

Birds and Mammals of the Cape Hatteras National Seashore

CIRCULATING COPY Thirty-five Years of Change
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By James F. Parnell, Wm. David Webster and Thomas L. Quay

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Introduction

The Cape Hatteras National Seashore was established in 1952. As part of an effort to catalog the animal life of the park, T. L. Quay from North Carolina State University was contracted in 1956 to inventory the terrestrial vertebrates there and to determine their relative numbers and habitats.

Dr. Quay and many students worked at Cape Hatteras from Nov. 8, 1956 to May 10, 1959. Quay visited the area at all seasons over this three-year period. The final report from his work was submitted in August of 1959 and is the basis for our comparisons.

Thirty-five years have passed since Quay submitted his project report. During that time many changes have occurred. It has been a period relatively free of major hurricanes; none have struck the National Seashore directly, although there have been near misses. Northeasterly storms are more prevalent, however, and beach erosion has been severe, especially at the north ends of Hatteras and Ocracoke islands.

In 35 years, normal plant community succession has continued to repair damage from the severe storm period of the 1950s. There have been significant changes in the structure and extent of several plant communities. Some have changed from extensive areas of bare sand or herbaceous vegetation in the 1950s to a greater extent of shrub and woody-thicket dominated communities.

Increased visitor populations have caused great changes in human use of the Cape Hatteras National Seashore. There has been a closely correlated increase in the development of human communities from Corolla to Kitty Hawk to Ocracoke. With this surge of people to the Outer Banks came tremendous increases in the use of off-road-vehicles on beaches.

These changes have resulted in the Cape Hatteras National Seashore being quite different today than it was when Quay began his work in 1956. These changes provide the basis for this project.

Interest in bird watching has increased since the 1950s and the Outer Banks has become a popular destination for bird watchers. This extraordinary increase in effort plus natural publication outlets in *The Chat* and *American Birds* have provided an excellent record of the birdlife of the Cape Hatteras National Seashore.

This work began in the 1930s when the Carolina Bird Club organized field trips to Pea Island National Wildlife Refuge and when personnel from the North Carolina Museum of Natural Sciences began work on the Outer Banks. Quay provided the first extensive organized effort to document the terrestrial vertebrate life there. In the process, he excited a group of students, and several returned to pursue more detailed studies on various aspects of the ecology of the area.

This work, plus that of other researchers, has provided a framework within which to place the colossal but unorganized efforts of a generation of observers

attracted by an abundance and diversity of wildlife at all seasons. We have attempted to tap all of these sources as a part of this work.

Methods of Study

During the course of this investigation (June 1, 1988 to May 31, 1989), 13 trips were made to the Cape Hatteras National Seashore to study the birds and mammals. A typical visit included J. F. Parnell and/or W. D. Webster and several field assistants, including scientists, graduate students and experienced bird watchers. Approximately 130 man-days were spent in the field.

Birds were recorded by direct observation in sample units of the major habitats within the area. We regularly visited sample units on Bodie, Hatteras and Ocracoke islands. Dredged-material islands and natural estuarine islands in the sound and inlets were not included, because the Cape Hatteras National Seashore does not have ownership or jurisdiction of these sites—owning only from the ocean beach to the sound. Visits were scheduled during all seasons to allow observation of the changing birdlife throughout the year. Data recorded were presence by habitat with a qualitative record of abundance.

Requests were also sent to students, scientists and serious bird watchers, asking that they complete a worksheet indicating what bird species they had recorded and in what habitats. Appendix A provides a bird species list based on the present work (the 1988-89 field seasons) and on input from others for several years.

Paul Sykes made extensive use of mist nets in 1965 to census the fall migration of land birds on Bodie and Pea islands, through the shrub-thicket zone (Sykes, 1967, 1986). Quay (1959) made no Sept., Oct., or early Nov. field trips and did not use mist nets. Sykes netted 42 species of small land birds not recorded by Quay (1959) and 10 more species that Quay had recorded as casual or rare.

Several techniques were used to census the mammals of the area. Small mammals were trapped with Museum Special snap traps, Sherman live traps and pitfall traps (number 10 cans buried with their lips flush with the ground). Bats were identified as they flew over permanent sources of water. The presence of larger mammals was verified by tracks, scats or direct observations.

Voucher specimens are available for most mammal species: these are deposited in the vertebrate collections at the University of North Carolina at Wilmington, United States National Museum in Washington, D.C., Museum of Zoology at the University of Michigan in Ann Arbor, the Academy of Natural Sciences in Philadelphia and the North Carolina Museum of Natural Sciences in Raleigh. Other records of mammals from the Cape Hatteras National Seashore were taken from the literature.

Thorough searches of the literature on birds and mammals of the Outer Banks

were conducted, and an extensive list of references is included as a part of this report. All individual published reports used in compiling this report are in the list of references. There are many individual reports in "Briefs for the Files" in *The Chat* and in the "Southeastern Atlantic Regional Report" in *American Birds*. While these were important in helping to determine the present status of many species, they were not cited individually except where they provided a reference for the only report of a species within the area.

Changes in the relative percentage of habitats was documented by comparing two sets of aerial photographs (1955 and 1984) of four selected areas and by reference to annual reports for the years 1975, 1976, 1977, 1978, 1979 and 1980 that were submitted by Quay to the North Carolina Agricultural Experiment Station.

Aerial photographic evaluation included the Bodie Island region, the area immediately south of Salvo, the Cape Point-Frisco-Hatteras region and Ocracoke Island. Habitats were categorized as bare beach, herbaceous plant-dominated communities and arborescent plant communities. The percentage of each type in each region for each of the test years was determined using a computer program that calculated the total area within designated boundaries. Changes in the relative amount of each habitat during the 30-year interval between photographs was correlated to changes in bird and mammal faunas.

Parnell, Webster and Quay visited the Cape Hatteras National Seashore together early in this project and discussed, in considerable detail, changes in community type and extent since Quay's earlier work. These discussions, Quay's annual reports for 1975-80, and the personal experience of Parnell, who was a student working with Quay during his original studies, provided continuous qualitative perspective to the quantitative data derived from the computer analysis.

Guide to Annotated Lists

A primary goal of this study was to compare the abundance and status of the birds and mammals that occupy the Cape Hatteras National Seashore today with that found by Quay in the late 1950s. To make these comparisons, we have begun the notation for each species with the original statement from Quay's 1959 report. We have then followed with our evaluation of the current situation relative to that species (in bold print to separate it from Quay's earlier evaluation).

An asterisk (*) after a species name indicates that the species was recorded during the present study. In his 1959 report, Quay used the following designations for status and abundance and we have generally maintained this use.

Resident: present throughout the year

Summer Resident: present all summer and usually breeding

Summer Visitant: present only part of the summer and usually not breeding.

Winter Resident: present all winter

Winter Visitant: present only part of the winter

Transient: migrating through in spring, fall or both

Abundant: of regular occurrence in very large numbers

Common: of regular occurrence in large numbers

Fairly common: of regular occurrence in moderate or fair numbers

Uncommon: of regular occurrence in rather small numbers, within the normal range

Rare: of regular to somewhat irregular occurrence in very small numbers, within the normal range

Casual: slightly beyond usual range, of only occasional occurrence and usually in small numbers

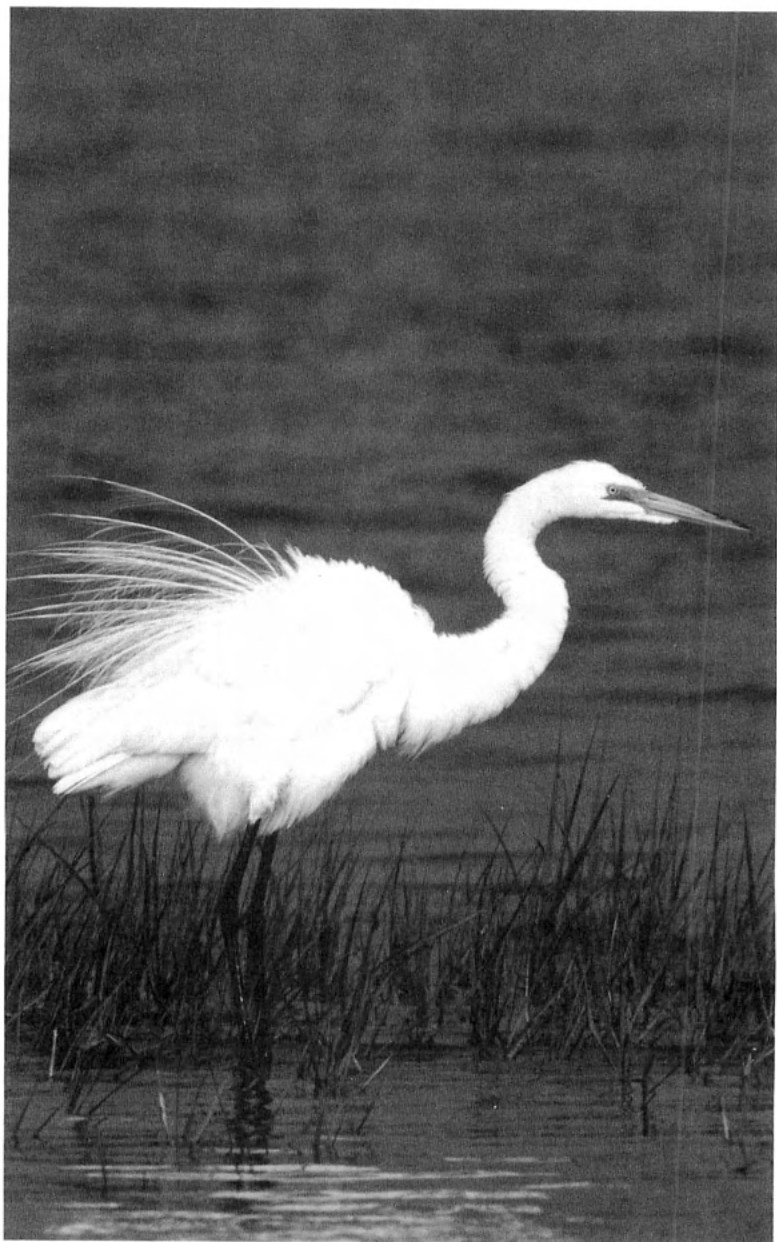
Accidental: well beyond the usual range, in very small numbers, and widely spaced in time

These terms necessarily imply somewhat different numbers in different species, and are used with due consideration of habits and conspicuousness.

It is also important to remember that the time frame for the current study was quite short (one year). Thus, apparent changes, especially for migratory birds, may reflect this short time period. We have attempted to strengthen the comparison by utilizing personal observations from other recent years and by soliciting opinions of the comparisons from active Outer Banks birdwatchers. John Fussell were particularly helpful in reading the annotated list and adding their considerable knowledge of the current birdlife of the Outer Banks to this effort.

Bird names follow the American Ornithologists' Union's Check-list of North

American Birds 6th edition, 1983 and subsequent supplements, while mammal names follow Jones et al (1986). When there has been a name change since Quay's report, we have placed the old common name in parenthesis following the current name.



Great Egret



The Birds

In 1959, Tom Quay listed 243 species of birds from the Cape Hatteras National Seashore. Since that time, more than 100 additional species have been recorded from the National Seashore or from the nearby inshore waters of the Atlantic Ocean.

Dave Lee of the North Carolina Museum of Natural Sciences has documented the presence of several species in offshore waters off Hatteras that have not been found inshore. We have not included those species but have listed Lee's primary publications dealing with both offshore and inshore seabirds in the bibliography. We also have not included Roanoke Island in this portion of the study.

Current status is based on a review of the literature on birds of the Outer Banks, especially material in *The Chat* and the "South Atlantic Region Report" in *American Birds*; personal observations of the authors and their assistants; and written and oral material provided by those who submitted their personal records for use in this project. The appearance of a species in this list does not mean that it has been accepted formally onto the North Carolina Bird List as maintained by the Museum of Natural Sciences.

PACIFIC LOON (*Gavia pacifica*). Not recorded by Quay. **There is a single record of a bird observed off Hatteras Point on May 15, 1987 (Tove 1988).**

COMMON LOON (*Gavia immer*)*. Fairly common winter resident; usually inshore ocean, inlets and sound. **Uncommon during winter of 1988-1989. This species has been suffering a decline due apparently to accumulations of heavy metals (McIntyre 1989).**

RED-THROATED LOON (*Gavia stellata*)*. Fairly common winter resident; inlets, and sound. **Uncommon during most recent winters.**

RED-NECKED GREBE (*Podiceps grisegena*). Rare winter visitant; open salt and freshwater areas. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

HORNED GREBE (*Podiceps auritus*)*. Uncommon winter resident; inshore ocean, surf, inlets, sound, tidal sloughs, open fresh ponds. **Numbers of this species have declined somewhat during the 1980s, although it may still be present in good numbers in February or March during some years.**

EARED GREBE (*Podiceps nigricollis*). Not recorded by Quay. **Now a rare winter visitant, the first record was of a bird at Pea Island in December 1967 (Browne and Warren 1968).**

WESTERN GREBE (*Aechmophorus occidentalis*). Accidental visitant. One adult seen on the North Pond at Pea Island on March 30, 1959. **Remains accidental with an additional record or two since the 1950s.**

PIED-BILLED GREBE (*Podilymbus podiceps*)*. Fairly common winter resident and uncommon summer resident: freshwater ponds and marshes. **This species remains uncommon in summer. Boone (1988a) did not find it nesting at Bodie Island. The winter status is unchanged.**

NORTHERN FULMAR (*Fulmarus glacialis*). Not recorded by Quay. **Lee and Rowlett (1979) report on an injured bird found at Pea Island in 1973 and a bird was seen at Buxton on November 4, 1985 (*The Chat* 50:4). There have been several recent records of beached birds.**

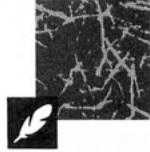
CORY'S SHEARWATER (*Calonectris diomedea*)*. Fairly common summer and fall visitant: offshore ocean. **This species may be abundant at times in inshore ocean waters.**

GREATER SHEARWATER (*Puffinus gravis*). Uncommon summer visitant; offshore ocean. **Considered by Lee and Booth (1979) to be a common summer visitant offshore, this species is often seen from the beach and there are many records of dead birds washing up on the beach after die-offs at sea.**

SOOTY SHEARWATER (*Puffinus griseus*). Uncommon summer visitant; offshore ocean. Casual; inshore ocean, surf, inlets. **Lee and Booth (1979) consider this species a common spring transient offshore. It is occasionally observed from the beach.**

MANX SHEARWATER (*Puffinus puffinus*). Not recorded by Quay. **Buckley (1973) reported seeing two individuals from the Hatteras beach in May of 1970. An oil soaked individual was found in early spring of 1978 (Lee and Rowlett 1979). A single bird was seen from shore at Bodie Island in February 1988 (LeGrand 1990a).**

AUDUBON'S SHEARWATER (*Puffinus lherminieri*). Uncommon (at times and places possibly fairly common) summer visitant; offshore ocean. Rare to casual; inshore ocean, inlets, surf, ocean beaches. **Lee and Booth (1979) considered this species to be common to abundant offshore during spring and fall with**



fewer birds present during summer months. The species is occasionally seen from shore.

WHITE-FACED STORM-PETREL (*Pelagodroma marina*). Not recorded by Quay. Two birds seen at Oregon Inlet in October of 1971 by R. Ake and D. Johnson are the only inshore records (Teulings 1972). There have been several additional records offshore (Watson et al 1986).

LEACH'S STORM-PETREL (*Oceanodroma leucorhoa*). Ranges widely over the ocean far offshore from North Carolina during the summer, but particular records either offshore or inshore are lacking. Lee and Booth (1979) report the species offshore during the warmer months. Inshore observations are very infrequent.

WILSON'S STORM-PETREL (*Oceanites oceanicus*). Fairly common summer visitant; offshore ocean. Rare; inshore ocean, inlets, and just beyond outer surf. This species has been reported more often inshore in recent years, likely the result of an increased level of effort.

TROPICBIRDS (*Phaethon*). Not recorded by Quay. Both White-tailed (*P. lepturus*) and Red-billed (*P. aethereus*) tropicbirds are known from the Atlantic Ocean offshore of the Cape Hatteras National Seashore. The single record from the area was of a bird found dead on the beach at Pea Island in 1939 and identified as a White-tailed Tropicbird (Pearson et al 1942). Lee and Irvin (1983) have raised doubts about its identity and the specimen has been lost.

AMERICAN WHITE PELICAN (WHITE PELICAN) (*Pelecanus erythrorhynchos*)*. Accidental visitant; ocean beaches and surf, sound, open freshwater ponds. Now uncommon, occasional birds have been present in Pamlico Sound, from Ocracoke to Oregon Inlet, since the early 1980s.



*Brown Pelican
in flight
(see next page).*

BROWN PELICAN (*Pelecanus occidentalis*)*. Fairly common resident. Ocracoke Island section only; uncommon visitant north of Cape Hatteras; surf, inlets, sound. **This species has become much more abundant in the region since the early 1980s. The species now nests at Oregon Inlet (over 1000 nests in 1988) and is common to abundant in winter (Sykes 1991) as well as in summer. Habitat utilization has not changed.**

MASKED BOOBY (*Sula dactylatra*). Not recorded by Quay. **This species is known to occasionally occur during summer in the waters offshore of Cape Hatteras (Lee and Haney 1984).**

BROWN BOOBY (*Sula leucogaster*). Not recorded by Quay. **This species has been reported once from Ocracoke (American Birds 37:858). See Lee and Haney (1984) for a discussion of this species off Cape Hatteras.**

NORTHERN GANNET (GANNET) (*Sula bassanus*)*. Abundant winter resident; offshore ocean, inshore ocean, inlets, surf. **The status or use of habitats does not appear to have changed for this species since the 1950s.**

GREAT CORMORANT (*Phalacrocorax carbo*)*. Not recorded by Quay. **This species is now a regular but uncommon winter visitor along the Outer Banks (Sykes 1991). It is most frequently seen around inlets or in inshore waters.**

DOUBLE-CRESTED CORMORANT (*Phalacrocorax auritus*)*. Abundant transient; uncommon winter resident north of Cape Hatteras; abundant winter resident from Hatteras Inlet to Ocracoke Inlet, where flocks of 2,000 to 10,000 may be seen at one time; inshore ocean, inlets surf, sound. **This species has increased in abundance since the 1950s (Sykes 1991). More than 50,000 were estimated in the vicinity of Hatteras Inlet on December 30, 1988, and large flocks are often seen in winter from Ocracoke to Oregon Inlet. Habitat utilization does not appear to have changed.**

MAGNIFICENT FRIGATEBIRD (*Fregata magnificens*). Casual summer visitant, accidental winter visitant; ocean, inlets, sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

GREAT BLUE HERON (*Ardea herodias*)*. Uncommon transient and winter resident, rare summer visitant; fresh and saltwater marshes and ponds, wet meadows, tidal flats. **This species is now fairly common in winter and is an occasional summer visitor. It does not nest in the mixed species heronries within the**

Cape Hatteras National Seashore. Habitat usage has not changed.

