

# A Three-Year Shorebird Survey of the Impoundments and Beaches on Bulls Island, South Carolina

---

Doreen Cubie<sup>1</sup>, Perry Nugent<sup>2</sup>, and Jim Cubie<sup>1</sup>

<sup>1</sup> 7329 Awendaw Landing Rd., Awendaw SC 29429, doreencubie@tds.net

<sup>2</sup> 2260 Dallerton Circle, Charleston, SC 29414

## Abstract

We conducted 59 shorebird surveys on Bulls Island in South Carolina's Cape Romain National Wildlife Refuge from April 2001 to June 2004, recording 168,258 individuals on the island's beaches (75.7% of the total), impoundments (19.1%), and one oceanside marsh (5.2%). Of the 29 species observed, the most abundant were Dunlin (*Calidris alpina*) with 61,236 individuals (36.39% of the total) and Short-billed Dowitcher (*Limnodromus griseus*) with 31,484 individuals (18.71%). We also recorded more than 10,000 individuals of four other species: Sanderling (*Calidris alba*), Red Knot (*Calidris canutus*), Semipalmated Plover (*Charadrius semipalmatus*), and Semipalmated Sandpiper (*Calidris pusilla*). The largest number of shorebirds in a single survey was 10,476 on April 1, 2002. The average number of shorebirds per survey was highest during the spring months (51.4% of the total). We also had 72 sightings of shorebirds of six species that had been color banded in Delaware, New Jersey, Michigan, Georgia, South Carolina, Canada, or Brazil. Our census highlights the importance of Bulls Island, especially its impoundments and its beaches, to wintering and migrating shorebirds.

## Introduction

Most shorebirds are long-distance migrants and face threats on breeding grounds, migration routes, and wintering sites. Over half of the shorebird species that use the United States are in decline, and surveys of shorebirds are of high conservation priority. Surveys are especially needed to further evaluate population trends and to identify important habitat (Brown et al. 2001). Cape Romain National Wildlife Refuge (CRNWR) is one of 85 sites in the Western Hemispheric Shorebird Reserve Network, and is a site of international importance. CRNWR provides critical habitat for migrating and wintering shorebirds in coastal South Carolina. Marsh and Wilkinson (1991) and Dodd and Spinks (2001) conducted earlier surveys of shorebirds in the greater Cape Romain region, but did not cover the impoundments of Bulls Island, a 10-kilometer barrier island located in CRNWR. At the request of the staff of CRNWR, we investigated shorebird use of Bulls Island's impoundments, beaches, and one oceanside marsh over a three-year period.

## Methods

Our shorebird surveys on Bulls Island (32.54.28 N, 79.36.47 W) ran from April 2001 to June 2004. Surveys were conducted twice a month from March to November, and once a month from December through February. We began most surveys two to three hours before high tide and finished two to three hours after high tide. Shorebirds are more concentrated around high tide and consequently are easier to count. We surveyed at the same locations every time: seven impoundments (House Pond, Upper Summerhouse Pond, Lower Summerhouse Pond, Jack's Pond, and Pools 1, 2, and 3); two locations on the beach at the northeastern tip of the island; and one oceanside marsh situated between Jack's Pond and the beach. We visited each location on every survey, although the time spent at each one varied according to the number of shorebirds present. The southern beaches were not covered. The principal surveyors were Doreen Cubie and Perry Nugent, with assistance from Jim Cubie and Sue Ann Russell. Our surveys were conducted by truck and on foot. Binoculars and spotting scopes were used, and we estimated large aggregations of shorebirds by counting across by tens for each species present.

## Results

We conducted 59 surveys and counted 168,258 shorebirds, an average of 2852 per survey. The single highest count was 10,476 on April 1, 2002. The lowest count was 122 on July 30, 2001. Table 1 lists the totals for each survey.

We observed a total of 29 species of shorebirds. The most abundant were Dunlin (61,236, 36.39%) and Short-billed Dowitcher (31,484, 18.71%), followed by Sanderling (15,047, 8.94%), Red Knot (13,906, 8.26%), Semipalmated Plover (12,986, 7.72%), and Semipalmated Sandpiper (10,533, 6.27%). Other species with more than 1000 individuals were Western Sandpiper (*Calidris mauri*), Black-bellied Plover (*Pluvialis squatarola*), Ruddy Turnstone (*Arenaria interpres*), Greater Yellowlegs (*Tringa melanoleuca*), Black-necked Stilt (*Himantopus mexicanus*), Least Sandpiper, (*Calidris minutilla*) and Willet (*Catoptrophorus semipalmatus*). Table 2 lists their total numbers and percentages, as well as the numbers for the other 16 species recorded during the surveys. A total of 940 shorebirds (0.56%), mostly distant birds in flight, were unidentified.

