

Survey and Census of Colonial Nesting Seabirds in South Carolina

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INTRODUCTION

Colonial seabirds are among the most conspicuous of any species found in South Carolina. They are generally large and are usually habituated to humans. Species such as the Eastern Brown Pelican (*Pelecanus occidentalis*) are often associated with the coast and are frequently the focus of tourism posters, souvenirs, and crafts.

The well-being of colonial seabirds and other waterbirds is synonymous with the health of the coast. Their variety of feeding mechanisms, broad prey base, wide range of salinity preferences, and a place near the top of the food chain all suggest that seabirds should serve as indicators of environmental health.

The vulnerability of nesting waterbirds has been made all too clear. Some heron and egret species (*Ardeidae*) were nearly exterminated by plume hunters in the late 1800s. More recently, Eastern Brown Pelican populations declined as a result of organochlorine pesticides until most uses of DDT were banned nationally in 1972. Wood Stork (*Mycteria americana*) numbers declined from 20,000 breeding pairs in 1930 to 5,000 pairs in 1985. These declines, especially in south Florida, appear to be directly related to human alteration of wetlands. The sensitivity of colonial waterbirds is directly related to the integral part they play in all the ecosystems in which they exist.

To manage colonial seabird species and to use them as environmental indicators, it is necessary to conduct point-in-time surveys and census in a reproducible, quantified manner. The fact that they are colonial nesters facilitates census and monitoring. Until our surveys (1988-89, 1993-95), there had never been a reproducible, statewide survey of colonial waterbirds of South Carolina. Only certain species have been monitored on a limited basis, especially during the 1960s and '70s (Beckett 1966a, b, Blus and Prouty 1979, Blus and Lamont 1979, Blus *et al.* 1979, Portnoy *et al.* 1981, and Wilkinson 1981, 1982). Some of the past censuses for these species are comparable to

recent ones because they were total nest counts that employed census techniques similar to those presently used.

OBJECTIVES

The objectives of our survey and census were to document population trends of nesting sea and shorebirds that were nesting, in most cases, colonially on the outer coast of South Carolina. Included were pelicans (*Pelecanidae*), shorebirds (*Haematipodidae* and *charadriidae*), gulls, terns (*Laridae*), and skimmers (*Rynchopidae*). Another objective was to develop a microcomputer data base that could be used to develop long term population trends and habitat use by sea and shorebirds in South Carolina.

METHODS

Sea and shorebird colonies were located based on 1) historical records, 2) results of recent surveys, 3) information derived from active birders, 4) habitat thought to be suitable, and 5) coastal aerial and boat surveys. During the 1988 and 1989 nesting season, nesting data were collected using several population estimation techniques. The techniques included aerial photographic counts, mark/recount multiple ground counts, single ground counts, point counts, perimeter counts, and sample counts made from 20% randomly stratified, parallel-strip transects.

Census procedures in South Carolina have evolved over time as techniques were tried and either incorporated or discarded. For instance, in early years (1969-86) pelican nest counts were done by single total ground-counts, usually done (but not always) between May 15-25, a time of peak nesting for pelicans in South Carolina. Beginning in 1987, incubation interval counts were tried on Marsh Island for pelican census and later used (1988-92) on all pelican nesting sites in South Carolina. This required that counts be made, of nests with eggs only, at incubation intervals in April, May and June. This method represented total nesting effort, while the single ground count compared yearly peak trends. Pelican nest numbers compiled during incubation interval count years would be inflated when compared to peak nesting single ground counts done during earlier or later years. Caution is suggested when comparing pelican nest counts done by these different methods because standardization of these count methods after the fact may cause misinterpretation and may be misleading. For more detail on these survey and census techniques, see Wilkinson 1991.

SURVEY AND CENSUS RESULTS 1988-89, 1993-96

In 1988, baseline surveys and census were initiated for sea and shorebird nesting on 45 sites ranging in size from < 10 m to > 5 km along the entire coast of South Carolina. The areas surveyed included all suitable seabird nesting habitats in the state. Of these sites, 23 were found to have seabird nesting.

Twenty-seven thousand six hundred sixty-two (27,662) nests of sea and shorebirds were located. The number of nesting pairs in 1988 were Royal Tern (10,771), Laughing Gull (7,288), Brown Pelican (6,783 - incubation interval counts used this year), Sandwich Tern (1,877), Black Skimmer(483), Gull-billed Tern (254), American Oystercatcher (141), Forster's Tern (40), Wilson's Plover (24), and Common Tern (1) (Table I).

These surveys and censuses were repeated in 1989. Results indicated a slight increase in nesting compared to 1988. Most of the nesting was accounted for by four species: Royal Tern (10,444), Brown Pelican (7,739 - incubation interval counts used again this year), Laughing Gull (6,563), and Sandwich Tern (2,204). There was a substantial increase in Black Skimmer counts. Thirty-seven sites were occupied for nesting in 1989, a substantial increase over the previous year. However, the increase was primarily attributable to two species: American Oystercatcher, and Wilson's Plover, birds which frequently move sites when disturbed. Most of the nesting occurred on 4 sites: Bird Key Stono, Marsh Island, Deveaux Bank and Middle White Banks.

In 1993, 26,649 nests were located on 46 nesting areas. The most numerous species were Royal Terns, Laughing Gulls, and Eastern Brown Pelicans (mid/late May single ground counts resumed this year), respectively. Areas that represented the largest number of nesting pairs and variety of species were Bird Key Stono, Deveaux Bank and Marsh Island (Table III).