GREEN-BACKED HERON (GREEN HERON) (*Butorides virescens*)*. Fairly common summer resident. Nests singly or in small groups in shrub thickets and thicket woodlands; feeds in salt and fresh ponds and marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

LITTLE BLUE HERON (*Egretta caerulea*)*. Uncommon summer resident, Pea Island only; rare to casual winter visitant; shallow ponds and marshes. **This species now nests in the heronries in Oregon Inlet and at Ocracoke and is frequently seen during the summer. It is uncommon in winter.**




Little Blue Heron

CATTLE EGRET (*Bubulcus ibis*)*. Casual and new transient and summer visitant; shallow ponds and marshes, meadows, roadsides. **This species is now a common breeder in most coastal heronries. It is found regularly along roadsides, in parking lots, and campgrounds in summer.**

REDDISH EGRET (*Egretta rufescens*). Not recorded by Quay. **This species is a casual visitant to the region. The first record was in September 1971 (Parnell 1972).**

GREAT EGRET (COMMON OR AMERICAN EGRET) (*Casmerodius albus*)*. Fairly common summer resident, Pea and Bodie islands only; uncommon winter resident; shallow ponds and marshes, tidal flats. **This species now nests in colonies at Oregon Inlet and Ocracoke. It is seen throughout the Park at all seasons, becoming uncommon in winter.**

SNOWY EGRET (*Egretta thula*)*. Fairly common summer resident, rare to casual winter visitant; shallow ponds and marshes. **This species now nests in colonies**



at Oregon Inlet and Ocracoke. It is seen throughout the Park at all seasons, becoming less common in winter.

TRICOLORED HERON (LOUISIANA HERON) (*Egretta tricolor*)*. Fairly common summer resident, rare winter resident; shallow ponds and marshes. **This species now nests in colonies at Oregon Inlet and Ocracoke. It is seen throughout the park at all seasons, becoming less common in winter.**

BLACK-CROWNED NIGHT-HERON (*Nycticorax nycticorax*)*. Fairly common summer resident, uncommon winter resident. Nests in small colonies in shrub thickets and thicket woodlands, including in the Pea Island heron rookery; feeds at night in the open ponds and marshes on the tidal flats. **Now fairly common at all seasons, but the Pea Island colony site has been abandoned.**

YELLOW-CROWNED NIGHT-HERON (*Nyctanassa violaceus*)*. A primarily freshwater species, of uncertain status and few dependable records in the park; none recorded 1956-59. Status pending further information; rare summer and winter visitant; shrub thickets, fresh-water ponds and marshes. **This species nested in small numbers at Pea Island in recent years. It now nests in Oregon Inlet and Ocracoke colonies and as scattered pairs elsewhere. It is uncommon spring through fall in most of the National Seashore becoming fairly common at Ocracoke in summer.**

LEAST BITTERN (*Ixobrychus exilis*)*. Fairly common summer resident; fresh and salt marshes; a small and secretive heron difficult to flush from its dense wet environment. **This species is seldom seen within the area and appears less abundant than during the 1950s. It probably should now be considered uncommon to rare.**

AMERICAN BITTERN (*Botaurus lentiginosus*)*. Uncommon resident; fresh and brackish marshes, edges of ponds, wet herb-shrub habitats. **This species appears to be less common in recent years. There is no recent evidence of breeding.**

WOOD STORK (*Mycteria americana*). Not recorded by Quay. **One recorded in a roadside pond on Bodie Island in July and August 1987 (Boone 1988a). One was also seen on the Hatteras Christmas Count in 1987.**

GLOSSY IBIS (*Plegadis falcinellus*)*. Rare and new summer resident, Pea and Bodie islands only; casual transient elsewhere; fresh and brackish marshes, shallow and marshy edges of fresh ponds. **This species has increased in abundance in the region and now nests in colonies at Oregon Inlet and Ocracoke. It is a fairly common summer resident with small numbers often remaining into**



winter (Sykes 1991).

WHITE IBIS (*Eudocimus albus*)*. Not recorded by Quay. This species has moved north into Pamlico Sound in recent years, now nesting in Oregon Inlet and at Ocracoke. It is an uncommon to fairly common permanent resident in the park, primarily in shallow fresh and brackish wetlands.




White Ibis

ROSEATE SPOONBILL (*Ajaia ajaja*). Not recorded by Quay. There is a record of this species from Bodie Island Pond during the summer of 1965 (Thornton 1965, Sykes 1966b). It should be considered an accidental visitant.

AMERICAN FLAMINGO (*Phoenicopterus ruber*). Accidental summer visitant. There have been several flamingo records on the Outer Banks or in Pamlico Sound since the 1950s (Ames 1965). There has, however, been a recent reevaluation of North Carolina flamingo records and most were apparently Chilean Flamingos (*Phoenicopterus chilensis*) (Lee 1987) so the specific identities of earlier flamingos is open to question. Flamingos should be considered accidental.

TUNDRA SWAN (WHISTLING SWAN) (*Cygnus columbianus*)*. Fairly common winter resident, Pea and Bodie islands; rare elsewhere; large, open and shallow fresh-water ponds, and the shallower inshore reaches of Pamlico Sound. This species is increasing in abundance in coastal North Carolina, and it is now a common winter resident on the impoundments at Pea Island and the ponds and borrow pits on Bodie Island and can usually be found in the open ponds at Buxton.

MUTE SWAN (*Cygnus olor*). Not reported by Quay. This species has become established in eastern Virginia, and observations of free flying birds are



increasing in North Carolina. Two birds were reported in Pamlico Sound just west of Avon in August 1981 (LeGrand 1982).

CANADA GOOSE (*Branta canadensis*)*. Winter resident; abundant at Pea Island and vicinity, fairly common on Bodie Island and at times and places in the sound, usually uncommon to rare elsewhere; open freshwater ponds and marshes, herbaceous salt and brackish marshes, shallow inshore sound waters, rye grass pastures, herbaceous beaches and dunes. **Numbers of Canada geese have declined drastically along the Outer Banks since the 1950s.**

BRANT (*Branta bernicla*)*. Winter resident; fairly common to uncommon in Ocracoke Island section, rare elsewhere; open and shallow inshore waters of sound and inlets. Formerly the most abundant goose on the Atlantic Seaboard, extending throughout Pamlico Sound in tens of thousands, until the eelgrass blight of the 1930s. **Abundance of this species varies greatly from year to year. It is generally uncommon within the park.**

BARNACLE GOOSE (*Branta leucopsis*). Accidental winter visitant, from Europe; open salt waters. **The status of this species does not appear to have changed since the 1950s. National Seashore records have come from the Pea Island area (Burford 1971a) and very likely represent escapes.**

GREATER WHITE-FRONTED GOOSE (WHITE-FRONTED GOOSE) (*Anser albifrons*). Casual winter visitant; fresh and brackish marshes. **The occurrence of this species seems more frequent in recent years with occasional birds at Pea Island.**

SNOW GOOSE (GREATER SNOW GOOSE AND BLUE GOOSE) (*Chen caerulescens*)*. Abundant winter resident, Pea and Bodie islands; rare elsewhere; feeds in the open but vegetated areas of salt and brackish marshes and tidal flats, primarily on saltwater cordgrass (*Spartina alterniflora*) and three-square (*Scirpus americanus*); rests on the Pea Island freshwater ponds, tidal flats and shallow or exposed shores of the sound. **The wintering population of Snow geese declined dramatically during the mid-1980s with only a few hundred birds present. The heavy use of Bodie Island marshes has almost ceased. There has, however, been an increase in the proportion of blue-phase birds in recent years.**

BAR-HEADED GOOSE (*Anser indicus*). Not recorded by Quay. **Two records from the National Seashore, one by Clay Gifford in the 1970s at Cape Point and one at Bodie Island in 1977 (Boone 1988a). Both were likely escapes.**



ROSS' GOOSE (*Chen rossii*). Not recorded by Quay. **First recorded in 1969 (Buckley 1969), individuals have been recorded during several winters in the last decade. It is a rare winter visitant.**

MALLARD (*Anas platyrhynchos*)*. Uncommon winter resident; fresh and brackish ponds and marshes, inshore sound. **Feral mallards now nest regularly in and around the villages and in Buxton Woods, and the species is an uncommon summer resident and fairly common winter resident of the National Seashore.**

AMERICAN BLACK DUCK (*Anas rubripes*)*. Common winter and uncommon summer resident; fresh, brackish, and salt marshes and ponds of all types, shallow inshore sound. **Numbers of this species appear to be declining in the park as elsewhere. The species still nests within the National Seashore.**


GADWALL (*Anas strepera*)*. Fairly common winter resident, uncommon summer resident; fresh and brackish ponds and marshes, inshore sound. **This species appears to be more common than in earlier years. It is a regular nesting species in the vicinity of Pea and Bodie islands and nests as far south as Ocracoke.**

NORTHERN PINTAIL (PINTAIL) (*Anas acuta*)*. Common winter resident; fresh and brackish ponds and marshes, inshore sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**



Brant (see page 14)

GREEN-WINGED TEAL (*Anas crecca carolinensis*)*. Fairly common winter resident; fresh and brackish ponds and marshes, inshore sound. **The Green-winged Teal appears more abundant during recent winters on the Pea Island impoundments.**



COMMON TEAL (*Anas c. crecca*)*. Accidental winter visitant, from Europe: fresh ponds. **Observations of the Eurasian race of the Common Teal have increased in recent years. It is now expected in winter in small numbers among the flocks of Green-winged Teal at Pea Island.**

BLUE-WINGED TEAL (*Anas discors*)*. Fairly common transient, being the first duck to arrive in the fall and the last to pass through in the spring; rare winter and summer resident: fresh and brackish ponds and marshes. **This species has been recorded nesting in small numbers at Pea and Bodie islands since the mid-1960s (Parnell and Quay 1962a).**

GARGANEY (*Anas querquedula*). Not reported by Quay. **A single bird was reported from Hatteras in March 1957 (Chamberlain 1957a 1957b, Gibson et al. 1957).**

EURASIAN WIGEON (EUROPEAN WIDGEON) (*Anas penelope*)*. Accidental winter visitant: fresh and brackish ponds and marshes. **This species is now recorded in small numbers most winters at Pea Island. It probably should be considered a rare winter visitant.**

AMERICAN WIGEON (*Anas americana*)*. Common winter resident: fresh and brackish ponds and marshes, inshore sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

NORTHERN SHOVELER (SHOVELER) (*Anas chyeata*)*. Fairly common transient, uncommon winter resident: fresh and brackish ponds and marshes, inshore sound. **This species appears to be more common during winter than in the 1950s.**

WOOD DUCK (*Aix sponsa*)*. Rare transient and summer resident: fresh ponds. **This species may be somewhat more common than in the 1950s. It probably should be considered an uncommon summer resident in Buxton Woods.**

FULVOUS WHISTLING-DUCK (*Dendrocygna bicolor*). Not recorded by Quay. **Now a casual visitant to the National Seashore, primarily during fall and winter.**

REDHEAD (*Aythya americana*)*. Fairly common winter resident: primarily offshore sound, occasionally coming inshore and to open ponds and sloughs in stormy weather. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**



RING-NECKED DUCK (*Aythya collaris*)*. Fairly common winter resident: open fresh ponds, inshore and offshore sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

CANVASBACK (*Aythya valisineria*)*. Uncommon winter resident, becoming fairly common at times when prolonged cold weather brings larger numbers from farther north; primarily offshore sound, being rare on the ponds and marshes of the islands. Both the redheads and the canvasback were considerably more abundant in former years. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

GREATER SCAUP (*Aythya marila*)*. Fairly common winter resident: open fresh and brackish ponds and deeper marshes, inshore and offshore sound. **This species appears less abundant since the 1950s. It probably should now be considered uncommon.**

LESSER SCAUP (*Aythya affinis*)*. Fairly common winter resident: open fresh and brackish ponds and deeper marshes, inshore and offshore sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**


COMMON GOLDENEYE (*Bucephala clangula*)*. Uncommon to rare winter resident: primarily in the open sound but occasionally in very small numbers close inshore and on the freshwater ponds. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BUFFLEHEAD (*Bucephala albeola*)*. Fairly common winter resident: primarily offshore and inshore sound, tidal sloughs, and inlets, but also on open fresh and brackish ponds in small numbers. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

OLDSQUAW (*Clangula hyemalis*)*. Uncommon winter resident: open sound, ocean inlets. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

HARLEQUIN DUCK (*Histrionicus histrionicus*)*. Not recorded by Quay. **There are several recent winter records from the National Seashore. It should be considered a rare winter visitor.**

COMMON EIDER (*Somateria mollissima*)*. Casual winter visitant; ocean and sound. **This species is recorded during most winters, usually in the vicinity of Oregon Inlet. It should be considered a rare winter visitor.**



KING EIDER (*Somateria spectabilis*)*. Casual winter visitant; ocean and sound. **This species has been recorded several times since the 1950s, most often at Oregon Inlet. It should be considered a rare winter visitor.**

WHITE-WINGED SCOTER (*Melanitta fusca*). Fairly common winter resident; offshore and inshore ocean, surf, open sound, inlets. **Less common in recent years, now an uncommon winter resident.**

SURF SCOTER (*Melanitta perspicillata*)*. Common winter resident; offshore and inshore ocean, surf, open sound, inlets. **Scoters still migrate past the park in large numbers, but it appears that the wintering population has been somewhat reduced.**

BLACK SCOTER (COMMON OR AMERICAN SCOTER) (*Melanitta nigra*)*. Fairly common to uncommon winter resident; offshore and inshore ocean, surf, open sound, inlets. **Scoters still migrate past the area in large numbers, but it appears that the wintering population has been somewhat reduced.**

RUDDY DUCK (*Oxyura jamaicensis*)*. Fairly common winter resident; fresh and brackish ponds and marshes, inshore sound. **The occurrence of this species varies considerably from winter to winter ranging from fairly common to uncommon.**

HOODED MERGANSER (*Lophodytes cucullatus*)*. Rare winter visitant; fresh and brackish ponds and marshes, inshore sound. **This species appears to be more common now than in the 1950s. It is a regular but uncommon winter visitor.**

COMMON MERGANSER (*Mergus merganser*). Rare winter visitant; fresh and brackish ponds and marshes; inshore sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

RED-BREASTED MERGANSER (*Mergus serrator*)*. Abundant winter resident; inshore ocean, surf, inlets, sound; occasionally on the ponds and marshes in small numbers. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

TURKEY VULTURE (*Cathartes aura*). Rare resident (possibly only visitant), no evidence of nesting; beaches and woodlands. **There are no recent breeding records, and it is likely that this species is now only a rare vagrant during fall migration.**



BLACK VULTURE (*Coragyps atratus*). Rare visitant; open woodlands, herbaceous beaches and dunes. **This species is very rarely seen and should be considered a casual visitant.**

AMERICAN SWALLOW-TAILED KITE (*Elanoides forficatus*)*. Not recorded by Quay. **This species has been recorded during spring in most recent years. No evidence of nesting has been found. It should be considered a rare spring transient.**

MISSISSIPPI KITE (*Ictinia mississippiensis*). Not recorded by Quay. **This species is now a casual vagrant in spring and fall along the Outer Banks.**

SHARP-SHINNED HAWK (*Accipiter striatus*)*. Fairly common transient, uncommon winter resident; woods, woods edges, thicket woodlands, shrub and herb-shrub thickets. **This species is now common to abundant in fall. As many as 100 birds per hour were recorded passing the Billy Mitchell Airport during the fall of 1988.**

COOPER'S HAWK (*Accipiter cooperii*)*. Fairly common transient, uncommon resident; woods, woods edges, thicket woodlands, shrub and herb thickets. **This species appears to be a much less common transient than in the 1950s. There are no recent summer records.**

RED-TAILED HAWK (*Buteo jamaicensis*)*. Casual winter visitant; herbaceous beaches and dunes, herb-shrub habitats. **Now a rare winter visitant.**

RED-SHOULDERED HAWK (*Buteo lineatus*)*. Fairly common resident, Buxton woods region; rare transient elsewhere; woods and thicket woodlands and nearby herb-shrub habitats. **This species is still fairly common in Buxton Woods. Work by Sykes (1986) indicates that it is also a fairly common transient.**

BROAD-WINGED HAWK (*Buteo platypterus*). Not recorded by Quay. **This species is a rare transient along the Outer Banks. Single individuals have been recorded on two Christmas counts in the 1980s.**

SWAINSON'S HAWK (*Buteo swainsoni*). Not recorded by Quay. **A casual visitor. One was recorded at Bodie Island in 1965 by Sykes (1986).**

ROUGH-LEGGED HAWK (*Buteo lagopus*). Accidental winter visitant; open herb-shrub areas. **The status and habitat utilization of this species does not appear to have changed since the 1950s (Lee 1968).**

GOLDEN EAGLE (*Aquila chrysaetos*). Not reported by Quay. **An accidental visitant (McCulloch 1952, Davis 1954).**

BALD EAGLE (*Haliaeetus leucocephalus*)*. Rare winter resident and summer visitant, uncommon transient; woods, marshes, ocean and sound beaches. **Numbers of this species have declined. It is now a rare visitant at all seasons.**

NORTHERN HARRIER (MARSH HAWK) (*Circus cyaneus*)*. Common winter resident; marshy edges of fresh and brackish ponds, fresh and tidal marshes, and various upland herb, shrub, and thicket habitats. **The winter numbers and habitat utilization of this species does not appear to have changed since the 1950s. Small numbers now are seen each summer and it is likely that the species nests in very small numbers. There are two nesting records, an early record from near Frisco (Pearson et al 1942) and a report from Ocracoke (Lee and Irvin 1988).**

OSPREY (*Pandion haliaetus*)*. Uncommon transient and summer resident, rare winter visitant; nests only in Buxton woods; feeds in fresh ponds, salt and brackish sloughs, in surf, and along ocean and sound beaches. **Now nests at Pea Island and Buxton. May be seen in good numbers during fall migration some years.**



Osprey



Peregrine Falcon

PEREGRINE FALCON (*Falco peregrinus*)*. Fairly common transient, rare to uncommon winter resident; hunts over all open, non-wooded habitats, and especially over the ponds, marshes, tidal flats, and ocean beaches. **Numbers of this species declined dramatically along the Atlantic Coast in the 1960s. There has, however, been an increase in numbers in the 1980s, and the species is once again seen regularly during migration and occasionally in winter.**



MERLIN (PIGEON HAWK) (*Falco columbarius*)*. Fairly common transient, rare winter resident: hunts over ponds, marshes, dunes, beaches, and open herb-shrub areas. **Numbers of this species declined dramatically along the Atlantic Coast in the 1960s. There has, however, been an increase in numbers in the 1980s, and the species is once again seen regularly during migration and occasionally in winter.**

