JOB VI-G: To evaluate human impacts on heron populations in residential areas in Tidewater, Virginia

Surveys were conducted again this year in the Hampton Roads and Tidewater areas to monitor urban heron and egret colonies and address citizen concerns. Prior to the nesting season, the Department of Agriculture and Consumer Services sent out approximately two dozen letters to homeowners who anticipated having problems with nesting colonial birds. As was the case last year, it was agreed that harassment would be permissible prior to nest construction to prevent nesting in certain areas. Information on nesting success and the effects of human intervention are discussed for both wading bird species in Tidewater Virginia.

Yellow-crowned night herons

Although the population numbers appeared stable again this year in Hampton, this once diffuse population is increasingly becoming more consolidated into fewer and larger colonies. Over 65% of the 1991 nesting pairs are contained within a residential area smaller than two city blocks. Smaller, peripheral colonies and individual nests are losing out to habitat destruction as well as being subjected to increasing harassment and predation from raccoons and fish crows.

The Norfolk population is the most dynamic population in the Tidewater area due to higher levels of harassment and nest destruction in this city. Survey numbers accurately reflect numbers of known nest sites from one year to the next, but probably are not indicative of the actual population numbers. This is due to the tremendous amount of time needed to relocate nesting pairs after they have been displaced from a historical area. Many pairs and colonies are not relocated until the following year because they may forego a nesting season if displaced at critical times. The frequent shifting of nesting pairs from year to year has generated much concern regarding the effects of displacement on long term reproductive success. One mechanism to alleviate this problem has been an attempt to educate more citizens about the status of this species and the implications of harassment.

Great Egrets

Given the extreme fidelity of this species to existing colony sites we believe that one colony's demise usually means another colony's growth. One example this year may have been the historical Norfolk colony and the rediscovered Virginia Beach colony on the Elizabeth River. Residents associated with the Norfolk colony have attempted for years to cause its abandonment. And this year what began as a colony with 54 nests in April had dropped to 20 or fewer nests by July probably due to continued harassment. However by the end of June the new Virginia Beach

colony had grown to 234 pairs, almost 100 pairs more than last year. This suggests recruitment from a source other than just the young of previous years. We anticipate the Norfolk colony may be the next colony abandoned due to human intervention.

The Portsmouth colony continued to show an increase in 1991 although this colony suffered close to 25% chick mortality this year at the hands of a severe summer storm with extremely high winds. The storm coincided with the peak weak of fledging and apparently blew many young off of nests who were still too weak to get back up into surrounding trees for protection. Over 50 young were known to have been killed by ground predators or starvation. All of the landowners involved with this site have been identified and most seem amenable to protecting the site, although no formal agreement has been reached to date.

The Hampton colony appears to have stabilized at just over 300 pairs. Although this site is not formally protected, the landowners have not applied for a permit to remove any of the nest trees as was once feared. This colony may suffer some habitat loss in the coming years however, so other potential nesting sites are being considered for protection. Table 6 depicts the past and present status of existing great egret colonies.

Table 6. Status of Known Great Egret Colonies Over Time

Colony Site	1987	1988	1989	1990	1991
Va Beach I	320	237	0	0	0
Va Beach II	30	-	-	100+	234
Norfolk	26	55	110	35	54(20)
Portsmouth	73	121	122	172	207
Hampton	-	241	296	305	307
Totals:	449	654	528	612+	802(768)

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PREPARED BY:	Ruth Beck Karen Terwilliger Dana Bradshaw John W. Akers Jerry W. Via Bill Williams Steve Rottenborn Tim O'Connell Greg Keller Sandra Hayslette Ann Tipper
TARGET DATE FOR COMPLETION:	Contuning
STATUS OF PROGRESS:	On schedule
SIGNIFICANT DEVIATIONS:	None
RECOMMENDATIONS:	Continue study
COST THIS SEGMENT:	$19,351 total $14,513 federal $4,838 state
APPROVED BY:	Bob Duncan Wildlife Div. Chief Jerry Sims PR Coordinator

Appendix 1
LOCATION OF GREAT BLUE HERON COLONIES IN VIRGINIA IN 1991

RUTH A. BECK

TOPO CHART NAME	WAY PT.	LOCATION BY TERRAIN FEATURE & CITY/COUNTY	GREAT BLUE HERON PAIRS	GREAT EGRET PAIRS	HABITAT TREE TYPE
AYLETT	64	Mattaponi River King William Co.	Not Found		Pine
BEULAHVILLE	59	Herring Creek King William Co.	6		Dead Bottomland Hardwood
BRANDON	NW	Morris Creek Charles City Co.	11		Bottomland Hardwood
BRANDON	NW	Barrows Creek Charles City Co.	14		Snags
CHARLES CITY	NW	James River	33		Snags
CHESTERFIELD	NW	Falling Creek Chesterfield Co.	18		Snags Swap
CLAYBANK I	32	Catlett Islands York Co.	3	2	Pine
CLAYBANK II	31	Queens Creek York Co.	80		Pine
CLAYBANK III	NW	Carter Creek Glouster Co.	4		Pine
COURTLAND	56	Nottaway River South Hampton Co.	40	9	Bottomland Hardwood
DENDRON I	65	Blackwater Sussex Co.	Not Found 1990-91		Bottomland Hardwood
DENDRON II	61	Blackwater Sussex/Surry	4	7	Bottomland Hardwood
GLOUCESTER I	35	Fox Mill Run Gloucester Co.	70		Bottomland Hardwood