A comparison of sea and shorebird nesting during the late 1980s and early 1990s indicates that nesting remained relatively stable for most species during the period (Tables I, II, and III). However, between the 1993 and 1994 nesting seasons there was a precipitous decline in nesting (-9,492 nests or -35.6%). Principal species involved in the decline were Eastern Brown Pelican, Laughing Gull, Sandwich Tern and Royal Tern (Tables III, IV). Severe erosion of Bird Key Stono, a major rookery, was at least in part attributable to this decline. All species nesting there were negatively impacted. The mixed colony on this island accounted for an average of 41% of the sea and shorebird nesting in South Carolina during 1988, '89, '93, and '94 years when complete surveys for the state were done. It also had become the site of the largest Eastern

AREA	Table I. Colonial Sea and Shorebird Nesting in South Carolina - 1988													
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	NESTS
Waties Island														
Garden City Point														
Murrells Inlet														
Huntington Beach State Park		3						1						4
Litchfield Beach														
North Island		6		5	41						4			56
Bosun's Point														
Winyah Bay														
Sand Island														
South Island														
Cedar Is.														
Cape Island					16						3			19
Cape Romain Harbor														
Lighthouse Island														
Raccoon Key		2		35	9						47			93
Five Fathom Creek														
White Banks East				5								250		255
White Banks Middle				5								738	423	1166
White Banks West				10				23				321	31	385
Marsh Island				6	16			17	3842	872	19	1563	2350	8685
New Island														
Bird Island				6	25				417	1	28	3		480
Anderson Creek														
Bull Island														
AIW Sewee to Charleston Harbor				19										19
Crab Bank				13	34						29			76
Castle Pinkney				6										6
Bird Key Stono				2	29				2548	1004	7	4285	3979	11854
Skimmer Flats				1	58						30			89
Captain Sam's Inlet														
Deveaux Bank				4	231				3964		85	128		4412
Botany Bay Island		4												4
Edingsville Beach				1										1
Edisto Beach														
South Edisto River					2									2
St. Helena Sound					8									8
Harbor Island														
Hunting Island														
Fripp Island														

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AREA	Colonial Sea and Shorebird Nesting in South Carolina - 1988													
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	NESTS
Bull Point														
Port Royal Sound		9		2										11
Joiner Bank														
AIW behind Hilton Head					24						2			26
Skull Creek				7										7
Calibogue Sound				4										4
Total Per Species	*NC	24	*NC	141	483	0	40	1	10771	1877	254	7288	6783	27662

*NC = Not complete or not counted.

** Incubation Interval Counts

AREA	Table II. Colonial Sea and Shorebird Nesting in South Carolina - 1989													
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	** Brown Pelican	TOTAL
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	NESTS
Waties Island														
Garden City Point		2												2
Murrells Inlet				2										2
Huntington Beach State Park								1						1
Litchfield Beach		3												3
North Island		8		16										24
Bosun's Point		7		7	4			1						19
Winyah Bay				1										1
Sand Island				1										
South Island														
Cedar Island		1												1
Cape Island		20		20	196	1		4			5			246
Cape Romain Harbor				14										14
Lighthouse Island		2		3										5
Raccoon Key				58	99						15			172
Five Fathom Creek				2										2
White Banks East				3								430		433
White Banks Middle				4			9					974	312	1289
White Banks West				25							30	220		275
Marsh Island				11					4268	1221		1592	3430	10522
New Island				3	50							3		56
Bird Island				11	60			1			35			107
Anderson Creek		2		2										4
Bull Island														
AIW Sewee to Charleston Harbor				26										26
Crab Bank				15	129						79	3		226
Castle Pinkney				9										9
Bird Key Stono				3					5219	835		3163	3974	13194
Skimmer Flats											2	2		4
Captain Sam's Inlet		1		2										3
Deveaux Bank				9	358				957	148	193	176	23	1864
Botany Bay Island		4		1										5
Edingsville Beach		1		3										4
Edisto Beach		3												3
South Edisto River														
St. Helena Sound				4										4
Harbor Island														
Hunting Island														
Fripp Island				1										1

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AREA	Colonial Sea and Shorebird Nesting in South Carolina - 1989													
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	NESTS
Bull Point				1										1
Port Royal Sound														
Joiner Bank					195						21			216
AIW behind Hilton Head				5										5
Skull Creek				1										1
Calibogue Sound				2										2
Total Per Species	*NC	54	*NC	266	1091	1	9	7	10444	2204	380	6563	7739	28756

*NC = Not Complete or not counted.

**Incubation Interval Counts

Brown Pelican rookery within the species range (Wilkinson *et al.* 1994). However, it completely washed away between the 1994 and 1995 nesting seasons. The principal species that nested on Bird Key Stono were Royal Tern, Sandwich Tern, Laughing Gull, and Eastern Brown Pelican. The average percent nesting decrease for these species in 1995 when compared with 1988, '89, '93, and '94, was 37%. This suggests that loss of nesting habitat caused by the disappearance of Bird Key Stono is in great part responsible for the recent sea and shorebird nesting decline in South Carolina.