AMERICAN KESTREL (SPARROW HAWK) (*Falco sparverius*)*. Common winter resident: herbaceous beaches and dunes, fresh and brackish marshes, herb-shrub areas: commonly seen perched on roadside wires. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

NORTHERN BOBWHITE (BOBWHITE) (*Colinus virginianus*). Not recorded by Quay. **There have apparently been recent releases within the National Seashore. It appears to be established on Bodie Island, and may be established near Avon and on Ocracoke.**

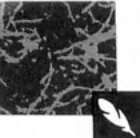
RING-NECKED PHEASANT (*Phasianus colchicus*)*. Fairly common resident, Hatteras Island only; commonest in Cape Hatteras section and least common at Pea Island. Nests and winters primarily in various types of mixed herb-shrub, shrub thicket, and thicket woodland habitats, both dry and moist; ranges into the deeper woods, the higher fresh and brackish marshes, and herbaceous beaches and dunes. **Numbers of this species declined greatly in the Cape Hatteras area coincident with the development of extensive thickets on the open flats. Populations shifted north to Pea Island where the species remained common until the early 1980s (Sykes 1991). Numbers appear to be declining there at present. The species was known to be present in the 1970s on Bodie Island, but we know of no recent records. An occasional bird has been recorded on Ocracoke Island in recent years.**

SANDHILL CRANE (*Grus canadensis*). Not recorded by Quay. **A flock of four was recorded by Kent Turner at Cape Point in October 1987.**

KING RAIL (*Rallus elegans*). Uncommon summer resident, rare winter resident, fresh and slightly brackish marshes. **This species is likely an uncommon permanent resident along the Seashore.**

CLAPPER RAIL (*Rallus longirostris*)*. Fairly common summer resident, uncommon winter resident: tidal marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

VIRGINIA RAIL (*Rallus limicola*)*. Uncommon transient, rare summer and winter



resident; fresh and brackish marshes. **This species is now found regularly in small numbers during both summer and winter.**

SORA (*Porzana carolina*)*. Rare transient, possibly more common than the records show; fresh and tidal marshes. **Now considered an uncommon winter visitant.**

YELLOW RAIL (*Coturnicops noveboracensis*)*. Rare transient and winter resident; fresh and brackish marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BLACK RAIL (*Laterallus jamaicensis*). Rare transient at most, possibly only casual visitant; moist meadow-like areas, marsh edges. **Recent evidence indicates that this species is more common in coastal marshes in northeastern North Carolina than believed earlier. It is likely that it is a breeder in the brackish marshes.**

PURPLE GALLINULE (*Porphyryla martinica*). Not recorded by Quay. **A casual spring or summer visitant usually in the impoundments at Pea Island.**

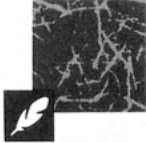
COMMON MOORHEN (COMMON OR FLORIDA GALLINULE) (*Gallinula chloropus*)*. Fairly common transient, uncommon summer resident, rare winter resident; fresh ponds and marshes. **This species is now found regularly on Christmas counts and should be considered uncommon at that season.**

AMERICAN COOT (*Fulica americana*)*. Common winter resident; fresh and brackish ponds and marshes, inshore sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

AMERICAN OYSTERCATCHER (*Haematopus palliatus*)*. Uncommon summer resident, casual winter visitant; ocean beaches, tidal sand flats, sand bars, dredge lumps; commonest around inlets. **Now a fairly common summer resident and an uncommon winter resident (Sykes 1991) .**



American Oystercatcher



BLACK-NECKED STILT (*Himantopus mexicanus*)*. Rare summer resident, Pea and Bodie islands; fresh and brackish marshes. **This species nests at the Pea Island National Wildlife Refuge where it prefers the shallow waters of the Pea Island Impoundments. While the species is also seen on the Bodie Island ponds, Boone (1988a) did not record it nesting on Bodie Island.**

AMERICAN AVOCET (*Recurvirostra americana*)*. Rare fall transient and winter visitant, casual spring transient and summer visitant; shallow fresh ponds and marshes, Pea and Bodie islands. Apparently becoming more common in recent years; status possibly uncommon in fall and winter. **This species was more common during the 1970s. A single flightless chick described from Pea Island indicated that nesting has occurred (McVaugh 1978). No further evidence has been found, and the species has become less common in recent years.**

SEMIPALMATED PLOVER (*Charadrius semipalmatus*)*. Common transient, casual winter visitant; tidal flats, beach pools, open shores of ponds and marshes. **Recent observations indicate that the species occurs regularly in winter.**


THICK-BILLED PLOVER (WILSON'S PLOVER) (*Charadrius wilsonia*)*. Uncommon summer resident; open beaches, often at edges of tern colonies. **This species is now rare, being seen less frequently than the Piping Plover.**



Piping Plover on nest

PIPING PLOVER (*Charadrius melodus*)*. Fairly common transient, uncommon winter visitant; tidal flats, beach pools, open beaches. **This species is now known to nest in small numbers along beaches (Golder 1985, 1986, Cooper 1990). It has been found nesting at Buxton, Hatteras Flats and Ocracoke. Numbers during migration and in winter appear to have declined.**

LESSER GOLDEN-PLOVER (*Pluvialis dominica*). Common fall transient, far offshore over the open ocean, coming ashore only occasionally (usually on easterly



storms). On the islands: casual fall transient, accidental winter visitant; open beaches, tidal flats, open shores of ponds and marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

KILLDEER (*Charadrius vociferus*)*. Uncommon winter resident; open beaches and dunes, tidal flats, open shores of ponds and marshes, moist pastures and open meadows, roadsides. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BLACK-BELLIED PLOVER (*Pluvialis squatarola*)*. Common transient, uncommon winter resident; ocean beaches, tidal flats and shores, pastures, open shores of ponds and marshes, roadsides. **This species remains a common transient, and is now a fairly common winter resident.**

HUDSONIAN GODWIT (*Limosa baemastica*)*. Uncommon fall transient, far offshore over the open oceans. On the islands of the Park: accidental fall transient; tidal flats and shores, margins of fresh ponds and marshes. **This species has become more common in recent years. It is now a fairly regular transient utilizing the shallow ponds at such places as Cape Point, Pea Island and Bodie Island.**

BAR-TAILED GODWIT (*Limosa lapponica*). Not recorded by Quay. **This species is now a casual fall visitor to the Outer Banks (Fussell 1983).**

BLACK-TAILED GODWIT (*Limosa limosa*). Not recorded by Quay. **There is a single record from Bodie Island during the winter of 1979 (Tove and Hughes 1981).**

MARBLED GODWIT (*Limosa fedoa*)*. Uncommon fall and casual spring transient, rare winter visitant; tidal flats and shores, open ocean beaches. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

WHIMBREL (*Numenius phaeopus*)*. Fairly common transient; ocean beaches, tidal flats and shores, shallow and open marshes and pools with sparse growths of short vegetation. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

LONG-BILLED CURLEW (*Numenius americanus*). Not recorded by Quay. **This species is now a rare but fairly regular fall and winter visitor.**

UPLAND SANDPIPER (UPLAND PLOVER) (*Bartramia longicauda*). Rare transient;



herbaceous beaches and dunes, drier shortgrass edges of marshes and pastures. **This sandpiper has been recorded more frequently in recent years, usually on shortgrass lawns and campgrounds or at Cape Point, and probably should be considered an uncommon fall transient.**

GREATER YELLOWLEGS (*Tringa melanoleuca*)*. Common transient, uncommon winter resident, rare summer visitant; fresh and tidal flats and open marshes, shores and edges of fresh ponds, open beaches. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

LESSER YELLOWLEGS (*Tringa flavipes*)*. Fairly common transient; shores and shallow margins of open ponds and marshes, beach and roadside pools. **This species may be common during migration.**

SPOTTED REDSHANK (*Tringa erythropus*)*. Not recorded by Quay. **A single bird was recorded at Cape Point May 13-17, 1987 (Cooper and Tove 1989).**

SOLITARY SANDPIPER (*Tringa solitaria*)*. Rare transient; shores and shallow edges of fresh ponds and marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

WILLET (*Catoptrophorus semipalmatus*)*. Fairly common summer resident, casual winter visitant; fresh and tidal marshes, tidal flats, herbaceous beaches and dunes, ocean beaches. **The habitat utilization of this species does not appear to have changed since the 1950s; however, the species is now a regular permanent resident.**

SPOTTED SANDPIPER (*Actitis macularia*)*. Fairly common transient; shores and shallow edges of ponds and marshes, open beaches, edges of tidal flats and sloughs. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

RUDDY TURNSTONE (*Arenaria interpres*)*. Fairly common transient, casual winter visitant; tidal flats and shores, ocean beaches. **This species is now an uncommon to fairly common winter resident along the beaches.**

WILSON'S PHALAROPE (*Phalaropus tricolor*). Accidental fall visitant; pools and ponds on beaches and in marshes. **This species is found in small numbers during the fall migration most years.**

NORTHERN PHALAROPE (RED-NECKED PHALAROPE) (*Phalaropus lobatus*). Common transient, offshore ocean. Rare transient; inshore ocean, ocean beaches.

beach pools, fresh ponds and roadside pools. **This species is found onshore in small numbers during migration most years.**

RED PHALAROPE (*Pbalaropus fulicaria*). Common transient, offshore ocean. Rare transient; inshore ocean, ocean beaches, beach pools, fresh ponds and roadside pools. **This species is also known to winter offshore in small numbers.**

AMERICAN WOODCOCK (*Scolopax minor*). Rare transient and winter visitant; lowland woods, wet or boggy thicket woodlands and shrub thickets, moist herb-shrub and herbaceous beach area. **Recent summer observations by Cooper (1988) indicate that this species may nest in small numbers in the Buxton area. It is uncommon during winter in the Buxton Woods area.**

COMMON SNIPE (*Gallinago gallinago*)*. Uncommon winter resident; moist herb-shrub and shrub thickets, wet thicket woodlands, open fresh and brackish marshes, marshy edges of ponds and pastures. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

SHORT-BILLED DOWITCHER (*Limnodromus griseus*)*. Fairly common transient, rare winter and summer visitant; tidal flats and shores, open and shallow shortgrass marshes. **This species may be common during migration and uncommon in winter.**



Short-billed Dowitcher

LONG-BILLED DOWITCHER (*Limnodromus scolopaceus*)*. Formerly very rare fall transient, now greatly reduced in numbers everywhere and of accidental occurrence on the North Carolina coast; tidal flats and shores, shortgrass marshes. **This**



species is now an uncommon fall and winter visitant (LeGrand 1973).

RED KNOT (KNOT) (*Calidris canutus*)*. Common transient, rare winter and summer visitant; ocean beaches, tidal flats and shores. **This species is now uncommon to fairly common in winter as well as being a common transient.**

SANDERLING (*Calidris alba*)*. Abundant transient, fairly common winter resident; primarily ocean beaches, also tidal flats and shores. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

SEMPALMATED SANDPIPER (*Calidris pusilla*)*. Abundant transient, uncommon winter and summer visitant; tidal flats and shores, edges and flats of fresh ponds and marshes, ocean beaches. **This species remains a common transient, but probably does not occur along the Outer Banks in winter.**

WESTERN SANDPIPER (*Calidris mauri*)*. Fairly common transient, uncommon winter and rare summer visitant; tidal flats and shores, edges and openings of fresh ponds and marshes. **This species is often common during the fall migration.**

LEAST SANDPIPER (*Calidris minutilla*)*. Common transient, uncommon winter visitant; fresh and tidal mud flats, short-grass marshes. **This species may now occasionally be encountered during winter.**

WHITE-RUMPED SANDPIPER (*Calidris fuscicollis*)*. Uncommon transient; tidal flats, beach pools, open shores and margins of fresh ponds and marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BAIRD'S SANDPIPER (*Calidris bairdii*). Not recorded by Quay. **This species is now seen with some degree of regularity during the fall migration. It should be considered a rare transient.**

PECTORAL SANDPIPER (*Calidris melanotos*)*. Common transient; tidal flats, grassy margins of fresh ponds and marshes, shortgrass dunes and beaches. **This species is now considered a fairly common transient.**

PURPLE SANDPIPER (*Calidris maritima*)*. Casual winter visitant; rocky shores and jetties, stony roadsides near the ocean. **This species is now considered a rare winter visitant.**

DUNLIN (*Calidris alpina*)*. Abundant transient, fairly common winter resident.

tidal flats and shores. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

CURLEW SANDPIPER (*Calidris ferruginea*). Not recorded by Quay. **Now a rare but regular transient, with birds observed from April to October.**

STILT SANDPIPER (*Micropalama himantopus*)*. Uncommon fall and late spring transient; margins and flats of open and shortgrass ponds and marshes. **This species is now considered a fairly common transient in the fall.**

BUFF-BREASTED SANDPIPER (*Tringites subruficollis*)*. Accidental fall transient; grassy edges of ponds and marshes. **This species has been recorded in small numbers during most recent years. It should be considered a rare fall transient.**


RUFF (*Philomachus pugnax*)*. Not recorded by Quay. **A casual visitant, with recent records from Pea and Bodie islands and Cape Point.**

POMARINE JAEGER (*Stercorarius pomarinus*). Uncommon winter resident, far offshore over the open ocean. Accidental visitant, inshore ocean, surf, inlets, ocean beaches. **This species has been recorded more frequently in recent years, likely a result of more activity by ocean watchers. It is now considered a common migrant offshore with a few individuals seen during the summer (Lee 1989).**

PARASITIC JAEGER (*Stercorarius parasiticus*)*. Fairly common winter resident, far offshore over the open ocean. Accidental visitant, inshore ocean, surf, inlets, ocean beaches. **This species has been recorded more frequently in recent years, likely a result of more effort by ocean watchers (Lee 1989).**

LONG-TAILED JAEGER (*Stercorarius longicaudus*). Uncommon winter resident, far offshore over the open ocean. No inshore record. **Lee (1989) has noted that this species is much more common offshore than was previously thought. There have also been observations from shore at Cape Point during the spring in recent years.**

GREAT SKUA (*Catharacta skua*). Not recorded by Quay. **There were several early skua records from the Outer Banks which were attributed to this species. Lee and Rowlett (1979) and Lee (1989) question these records on the basis of difficulty in separating Great Skuas and South Polar Skua. Great Skuas have, however, been seen in recent years both offshore and inshore. The species should be considered accidental.**



SOUTH POLAR SKUA (*Catharacta maccormicki*). Not recorded by Quay. A single individual was found at Cape Hatteras in 1976 (Lee and Rowlett 1979) and two were recorded passing Cape Point on May 28, 1987 by John Fussell. It is an uncommon migrant and very uncommon summer visitor offshore (Lee pers. comm.)

GLAUCOUS GULL (*Larus hyperboreus*)*. Casual winter and spring visitor; ocean beaches, inlets. This species has been recorded in small numbers during most recent winters. It is most frequently seen among the large flocks of gulls at Cape Point or near boat harbors.

ICELAND GULL (*Larus glaucoides*). Not recorded by Quay. This species has been recorded fairly regularly during recent winters usually among the large wintering gull flocks at Cape Point or among the gulls around the marinas at Hatteras Village.

GREAT BLACK-BACKED GULL (*Larus marinus*)*. Fairly common winter resident; inshore ocean, surf, inlets, inshore sound, open beaches, fresh ponds. Small numbers of immature birds are summer visitors. This gull now nests adjacent to the Cape Hatteras National Seashore on islands in Oregon and Hatteras inlets. It is now a common to abundant winter resident and uncommon summer resident.

LESSER BLACK-BACKED GULL (*Larus fuscus*)*. Not recorded by Quay. This species was first recorded by M. Browne on the 1968 Christmas Count. It now occurs in small numbers along the beaches and around the inlets during most winters. As many as 12 individuals have been recorded in a single day. It is a rare to uncommon winter resident (Tove 1989).

HERRING GULL (*Larus argentatus*)*. Abundant winter resident; inshore ocean, surf, inlets, inshore sound, open beaches and flats, fresh ponds. Small numbers of immature birds are summer visitors. This species is now a permanent resident in the region. Three to five hundred pairs nest each year in Pamlico Sound and the species is found throughout the year.

THAYER'S GULL (*Larus thayeri*). Not recorded by Quay. Now a casual winter visitor, the first record from the National Seashore was from Ocracoke Island on December 27, 1983 (Tove 1985).

RING-BILLED GULL (*Larus delawarensis*)*. Abundant winter resident; inshore ocean, surf, inlets, inshore sound, open beaches and flats, fresh ponds. Small numbers of immature birds are summer visitors. The status and habitat

utilization of this species does not appear to have changed since the 1950s.

MEW GULL (*Larus canus*). Not recorded by Quay. **There have been two recent records of this species. Both were winter records, one in 1980 (Lewis et al 1981) and one in 1983 (Lewis 1984).**

COMMON BLACK-HEADED GULL (*Larus ridibundus*)*. Not recorded by Quay. **This species is now recorded during most years among the large winter flocks of gulls at Cape Point. It should be considered a rare winter visitant (Tove 1989).**



Laughing Gull

LAUGHING GULL (*Larus atricilla*)*. Abundant summer resident, uncommon winter visitant; inshore ocean, surf, inlets, inshore sound, open beaches and flats, fresh and salt ponds and marshes, tidal sloughs and shores. **This species is quite common during early winter not departing until the first really cold weather, usually in late December or early January.**

LITTLE GULL (*Larus minutus*)*. Not recorded by Quay. **This species has occurred regularly inshore during late winter and spring in recent years (Tove 1989). Individuals occasionally are seen onshore at Cape Point. It is usually found within flocks of Bonaparte's Gulls.**

BONAPARTE'S GULL (*Larus philadelphia*)*. Abundant transient, uncommon winter visitant; primarily inshore ocean, surf, beaches, and inlets, also inshore sound and beaches and fresh ponds. **This species is scarce during the fall migration but becomes abundant in late winter and remains so into spring.**

FRANKLIN'S GULL (*Larus pipixcan*). Not recorded by Quay. **An accidental visitor to the Outer Banks, this species was recorded in 1983 and 1984 (LeGrand and Hunter 1985), by Fussell in 1986 (LeGrand 1987a), and by**



O'Brien in 1989 (LeGrand 1991b).