We tallied 32,080 individuals (19.1% of the total) in the impoundments, primarily in Jack's Pond and Upper and Lower Summerhouse Ponds. A total of 8751 shorebirds (5.2%) were counted in the Oceanside marsh and 127,427 (75.7%) were on the beach. Table 3 lists the species and numbers recorded in each of the three habitats.

To approximate an annual cycle, we divided the year into four sections: Winter (November–February), Spring Migration (March–May), Summer (June–July), and Fall Migration (August–October) During Winter, we counted 47,131 shorebirds on 12 surveys, and the average count was 3928

(28.0% of the total). During Spring Migration, we tallied 86,512 shorebirds on 19 surveys, and the average count was 4553 (51.4%). During Summer, we recorded 4345 shorebirds on 12 surveys and the average count was 612 (4.4%). During Fall Migration, we counted 27,271 individuals on 16 surveys, and the average count was 1704 (16.2%). Table 4 lists the species and their seasonal numbers.

Table 1. Total numbers of shorebirds by date for surveys on Bulls Island, SC

Date	Total	Date	Total
29 April 2001	3683	05 November 2002	2075
07 May 2001	3434	18 November 2002	3204
21 May 2001	2677	03 February 2003	5952
11 June 2001	839	18 February 2003	4663
25 June 2001	389	03 March 2003	6246
30 July 2001	122	17 March 2003	5113
13 August 2001	431	07 April 2003	6254
27 August 2001	2080	21 April 2003	4769
12 September 2001	838	05 May 2003	3774
02 October 2001	495	19 May 2003	3604
15 October 2001	1015	02 June 2003	710
22 October 2001	4623	16 June 2003	614
05 November 2001	3672	30 June 2003	348
19 November 2001	4208	28 July 2003	605
28 January 2002	3623	11 August 2003	996
11 February 2002	9513	25 August 2003	899
18 March 2002	7579	15 September 2003	3325
01 April 2002	10,476	29 September 2003	1790
15 April 2002	4178	14 October 2003	2214
29 April 2002	7893	27 October 2003	2143
13 May 2002	3055	24 November 2003	2440
20 May 2002	2897	15 December 2003	3656
03 June 2002	1528	09 February 2004	2078
24 June 2002	508	23 February 2004	1096
08 July 2002	127	09 March 2004	4189
22 July 2002	558	19 April 2004	926
09 September 2002	1593	04 May 2004	4790
23 September 2002	2100	17 May 2004	974
07 October 2002	1670	07 June 2004	997
21 October 2002	2010		

Table 2. Total shorebird numbers and species recorded on Bulls Island, SC from April 2001 to June 2004

Common name	Scientific name	Total	Per cent
Dunlin	<i>Calidris alpina</i>	61,236	36.39%
Short-billed Dowitcher	<i>Limnodromus griseus</i>	31,484	18.71%
Sanderling	<i>Calidris alba</i>	15,047	8.94%
Red Knot	<i>Calidris canutus</i>	13,906	8.26%
Semipalmated Plover	<i>Charadrius semipalmatus</i>	12,986	7.72%
Semipalmated Sandpiper	<i>Calidris pusilla</i>	10,553	6.27%
Western Sandpiper	<i>Calidris mauri</i>	7299	4.34%
Black-bellied Plover	<i>Pluvialis squatarola</i>	5778	3.43%
Ruddy Turnstone	<i>Arenaria interpres</i>	1722	1.02%
Greater Yellowlegs	<i>Tringa melanoleuca</i>	1498	0.89%
Black-necked Stilt	<i>Himantopus mexicanus</i>	1319	0.78%
Least Sandpiper	<i>Calidris minutilla</i>	1237	0.74%
Willet	<i>Tringa semipalmata</i>	1076	0.64%
Unidentified		940	0.56%
Marbled Godwit	<i>Limosa fedoa</i>	782	0.46%
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	427	0.25%
Killdeer	<i>Charadrius vociferus</i>	198	0.12%
Spotted Sandpiper	<i>Actitis macularius</i>	138	0.08%
American Oystercatcher	<i>Haematopus palliatus</i>	133	0.08%
Wilson's Plover	<i>Charadrius wilsonia</i>	127	0.08%
Stilt Sandpiper	<i>Calidris himantopus</i>	98	0.06%
Whimbrel	<i>Numenius phaeopus</i>	77	0.05%
Lesser Yellowlegs	<i>Tringa flavipes</i>	64	0.04%
Solitary Sandpiper	<i>Tringa solitaria</i>	56	0.03%
Wilson's Snipe	<i>Gallinago delicata</i>	22	0.01%
Pectoral Sandpiper	<i>Calidris melanotos</i>	17	0.01%
Piping Plover	<i>Charadrius melodus</i>	16	0.01%
American Avocet	<i>Recurvirostra americana</i>	12	0.01%
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	9	0.01%
American Woodcock	<i>Scolopax minor</i>	1	0.01%