Simultaneous surveys and censuses conducted in North Carolina, South Carolina, and Georgia allowed for a regional overview of nesting losses and gains for the 1993 and 1995 seasons. Eastern Brown Pelican losses in South Carolina (-1,396) were almost exactly accounted for by gains in North Carolina and Georgia. Royal Tern losses in South Carolina (-5,181) and North Carolina (-500) were accounted for by gains in Georgia. Laughing Gull losses in South Carolina (-2,500) were more than accounted for by gains in North Carolina (+5,500). North Carolina also apparently picked up gains in Laughing Gulls from nesting declines in Virginia during the same period. Gull-billed Tern losses in South Carolina (-112) were accounted for gains in North Carolina and Georgia. Sandwich Tern losses in South Carolina (-920) have not been accounted for in the other two states (Figure 1).

Survey and census emphasis in 1996 was primarily directed toward the colonial wading birds and survey effort was reduced for sea and shorebirds. However, we conducted surveys for five species that had shown declines during the previous year. Four of the five species continued to show a nesting decline during 1996: Royal Tern, Sandwich Tern, Eastern Brown Pelican, and Black Skimmer. Counts for Laughing Gulls were not done statewide in 1996 and therefore totals are not comparable with other years. Gull-billed Tern nesting increased during this same period (Table VI).

SPECIES ACCOUNTS

Brown Pelican Trends

Systematic annual counts of pelican nests have been conducted in South Carolina since 1969. Brown Pelicans have nested at ten locations since 1946. Six of these sites were in the Bulls Bay region. Marsh Island, (in the middle of Bulls Bay) was a major pelican nesting site from 1948-1996, and had nests in all but eight years during this period. Other important pelican colonies in South Carolina included Deveaux Bank in the mouth of the North Edisto River. It contained one of the two largest pelican colonies in South Carolina from 1946 until it washed away in 1979. In 1980, pelicans used Bird Key

AREA	Table III. Colonial Sea and Shorebird Nesting in South Carolina - 1993													
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	NESTS
Waties Island	2	2												4
Garden City Point	4	2												6
Murrells Inlet			14	6										20
Huntington Beach State Park														
Litchfield Beach														
North Island	6		10	8										24
Winyah Bay														
Bosun's Point			3	1										4
Sand Island	4		1											5
South Island														
Cedar Island														
Cape Island	18	4	18	12	84									136
Cape Romain Harbor			13	3										16
Lighthouse Island			2	2	94									98
Raccoon Key	19	1	28	25	228	1	18			87				407
Five Fathom Creek			6	2										8
White Banks East			4	4								320		328
White Banks Middle			8	3						27		556		594
White Banks West			8	7			4					54		73
Marsh Island			9	9					2211	196	2	1399	1936	5762
New Island	2	2												4
Bird Island														
Anderson Creek			5	1										6
Bull Island	10		2											12
AIW Sewee to Charleston Harbor	6		26	13										45
Crab Bank			1		64						16	124		205
Castle Pinkney				8										8
Bird Key Stono				2		1		1345	1494			4331	3181	10354
Skimmer Flats			2	1	98						9			110
Captain Sam's Inlet														
Deveaux Bank					178			6452	832	129	532	42		8165
Seabrook Island														
Botany Bay Island														
Edingsville Beach														
Edisto Beach														
South Edisto River			1											1
St. Helena Sound			11	2										13
Harbor Is.			2											2
Hunting Island														

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AREA	Colonia Sea and Shorebird Nesting in South Carolina - 1993													
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gulf-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	NESTS
Fripp Island														
Bull Point														
Port Royal Sound	1		8	6										15
Joiner Bank			2	2	189						7			200
AIW behind Hilton Head			3	1										4
Skull Creek			2											2
Calibogue Sound			16	2										18
Total Per Species	70	9	206	123	935	2	4	18	10008	2522	277	7316	5159	26649

*NC = Not complete or not counted.

**Peak Nesting Single Ground Counts

Table IV. Colonial Sea and Shorebird Nesting in South Carolina - 1994

AREA	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL NESTS
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	
Waits Island														
Garden City Point	4													4
Murrells Inlet														
Huntington Beach St Park	1													1
Litchfield Beach	5	1												6
North Island	2													2
Winyah Bay														
Bosun's Point														
Sand Island														
South Island														
Cedar Island														
Cape Island		1			25						9			35
Cape Romain harbor														
Lighthouse Island		5			289			8			4			306
Raccoon Key					97			4			31			132
Five Fathom Creek														
White Banks East												151		151
White Banks Middle								265	6	40	452			763
White Banks West											125	12		137
Marsh Island								733	27	10	612	556		1938
New Island														
Bird Island														
Anderson Creek														
Bull Island														
AIW Sewee to Charleston Harbor														
Crab Bank					51							212		263
Castle Pinkney														
Bird Key Stono					112			2873	1556	29	1946	2078		8594
Skimmer Flats														
Captain Sam's Inlet														
Deveaux Bank					194			3149	165	59	846	177		4690
Seabrook Island														
Botany Bay Island														
Eddingsville Beach														
Edisto Beach														
South Edisto River														
St. Helena Sound														
Harbor Island														
Hunting Island														
Fripp Island														

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Colonial Sea and Shorebird Nesting in South Carolina - 1994

AREA	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL NESTS
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	
	Bull Point													
Port Royal Sound														
Joiner Bank					235									235
AIW Behind Hilton Head														
Skull Creek														
Calibogue Sound														
Total Per Species	12	7	*NC	*NC	1003	0	0	12	7020	1754	182	4344	2823	17157

*NC = Not complete or not counted.