BLACK-LEGGED KITTIWAKE (*Rissa tridactyla*)*. Casual winter visitant, offshore ocean. Accidental winter visitant; inshore ocean, surf, inlets, ocean beaches. **This species is a common winter resident offshore. It is occasionally seen inshore or on the beach.**

SABINE'S GULL (*Xema sabini*)*. Not recorded by Quay. **This species has been recorded offshore of Cape Hatteras. We saw an individual at Cape Point in the fall of 1988 and H. Hendrickson and B. Basham recorded one there in the fall of 1989 (LeGrand 1990b).**


GULL-BILLED TERN (*Sterna nilotica*)*. Uncommon summer resident; open beaches and shores, surf, inshore sound; nests on low sandy beaches, sandbars, and dredge lumps, often with black skimmers and common terns. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

FORSTER'S TERN (*Sterna forsteri*)*. Fairly common transient, rare winter visitant; inshore ocean, surf, inlets, inshore sound, open beaches. **This species now nests at several colony sites in Pamlico Sound usually including sites immediately adjacent to Hatteras Island and in the Ocracoke marshes. Its status is thus that of permanent resident, more abundant in winter than in summer.**



Common Tern

COMMON TERN (*Sterna hirundo*)*. Common summer resident; inshore ocean, surf, inlets, inshore sound, open beaches and shores. Nests on sandy and grassy islands



and dredge lumps in the sound, occasionally isolated sandy beaches on the main islands. **Since the mid-1980s this species has nested in sizable numbers at Cape Point and on the flats north of Hatteras Inlet. A large nesting assemblage was present during the 1970s and early 1980s on Ocracoke Flats. This site was abandoned after construction of a roadbed and adjacent ditches prevented ORV traffic across the area which led to the development of marsh vegetation.**

ARCTIC TERN (*Sterna paradisaea*). Not recorded by Quay. **Now considered a rare transient offshore, accidental onshore.**

ROSEATE TERN (*Sterna dougallii*). Rare transient: inshore ocean, surf, inshore sound, open beaches. **This species is now a rare summer visitant occasionally being seen in or near one of the tern colonies.**

BRIDLED TERN (*Sterna anaethetus*). Not recorded by Quay. **Now known to occur regularly offshore, there are several records from the beach, usually associated with storms (Grant 1973, Browne et al 1976). A casual summer or fall visitant.**

SOOTY TERN (*Sterna fuscata*)*. Not recorded by Quay. **This species has been recorded in or around tern and skimmer colonies in recent years. In 1988, two nests were found in a mixed-species colony on a natural island in Ocracoke Inlet and in 1989 a nest was found on Ocracoke Flats. The species should be considered a rare summer visitant.**

LEAST TERN (*Sterna antillarum*)*. Fairly common summer resident: surf, inlets, inshore sound, open beaches, tidal ponds and sloughs, fresh ponds and marshes. Nests on sandy islands and dredge lumps in the sound and on isolated sandy beaches on the main islands. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

ROYAL TERN (*Sterna maxima*)*. Abundant summer resident, uncommon winter visitant; inshore ocean, surf, inlets, inshore sound, open beaches. Nests on sand and shell islands and dredge lumps in the sound. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

SANDWICH TERN (*Sterna sandwicensis*)*. Uncommon summer resident: inshore ocean, surf, inlets, inshore sound, open beaches. Nests in small numbers in royal tern colonies. **This species is likely more abundant than in the 1950s. It still nests on islands in Pamlico Sound and is a fairly common transient along the beaches.**



Royal Tern

CASPIAN TERN (*Sterna caspia*)*. Uncommon transient, casual winter visitant; inshore ocean, surf, inlets, inshore sound, open beaches. **This species now nests in small numbers in the Pamlico Sound colonies. A single pair nested at Ocracoke in 1987.**

BLACK TERN (*Chlidonias niger*)*. Fairly common transient, late-summer visitant; commoner in fall migration; inshore ocean, surf, inlets, inshore sound, open beaches, fresh and tidal ponds and marshes. **This species appears to have become less common during recent years.**

BROWN NODDY (*Anous stolidus*). Not recorded by Quay. **An accidental summer visitant offshore, two were seen in June 1977, eight miles northeast of Oregon Inlet (Lee and Booth 1979).**



Black Skimmer

BLACK SKIMMER (*Rynchops niger*)*. Common summer resident, uncommon to rare winter visitant; primarily quieter waters of inshore sound, inlets, and flooded tidal flats, but also in surf at times; rests on open beaches of all types. Nests on

sandy islands and dredge lumps in the sound and on isolated beaches on the main islands. **Now nests at Cape Point and the flats at Harteras Inlet but no longer on Ocracoke.**

RAZORBILL (*Aica torda*). Casual winter visitant; offshore ocean, inshore ocean, surf, inlets, sound, ocean beaches. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Status was summarized by Jones (1967).**

THICK-BILLED MURRE (*Uria lomvia*). Accidental winter visitant; offshore and inshore waters. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

DOVEKIE (*Alle alle*). Rare (but irregular, and occasionally in rather large numbers) winter visitant; offshore ocean, inshore ocean, surf, inlets, ocean beaches. **There have been no recent invasions by this species.**

ROCK DOVE (*Columba livia*)*. Not recorded by Quay. **Rock Doves are now uncommon to fairly common residents in the Buxton vicinity.**

WHITE-WINGED DOVE (*Zenaida asiatica*). Accidental summer-fall visitant; Pea Island. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

MOURNING DOVE (*Zenaida macroura*)*. Fairly common resident; open herb-shrub zones, partially vegetated beaches and dunes, woods edges, borders of thicket woodlands. **Numbers of this species are greater now than in the 1950s. It is common now at all seasons.**

YELLOW-BILLED CUCKOO (*Coccyzus americanus*)*. Fairly common summer resident; woods and thicket woodlands. **This species appears less common now than in the 1950s. It probably should be considered uncommon.**

BLACK-BILLED CUCKOO (*Coccyzus erythrophthalmus*). Not recorded by Quay. **Apparently an uncommon migrant utilizing shrub thicket and woodland habitats. Sykes recorded eight individuals at Bodie Island in 1965 (Sykes 1986).**

BARN OWL (*Tyto alba*)*. Fairly common winter resident; roosts in dense herb-shrub thickets; forages over herbaceous beaches and dunes, herb-shrub areas, and fresh and salt marshes. **Numbers of this species may have declined since the 1950s. While it is still seen fairly regularly in winter at Bodie Island and**



Ocracoke, it is seldom recorded elsewhere.

EASTERN SCREECH OWL (SCREECH OWL) (*Otus asio*)*. Uncommon resident: Buxton woods. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

GREAT HORNED OWL (*Bubo virginianus*)*. Not recorded by Quay. **This species may be heard calling in Buxton Woods in winter. While no nests have been found, it likely breeds. It should be considered a rare permanent resident.**

SNOWY OWL (*Nyctea scandiaca*). Casual winter visitant; open herbaceous, herb-shrub and marsh habitats. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BURROWING OWL (*Athene cunicularia*). Not recorded by Quay. **There is a single record for the National Seashore. On February 14, 1967 a bird was collected at Avon (Sykes 1974).**


SHORT-EARED OWL (*Asio flammeus*)*. Uncommon winter resident; roosts in dense herb-shrub thickets, both on and above ground; forages over marshes and adjacent herb-shrub zones. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

NORTHERN SAW-WHET OWL (SAW-WHET OWL) (*Aegolius acadicus*)*. Accidental winter visitant; woods and thickets. **This species has been recorded several times in recent years, most recently on February 3, 1990 (LeGrand 1991a), and probably should be considered a rare but regular winter visitor.**

CHUCK-WILL'S WIDOW (*Caprimulgus carolinensis*)*. Rare summer resident; woods and thicket woodlands. **This species is now an uncommon to fairly common resident in Buxton Woods and is also found at Bodie Island, Salvo and Ocracoke. It is a casual winter visitor.**

COMMON NIGHTHAWK (*Chordeiles minor*). Rare summer resident; partially vegetated herbaceous beaches and dunes, drier borders and openings in marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

CHIMNEY SWIFT (*Chaetura pelagica*). Uncommon summer resident; nests in chimneys in the villages, and forages in the vicinity. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**



RUBY-THROATED HUMMINGBIRD (*Archilochus colubris*). Rare summer resident; wooded areas and around habitations with flower gardens. **A fairly common fall transient and an uncommon summer resident in Buxton Woods.**

BELTED KINGFISHER (*Ceryle alcyon*)*. Fairly common winter resident; fresh and tidal ponds and open marshes, tidal sloughs. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

NORTHERN FLICKER (YELLOW-SHAFTED FLICKER) (*Colaptes auratus*)*. Fairly common resident, locally common in Buxton Woods; woods, thicket woodlands, open herb-shrub areas. **This species appears less abundant than in the 1950s.**

PILEATED WOODPECKER (*Dryocopus pileatus*). Casual transient; woods and woods edges. **Cooper (1988) reported that this species was present during the breeding season at Buxton in 1986 and 1987 and that nesting was suspected but not confirmed. It was recorded on one Christmas count during the 1980s.**

RED-BELLIED WOODPECKER (*Melanerpes carolinus*). Not recorded by Quay. **Sykes (1986) recorded a single individual at Bodie Island in 1965 and it is an uncommon winter resident in Buxton Woods.**

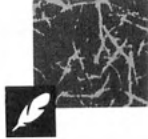
RED-HEADED WOODPECKER (*Melanerpes erythrocephalus*). Not recorded by Quay. **Occasionally recorded during the fall migration. Sykes (1986) recorded 10 individuals in 1965. Now an uncommon transient.**

YELLOW-BELLIED SAPSUCKER (*Sphyrapicus varius*). Not recorded by Quay. **A fairly common fall transient. Sykes (1986) recorded 52 individuals in 1965. An uncommon winter resident in Buxton Woods.**

HAIRY WOODPECKER (*Picoides villosus*). Rare resident; Buxton woods. **An uncommon fall transient. Sykes (1986) recorded 29 individuals at Bodie Island in 1965. Cooper (1988) found no evidence of breeding in Buxton Woods.**

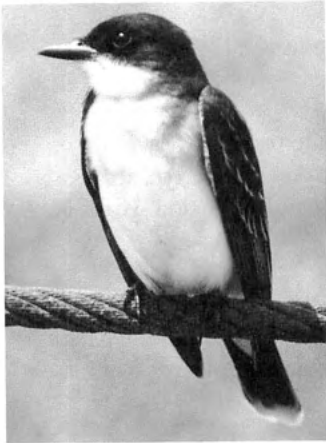
DOWNY WOODPECKER (*Picoides pubescens*). Uncommon resident; Buxton Woods. **A fairly common fall transient through the Park and an uncommon winter resident. There are no recent breeding records.**

EASTERN KINGBIRD (*Tyrannus tyrannus*)*. Fairly common summer resident; margins of woods and thickets, herb-shrub habitats in both marsh and upland. **The status and habitat utilization of this species does not appear to have**



changed since the 1950s.

GRAY KINGBIRD (*Tyrannus dominicensis*). Accidental spring visitant; woods edges. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**



Eastern Kingbird

WESTERN KINGBIRD (*Tyrannus verticalis*)*. Casual late-fall transient; herbaceous beaches and dunes, open herb-shrub and woods edge areas. **This western species is now a rare but fairly regular fall visitant.**

SCISSOR-TAILED FLYCATCHER (*Tyrannus forficatus*). Not recorded by Quay. **A casual late summer and fall visitant, with records from Ocracoke and Hatteras Island during the 1960s, 1970s and 1980s.**

GREAT CRESTED FLYCATCHER (*Myiarchus crinitus*)*. Fairly common summer resident; woods and thicket woodlands. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

ASH-THROATED FLYCATCHER (*Myiarchus cinerascens*). Not recorded by Quay. **Sight records exist for Pea Island in June 1973 (Teulings 1974) and Cape Point in September 1981 (LeGrand 1982).**

EASTERN PHOEBE (*Sayornis phoebe*)*. Rare winter resident; woods edge, thicket, and herb-shrub habitats. **This species has been more frequently observed in recent years; now uncommon.**

YELLOW-BELLIED FLYCATCHER (*Empidonax flaviventris*). Not recorded by Quay. **This species has been occasionally recorded during the fall migration in**

recent years. Sykes (1986) found six individuals in 1965.

ACADIAN FLYCATCHER (*Empidonax virescens**). Not recorded by Quay. Sykes (1986) recorded two individuals in 1965, and the species is occasionally seen in Buxton Woods in spring.

LEAST FLYCATCHER (*Empidonax minimus*). Not recorded by Quay. Sykes (1986) recorded a single individual in 1965.

EASTERN WOOD PEWEE (*Contopus virens*). Not recorded by Quay. An uncommon to fairly common fall transient. Sykes (1986) recorded 28 individuals in 1965. It has been occasionally found in Buxton Woods in summer and may breed there.

OLIVE-SIDED FLYCATCHER (*Contopus borealis*). Not recorded by Quay. Three individuals were recorded by Sykes in 1965 (Sykes 1986) and there have been occasional records since. The species is now considered a rare transient.


VERMILION FLYCATCHER (*Pyrocephalus rubinus*). Not recorded by Quay. A single individual was reported from Pea Island on October 4, 1986 (Hader 1987).

HORNED LARK (*Eremophila alpestris*). Rare winter visitant: open and partially vegetated beaches and dunes. The status and habitat utilization of this species does not appear to have changed since the 1950s.

TREE SWALLOW (*Tachycineta bicolor**). Abundant fall and fairly common spring transient, uncommon to rare winter visitant; in the air over all land, freshwater, and marsh environments; often perched in large numbers on wires during migrations, settling in myrtle thickets at times in winter to eat berries. This species is still abundant during the fall but appears less common in spring.

BANK SWALLOW (*Riparia riparia*). Rare transient: over open areas, especially around ponds and marshes. Observations of this species have increased during fall migration in recent years.

NORTHERN ROUGH-WINGED SWALLOW (ROUGH-WINGED SWALLOW) (*Stelgidopteryx serripennis*). Rare transient: over open areas, especially around ponds and marshes. The status and habitat utilization of this species does not appear to have changed since the 1950s.



BARN SWALLOW (*Hirundo rustica*)*. Abundant transient, common summer resident: nests in protected places in, under, and on buildings, bridges, boats, and other man-made structures; forages over open and vegetated beaches, dunes, ponds, and marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

CLIFF SWALLOW (*Hirundo pyrrhonota*). Rare transient: over open areas, especially around ponds and marshes. **There is a 1982 record of nesting under the Oregon Inlet bridge (*The Chat* 46:121).**

PURPLE MARTIN (*Progne subis*)*. Fairly common summer resident; in the villages; nests in boxes and gourds, forages over open areas nearby. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BLUE JAY (*Cyanocitta cristata*)*. Rare transient; woods and thickets. **Cooper considered this species a common summer resident in Buxton Woods in 1986 and 1987 and we recorded it regularly there during the winter of 1988-89. It thus appears now to be a common permanent resident in the Buxton Woods area.**

AMERICAN CROW (*Corvus brachyrhynchos*)*. Uncommon resident; woods and soundside thicket woodlands, and open areas. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

FISH CROW (*Corvus ossifragus*)*. Fairly common to locally common resident; nests in woods and thicket woodlands; forages widely through various open and vegetated beaches and dunes, ocean and sound beaches, fresh and tidal ponds and marshes, and herb-shrub-thicket habitats. **This species is now abundant at all seasons and in most habitats.**

CAROLINA CHICKADEE (*Parus carolinensis*). Not recorded by Quay. **This common mainland species was not found in Buxton Woods by Cooper (1988), although it apparently migrates through the area in the fall as Sykes (1986) recorded 98 individuals in 1965. It occurs at Bodie Island throughout the year.**

WHITE-BREASTED NUTHATCH (*Sitta carolinensis*). Not recorded by Quay. **A rare fall transient along the Outer Banks, four were recorded in 1965 by Sykes (1986).**

RED-BREASTED NUTHATCH (*Sitta canadensis*)*. Not recorded by Quay. **An**

irregular migrant and winter resident, 151 were recorded during the fall of 1965 (Sykes 1986).

BROWN-HEADED NUTHATCH (*Sitta pusilla*). Rare resident; woods and thicket woodlands. **This species has not been recorded in Buxton Woods in recent years.** Cooper (1988) did not find it during his extensive studies in 1986 and 1987.

BROWN CREEPER (*Certhia americanus*)*. Uncommon winter resident; woods and thicket woodlands. **This irregular species is uncommon to absent during some winters and fairly common during others.** Sykes (1986) recorded 227 individuals during the fall of 1965.

HOUSE WREN (*Troglodytes aedon*). Uncommon winter resident; woods and thickets. **The status and habitat utilization of this species does not appear to have changed since the 1950s, although during some winters it is more abundant than in others.**


WINTER WREN (*Troglodytes troglodytes*). Not recorded by Quay. **An uncommon to rare fall transient and winter visitor.** Sykes (1986) recorded seven individuals in 1965.