We had 72 sightings of color-banded shorebirds, although it is possible some of these were multiple observations of the same birds on different surveys. The majority of the banded shorebirds were Red Knots, although we also recorded Western Sandpiper, Dunlin, Sanderling, American Oystercatcher, and one Piping Plover. The oystercatchers were banded

locally, but nearly all of the other shorebirds were color banded in the Delaware Bay/Cape May, New Jersey region. The exceptions were three Red Knots banded in coastal Georgia and in South Carolina's Hunting Island State Park, one Red Knot banded in Canada, and one Red Knot banded in Brazil. Also, the single color-banded Piping Plover was banded as a chick in Sleeping Bear Dunes National Seashore in Michigan. It was observed on the north beach during two successive fall migrations.

Table 3. Numbers and species of shorebirds, classified by habitat, on 59 surveys on Bulls Island, SC from April 2001 to June 2004

Species	Impoundments	Marsh	Beach
Black-bellied Plover	238	749	4791
Semipalmated Plover	3152	893	8941
Piping Plover	0	0	16
Wilson's Plover	13	14	100
Killdeer	149	14	35
American Oystercatcher	5	19	109
Black-Necked Stilt	1264	55	0
Marbled Godwit	162	94	526
American Avocet	12	0	0
Greater Yellowlegs	1424	66	8
Lesser Yellowlegs	58	5	1
Solitary Sandpiper	55	1	0
Willet	144	144	788
Spotted Sandpiper	126	12	0
Whimbrel	29	48	0
Ruddy Turnstone	40	49	1633
Red Knot	6	1610	12,290
Sanderling	67	328	14,652
Dunlin	3785	1330	56,121
Pectoral Sandpiper	17	0	0
White-rumped Sandpiper	9	0	0
Western Sandpiper	1661	191	5447
Semipalmated Sandpiper	7015	1046	2492
Least Sandpiper	1152	36	49
Stilt Sandpiper	92	6	0
Unidentified	792	2	146
Long-billed Dowitcher	409	18	0
Short-billed Dowitcher	10,181	2021	19,282
American Woodcock	1	0	0
Wilson's Snipe	22	0	0

Five species of breeding shorebirds were observed. The most numerous were Black-necked Stilts, which nested in Jack's Pond and Lower and Upper Summerhouse Ponds during our surveys. We frequently saw adults and chicks together in July and August. We also saw one American Oystercatcher with a chick, flushed one Willet from a nest, and observed a number of Wilson's Plovers and Killdeer performing broken-wing displays, suggesting we were near a nest or chick.

Table 4. Numbers and species of shorebirds, listed by seasons, recorded on 59 surveys on Bulls Island, SC from April 2001 to June 2004