**Peak Nesting Single Ground Counts

AREA	Table V. Colonial Sea and Shorebird Nesting in South Carolina - 1995											
	American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL NESTS
	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	
Waties Island												
Garden City Point												
Murrells Inlet		9										9
Huntington Beach State Park												
Litchfield Beach												
North Island		1										1
Winyah Bay												
Bosun's Point												
Sand Island												
South Island												
Cedar Island												
Cape Island		7	221			13			1			242
Cape Romain Harbor		2										2
Lighthouse Island			46	1		14			1			62
Raccoon Key		3	251	1		24			84			363
Five Fathom Creek		1										1
White Banks East		5								590		595
White Banks Middle		2					133		59	848		1042
White Banks West		3					71			152	9	235
Marsh Island		2		1			1707	527		2100	1432	5769
New Island												
Bird Island												
Anderson Creek		1										1
Bull Island												
AIW Sewee to Char. Harbor		14										14
Crab Bank		7	88				129		6	819	877	1926
Castle Pinkney		6										6
Bird Key Stono												
Skimmer Flats			5						3	28	25	61
Kiawah Island			51						4	17		72
Captain Sam's Inlet												
Deveaux Bank		1	36				2787	1075	7	312	857	5075
Seabrook Island												
Botany Bay Island												
Eddingsville Beach												
Edisto Beach												
South Edisto River												
St. Helena Sound												
Harbor Island												
Hunting Island												

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AREA	Colonial Sea and Shorebird Nesting in South Carolina - 1995											
	American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Common Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL NESTS
	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	
Fripp Island												
Bull Point												
Port Royal Sound												
Joiner Bank			298									298
AIW Behind Hilton Head												
Skull Creek												
Calibogue Sound												
Total Per Species	*NC	64	996	3	0	51	4827	1602	165	4866	3200	15774
*NC Not Complete or Not Counted												
**Peak Nesting Single Ground Counts												

AREA	Table VI. Colonial Sea and Shorebird Nesting in South Carolina - 1996												TOTAL NESTS	
	Wilson's Plover		American Oystercatcher		Black Skimmer	Sooty Tern	Forster's Tern	Commo Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull		**Brown Pelican
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest		Nest
Waties Island														
Garden City Point														
Murrells Inlet														
Huntington Bch. St. Pk.														
Litchfield Beach														
North Island														
Winyah Bay														
Bosun's Point														
Sand Island														
South Island														
Cedar Island														
Cape Island														
Cape Romain Harbor														
Lighthouse Island					541			14	861	256	88			1760
Raccoon Key														
Five Fathom Creek														
White Banks East												41		41
White Banks Middle								44			14	65		123
White Banks West												8		8
Marsh Island					1				769	82	9	106	1168	2135
New Island														
Bird Island														
Anderson Creek														
Bull Island														
AIW Sewee to Char.Hrb.														
Crab Bank					8				224		76	573	1222	2103
Castle Pinkney														
Bird Key Stono														
Skimmer Flats													61	61
Captain Sam's Inlet														
Deveaux Bank					148				1220	1197	5	377	610	3557
Seabrook Island														
Botany Bay Island														
Eddingsville Beach														
Edisto Beach														
South Edisto River														
St. Helena Sound														
Harbor Island														
Hunting Island														
Fripp Island														

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Colonial Sea and Shorebird Nesting in South Carolina - 1996

AREA	Wilson's Plover		American Oysterctchr		Black Skimmer	Sooty Tern	Forster's Tern	Commo Tern	Royal Tern	Sandwich Tern	Gull-Billed Tern	Laughing Gull	**Brown Pelican	TOTAL NESTS
	Pair	Nest	Pair	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	Nest	
	Bull Point													
Port Royal Sound														
Joiner Bank														
AIW Behind Hilton Head														
Skull Creek														
Calibogue Sound														
Total Per Species	*NC	*NC	*NC	*NC	698	0	0	14	3118	1535	192	*NC	3061	*NC

*NC = Not complete or not counted.

**Peak Nesting Single Ground Counts

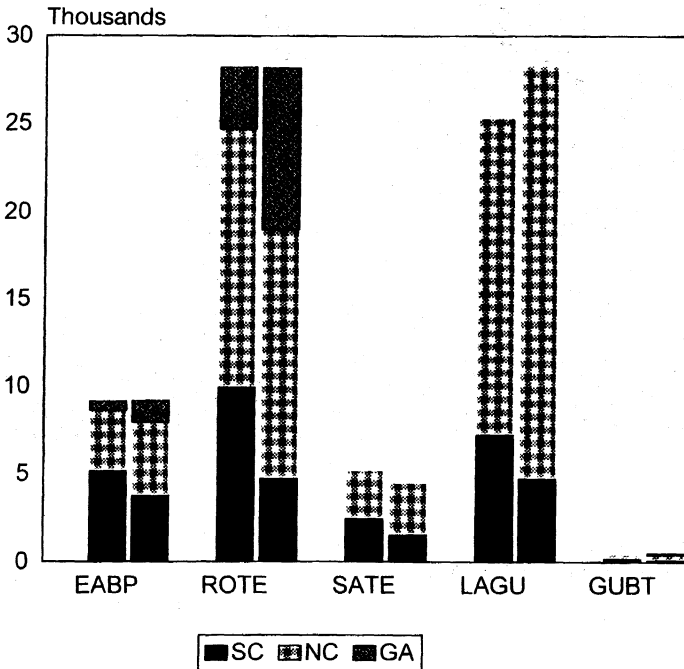


Figure 1. Comparisons of seabird nesting in North Carolina, South Carolina, and Georgia in 1993 (left column) and 1995 (right column)

Stono, 20 km northeast of Deveaux Bank. Bird Key Stono's colony was quickly established as one of the largest Eastern Brown Pelican colonies in the United States, with 2,029-3,979 nesting pairs (Wilkinson *et al.* 1994).