BEWICK'S WREN (*Troglodytes bewickii*). Not recorded by Quay. **There is a single record for Pea Island from November 1972 by Edmund LeGrand (Teulings 1973).**

CAROLINA WREN (*Troglodytes ludovicianus*)*. Common resident; woods and woods borders, thicket woodlands, herb-shrub and shrub thicket habitats. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**



Carolina Wren



MARSH WREN (LONG-BILLED MARSH WREN) (*Cistothorus palustris*)*. Common resident; salt and brackish marshes; fresh marshes to some extent in migration. **This species may have declined as a breeder. It is still present but appears to occur sporadically in some marshes and not in others. It is uncommon in winter.**

SEDGE WREN (SHORT-BILLED MARSH WREN) (*Cistothorus platensis*)*. Fairly common winter resident; fresh and brackish marshes, margins of fresh ponds, wet herb-shrub and thicket woodland habitats. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

NORTHERN MOCKINGBIRD (MOCKINGBIRD) (*Mimus polyglottos*)*. Common resident; herb-shrub and shrub thicket, thicket woodland, and woods edge habitats, especially the drier types. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Thicket habitat has increased since the 1950s, and the total population of this species has likely increased considerably.**


GRAY CATBIRD (CATBIRD) (*Dumetella carolinensis*)*. Common resident; woods, woods border and thicker habitats, especially the denser and wetter types. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Because thicket habitat has increased since the 1950s the total population of this species has likely increased considerably.**

BROWN THRASHER (*Toxostoma rufum*)*. Fairly common resident; woods borders, thicket woodlands, taller shrub thickets. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Because thicket habitat has increased since the 1950s the total population of this species has likely increased considerably.**

SAGE THRASHER (*Oreoscoptes montanus*). Not recorded by Quay. **There is a single record of this western species in 1965 by Sykes (1986).**

AMERICAN ROBIN (ROBIN) (*Turdus migratorius*)*. Uncommon winter resident; woods, thicket woodlands, herb-shrub areas, herbaceous openings, village yards. **This species is now a common winter resident.**

WOOD THRUSH (*Hylocichla ustelina*). Not recorded by Quay. **This species appears to be a rare fall transient. Sykes (1986) recorded four individuals in 1965.**



HERMIT THRUSH (*Catharus guttatus*)*. Fairly common winter resident; Buxton Woods. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

SWAINSON'S THRUSH (*Catharus ustulatus*). Not recorded by Quay. **This species is likely an uncommon to fairly common fall transient along the Outer Banks. Sykes (1986) recorded 67 individuals in 1965.**

GRAY-CHEEKED THRUSH (*Catharus minimus*). Not recorded by Quay. **A rare to uncommon fall transient along the Outer Banks. Sykes (1965) recorded 14 individuals in 1965.**

VEERY (*Catharus fuscescens*). Not recorded by Quay. **This species appears to be a rare fall transient. Sykes (1986) recorded a single individual in 1965.**

EASTERN BLUEBIRD (*Sialia sialis*). Not recorded by Quay. **This species was seen on the 1987 Christmas count and should be now considered a casual winter visitant.**

NORTHERN WHEATEAR (WHEATEAR) (*Oenanthe oenanthe*). Not recorded by Quay. **There is a single record of this species from Avon in October 1987 by John Fussell (LeGrand 1988).**

BLUE-GRAY GNATCATCHER (*Poliophtila caerulea*). Rare transient; woods, woods borders, and thickets, especially around water. **This species is now an uncommon transient in the Buxton Woods area. One was found on the 1987 Christmas count.**

GOLDEN-CROWNED KINGLET (*Regulus satrapa*)*. Uncommon winter resident; mixed evergreen-deciduous woods and thicket woodlands, mainly in Buxton Woods. **The abundance of this species varies from year to year. During some winters the species is uncommon but in others it may be quite common.**

RUBY-CROWNED KINGLET (*Regulus calendula*)*. Rare winter resident; mixed woods and thickets. **This species now occurs regularly during the fall migration and may be fairly common during some winters.**

WATER PIPIT (*Anthus spinoletta*). Uncommon to rare winter visitant; sparsely vegetated herbaceous beaches and dunes, grassy pastures and marsh edges, marginal mud flats. **Appears more common in migration than recorded by Quay; 90 individuals recorded by Sykes (1986) in 1965.**



SPRAGUE'S PIPIT (*Anthus spragueii*). Not recorded by Quay. **Sykes (1986) recorded a single individual in 1965.**

CEDAR WAXWING (*Bombycilla cedrorum*)*. Fairly common winter visitant, sometimes locally abundant; woods edges, thicket woodlands, shrubbery in villages. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

NORTHERN SHRIKE (*Lanius excubitor*). Accidental winter visitant; woods and thicket edges, open herb-shrub areas. **There have been no records of this northern species since the 1950s.**

LOGGERHEAD SHRIKE (*Lanius ludovicianus*). Rare winter visitant; woods and thicket edges, open herb-shrub areas, roadsides, villages. **This species is seldom seen and should be considered casual.**

EUROPEAN STARLING (STARLING) (*Sturnus vulgaris*)*. Fairly common resident; herbaceous beaches and dunes, open herb-shrub areas, borders of woods and thickets, yards and buildings; primarily in and around the villages, both for nesting and foraging. **This species should now be considered a common resident.**

WHITE-EYED VIREO (*Vireo griseus*)*. Uncommon summer resident; woods and thickets, especially around water. **This species now overwinters in small numbers in Buxton Woods.**

YELLOW-THROATED VIREO (*Vireo flavifrons*). Not recorded by Quay. **This species is now considered a rare transient.**

SOLITARY VIREO (*Vireo solitarius*)*. Not recorded by Quay. **This species appears to be a rare to uncommon transient and winter resident in the Buxton Woods area.**

RED-EYED VIREO (*Vireo olivaceus*)*. Fairly common summer resident; woods and woodland thickets. **Cooper (1988) considered this species to be uncommon at Buxton Woods in 1986 and 1987.**

PHILADELPHIA VIREO (*Vireo philadelphicus*). Not recorded by Quay. **This species is now recorded occasionally during fall migration usually in shrub thicket habitats.**

BLACK-AND-WHITE WARBLER (*Mniotilta varia*)*. Rare transient; woodlands, especially Buxton Woods. **This species is now a fairly common transient**



during the fall migration.

PROTHONOTARY WARBLER (*Protonotaria citrea*)*. Fairly common summer resident; Buxton Woods, in understory and shrub layers along edges of ponds and marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

WORM-EATING WARBLER (*Helminthos vermivorus*). Not recorded by Quay. **Now a rare to uncommon transient.**

GOLDEN-WINGED WARBLER (*Vermivora chrysoptera*). Not recorded by Quay. **This species is now considered a rare fall migrant along the Outer Banks.**

BLUE-WINGED WARBLER (*Vermivora pinus*). Not recorded by Quay. **A rare transient along the Outer Banks. Sykes (1986) recorded two individuals in 1965.**

TENNESSEE WARBLER (*Vermivora peregrina*). Not recorded by Quay. **An uncommon fall migrant. Sykes (1986) recorded 10 individuals in 1965.**

ORANGE-CROWNED WARBLER (*Vermivora celata*)*. Uncommon transient, rare winter visitant; thickets and woods edges. **This species is now a regular but uncommon winter resident in the Buxton Woods area.**

NASHVILLE WARBLER (*Vermivora ruficapilla*). Not recorded by Quay. **A rare transient during the fall. Sykes (1986) recorded seven individuals in 1965. There is a single recent spring record from Buxton (LeGrand 1987b).**

NORTHERN PARULA (*Parula americana*). Not recorded by Quay. **Cooper (1988) found this species nesting at Nags Head Woods but not at Buxton. It is an uncommon transient through the region. It is known to have been present at Frisco during the breeding season.**

YELLOW WARBLER (*Dendroica petechia*)*. Uncommon summer resident; open moist lowland woods and thicket woodlands especially around willow trees. **This species is now a rare and localized summer resident.**

MAGNOLIA WARBLER (*Dendroica magnolia*)*. Not recorded by Quay. **This species is an uncommon transient in the fall. Sykes (1986) recorded 54 individuals in 1965.**

CAPE MAY WARBLER (*Dendroica tigrina*). Not recorded by Quay. **This species**



is an uncommon to fairly common fall migrant. Sykes (1986) found 136 individuals at Bodie and Pea islands in 1965.

BLACK-THROATED BLUE WARBLER (*Dendroica caerulescens*)*. Not recorded by Quay. **This species is an uncommon to fairly common transient during fall migration, especially in Buxton Woods.**

YELLOW-RUMPED WARBLER (MYRTLE WARBLER) (*Dendroica coronata*)*. Abundant winter resident: woods, thickets, herb-shrub areas of all types. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BLACK-THROATED GREEN WARBLER (*Dendroica virens*). Not recorded by Quay. **This species is a rare to uncommon transient. Sykes (1986) recorded 11 individuals in 1965. There is a winter record from Buxton Woods in 1983 by Harry LeGrand.**

CERULEAN WARBLER (*Dendroica cerulea*). Not recorded by Quay. **This species is a rare transient along the coast. Davis (LeGrand 1986) found one individual at Buxton on October 13, in 1986.**

BLACKBURNIAN WARBLER (*Dendroica fusca*). Not recorded by Quay. **This species is a rare to uncommon transient. Sykes (1986) found four individuals in 1965.**

YELLOW-THROATED WARBLER (*Dendroica dominica*)*. Not recorded by Quay. **This species was considered to be an uncommon summer resident at Buxton Woods in 1986 and 1987 by Cooper (1988).**

CHESTNUT-SIDED WARBLER (*Dendroica pensylvanica*). Not recorded by Quay. **This species is a rare fall transient. Sykes (1986) recorded two individuals in 1965.**

BAY-BREASTED WARBLER (*Dendroica castanea*). Not recorded by Quay. **This species appears to be a rare to uncommon transient along the Outer Banks. Sykes (1986) recorded only four individuals in 1965.**

BLACKPOLL WARBLER (*Dendroica striata*). Not recorded by Quay. **This species is an uncommon to fairly common fall transient along the Outer Banks. Sykes (1986) recorded 95 individuals in 1965.**

PINE WARBLER (*Dendroica pinus*)*. Common summer resident: Buxton Woods.

This species is now known to winter in Buxton Woods and should be considered an uncommon to fairly common permanent resident.

PRAIRIE WARBLER (*Dendroica discolor*)*. Common summer resident; woods edge, thicket, and open herb-shrub habitats. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**



Prairie Warbler

PALM WARBLER (*Dendroica palmarum*)*. Uncommon winter resident; woods edges and openings, herb-shrub zones, tall and open herbaceous growth along margins of ponds and marshes. **This species is often common during the fall migration.**

OVENBIRD (*Seiurus aurocapillus*)*. Not recorded by Quay. **Sykes (1986) recorded seven individuals at Bodie Island during the fall of 1965. The species has also been found to winter in Buxton Woods in small numbers where it has been recorded on several Christmas counts since 1981.**

NORTHERN WATERTHRUSH (*Seiurus noveboracensis*). Not recorded by Quay. **This species is an uncommon fall migrant. Sykes (1986) found 39 individuals in 1965.**

LOUISIANA WATERTHRUSH (*Seiurus motacilla*)*. Not recorded by Quay. **A single bird was heard in song in Buxton Woods during the spring of 1989.**

KENTUCKY WARBLER (*Oporornis formosus*). Not recorded by Quay. **There is a single record from Ocracoke in September 1988 by R. Davis (LeGrand and Lynch 1989).**

CONNECTICUT WARBLER (*Oporornis agilis*). Not recorded by Quay. **This**



species is a rare fall transient. Four individuals were found by Sykes (1986) in 1965.

MOURNING WARBLER (*Oporornis philadelphia*). Not recorded by Quay. **This species is now a rare fall migrant along the Outer Banks.**

COMMON YELLOWTHROAT (YELLOWTHROAT) (*Geothlypis trichas*)*. Common resident: moist thickets and woods edges and compact herb-shrub growths, especially over and around water. **This species appears less common in winter than during the breeding season.**

YELLOW-BREASTED CHAT (*Icteria virens*). Casual winter visitant; Pea Island thicket woodland. **Sykes (1986) recorded 11 individuals during the fall of 1965. It is now a rare to uncommon fall transient. It nests at Bodie Island (Fussell, pers. comm.)**

HOODED WARBLER (*Wilsonia citrina*)*. Rare transient: Buxton woods. **This species may breed in small numbers in Buxton Woods (Fussell, pers. comm.) but it was not found by Cooper (1988).**

WILSON'S WARBLER (*Wilsonia pusilla*). Not recorded by Quay. **An uncommon fall migrant, Sykes (1986) recorded four individuals during the fall of 1965. They are most often found in dense shrub thickets.**


CANADA WARBLER (*Wilsonia canadensis*). Not recorded by Quay. **A rare transient along the Outer Banks. Sykes (1986) recorded two in 1965.**

AMERICAN REDSTART (*Setophaga ruticilla*). Rare transient: moist woods and thickets. **This species is now one of the most common fall transients along the Outer Banks. Is found in both thicket and woodland habitats.**

HOUSE SPARROW (*Passer domesticus*)*. Fairly common resident: in and about the villages. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

BOBOLINK (*Dolichonyx oryzivorus*)*. Uncommon transient: herbaceous beaches and dunes, open herb-shrub areas. **Now considered a fairly common to common fall transient. Sykes (1986) recorded 192 individuals at Bodie and Pea islands in 1965.**

EASTERN MEADOWLARK (*Sturnella magna*)*. Common resident: herbaceous beaches and dunes, herb-shrub habitats of all types from dry to moist, edges and



openings in fresh and tidal marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Because the extent of grasslands has decreased since the 1950s numbers of this species are likely reduced.**

WESTERN MEADOWLARK (*Sturnella neglecta*). Not recorded by Quay. **There is a single record from 1965 by Sykes (1986).**

YELLOW-HEADED BLACKBIRD (*Xanthocephalus xanthocephalus*). Casual fall visitant; herbaceous and herb-shrub habitats. **This western species is recorded during most years as a rare but regular fall visitant.**

RED-WINGED BLACKBIRD (*Agelaius phoeniceus*)*. Abundant resident; fresh and tidal marshes and pond edges, wetter herb-shrub zones, herbaceous beaches and dunes, roadsides, wet pastures and grassy marsh edges. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

ORCHARD ORIOLE (*Icterus spurius*)*. Not recorded by Quay. **This species now nests in thicket habitats.**

NORTHERN ORIOLE (BALTIMORE ORIOLE) (*Icterus galbula*)*. Rare transient; woods and thicket woodlands. **This species is a fairly common fall transient along the Outer Banks. Sykes (1986) recorded more than 600 individuals in 1965.**

RUSTY BLACKBIRD (*Euphagus carolinus*). Rare winter visitant; thickets and marshes. **This species is now a rare to uncommon fall transient.**

BREWER'S BLACKBIRD (*Euphagus cyanocephalus*). Not recorded by Quay. **Sykes (1986) recorded a single individual in 1965.**

BOAT-TAILED GRACKLE (*Quiscalus major*)*. Common resident; nests in small colonies in thickets of shrubs and low trees; forages widely on open beaches and shores (especially along the sound), on herbaceous beaches and dunes, in wet herb-shrub habitats, and all through the fresh and tidal marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

COMMON GRACKLE (*Quiscalus quiscula*)*. Uncommon resident; herb-shrub-thicket habitats, often with boat-tailed grackles and red-winged blackbirds. **This species is now a fairly common nesting species.**



BROWN-HEADED COWBIRD (*Molothrus ater*)*. Rare summer resident. Hatteras and Ocracoke Islands; fairly common summer resident, Bodie Island; all herbaceous and woody habitats, wherever nests of small birds available for nest-parasitism. **Numbers of this species have increased greatly since the 1950s. It is now a fairly common permanent resident.**

SCARLET TANAGER (*Piranga olivacea*). Not recorded by Quay. **Sykes (1986) recorded 11 individuals in 1965. Now a rare to uncommon fall transient.**

SUMMER TANAGER (*Piranga rubra*). Not recorded by Quay. **Two individuals were recorded in 1965 by Sykes (1983). It is occasionally seen during summer in Buxton Woods and may nest there.**

NORTHERN CARDINAL (CARDINAL) (*Cardinalis cardinalis*)*. Fairly common resident; woods and thicket woodlands. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Because thicket habitat has increased since the 1950s the total population of this species within the Seashore has likely increased considerably.**

ROSE-BREASTED GROSBEAK (*Pheucticus ludovicianus*). Not recorded by Quay. **Sykes (1986) recorded 11 individuals during the fall of 1965 and the species is now considered an uncommon fall transient.**

BLUE GROSBEAK (*Guiraca caerulea*). Not recorded by Quay. **An uncommon transient. Sykes (1986) recorded 11 individuals in the fall of 1965 and two were recorded by Boone (1988a) in the spring of 1987. Recent records from Bodie Island in June indicate that it likely breeds (Fussell, pers. comm.).**

INDIGO BUNTING (*Passerina cyanea*)*. Rare summer resident, locally uncommon in Buxton Woods; woods and thicket woodlands. **This species appears to be increasing in numbers, likely a result of increasing availability of thicket habitats.**

PAINTED BUNTING (*Passerina ciris*). Casual spring visitant; Buxton Woods. **Now a casual spring and winter visitant.**

DICKCISSEL (*Spiza americana*). Not recorded by Quay. **Three were recorded in the fall of 1965 by Sykes (1986). Now a rare fall visitant.**

EVENING GROSBEAK (*Coccothraustes vespertina*). Not recorded by Quay. **This species is now an irregular and uncommon fall (Sykes 1986) and winter visitant along the coast. Two individuals remained at Buxton until early**

May in 1988 (LeGrand 1989).

PURPLE FINCH (*Carpodacus purpureus*). Casual winter visitant: woods and thickets. **This species is now an irregular but sometimes fairly common winter visitant.**

HOUSE FINCH (*Carpodacus mexicanus*). Not recorded by Quay. **It is now a rare winter visitant whose numbers are increasing.**

COMMON REDPOLL (*Carduelis flammea*). Casual winter visitant: herbaceous and shrubby habitats. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

PINE SISKIN (*Carduelis pinus*). Not recorded by Quay. **Sykes (1986) recorded 46 during the fall of 1965. Now an uncommon and irregular winter visitant.**

AMERICAN GOLDFINCH (*Carduelis tristis*)*. Uncommon winter resident: herbaceous, shrubby, thicket, and woods edge habitats. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

RED CROSSBILL (*Loxia curvirostris*). Not recorded by Quay. **Now a casual winter visitant first seen during the 1969 Bodie Island Christmas Count.**

RUFOUS-SIDED TOWHEE (*Pipilo erythrophthalmus*)*. Uncommon winter resident, common summer resident: woods, woods edges, thickets, herb-shrub growths. **The status and habitat utilization of this species does not appear to have changed since the 1950s. Since thicket habitat has increased since the 1950s the total population of this species within the park has likely increased considerably.**

LARK BUNTING (*Calamospiza melanocorys*). Not recorded by Quay. **This western species is an accidental visitant (Sykes 1964, Burford 1971b). There have been no records in the 1980s.**

SAVANNAH SPARROW (including IPSWICH SPARROW) (*Passerculus sandwichensis*)*. Abundant winter resident: herbaceous beaches and dunes, open herb-shrub areas, edges and grassy openings in fresh tidal marshes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

GRASSHOPPER SPARROW (*Ammodramus savannarum*). Not recorded by Quay. **Sykes (1986) recorded 14 individuals during the fall of 1965. It is now**



considered a rare fall transient.

LECONTE'S SPARROW (*Ammodramus leconteii*). Not recorded by Quay. Now a rare winter visitant. A single individual was collected by Sykes (1978) on Bodie Island in January 1975.

SHARP-TAILED SPARROW (*Ammodramus caudacutus*)*. Uncommon winter resident; tidal marshes. This species may also be fairly common during the fall migration.

SEASIDE SPARROW (*Ammodramus maritimus*)*. Common summer resident, uncommon winter resident; tidal marshes. The status and habitat utilization of this species does not appear to have changed since the 1950s.

VESPER SPARROW (*Poocetes gramineus*)*. Uncommon winter visitant; herbaceous beaches and dunes, pastures and grassy edges of marshes, open herb-shrub areas. This species is now rare and more likely to be seen during the fall.

LARK SPARROW (*Chondestes grammacus*). Casual winter visitant; herbaceous beaches and dunes, open herb-shrub growths. This species is now occasionally seen during migration and is considered rare in winter.

BACHMAN'S SPARROW (*Aimophila aestivalis*). Casual summer visitant; open herbaceous and herb-shrub growths. There are no recent records of this species from the Outer Banks. It is likely that it no longer occurs within the Cape Hatteras National Seashore.

DARK-EYED JUNCO (SLATE-COLORED JUNCO) (*Junco hyemalis*). Uncommon winter resident; open woods, thicket, shrub, and herbaceous habitats. The status and habitat utilization of this species does not appear to have changed since the 1950s.

AMERICAN TREE SPARROW (TREE SPARROW) (*Spizella arborea*). Not recorded by Quay. Six individuals were recorded during the fall of 1965 by Sykes (1986). It should be considered a casual fall and winter visitant.

CHIPPING SPARROW (*Spizella passerina*)*. Rare winter visitant; woods borders and thicket woodlands. This species is now more common than recorded by Quay. Sykes (1986) reported 100 individuals in 1965.

CLAY-COLORED SPARROW (*Spizella pallida*). Not recorded by Quay. A rare fall visitant. Sykes (1986) recorded nine individuals in 1965, and the species is



reported in small numbers during most years.