LOCATION OF GREAT BLUE HERON COLONIES IN VIRGINIA IN 1991

RUTH A. BECK

TOPO CHART NAME	WAY PT.	LOCATION BY TERRAIN FEATURE & CITY/COUNTY	GREAT BLUE HERON PAIRS	GREAT EGRET PAIRS	HABITAT TREE TYPE
GLOUCESTER II	NW	Beaverdam Swamp Gloucester Co.	14		Snags
HOG ISLAND I	NW	Hog Island State Waterfowl Refuge Surry Co.	275	15	Pine
HOG ISLAND II	NW	College Run Surry Co.	18		Cypress
HYLAS	52	Tuckahoe Creek Goochland Co.	25		Snags Swamp
INDIAN HEAD	51	Mason Neck Fairfax Co.	694		Hardwood Pine
KNOTS ISLAND	57	Cedar Island Va. Beach City	81	7	Pine
LANCASTER I	46	Great Wicomico Northumberland Co.	Not Found 1990-91		Bottomland Hardwood
LANCASTER II	47	Bush Mill Stream Northumberland Co.	330		Swamp Bottomland Hardwood
LIVELY	NW	Lancaster Creek Richmond Co.	18		Dead Snag & Hardwood
LORETTO	NW	Occupacia Creek Essex Co.	15		Snags
MIDLOTHIAN	NW	Not available	9		Snags
MONTROSS I	48	Cat Point Creek Richmond Co.	30		Snags

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TOPO CHART NAME	WAY PT.	LOCATION BY TERRAIN FEATURE & CITY/COUNTY	GREAT BLUE HERON PAIRS	GREAT EGRET PAIRS	HABITAT TREE TYPE
MORATTICO	NW	Laton Swamp Richmond Co.	17		Snags
MOUNT LANDING	NW	Quioccasin Creek Essex Co.	13		Hardwood
MOYOCK	NW	Northwest River Chesapeake City	Not Found 1990-91		Bottomland Hardwood
NEW POINT COMFORT	33	Peppers Creek Mattews Co.	275		Pine
NORGE	NW	Longhill Swamp James City Co.	56		Snags
PASSAPATANZY	50	Potomac Creek Stafford Co.	321		Bottomland Hardwood
PLEASANT RIDGE I	60	Pocaty River Va. Beach City	10	8	Bottomland Hardwood
PLEASANT RIDGE II	53 58	Intracoastal Waterway Va. Beach City	341	94	Bottomland Hardwood
PORT ROYAL	NW	Mill Creek A.P. Hill Caroline Co.	Not Found 1990-91		Bottomland Hardwood
PROVIDENCE FORGE	NW	Collins Run New Kent Co.	Not Found 1990-91		Bottomland Hardwood
PROVIDENCE FORGE		Chickahominy River- New Kent/ Charles City Line	23		Snags

LOCATION OF GREAT BLUE HERON COLONIES IN VIRGINIA IN 1991

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TOPO CHART NAME	WAY PT.	LOCATION BY TERRAIN FEATURE & CITY/COUNTY	GREAT BLUE HERON PAIRS	GREAT EGRET PAIRS	HABITAT TREE TYPE
QUINTON	NW	Chickahominy River- New Kent/ Hanover/Henrico Line	80		Snags
RICHMOND	NW	Chickahominy River- Hannover Co.	24		Dead Snag
RICHMOND	NW	Chickahominy River- Hannover Co.	53		Bottomland Hardwood
ROXBURY	66	White Oak Swamp Chicahominy River- New Kent Co.	360	20	Bottomland
ROXBURY	NW	Chickahominy River- New Kent/ Charles City Line	8		Snags
SEVEN PINES	NW	Mechanicsville Chickahominy River	120	8	Bottomland Hardwood
SEVEN PINES	NW	Chickahominy River River- Hannover Co.	20	3	Cypress Snags
SHACKELFORDS I	36	Burnt Mill Creek King & Queen Co.	498		Bottomland Hardwood
SHACKELFORDS II	NW	Poropotank River Gloucester/King and Queen Co. Line	12		Dead Snags
SURRY I	NW	Jamestown Island James City Co.	3		Pine
SURRY II	NW	Black Duck Gut Surry Co.	Area Cut		Dead Snags

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TOPO CHART NAME	WAY PT.	LOCATION BY TERRAIN FEATURE & CITY/COUNTY	GREAT BLUE HERON PAIRS	GREAT EGRET PAIRS	HABITAT TREE TYPE
TANGIER	NW	Watts Island Accomac Co.	160	48	Hardwood
TOANO	45	France Swamp York River James City Co.	114		Bottomland Hardwood
TUNSTALL I	38	Jack's Creek King William Co.	77		Pine & Bottomland Hardwood
TUNSTALL II	NW	Macon Creek New Kent Co.	42	10	Pine
TUNSTALL III	NW	Matton Creek New Kent Co.	21	7	Snags
WALKERS	NW	Tonyham Swamp Charles City Co.	12		Snags
WARE NECK	34	Burke Mill Stream Gloucester Co.	40		Bottomland Hardwood
WARE NECK	NW	Burke Mill Stream Gloucester Co.	22		Snags
YELLOW TAVERN	NW	Virginia Country Club	21		Snags
YELLOW TAVERN	NW	Not Available	8		Snags
YORKTOWN	30	Beaver Dam Creek York Co.	414	15	Pine
TOTAL PAIRS OF ADULTS:			5017	253	