Numbers of pelican nests have generally increased each year from 1970-1989. Nest numbers decreased in 1990 after Hurricane Hugo and then increased somewhat in 1992 and 1993. In 1994, nesting again decreased and remains low (Figure 2). The recent disappearance of Bird Key Stono has been implicated as a cause in this latest decline.

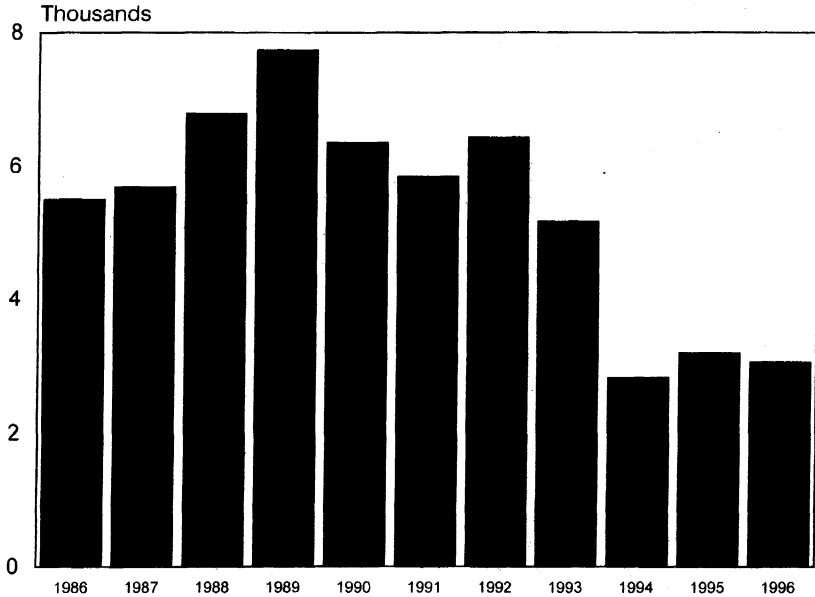


Figure 2. Eastern Brown Pelican nesting trends in South Carolina 1986-96.

1987-1992 Incubation Interval Counts

1986, 1993-1996 Nesting Single Ground Counts

Wilson's Plover

The Wilson's Plover is a fairly common resident along most of the South Carolina coast from March through October, but is uncommon in winter. It is strictly a coastal species and is only a vagrant inland. It is a fairly gregarious bird, often seen in small flocks or with other species of small plovers. It sometimes is a colonial nester, but it maintains individual territories. It may occasionally be found nesting in Least Tern colonies.

Most hatching occurs in late May and June. During recent surveys, Wilson's Plovers were found nesting in all coastal counties except Jasper. Ten traditional sites were Murrells Inlet area, North Inlet area, Sandy Island (Winyah Bay), Cape Island, Lighthouse Island, Raccoon Key, Bull Island, Kiawah Island, Botany Bay Island, and Little Capers Island.

Wilson's Plovers appear to nest in South Carolina in low numbers; but since our technique of locating nests appears to be inefficient and the timing

of nesting asynchronous, perhaps this assessment greatly underestimates nesting.

American Oystercatcher

The American Oystercatcher is a common resident on the South Carolina coast and is locally abundant in winter. The Cape Romain region is one of its most important wintering areas on the eastern North American coast (Marsh and Wilkinson, 1991). The oystercatcher nests from Waites Island to Calibogue Sound on the South Carolina coast, but over 75% of this nesting occurs from Cape Island to Charleston Harbor.

In South Carolina, oystercatchers nest on small islands, coastal beaches, dunes, and wave-formed shell ridges. They usually do not colonize but nest on separate territories. Occasionally a dozen or more pair will nest on a small island near each other.

Regular oystercatcher nesting surveys were initiated in 1986 by the South Carolina Wildlife and Marine Resources Department. Nesting occurred at a fairly large number of sites along the coast, but there are eleven important general locations that have been traditionally used for nesting by oystercatchers: Murrells Inlet, the North Inlet area, Cape Island, Cape Harbor, Raccoon Key, Marsh Island, White Banks, the Intracoastal Waterway between Moore's Landing and Charleston Harbor, Crab Bank, Castle Pinkney, and Deveaux Bank. In the past, Raccoon Key was one of the most important oystercatcher nesting area on the South Carolina coast, with as many as 58 nests located there during a season. Following Hurricane Hugo, the oystercatcher wintering population was the lowest observed during the five years that surveys were conducted, and approximately half the number observed during the previous year (1989). A nesting decline after the hurricane was probably a result of erosion on all nesting areas in the Cape Romain region. Raccoon Key has continued to erode, and nesting remains low (1996).