FIELD SPARROW (*Spizella pusilla*)*. Uncommon winter resident; herbaceous beaches and dunes, herb-shrub-thicket areas. **This species now breeds in small numbers on Bodie Island. It remains uncommon in winter.**

WHITE-CROWNED SPARROW (*Zonotrichia leucophrys*). Casual winter-spring visitant; moist and dense herb-shrub growths. **The occurrence of this species has increased in recent years. It is now found in small numbers during both spring and fall in most years.**

WHITE-THROATED SPARROW (*Zonotrichia albicollis*)*. Uncommon winter resident; woods, woods edges, thickets. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

FOX SPARROW (*Passerella iliaca*). Uncommon winter visitant; woods and thickets. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

LINCOLN'S SPARROW (*Melospiza lincolni*). Not recorded by Quay. **Now considered a rare fall transient. Sykes (1986) recorded eight individuals during the fall of 1965.**

SWAMP SPARROW (*Melospiza georgiana*)*. Common winter resident; fresh and tidal marshes and adjoining moist herb-shrub areas. **Numbers of this species appear to have declined. While still occurring regularly, it seems less abundant than during earlier years.**

SONG SPARROW (*Melospiza melodia*)*. Common winter resident, fairly common summer resident; tidal marshes, dry and moist herb-shrub areas, herbaceous beaches and dunes. **The status and habitat utilization of this species does not appear to have changed since the 1950s.**

LAPLAND LONGSPUR (*Calcarius lapponicus*)*. Not recorded by Quay. **This species is now found occasionally in small numbers on beaches and sand flats during fall or winter. It should be considered a rare winter visitant.**

SNOW BUNTING (*Plectrophenax nivalis*)*. Casual winter visitant; open and sparsely vegetated beaches and dunes, including ocean beaches. **This species is now found in small numbers during most winters.**

The Mammals

In 1959, Tom Quay included 22 species of terrestrial mammals and eight species of marine mammals in his checklist. We provide documentation for six additional terrestrial species (southern short-tailed shrew, silver-haired bat, evening bat, marsh rabbit, eastern harvest mouse and hispid cotton rat) within or immediately adjacent to the Cape Hatteras National Seashore. We remove one species (cotton mouse) reported previously.


We have included Roanoke Island and that segment of Currituck County that extends from the Virginia state line southward to Bodie Island in this part of our investigation, since both provide ancillary information about the mammals of the National Seashore.

This annotated list does not include feral ungulates, or such accidental reports as the black bear record from near Whalebone (Lee et al 1983). Although not the focus of this report, the list of marine mammals known from the National Seashore or surrounding areas now includes at least 25 species (Schmidly 1981).

Following each species account is a list of specimens deposited in major repositories known to house sizable collections of mammals from the region, including the Academy of Natural Sciences in Philadelphia (ANSP), North Carolina State Museum of Natural Sciences (NCSM), the Museum of Zoology at the University of Michigan (LMMZ), the United States National Museum of Natural History (USNM) and the Vertebrate Collections at the University of North Carolina at Wilmington (UNCW).

Specimens in these museums were examined by William David Webster except for those at NCSM, which were graciously identified by Mary Kay Clark. Additional records, including passages from Quay's field notes of the late 1950s, are listed thereafter and together with the specimens examined provide a convenient list of all localities within the National Seashore and surrounding areas where a particular species of mammal has been recorded.

VIRGINIA OPOSSUM (*Didelphis virginiana*) (OPOSSUM (*Didelphis marsupialis*))*.
Fairly common, Bodie Island only; herb, shrub, thicket, beach, and marsh-edge habitats. Formerly common on Hatteras Island, and possibly Ocracoke, until late nineteen thirties and early nineteen forties; cause for the local extinction unknown. **Now relatively common on Bodie and Hatteras islands in dune, shrub and thicket habitats, especially around villages. Tracks and vehicle-killed individuals were observed most frequently in the areas between Hatteras and Buxton and between Whalebone Junction and Kitty Hawk; uncommon on Pea Island. This species does not occur on Ocracoke Island, but it is common on Roanoke Island.**



Specimens examined (1).—*Dare Co.*: Avon (1 UNCW).

Additional records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Hatteras (Allen 1901); Manteo (Lee et al 1983); Nags Head (Webster 1988).

SOUTHEASTERN SHREW (*Sorex longirostris*). Rare, Hatteras Island: dense and moist herbaceous, herb-shrub, and marsh-edge habitats. **Quay based his remarks on two skulls in owl pellets found under a cedar tree near the Cape Hatteras Lighthouse. Additional Hatteras Island records are also from owl pellets. This species does not occur on Bodie or Ocracoke islands, and its status on Roanoke Island is unknown.**

Additional Records.—*Dare Co.*: Big Kinnakeet, Hatteras Island (Engels 1941); Pea Island (Lee et al 1983).

SOUTHERN SHORT-TAILED SHREW (*Blarina carolinensis*)*. Not recorded by Quay. **We have examined specimens of this species from Roanoke Island, near Kitty Hawk, and Bodie Island where is uncommon. Quarles (1974) reported it from "Hatteras North" (ca. 2 mi. SW Cape Hatteras lighthouse) but the specimen was not saved (Odum, pers. comm.). Skeletal remains of *Sorex* and *Cryptotis*, but not *Blarina*, have been taken from owl pellets collected on Hatteras Island, and we find it unlikely that this shrew occurs on Hatteras or Ocracoke islands.**

Specimens Examined (4).—*Dare Co.*: Bodie Island (1 UNCW); 2.2 mi. NNW Kitty Hawk (1 USNM); Manteo (1 UNCW); Wanchese (1 UNCW).

Additional Records.—*Dare Co.*: Nags Head (Webster 1988).

LEAST SHREW (*Cryptotis parva*)*. Common to locally abundant, Cape Hatteras-Hatteras Inlet region: possibly present in lower numbers in whole park: open to dense and moist herbaceous and herb-shrub habitats. **This shrew is widespread on Bodie, Hatteras and Roanoke islands, where it is relatively common in dense herbaceous communities, especially during periods of rapid population growth. It is fairly common in thickets and on hummocks in marshes, but it is rare in sparsely-vegetated dunes and dense forests. This species was moderately represented in owl pellets collected from Hatteras Island in the late 1950s.**

Specimens Examined (23).—*Dare Co.*: Bodie Island (13 UNCW); Buxton (1

NCSM, 2 UMMZ, 1 UNCW); Hatteras (1 UNCW); Little Kinnakeet (4 UNCW); Nags Head (1 UNCW).

Additional Records.—*Dare Co.*: Frisco (Quay's field notes).

EASTERN MOLE (*Scalopus aquaticus*)^{*}. Abundant. Buxton Woods-Cape Hatteras region: not present elsewhere, except possibly at Avon; washed with regular or hurricane tide waters. **Relatively common on Bodie and Hatteras islands in most upland communities; its status on Roanoke Island is unknown.** Tunnels usually are found in soils containing roots and other organic matter, such as in residential areas and forests, but they sometimes enter the beach strand from adjacent dunes and grasslands.

Specimens Examined (4).—*Currituck Co.*: Corolla (1 UNCW). *Dare Co.*: Buxton (1 UNCW); 1.2 mi. NNW Kitty Hawk fishing pier (2 USNM).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Avon (Boone 1988b); Bodie Island (Boone 1988b); Cape Hatteras (Brimley 1944-46); Frisco (Quay's field notes); Nags Head Woods (Webster 1988).

SILVER-HAIRED BAT (*Lasiorycteris noctivagans*). Not recorded by Quay. Webster (1988) speculated that forests along the Outer Banks are used as daytime roosts during spring and fall migrations, but silver-haired bats are apparently rare in the National Seashore.

Specimens Examined (2).—*Hyde Co.*: Ocracoke (2 ANSP).

Additional Records.—*Dare Co.*: Nags Head Woods (Webster 1988); Pea Island (Lee et al 1983).

RED BAT (*Lasturus borealis*)^{*}. The only record is of an adult male collected at Pea Island on August 31, 1958 from a group of four bats flying over the road at dusk. **Uncommon on Bodie and Hatteras islands except during autumnal migrations when it is locally abundant. It is relatively common on Roanoke Island, but we have not found it on Ocracoke Island, even when large swarms of bats move through in the fall. Red bats forage along the edges of forests and over roads and permanent sources of water from March through November in the Buxton area, and this species may overwinter there.**

Specimens Examined (1).—*Dare Co.*: Bodie Island (1 UNCW).

Additional Records.—*Dare Co.*: Nags Head Woods (Webster 1988); Pea Island, Oregon Inlet Coast Guard Station (Quay's field notes); Pea Island (Lee et al 1983).

EVENING BAT (*Aycticeus humeralis*). Not recorded by Quay. Although a common spring-to-fall resident on the mainland, we provide herein the first report of this species from the barrier islands of North Carolina.

Specimens Examined (2).—*Dare Co.*: 0.5 mi. E, 1.2 mi. S bridge over Currituck Sound, Rt. 158 (1 USNM); Manteo (1 NCSM).

MARSH RABBIT (*Sylvilagus palustris*)*. Not recorded by Quay. Although Engels (1942) recorded marsh rabbits from Ocracoke Island, Quay did not include this species in his checklist of mammals. It is found in thickets and marshes and is particularly abundant along the highway on Bodie Island, uncommon on Ocracoke Island (based on a single individual found dead on the road by Webster), and locally common on Roanoke Island. Boone (1988b) noted the presence of marsh rabbits on Hatteras Island, but we found no evidence of their existence there, and marsh rabbits have not been taken on Pea Island, where rabbits are trapped to feed the red wolves at Alligator River National Wildlife Refuge.

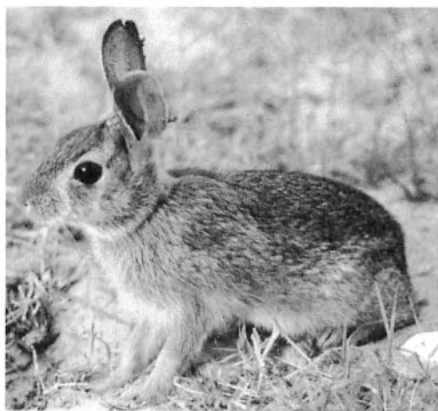
Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Manteo (Lee et al 1983); Nags Head Woods (Webster 1988).

EASTERN COTTONTAIL (*Sylvilagus floridanus*)*. Abundant (except entirely absent from Pea Island): woods edges, thickets, herb and herb-shrub habitats, sparsely vegetated beaches and dunes near heavier cover, edges of fresh and brackish marshes. Now common to abundant wherever adequate cover exists on Bodie, Hatteras, Ocracoke and Roanoke islands. The distributional status of the cottontail has changed tremendously over the years. E. L. Green, Jr., did not record its presence in the Cape Hatteras region in 1936-37. Quay considered it to be abundant throughout except at Pea Island, which became connected to Hatteras Island in 1945 when New Inlet closed. Cottontails are now a common sight at dusk and dawn. It is greatly outnumbered by the marsh rabbit at Bodie Island.

Specimens Examined (17).—*Dare Co.*: Bodie Island (1 NCSM); Buxton (5

UMMZ, 3 UNCW); 1 mi. S Buxton (1 UMMZ); Cape Hatteras (2 UMMZ); Frisco (2 UNCW); Nags Head Woods (1 NCSM); Salvo (1 UNCW). *Hyde Co.*: Ocracoke Island (1 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Duck (Lee et al 1983); Hatteras Inlet (Quay's field notes); Wright Brothers Memorial (Boone 1988b).



*Eastern
Cottontail*

EASTERN GRAY SQUIRREL (*Sciurus carolinensis*)^{*}. Fairly common to locally common, Buxton Woods only. **Now fairly common in forested habitats on Hatteras and Roanoke islands.** Small numbers have been introduced into Ocracoke Village at various times, but without success. Squirrels have not yet colonized Bodie Island (Boone 1988b), but suitable habitat has developed there in the last 35 years and movement into the area should be expected. Individuals in Buxton Woods were heavily parasitized by bots in late summer and early fall in 1988.

Specimens Examined (9).—*Dare Co.*: Buxton (2 UMMZ); 1.2 mi. E Buxton (2 UMMZ); "Dare City" (1 UMMZ); Frisco (1 UMMZ); Kitty Hawk Woods (1 NCSM); Manteo (1 NCSM, 1 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: 3 mi. S Cape Hatteras (Quay's field notes); Duck (Lee et al 1983); Nags Head Woods (Webster 1988).

MARSH RICE RAT (*Oryzomys palustris*)^{*}. Abundant, Hatteras Island; most likely fairly common on Bodie and Ocracoke islands; fresh and brackish herbaceous

marshes, moist herb-shrub areas. Wet meadows and marshes are the favored haunts of the marsh rice rat, which is locally abundant on Bodie, Hatteras and Roanoke islands, and uncommon on Ocracoke Island. The skeletal remains of this species and meadow voles were numerically dominant in owl pellets taken from Hatteras Island in the late 1950s.

Specimens Examined (33).—*Dare Co.*: Bodie Island (12 UNCW); Buxton (1 NCSM, 2 UNCW); Frisco (1 UMMZ); Hatteras Inlet (1 NCSM); Nags Head (1 NCSM, 1 UMMZ, 1 UNCW); 1 mi. E Nags Head (2 UNCW); Pea Island, 4-5 mi. S. Oregon Inlet (7 UNCW). *Hyde Co.*: Ocracoke Island (4 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Cape Hatteras (Brimley 1944-46); Nags Head Woods (Webster 1988); Rodanthe (Quay's field notes).

EASTERN HARVEST MOUSE (*Reithrodontomys humilis*). Not recorded by Quay. This mouse is rarely encountered on the Outer Banks (Webster 1988). Lee et al (1983) provided the only record of its occurrence in the National Seashore, that being an individual from Ocracoke Island. Although records from Bodie, Hatteras and Roanoke islands are lacking, it may occur on each.

Specimens Examined (8).—*Currituck Co.*: 3 mi. S Corolla (4 UNCW). *Dare Co.*: 4 mi. NNW Duck (2 USNM); 0.7 mi. NNW Kitty Hawk fishing pier (1 USNM). *Hyde Co.*: Ocracoke Island, south end (1 NCSM).

WHITE-FOOTED MOUSE (*Peromyscus leucopus*)*. Common. Buxton Woods and closely adjacent herb-shrub-thicket areas. Now common to locally abundant in thickets and forests, uncommon around buildings and rare in dunes and grasslands on Bodie, Hatteras and Roanoke islands. It does not occur on Ocracoke Island. The cotton mouse (*Peromyscus gossypinus*) has been reported to inhabit the forests on Hatteras Island in the Frisco-Buxton area. This record apparently originated with E. L. Green, Jr., who subsequently was cited by Brimley (1944-46), Lee et al (1983) and others. In our evaluation of *Peromyscus* from the Outer Banks we find no specimens of *P. gossypinus* from the Cape Hatteras National Seashore, although the cotton mouse probably inhabits the forest on nearby Roanoke Island. Ontogenetic variation in size and seasonal variation in pelage coloration in *Peromyscus* has apparently led to the confusion in identifying individuals from Hatteras Island. If skulls of specimens are arranged from youngest to oldest (based on the degree of tooth wear) a gradual increase in size is obvious, with no evidence of two taxa of different sizes. If skins of adult specimens are

arranged by month of capture, specimens in bright summer fur are available from the months of April through September, whereas those in dull winter fur are available from September through April.

Specimens Examined (95).—*Currituck Co.*: 3 mi. S Corolla (10 UNCW). *Dare Co.*: Bodie Island (9 UNCW); Buxton (2 NCSM, 28 UNCW); near Duck (4 USNM); Frisco (2 UMMZ, 14 UNCW); near Kitty Hawk (19 USNM); Manteo (2 USNM); Nags Head (5 UNCW).

Additional Records.—*Dare Co.*: Avon (Boone 1988b); Cape Hatteras (Brimley 1944-46); Coquina Beach (Boone 1988b); Salvo (Boone 1988b).

HISPID COTTON RAT (*Sigmodon hispidus*). Not recorded by Quay. The status of this rodent is uncertain. Four individuals were taken by E. L. Green, Jr., from "sandy-shrub areas" at Cape Hatteras in 1936. Unfortunately Green's specimens were not saved, and cotton rats have not been found on Hatteras Island since that time. Cotton rats are known from Roanoke Island (Lee et al 1983) and north of Bodie Island (Webster 1988).

Specimens Examined (1).—*Dare Co.*: Nags Head Woods (1 NCSM).

MEADOW VOLE (*Microtus pennsylvanicus*)?. Common. Cape Hatteras-Hatteras Inlet region: probably fairly common on all of Hatteras and Bodie islands in suitable locations; dense herb and herb-shrub habitats, marsh edges. **Now fairly common in marshes and meadows on Bodie, Hatteras and Roanoke islands. It apparently does not occur on Ocracoke Island.**

Specimens Examined (9).—*Dare Co.*: Bodie Island (5 UNCW); Buxton (2 UNCW); Nags Head (1 UNCW); Pea Island, 5 mi. S Oregon Inlet (1 UNCW).

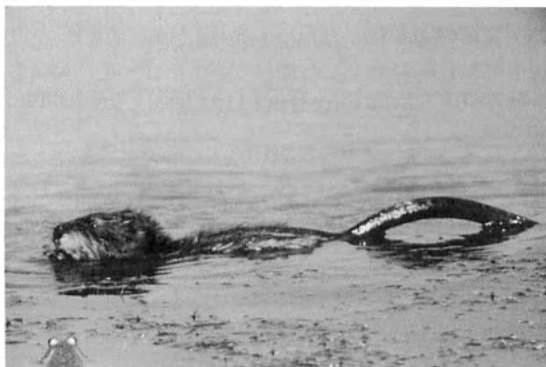
Additional Records.—*Dare Co.*: Hatteras (Brimley 1944-46); Hatteras Inlet (Quay's field notes).

MUSKRAT (*Ondatra zibethicus*)?. Fairly common. Hatteras and Bodie islands, locally abundant in the two large freshwater ponds on Pea Island and the one on Bodie Island; fresh and brackish ponds and marshes. **Muskrats are now relatively common in the marshes of Bodie, Hatteras, Ocracoke and Roanoke islands. Individuals usually were seen in roadside ditches, canals and along the edges of shallow ponds.**

Specimens Examined (8).—*Currituck Co.*: Corolla (1 UNCW); Pine Island (1 USNM). *Dare Co.*: Bodie Island (1 UNCW); Buxton (1 UNCW); Nags Head (1

USNM); Pea Island (1 NCSM, 2 UNCW).

Additional Records.—*Dare Co.*: Cape Hatteras (Quay's field notes).