	Winter	Spring Migration	Summer	Fall Migration
Black-bellied Plover	1637	3162	249	730
Semipalmated Plover	2756	6270	441	3519
Piping Plover	2	6	0	8
Wilson's Plover	2	71	40	14
Killdeer	25	107	50	16
American Oystercatcher	16	45	38	34
Black-Necked Stilt	0	516	720	83
Marbled Godwit	37	51	236	458
American Avocet	0	0	1	11
Greater Yellowlegs	186	867	151	294
Lesser Yellowlegs	2	30	15	17
Solitary Sandpiper	0	22	5	29
Willet	184	215	167	510
Spotted Sandpiper	4	72	33	29
Whimbrel	0	55	13	9
Ruddy Turnstone	469	756	70	427
Red Knot	1443	8124	35	4304
Sanderling	3302	4381	681	6683
Dunlin	25,500	33,662	34	2040
Pectoral Sandpiper	0	1	13	3
White-rumped Sandpiper	0	5	4	0
Western Sandpiper	2100	2909	372	1918
Semipalmated Sandpiper	0	5962	1922	2669
Least Sandpiper	2	918	113	204
Stilt Sandpiper	2	4	62	30
Unidentified	0	349	66	525
Long-billed Dowitcher	6	402	0	19
Short-billed Dowitcher	9442	17,549	1813	2680
American Woodcock	0	0	0	1
Wilson's Snipe	14	1	0	7

## Discussion

Our census differed from Marsh and Wilkinson (1991) and Dodd and Spinks (2001) in several respects. First, our survey covered a longer period and was restricted to Bulls Island. We did not count shorebirds in the estuarine areas behind the island, as Dodd and Spinks did, but we did census the impoundments and one of the oceanside marshes, which they did not do. We covered the area by vehicle and on foot, instead of by boat, which allowed us to better observe and count roosting flocks of cryptic shorebirds. It also allowed us to identify the smaller *Calidris* sandpipers to species. In addition, by surveying the beaches on foot, we were able to observe color-banded shorebirds. The 72 banded shorebirds that we recorded suggest Bulls Island is used by birds from all over the hemisphere.

Like Dodd and Spinks, our two most abundant species were Dunlin and Short-billed Dowitcher. As they did, we also recorded large numbers of Sanderlings, Red Knots, Semipalmated Plovers, Semipalmated Sandpipers, Western Sandpipers, and Black-bellied Plovers. Our counts of American Oystercatchers and Marbled Godwits, however, were low compared to the findings of Marsh and Wilkinson and Dodd and Spinks. These two research teams also surveyed oyster reefs and docks along the Intracoastal Waterway. Both are favored roosting spots for oystercatchers and godwits. Bulls Island has little of this type of habitat, and consequently, we did not find large flocks of these two species on the island.

The highest shorebird count by Dodd and Spinks for the Cape Romain area was found during a census at the end of March. Our largest number of shorebirds in a single survey on Bulls Island was on April 1, 2002, suggesting that shorebird numbers peak in late March and early April when the winter residents overlap with the first of the spring migrants.

We had expected our average survey totals would be much higher during spring and fall migration. The single largest count was indeed during spring migration, but the average of the winter surveys was only 13.7% less than the spring count and was 56.6% higher than the fall migration period. The data do seem to indicate there is a large population of wintering shorebirds on Bulls Island.

Of all the areas surveyed, the beach on the northeastern tip of Bulls Island contained the largest number of shorebirds. Protecting this high-tide roost from human disturbance is critical, not only during migration but during winter as well. We also found the numbers of shorebirds in the impoundments were significant, with 19% of all observed shorebirds. Water levels in the impoundments were important, however. The highest numbers of shorebirds were found when the water in the impoundments was drawn down enough to expose shorelines and small mudflats. When water levels were high, virtually no shorebirds were present in the impoundments.

Our census highlights the importance of Bulls Island's impoundments and its beaches, and also serves as baseline data for this area of CRNWR. Long-term monitoring is encouraged to document trends of the species using this island, and to identify management practices that will benefit shorebirds.

**Acknowledgments**

Our thanks to Sarah Dawsey, Refuge Manager, Cape Romain National Wildlife Refuge, and Craig Sasser, Refuge Manager, Waccamaw National Wildlife Refuge, who gave us the opportunity to conduct these surveys, and to the Cape Romain staff who provided transportation and support.

**References**

- Brown, S. C., C. Hickey, B. Harrington, and R. Gill. 2001. The U. S. shorebird conservation plan. Manomet Center for Conservation Sciences. Manomet, Massachusetts.
- Dodd, S. L. and M. D. Spinks. 2001. Shorebird assemblages of the Cape Romain region, South Carolina. *Chat* 65:45–67.
- Marsh, C. P. and P. M. Wilkinson. 1991. The significance of the central coast of South Carolina as critical shorebird habitat. *Chat* 54:69–92.

*Received 6 January 2012, accepted 16 April 2012*