Laughing Gull

The first record of Laughing Gulls nesting in South Carolina is April 8, 1884, when one nest was recorded in Beaufort County (Sprunt & Chamberlain 1970). Nearly 50 years later (May 1933), a second nest was found on White Banks, Bull's Bay. Laughing Gull nesting has continued in South Carolina since then. By the late 1940s, nesting had increased to around 200 pairs at two locations (Sprunt & Chamberlain 1970). It now is one of the most numerous nesting seabirds on the South Carolina coast (Tables I-V).

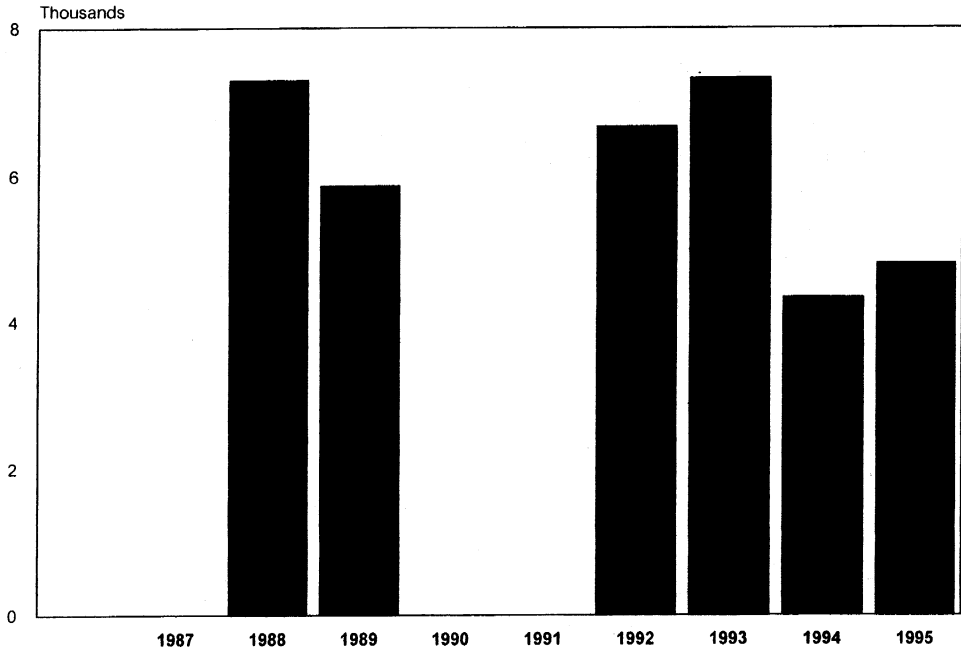


Figure 3. Laughing Gull nesting trends in South Carolina 1988-89, 1992-95.

Their colony sites are traditional as long as they remain suitable. In recent years they have nested at as many as 10 sites. The most important sites were White Banks (where nesting was originally initiated 60 years ago), Marsh Island, Crab Bank, Bird Key Stono, and Deveaux Bank.

Laughing gulls are difficult to survey, requiring intensive effort by experienced crews. Statewide Laughing Gull surveys were initiated in 1988 in South Carolina. Nesting trends are similar to some other seabirds, down from the recent past (Figure 3). This decline is probably attributable to nesting habitat loss when Bird Key Stono washed away.

Gull-billed Tern

The first nest of this tern found in South Carolina were on Cape Island in May 1929 (Sprunt and Chamberlain 1970). It now nests there regularly, but in low numbers.

Gull-billed tern nesting has occurred on 10 sites in South Carolina in the recent past. The most important sites were Raccoon Key, Crab Bank, Bird Key Stono, Deveaux Bank and Joyner Bank. It has shown a rather precipitous decline since 1990 (Figure 4).

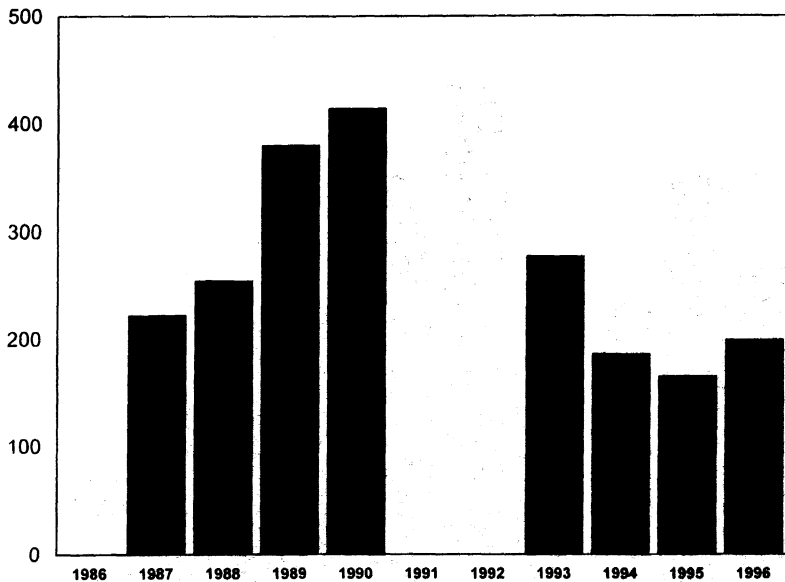


Figure 4. Gull-billed Tern nesting trends in South Carolina 1987-90, 1993-96.