Muskrat

BLACK RAT (*Rattus rattus*). Fairly common, Ocracoke Island only; in and around buildings, and in nearby herb-shrub and marsh areas. Engels collected a black rat on Ocracoke in 1940, but did not find the Norway rat. **Engels (1942) reported the black rat from Ocracoke Island, but there have been no additional records of this commensal species since. At least one species of *Rattus* still inhabits Ocracoke Village, moving into restaurants that close during the colder months.**

NORWAY RAT (*Rattus norvegicus*). Common, Hatteras Island; most likely on Bodie Island; in and around buildings and dumps, herb-shrub areas, edges of fresh and brackish ponds and marshes. **Now known from Bodie (Boone 1988b) and Hatteras islands, where it is uncommon around buildings and rare in marshes. Its abundance on Pea Island has diminished since Quay's field investigations. This species may have replaced the black rat on Ocracoke Island.**

Additional Records (Quay's field notes).—*Dare Co.*: Avon; Cape Hatteras; Frisco; Pea Island.

HOUSE MOUSE (*Mus musculus*)*. Abundant; buildings, sparsely to densely vegetated beaches and dunes, herb-shrub growths, marsh edges. **Currently the most abundant and widespread mammal in the Cape Hatteras National Seashore; it is an abundant denizen of dunes and grasslands, an uncommon inhabitant of marsh and swamp edges and a locally common resident around buildings on all islands included in this report. It was moderately common in owl pellets collected on Hatteras Island in the late 1950s.**

Because it is abundant and found in all habitats, some specimens were discarded.

Specimens Examined (63).—*Dare Co.*: Bodie Island (23 UNCW); Buxton (1 NCSM); Cape Hatteras (1 USNM); Little Kinnakeet (1 UNCW); Oregon Inlet (35 UNCW, 1 USNM); Pea Island (1 NCSM).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.* (Quay's field notes, unless otherwise noted): Frisco; Hatteras Inlet; Manteo (Lee et al 1983); Nags Head (Webster 1988); Rodanthe.

NUTRIA (*Myocastor coypus*)^{*}. Fairly common to locally common, Hatteras Island; fresh and brackish ponds and marshes. **Since its introduction on Hatteras Island in 1941, the nutria has become a widespread inhabitant of all wetland habitats on Bodie, Hatteras, Ocracoke and Roanoke islands.** Nutria frequently were seen feeding in the fields and shallow ponds on Pea Island, and their distinctive foot and tail tracks indicate that they sometimes wander into dune and beach strand habitats. Milne (1963) and Milne and Quay (1967) discussed the status of the nutria on Hatteras Island.

Specimens Examined (8).—*Currituck Co.*: Corolla (2 UNCW). *Dare Co.*: Buxton (1 NCSM); Duck (1 USNM); dredged-material island in Hatteras Inlet (1 UNCW); 0.25 mi. S Cape Hatteras Lighthouse (1 NCSM); Pea Island (1 NCSM, 1 UNCW).

Additional Records.—*Dare Co.*: Bodie Island (Boone 1988b); Nags Head (Webster 1988).

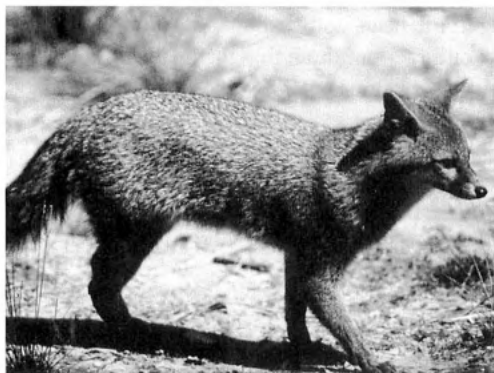


Nutria

GRAY FOX (*Urocyon cinereoargenteus*)*. Common, Bodie Island; open and herbaceous beaches and dunes, herb-shrub and thicket habitats, edges of fresh and brackish marshes. **Now common on Bodie Island, where it frequently was seen dead along the side of the highway. Only sight records exist on Hatteras and Roanoke islands, where it apparently is uncommon.** Tracks and scat usually were found in dune-strand and grassland-thicket transitional areas or in forests with broken canopies. It does not inhabit Ocracoke Island.

Specimens Examined (3).—*Dare Co.*: Bodie Island (2 UNCW); Kill Devil Hills (1 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Nags Head (Webster 1988); Wright Brothers Memorial (Boone 1988b).



Gray Fox

RACCOON (*Procyon lotor*)*. Common, Hatteras Island (except the Pea Island part) and Bodie Island; locally abundant in Buxton Woods-Cape Hatteras area; nests and dens in trees and thickets; ranges widely, at night, on open and vegetated beaches and dunes, along the edges and shores of ponds and marshes, on soundside beaches and shores with or without bordering salt marsh, in herb-shrub and thicket habitats, and through the woodlands. **Now common in forests and thickets and uncommon to locally common in most wetlands on Bodie, Hatteras and Roanoke islands.** It is common in Buxton, where individuals can often be flushed from the large garbage containers at night. It does not occur on Ocracoke Island.

Specimens Examined (2).—*Dare Co.*: Buxton (1 UNCW); Frisco (1 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Bodie Island (Boone 1988b); Cape Hatteras (Quay's field notes); Duck (Lee et al 1983); Nags Head (Webster 1988).

MINK (*Mustela vison*)*. Uncommon; locally fairly common, Avon and Frisco regions; rare to casual, Pea Island; fresh and brackish ponds and marshes—mainly along the edges and shorelines of ponds, sloughs, ditches, marsh openings, and sound. **Now uncommon in marshes, wet meadows and along the edges of ditches, canals and ponds.** Engels (1942) recorded its presence on Ocracoke Island, and E. L. Green, Jr., observed it near Buxton. Boone (1988b) did not include this species in his list of the mammals of Bodie Island, but we have seen mink or their tracks in freshwater marshes near the Bodie Island Lighthouse and at the north and south ends of Ocracoke Island.

Specimens Examined (1).—*Dare Co.*: Cape Hatteras National Seashore (1 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Buxton (Lee et al 1983); Nags Head (Webster 1988).



River Otter

RIVER OTTER (*Lutra canadensis*)*. Fairly common; inshore sound beaches, sound-side sloughs and embayments, fresh and brackish ponds and marshes, occasionally on ocean beaches. **A fairly common denizen of the Seashore, otters or their spoor were usually seen in shallow water around inlets or in creeks,**

sloughs and ponds on Bodie, Hatteras, Ocracoke and Roanoke islands. Boone (1988b) did not mention the presence of otter on Bodie Island, but we have seen the animals, their tracks and their scat there, at Pea Island and at the south ends of Hatteras and Ocracoke islands.

Specimens Examined (1).—*Dare Co.*: Pea Island (1 UNCW).

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.*: Nags Head (Webster 1988).

HOUSE CAT (*Felis silvestris* (*F. domesticus*)). Feral house cats are common. Now locally common in all upland habitats on Bodie, Hatteras, Ocracoke and Roanoke islands. Population sizes vary from island to island but, in general, numbers are greater near persistent sources of recruitment (towns and villages). A cat removal program is recommended.

Additional Records.—*Currituck Co.*: Currituck Shooting Club (Parnell et al 1987a); Pine Island Audubon Sanctuary and Pine Island Shooting Club (Parnell et al 1987b). *Dare Co.* (Boone 1988b, unless otherwise noted): Avon; Bodie Island; Buxton; Coquina Beach; Little Kinnakeet; Nags Head Woods (Webster 1988).

WHITE-TAILED DEER (*Odocoileus virginianus*)*. Common. Buxton Woods only. Now common in the forested parts of Bodie and Hatteras islands. The Hatteras population is relatively stable, but the herd at Bodie Island apparently has become established only within the last 35 years.

Specimens Examined (6).—*Currituck Co.*: 3 mi. S Corolla (2 UNCW). *Dare Co.*: Avon (1 UNCW); Buxton (2 NCSM, 1 UNCW).

Additional Records.—*Dare Co.*: Cape Hatteras (Quay 1959); Nags Head Woods (Webster 1988); Wright Brothers Memorial (Boone 1988b).

FERAL ANIMALS. Feral horses, pigs, cattle, sheep and goats have been released on Bodie, Hatteras and Ocracoke islands in the past. There are anecdotal records of each in the literature, and we mention them here only for the sake of completeness. All were removed from the National Seashore by the 1950s except one small herd of horses, which is penned on Ocracoke Island. Individuals of each species still escape from captivity on occasion, especially pigs (Parnell et al 1987a 1987b), but for the most part feral livestock are no longer important animals in the Cape Hatteras Seashore.

Discussion

The Cape Hatteras National Seashore has changed considerably since Quay's investigation in the late 1950s. There have been few major tropical storms, and the natural process of community succession has progressed to a more complex assortment of habitats, with a general trend toward more areas of dense thicket and thicket-woodland in the most protected portions.

Many open areas that were once maintained by storms or accessible only to recreational vehicles, such as Ocracoke Flats, have become dominated by herbaceous vegetation during this period of less frequent tropical storm activity and greater control of off-road vehicular traffic. Ponds have become overgrown with submerged and emergent vegetation and are gradually filling with organic debris. Only intertidal beaches and beachfront areas that are affected by frequent northeasters, overwash or inlet migration are still characterized by bare beach or sparsely vegetated dunes. These predictable changes in community composition have altered the availability of habitat for wildlife, especially birds and mammals.

During the mid-to-late 1970s, Quay, under contract with the North Carolina Agricultural Experiment Station, evaluated changes in the National Seashore's habitats and noted that there had been major changes since the late 1950s. He pointed out increases in high marsh from low marsh and swale, extensive succession toward woody vegetation, reduction and thinning of Buxton Woods as development occurred, and expansion of buildings (Quay 1978).

He also noted that changes leading from younger, more open habitats to older, denser woody habitats were resulting in decreases in the diversity of vertebrates in many portions of the area and commented that there was a decline in the use of natural beach communities by nesting birds as erosion and increased human use made them less suitable for wildlife.

He contrasted the situation within the National Seashore, which is not a directly managed habitat, with a greater diversity of habitats and animal life in the Pea Island National Wildlife Refuge where habitat management led to the maintenance of a greater proportion of ecologically younger habitats (Quay 1979). Habitat management at Pea Island, beginning in the late 1930s, included cutting, burning, discing, and controlling water levels in the ponds.

Changes Over 20 Years

In 1980, Quay compared changes in habitats at comparable selected areas on Bodie and Pea islands between 1958 and 1978. He estimated, by use of aerial photographs and on-site inspections, that there had been a 43 percent conversion from open, lower, more diverse herb-dominated communities to herb-shrub, or shrub-dominated communities on Bodie Island. He estimated a 14 percent change from open communities toward shrub dominated communities at Pea Island. He also noted that the fauna of Pea Island was much more diverse and richer in

numbers than that at Bodie Island (Quay 1980).

To provide a more quantitative assessment of changes since the late 1950s than was possible based on a visual interpretation of observed changes, we compared sets of aerial photographs taken in 1955 and 1984 at four areas within the boundaries of the Cape Hatteras National Seashore. The areas chosen for evaluation were Bodie Island, Hatteras Island just south of Salvo, the Buxton-Frisco-Hatteras Village region and Ocracoke Island.

The amount of unvegetated habitat, herbaceous plant-dominated and shrub/forest-dominated habitat was calculated for each identical sample area from both sets of photographs. The results from three of these areas are found in Table 1. So much sand has accreted on the south end of the fourth area, Bodie Island, during the 30-year-period that we could not compare the two sets of photographs directly, but the same general pattern of vegetative succession has occurred there as at the other three sites.

In each area, there has been a progression from open, unvegetated habitat to communities dominated by dense herb or shrub/forest communities. Part of this phenomenon is due to the protective nature of dunes that were built primarily in the 1950s, which prevented lowland flooding (thereby allowing herbaceous plants to become established) and by trapping windblown sand (Birkemeier et al 1984).

Vegetation that had become established prior to Quay's investigation was severely overwashed by major hurricanes in 1954 and 1955, and then again in the Ash Wednesday Storm of 1962, and during Quay's early work, was very open with extensive barren or nearly barren areas present. Since that time, however, much of the bare habitat has become vegetated by herbs, grasses and shrubs. Also contributing to this trend towards less bare, unvegetated habitat is the policy to prohibit recreational vehicles on dunes and other areas considered important wildlife habitat — such as Piping Plover nesting sites — and the removal of grazing livestock.

Table 1. Relative percentage of three habitat types in three selected areas within Cape Hatteras National Seashore.

Habitat Type	Ocracoke 1955/ 1984	Cape Point/ Hatteras 1955/ 1984	Salvo 1955/ 1984
Unvegetated	38.3/ 13.8	19.5/ 9.6	41.8/ 8.8
Herb-dominant	61.0/ 76.9	63.1/ 43.0	58.2/ 86.8
Shrub/forest dominant	0.7/ 9.3	17.4/ 47.4	0.0/ 4.4

Maritime Forests in the Making

Herbaceous plant-dominated habitats are more common now on Ocracoke and the area south of Salvo than in the late 1950s, for the reasons listed above. These areas remain relatively unstable and have been seriously overwashed during major storms since the 1950s, resulting in transitional habitat that becomes overgrown by herbaceous vegetation when storms are not frequent but that seldom develops into thickets or woodlands.

On the other hand, the amount of area dominated by herbaceous vegetation has diminished in the relatively stable Cape Point-Hatteras-Buxton region as open unvegetated areas and grasslands of the 1950s have been replaced by well-developed shrub thickets and developing woodlands. The Bodie Island region south of the marina, primarily barren sand flats in the 1950s, has become dominated by herbaceous vegetation as sand has accumulated on the north side of Oregon Inlet under the bridge. This region is too recent for the development of arborescent vegetation.

Areas dominated by shrub thickets and young thicket woodlands have increased in all study areas, including Bodie Island north of the marina. These areas represent the most protected segments of the National Seashore, and although the mature portions of that segment of Buxton Woods protected by inclusion in the National Seashore have remained essentially unchanged throughout this period, much of the National Seashore has become dominated by thickets and young forests.

This is particularly evident along the west side of Highway 12 between Buxton and Pea Island, where unobstructed views of the marsh were common during Quay's field work in the 1950s but where communities dominated by woody vegetation now prevail. These habitats, the most protected in the area, will likely continue to develop toward maritime forests if they remain undisturbed.

These changes in vegetation have had a profound effect on birds and mammals. Species that inhabit herb-dominated and arborescent communities are, in general, more abundant than in the late 1950s, whereas those that utilize bare to nearly bare unvegetated upland habitats are less common.

The situation is not simple, however. We appear to be in a period of relatively mild winters and the ranges of some species are expanding or contracting into or out of the region without regard to local changes in habitat. In others, changes in population sizes within the National Seashore simply reflect changes in numbers throughout the ranges of the species. Much additional study, both locally and regionally, will be needed to fully explain all the changes that have occurred over the past 35 years.

Bird and Mammal Use of the National Seashore

Quay included 243 species of birds and 22 species of terrestrial mammals in his checklist. This report contains 363 species of birds and 27 species of mammals.

Many of the additional bird records reflect incidental reports of species that do not regularly inhabit the Cape Hatteras National Seashore. The area is along a major migratory route and is a place where vagrant birds often stop. As the reputation for the presence of vagrants has grown, increased activity of bird watchers in the region has directly led to the discovery of many species new to the area.

While the National Seashore provides important resting places for these birds, their presence relates less directly to the quantity and nature of the habitats than is the case for those species that regularly use habitats within the area during some portion of their annual cycle. As noted in the methods of study section, Sykes recorded 42 species of small land birds in 1965 (Sykes 1967, 1986) by the use of mist net during the fall migration.

Mammals are much more sedentary than birds, and most of the new mammal records clarify the status of species that were omitted in the previous report because too little was known at that time to comment about them with certainty.

Several species of colonial waterbirds have increased their use of open unvegetated or sparsely vegetated beaches for nesting during the past 35 years. Quay found only small colonies of terns on the beaches, but in the early 1980s a large, mixed-species colony developed on Ocracoke Flats and in the mid-1980s large colonies developed at Cape Point and on the north side of Hatteras Inlet.

Reasons behind the establishment of the Ocracoke Flats colony are obscure, but its subsequent demise was clearly attributable to the development of extensive marshes after heavy ORV traffic on the flats was restricted to a new road built from Highway 12 to Ocracoke Inlet.

Colony development at Cape Point and Hatteras Flats was clearly related to the loss of suitable habitat on nearby dredged-material islands as dredging practices failed to maintain the early successional stages needed by these species. Here, restriction of vehicular traffic on beaches allowed these birds to nest successfully at beach locations where they were not able to survive during earlier periods when control of ORVs was less evident.

The lesson of Ocracoke Flats should be remembered, however, as without either natural storm events or the disturbance (outside of the nesting season) of ORVs, both of these areas will also likely remain suitable for nesting for only a few years. The upper beach area at Cape Point is already becoming vegetated and much of the colony shifted out closer to the point during the 1989 season. These bare but relatively stable conditions may also be important to the apparently increasing nesting population of Piping Plovers.

Species that likely have increased in abundance since the late 1950s due to an increase in herb-dominated communities include the Eastern Meadowlark and Red-winged Blackbird. The nutria probably fits into this category as well. Species that have increased in abundance with increased amounts of thicket and woodland habitats include the Eastern Phoebe, Northern Mockingbird, Gray Catbird, Brown Thrasher, Indigo Bunting and Rufous-sided Towhee. Mammals that fall into this

category include the Virginia opossum and white-footed mouse.

The Blue Jay has extended its range throughout northeastern North Carolina in recent years and the increase within the National Seashore is part of a general but poorly understood trend. Several species of birds are more abundant now throughout their respective ranges or are generally expanding ranges into the region and now occur regularly. Such species include the Double-crested Cormorant, Little Blue Heron, Cattle Egret, White and Glossy ibises, Tundra Swan, Gadwall, Northern Shoveler, Wood Duck, Hooded Merganser, American Oystercatcher, Herring Gull, Great Black-backed Gull, Forster's Tern, Caspian Tern and Brown-headed Cowbird.

Increased observations of species such as the Common Teal and Eurasian Wigeon are likely due to increased searching by bird watchers who have become aware of the potential for their presence.

The Ring-necked Pheasant has decreased in abundance since the late 1950s as open, herb-dominated communities have been replaced by dense tangles of arborescent vegetation, and as predators such as Virginia opossums, gray foxes and feral cats have become more abundant on Hatteras Island. Local observers also note a correlation in their decline with the unusual severe winter storms of the mid-1980s. The Thick-billed Plover is also less common than earlier. This may be due to diminished bare substrate, but the Piping Plover, which appears to have similar habitat requirements, has increased during the same period.

The construction of a rock jetty on the southside of Oregon Inlet has created a man-made rocky shoreline, providing winter habitat for such species as Purple Sandpipers, eiders, and Harlequin Ducks.

Migratory, largely carnivorous birds such as the Common Loon, Horned Grebe, Least Bittern, American Bittern, the scoters, Cooper's Hawk, Bald Eagle and Black Tern are less abundant, due perhaps to persistent pesticides in the environment or to other environmental and biological contaminants either in North Carolina habitats or perhaps in areas occupied during other parts of their annual cycles.