Royal Tern

Royal Terns are usually the state's most abundant breeding marine birds. They nest in close-packed, often large colonies, usually with Sandwich Terns.

Royal Terns have nested at nine locations in South Carolina since 1974: Lighthouse Island, White Banks, Marsh Island, Bird Island in Bull's Bay,

Crab Bank, Bird Key Stono, Deveaux Bank, Egg Bank in St. Helena Sound, and Joyner Bank).

Our census indicates that Royal Tern nesting was highest, during the past eleven years, during 1990. Since that time, their nests have steadily declined in South Carolina. The 1996 census indicated that Royal Tern nesting in South Carolina was the lowest in 21 years (Figure 5).

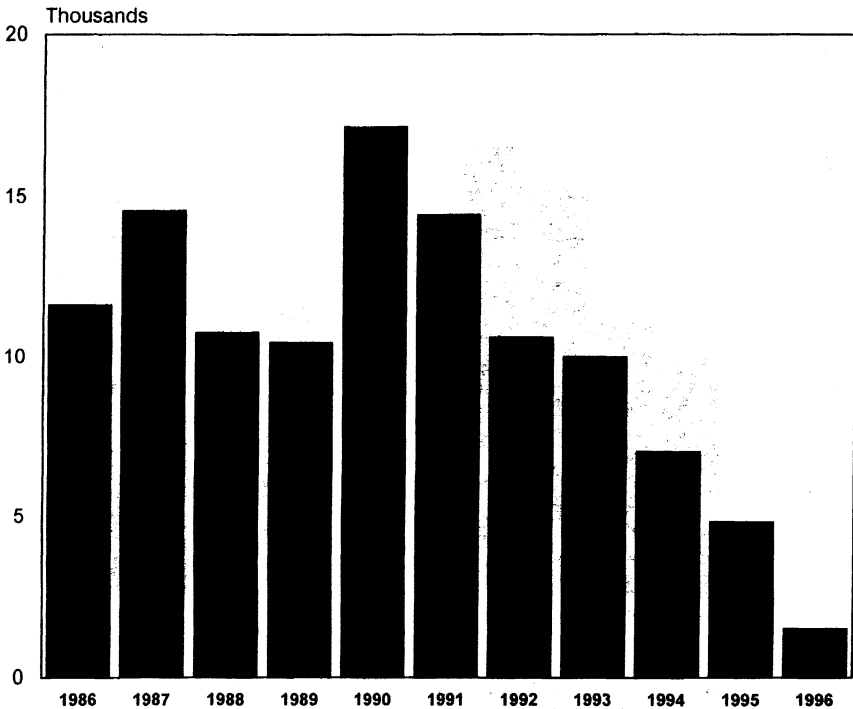


Figure 5. Royal Tern nesting trends in South Carolina 1986-96.

Sandwich Tern

In South Carolina, Sandwich Terns have always been found nesting with Royal Terns.

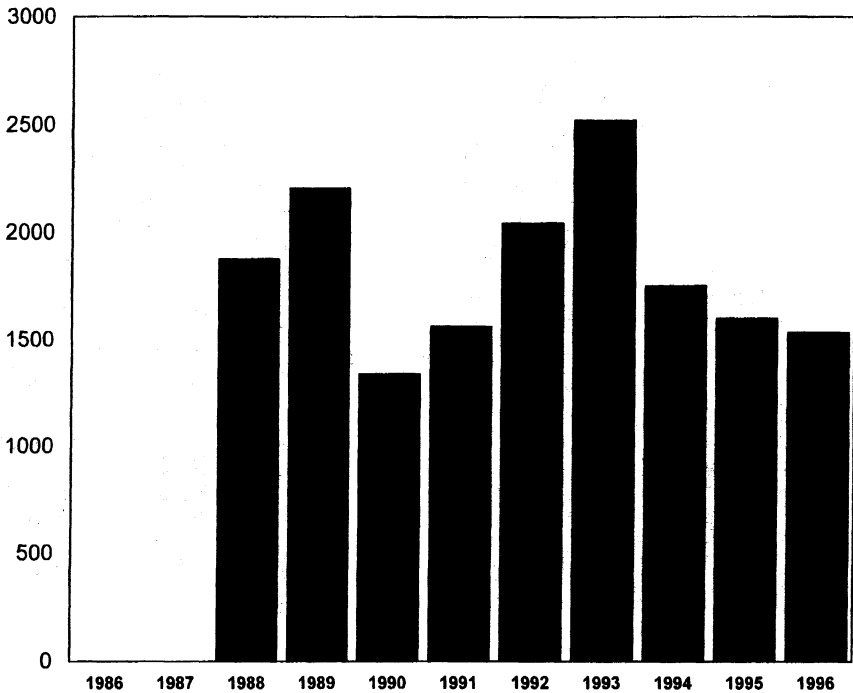


Figure 6. Sandwich Tern nesting trends in South Carolina 1988-96.

Sandwich Terns have nested at six colonies since 1975: Lighthouse Island, Marsh Island, Bird Island in Bull's Bay, Bird Key Stono, Deveaux Bank, and Joyner Bank). Although this species has declined since 1992-93, it remains rather stable over a longer period (Figure 6).

Black Skimmer

In South Carolina, skimmers nest on the ground in colonies, usually associated with Gull-billed Terns. Since the terns initiate nesting first, the skimmers appear to be the ones that choose the association. Their nesting season may be erratic and prolonged due to renesting attempts.

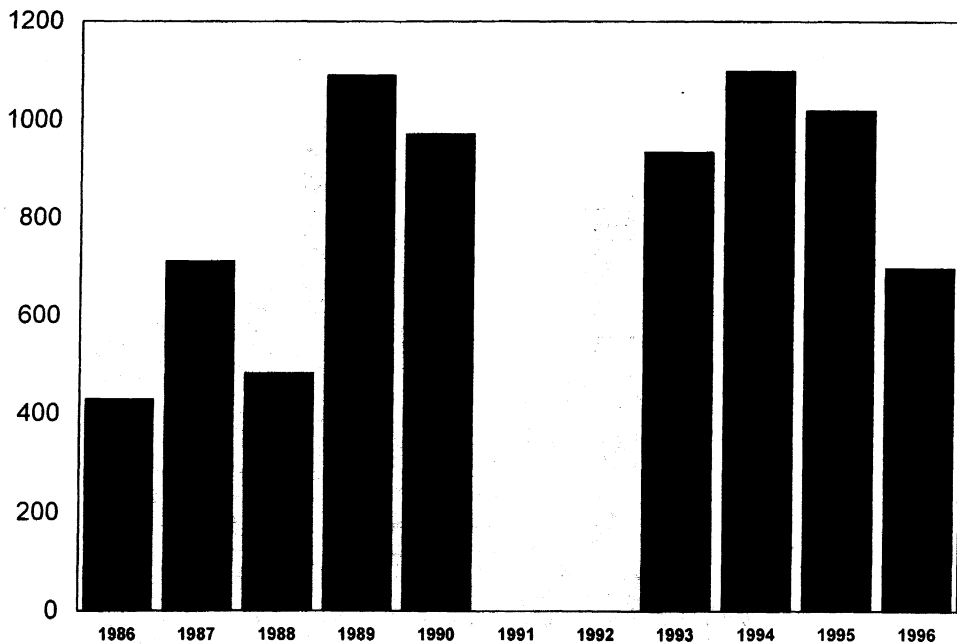


Figure 7. Black Skimmer nesting trends in South Carolina 1986-90, 1993-96.

Common Tern

A few are present in summer and breed here uncommonly. The central coast of South Carolina appears to be the southern limits of their breeding distribution along the Atlantic coast of the United States. In the southeastern states only North Carolina contains a significant number of breeding Common Terns.

The Common Tern was reported nesting for the first time in South Carolina on May 31, 1964, on Deveaux Bank. Subsequently, a total of eight nests were found there that year (Sprunt and Chamberlain 1970). Nesting in recent years has remained low. Their nesting is on open or sparsely vegetated

sand or sand/shell beaches, always in association with some other more abundant nesting species (*i.e.*, Black Skimmer, Gull-billed Tern, Least Tern and Wilson's Plover). Most of their limited nesting in South Carolina occurs in the Bull's Bay region.

Forster's Tern

The first confirmed nesting of this species in South Carolina was in 1987, when 13 nests, located in three separate groups, were found in the Bull's Bay region. It continues to nest there.

In South Carolina, Forster's Terns nest primarily in saltwater marshes. Nests are built on rafts of dead *spartina alterniflora* accumulated by wind or wave action. Nesting has also been found on a grassy beach island.

All nesting in South Carolina has been in the Bull's Bay region.

Other Sea and Shorebirds that Nest in South Carolina

Eight species of sea and shorebirds are recorded as having nested in South Carolina, seven of which were not specifically targeted for census during our surveys. These species are the Piping Plover (*Charadrius melodus*), Killdeer (*C. vociferus*), Black-necked Stilt (*Himantopus mexicanus*), Willet (*Cototrophorus semipalmetus*), Spotted Sandpiper (*Actitis macularia*), Caspian Tern (*Sterna caspia*), and Sooty Tern (*S. fuscata*). Four of these -- the Piping Plover, Spotted Sandpiper, Caspian Tern and Sooty Tern -- breed here very rarely and would be of interest mainly as a matter of record. The Killdeer nests mostly in open farmland and fields away from the coast, which is beyond the scope of these surveys. The Willet is a common resident on the coast and usually nests on beaches or near coastal marshes. Their cryptic nest is a grass lined depression on the ground located in low clumps of grass, bushes, or sometimes in stands of waist high grass. The nest is not easily located unless the female flushes. They usually nest singularly, but sometimes in well concealed loose colonies. There have been no standardized nesting surveys of Willets for South Carolina.

The Black-necked Stilt was once considered a rare summer resident in South Carolina. In the 1930s and 1940s, though still rather scarce, it was increasingly seen in the Cape Romain and Santee Delta region. The first breeding record for South Carolina was established in July 1938 in Charleston County (Sprunt & Chamberlain 1970). A second record was from South Island, Georgetown County, in 1947. In the 1950s, it became a fairly common summer resident in South Carolina and since that time has been found to nest in increasing numbers in several locations within the state.

There have been no standardized survey and census of nesting Black-necked Stilts in South Carolina. They mostly nest in impounded marsh areas and spoil sites, which are usually apart from areas where the coastal sea and shorebird surveys are conducted.

We found it difficult to survey and monitor Least Terns (*Sterna antillarum*) over large areas due to their use of both ground and roof nesting sites. Specific efforts to address these difficulties were undertaken, and a separate report is in preparation detailing their recent population trends.

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