At least three species (Brown Pelican, Osprey and Peregrine Falcon) that have suffered in parts of their ranges due to pesticides have increased their numbers in recent years.

Canada Goose populations have declined throughout the state as populations began to overwinter farther north in the late 1950s. Snow Goose populations appeared to be following a similar trend beginning in the mid-1980s. Black Duck populations are declining on a continent-wide basis due at least partially to increased competition and hybridization with the Mallard. This may well help to account for changes within the National Seashore, as Mallard numbers appear to have increased, and feral Mallards are now established at several villages.

For information on the status of birds at Cape Hatteras see the pamphlet entitled, *Birds of the Outer Banks* (Fussell and Lyons 1990).

Status of Mammals

The status of several species of mammals remains a bit mysterious. The southeastern shrew may have been more widespread when maritime forests were more prevalent in the late 1800s (Dunbar 1958), but it is seldom encountered now even though forests are again becoming more widespread. The hispid cotton rat has apparently been extirpated from Hatteras Island, although it still inhabits Roanoke Island and the Outer Banks north of Oregon Inlet.

The distribution of marsh rabbits and eastern cottontails is confusing—the former is known from Bodie and Ocracoke islands but not Hatteras Island, whereas the latter is found in large numbers throughout the area. Perhaps both species have been introduced at various places in the past, with varying degrees of success. Five species (house mouse, Norway rat, black rat, nutria and feral house cat) have intentionally or accidentally been introduced into the region and although their effect on native mammals is not well known, it is not natural and therefore probably not beneficial.

Recent management decisions to regulate vehicular traffic, remove livestock and feral house cats, and control-burn segments of the National Seashore represent a departure from traditional policy (Quay 1989) and will help to restore and maintain a diversity of habitats critical for a diverse fauna, and will provide the basis for many of the recreational and commercial pursuits of the National Seashore's visitors.

More Study Needed

This book has only begun to evaluate the changes that have occurred at the Cape Hatteras National Seashore over the past 35 years. Additional, more detailed, quantitative evaluations are needed. We recommend the establishment of permanent transects through all major community types. These can serve to allow evaluation of changes in both plant and animal communities. We recommend regular evaluation of these transects at preselected intervals. The development of a database for the storage of such information would also facilitate the use of such data and would help to standardize the evaluation of trends over time.

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This list of references is based on a review of the literature on the birds and mammals of the Outer Banks of North Carolina. In addition to the individual reports listed below there is a great deal of additional information on birds of the Cape Hatteras National Seashore within the "Briefs for the Files" in each issue of *The Chat* and in the "Southern Atlantic Region" report in each issue of *American Birds*.

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Appendix A

Habitat Associations of Birds Based on Recent Field Studies

Habitat Descriptions

1) **INSHORE OCEAN:** Record only those species seen from the beach, not from boats offshore.

2) **BEACH:** The intertidal area from water line to the base of the dunes.

3) **DUNE GRASSLAND:** The dune fields behind the beach back to where other habitats such as shrub thickets or grass flats begin.

4) **SAND FLAT:** The low flats, generally west of highway 12, usually dominated by smooth cordgrass, seaside goldenrod and other grasses or forbs. This is an upland habitat, not high marsh.

5) **SHRUB THICKET:** Habitats dominated by woody vegetation less than 5 meters in height. Wax myrtle, *Iva* spp., *Baccharis halimifolia*, and low live oak thickets are most typical.

6) **MARITIME FOREST:** Habitats dominated by woody vegetation more than 5 meters tall. All forest in the Park is considered maritime.

7) **HIGH MARSH:** Habitats dominated by grasses and forbs, usually *Spartina patens*, which flood with sound water at irregular and infrequent intervals. Usually found along the sound side of the island.

8) **BRACKISH MARSH:** The fringe of marsh along the sound side of the island that floods on a regular basis, usually dominated by *Spartina alterniflora*.

9) **FRESH WETLAND:** Freshwater marshes and ponds usually dominated by cattails, sawgrass, etc. The marshes and ponds of Buxton Woods are the most important examples.

10) **IMPOUNDMENT:** Shallow, diked impoundments that may be fresh or slightly brackish. The impoundments at Pea Island are most important.

11) **BODIE ISLAND POND:** This includes the lighthouse pond and roadside borrow pits on Bodie Island.

12) **UNDESIGNATED:** Species for which there are no habitat data.

Numbers indicate habitats for each species

GAVIIDAE

- Pacific Loon — 1
- Common Loon — 1-9-10
- Red-throated Loon — 1

PODICIPEDIDAE

- Red-necked Grebe — 1
- Horned Grebe — 1-10-11
- Eared Grebe — 10
- Pied-billed Grebe — 8-9-10-11

PROCELLARIIFORMES

- Northern Fulmar — 1
- Cory's Shearwater — 1
- Greater Shearwater — 1
- Sooty Shearwater — 1
- Manx Shearwater — 1
- Audubon's Shearwater — 1
- Leach's Storm-Petrel — 1
- Wilson's Storm Petrel — 1

PELECANIFORMES

- White Pelican — 2
- Brown Pelican — 1-2-6-10-11
- Gannet — 1-12
- Great Cormorant — 1-10
- Double-crested Cormorant — 1-2-10-11
- Magnificent Frigatebird — 1

CICONIIFORMES

- Great Blue Heron — 2-3-6-7-8-9-10-11
- Green-backed Heron — 5-7-8-9-10-11
- Little Blue Heron — 2-5-7-8-9-10-11
- Cattle Egret — 3-4-5-7-8-9-10-11
- Reddish Egret — 9
- Great Egret — 2-4-5-7-8-9-10-11
- Snowy Egret — 2-5-7-8-9-10-11
- Tricolored Heron — 5-7-8-9-10-11
- Black-crowned Night-Heron — 3-4-5-7-8-9-10-11
- Yellow-crowned Night-Heron — 3-4-5-7-8-9-10-11
- Least Bittern — 9-10-11
- American Bittern — 4-7-8-9-10-11
- Wood Stork — 11

Glossy Ibis — 4-5-7-8-9-10-11
White Ibis — 3-4-5-7-8-9-10-11
American Flamingo — 1
ANSERIFORMES
Tundra Swan — 4-9-10-11
Canada Goose — 1-2-4-7-8-9-10-11
Brant — 1-2-9-10-11
Barnacle Goose — 8-10
White-fronted Goose — 4-10
Ross' Goose — 3-4-8-10-11
Snow Goose 1-2-3-4-7-8-9-10-11
Mallard — 1-4-8-9-10-11
Black Duck — 1-4-5-7-8-9-10-11
Gadwall — 1-4-7-8-9-10-11
Northern Pintail — 1-4-7-8-9-10-11
Common Teal — 1-4-8-9-10-11
Blue-winged Teal — 4-7-8-9-10-11
European Wigeon — 8-10-11
American Wigeon — 1-4-8-9-10-11
Northern Shoveler — 4-8-9-10-11
Wood Duck — 8-9-10-11
Redhead 1-9-10-11
Ring-necked Duck — 1-9-10-11
Canvasback — 1-9-10-11
Greater Scaup — 1-9-10
Lesser Scaup -- 1-9-10-11
Common Goldeneye — 1-9-10-11
Bufflehead — 1-9-10-11
Oldsquaw — 1-10
Harlequin Duck — 1
Common Eider — 1
King Eider — 1
White-winged Scoter — 1
Surf Scoter — 1
Black Scoter — 1
Ruddy Duck — 1-9-10-11
Hooded Merganser — 9-10-11
Common Merganser — 1-10-11
Red-breasted Merganser — 1-9-10-11
FALCONIFORMES
Turkey Vulture -- 12
Swallow-tailed Kite — 9

Mississippi Kite — 12
Sharp-shinned Hawk — 4-5-6-8
Cooper's Hawk — 5-6
Red-tailed Hawk — 4-5
Red-shouldered Hawk — 5-6-9
Broad-winged Hawk — 12
Swainson's Hawk — 3
Rough-legged Hawk — 7-8
Bald Eagle — 5-10
Marsh Hawk — 3-4-5-7-8-9-10-11
Osprey — 1-8-9-10-11
Peregrine Falcon — 2-3-4-5-6-7-10-11
Merlin — 2-3-4-5-6-7-10-11
American Kestrel — 3-4-5-6-7-10

GALLIFORMES

Bobwhite — 3-4-5-6-7
Ring-necked Pheasant — 3-4-5-7-10

GRUIFORMES

Sandhill Crane — 12
King Rail — 7-8-9-10-11
Clapper Rail — 7-8-10-11
Virginia Rail — 7-8-9-10-11
Sora — 7-8-9-10-11
Yellow Rail — 8
Black Rail — 4-8
Common Moorhen — 7-9-10-11
American Coot — 8-9-10-11

CHARADRIIFORMES

American Oystercatcher — 2-3-4-10
Black-necked Stilt — 8-10-11
American Avocet — 8-10-11
Semipalmated Plover — 2-10-11
Wilson's Plover — 2-10
Killdeer — 2-3-4-10-11
Piping Plover — 2-4-10
American Golden Plover — 2-3-4-10-11
Black-bellied Plover — 2-3-4-7-10-11
Hudsonian Godwit — 2-10-11
Bar-tailed Godwit — 10
Marbled Godwit — 2-10-11
Whimbrel — 2-4-10-11
Long-billed Curlew — 2-4-7

Upland Sandpiper — 3-4-7
 Greater Yellowlegs — 2-4-7-9-10-11
 Spotted Redshank — 2-7
 Lesser Yellowlegs — 2-7-10-11
 Solitary Sandpiper — 9-10-11
 Willet — 2-3-4-7-8-9-10-11
 Spotted Sandpiper — 2-9-10-11
 Ruddy Turnstone — 2-4-10-11
 Wilson's Phalarope — 2-10-11
 Northern Phalarope — 1-2-10-11
 Red Phalarope — 2
 American Woodcock — 4-5-6-8-11
 Common Snipe — 2-4-7-8-9-10-11
 Short-billed Dowitcher — 2-4-8-9-10-11
 Long-billed Dowitcher — 9-10-11
 Red Knot — 2-4-10-11
 Sanderling — 2-4-10-11
 Semipalmated Sandpiper — 2-4-9-10-11
 Western Sandpiper — 2-10-11
 Least Sandpiper — 2-7-8-9-10-11
 White-rumped Sandpiper — 2-4-10-11
 Baird's Sandpiper — 2-7-10-11
 Pectoral Sandpiper — 2-3-4-7-10-11
 Purple Sandpiper — 2
 Dunlin — 2-7-8-9-10-11
 Curlew Sandpiper — 2-10-11
 Stilt Sandpiper — 10-11
 Buff-breasted Sandpiper — 2-3-4-7-8-10-11
 Ruff — 2-10-11
 Pomarine Jaeger — 1-2
 Parasitic Jaeger — 1-2
 Long-tailed Jaeger — 1
 South Polar Skua — 1
 Glaucous Gull — 2
 Iceland Gull — 2
 Great Black-backed Gull — 1-2-3-4-10-11
 Lesser Black-backed Gull — 1-2-4-8-10
 Herring Gull — 1-2-3-4-8-9-10-11
 Thayer's Gull — 2
 Ring-billed Gull — 1-2-3-7-8-9-10-11
 Black-headed Gull — 2
 Laughing Gull — 1-2-3-8-9-10-11

Franklin's Gull — 2-10
Bonaparte's Gull — 1-2-4-9-10-11
Little Gull — 1-2-11
Black-legged Kittiwake — 1-2
Sabine's Gull — 2
Gull-billed Tern — 2-3-4-7-8-9-10-11
Forster's Tern — 1-2-3-8-9-10-11
Common Tern — 1-2-3-4-7-8-9-10-11
Arctic Tern — 2
Roseate Tern — 1-2
Sooty Tern — 2-3-4
Least Tern — 1-2-4-10-11
Royal Tern — 1-2-3-4-10-11
Sandwich Tern — 1-2-3-4-10-11
Caspian Tern — 1-2-3-9-10-11
Black Tern — 1-2-3-4-7-8-9-10-11
Black Skimmer — 1-2-4-9-10-11
Razorbill — 1-2
Dovekie — 1-2
COLUMBIFORMES
Rock Dove — 12
White-winged Dove — 5
Mourning Dove — 3-4-5-6-10
CUCULIFORMES
Yellow-billed Cuckoo — 5-6
Black-billed Cuckoo — 5-6
STRIGIFORMES
Barn Owl — 3-4-5-6-7-8-10-11
Screech Owl — 5-6
Great Horned Owl — 5-6
Snowy Owl — 3
Burrowing Owl — 3
Short-eared Owl — 3-4-5-6-7-8-9-11
Saw-whet Owl — 6
CAPRIMULGIFORMES
Chuck-will's Widow — 5-6
Common Nighthawk — 3-4-5
APODIFORMES
Chimney Swift — 5
Ruby-throated Hummingbird — 5-6
CORACIIFORMES
Belted Kingfisher — 7-8-9-10-11

PICIFORMES

- Common Flicker — 5-6-10
- Pileated Woodpecker — 5-6
- Red-bellied Woodpecker — 5-6
- Red-headed Woodpecker — 5-6
- Yellow-bellied Sapsucker — 5-6
- Hairy Woodpecker — 6
- Downy Woodpecker — 5-6

PASSERIFORMES

- Eastern Kingbird — 3-4-5-6
- Gray Kingbird — 3-5-6
- Western Kingbird — 3-4-5
- Scissor-tailed Flycatcher — 3
- Great Crested Flycatcher — 5-6
- Ash-throated Flycatcher — 5
- Eastern Phoebe — 4-5-6-7-10-11
- Yellow-bellied Flycatcher — 5-6
- Acadian Flycatcher — 5-6
- Alder Flycatcher — 5-6
- Least Flycatcher — 5-6
- Eastern Wood Pewee — 5-6
- Olive-sided Flycatcher — 5-6
- Vermilion Flycatcher — 5-10
- Horned Lark — 3
- Tree Swallow — 5-7-8-9-10-11
- Bank Swallow — 12
- Rough-winged Swallow — 12
- Barn Swallow — 5
- Cliff Swallow — 5
- Purple Martin — 5
- Blue Jay — 5-6
- Common Crow — 5-6
- Fish Crow — 2-3-4-5-6-7-8-9-10-11
- Carolina Chickadee — 5-6
- Tufted Titmouse — 6
- White-breasted Nuthatch — 5-6
- Red-breasted Nuthatch — 5-6
- Brown-headed Nuthatch — 5-6
- Brown Creeper — 5-6
- House Wren — 3-4-5-6
- Winter Wren — 4-5-6
- Bewick's Wren — 5

Carolina Wren — 4-5-6-10
Marsh Wren — 7-8-9-10-11
Sedge Wren — 7-8-9-10-11
Northern Mockingbird — 3-4-5-6
Gray Catbird — 4-5-6
Brown Thrasher — 4-5-6
Sage Thrasher — 4
American Robin — 3-4-5-6
Wood Thrush — 5-6
Hermit Thrush — 4-5-6
Swainson's Thrush — 5-6
Gray-cheeked Thrush — 6
Veery — 5-6
Eastern Bluebird — 4-5-6
Wheatear — 4
Blue-gray Gnatcatcher — 5-6
Golden-crowned kinglet — 5-6
Ruby-crowned Kinglet — 5-6
Water Pipit — 2-3-4
Sprague's Pipit — 3
Cedar Waxwing — 5-6
Loggerhead Shrike — 3-4
Starling — 4-5-6
White-eyed Vireo — 5-6
Yellow-throated Vireo — 5-6
Solitary Vireo — 5-6
Red-eyed Vireo — 5-6
Philadelphia Vireo — 5-6
Black-and-white Warbler — 5-6
Prothonotary Warbler — 5-6
Worm-eating Warbler — 5-6
Golden-winged Warbler — 5-6
Blue-winged Warbler — 5-6
Tennessee Warbler — 5-6
Orange-crowned Warbler — 5-6-7
Nashville Warbler — 5
Northern Parula — 5-6
Yellow Warbler — 5-6
Magnolia Warbler — 5-6
Cape May Warbler — 4-5-6
Black-throated Blue Warbler — 5-6
Yellow-rumped Warbler — 3-4-5-6-8-9

Black-throated Green Warbler — 5-6
Cerulean Warbler — 6
Blackburnian Warbler — 5-6
Yellow-throated Warbler — 5-6
Chestnut-sided Warbler — 5-6
Bay-breasted Warbler — 5-6
Blackpoll Warbler — 5-6
Pine Warbler — 5-6
Prairie Warbler — 5-6
Palm Warbler — 3-4-5-6-7-8-9
Ovenbird — 5-6
Northern Waterthrush — 5-6-9-10-11
Louisiana Waterthrush — 5
Kentucky Warbler — 5-6
Connecticut Warbler — 5-6
Mourning Warbler — 5-6
Common Yellowthroat — 3-4-5-6-7-8-9-10-11
Yellow-breasted Chat — 5
Hooded Warbler — 5-6
Wilson's Warbler — 5-6
Canada Warbler — 12
American Redstart — 5-6
House Sparrow — 5-6
Bobolink — 3-4-5-7-8-9
Eastern Meadowlark — 3-4-5-7-11
Yellow-headed Blackbird — 3-4-5-7-9
Red-winged Blackbird — 3-4-5-6-7-8-9-10-11
Orchard Oriole — 5-6
Northern Oriole — 5-6
Rusty Blackbird — 6-9
Boat-tailed Grackle — 2-3-4-5-6-7-8-9-10-11
Common Grackle — 3-4-5-6
Brown-headed Cowbird — 3-4-5-6
Scarlet Tanager — 5-6
Summer Tanager — 5-6
Northern Cardinal — 4-5-6
Rose-breasted Grosbeak — 5-6
Blue Grosbeak — 4-5-6
Indigo Bunting — 4-5-6
Dickcissel — 5
Evening Grosbeak — 6
Purple Finch — 5-6

House Finch — 5-6
Common Redpoll — 5
Pine Siskin — 4-5-6
American Goldfinch — 3-4-5-6
Red Crossbill — 6
Rufous-sided Towhee — 5-6
Lark Bunting — 3
Savannah Sparrow — 3-4-5-7
Grasshopper Sparrow — 3
LeConte's Sparrow — 8
Sharp-tailed Sparrow — 7-8
Seaside Sparrow — 7-8
Vesper Sparrow — 3-4-5
Lark Sparrow — 4-5
Bachman's Sparrow — 12
Dark-eyed Junco — 3-4-5-6
Tree Sparrow — 4-5
Chipping Sparrow — 3-4-5-6
Clay-colored Sparrow — 3-4-5
Field Sparrow — 3-4-5-6
White-crowned Sparrow — 4-5
White-throated Sparrow — 5-6-7
Fox Sparrow — 5-6
Lincoln's Sparrow — 4-5
Swamp Sparrow — 4-5-6-7-8-9-10-11
Song Sparrow — 4-5-6-7-8-9-10-11
Lapland Longspur — 2-3
Snow Bunting — 2-3

