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Assessing the distribution of rufa red knots during spring passage (Cape Henlopen, DE through Little River Inlet, NC): 2022 Annual Report

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ASSESSING THE DISTRIBUTION OF *Rufa* RED KNOTS DURING SPRING PASSAGE (CAPE HENLOPEN, DE THROUGH LITTLE RIVER INLET, NC): 2022 ANNUAL REPORT

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Project Partners:

The Center for Conservation Biology
United States Fish & Wildlife Service



The Center for Conservation Biology is an organization dedicated to discovering innovative solutions to environmental problems that are both scientifically sound and practical within today's social context. Our philosophy has been to use a general systems approach to locate critical information needs and to plot a deliberate course of action to reach what we believe are essential information endpoints.

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EXECUTIVE SUMMARY

The *rufa* subspecies of the red knot (*Calidris canutus*) has declined precipitously over the past four decades from an estimated population of 100,000-150,000 individuals to possibly fewer than 30,000. The *rufa* population undertakes extreme migrations with annual movement distances that range up to 30,000 km and one component of their complex annual cycle is a final refueling event in May before leaving on their ultimate flight to breeding grounds in the high. Major spring staging areas for red knots have been identified along the mid-Atlantic (DE Bay through Delmarva Peninsula) and south Atlantic (SC through north FL) coast. Although a great deal of work with spring migrants has been conducted within DE Bay, we know much less about the importance of staging areas south of this area. Over the past two years, numbers of knots using DE Bay have dropped unexpectedly raising questions about possible short-stopping of birds within southerly staging sites. The Center for Conservation Biology conducted an aerial survey along the outer coast from Cape Henlopen, DE to Little River Inlet, NC as part of a more comprehensive monitoring program that includes the portion of the Atlantic Coast that supports staging knots. The survey was conducted on 18 and 19 May, 2022 and 8,298 red knots were detected in 162 flocks. This included 18 birds in 1 flocks in DE, 67 birds in 4 flocks in MD, 3,595 birds in 32 flocks in Virginia and 4,618 birds in 125 flocks in NC.

BACKGROUND

Context

The *rufa* subspecies of the red knot (*Calidris canutus*) has declined precipitously over the past four decades from an estimated population of 100,000-150,000 individuals to possibly fewer than 30,000 (Dunne et al 1982, Niles et al. 2008), leading some authors to suggest that the population is highly vulnerable to extinction (Baker et al. 2004). This concern has led the United States Fish and Wildlife Service to elevate the form to the list of threatened and endangered wildlife (79 FR 73706) under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). The *rufa* population undertakes extreme migrations with annual movement distances that range up to 30,000 km (Harrington 2001, Niles et al. 2010). One component of their complex annual cycle is a final refueling event in May before leaving on their ultimate flight to breeding grounds in the high Arctic (Morrison and Harrington 1992, Harrington and Flowers 1996, Niles et al. 2008). Conditions within spring staging sites along the western Atlantic Coast are critical to the future of the *rufa* population. Birds must build a large enough energy reserve to complete their flight to the Arctic and arrive with enough surplus to initiate reproduction and take advantage of the short breeding season (Morrison and Hobson 2004, Morrison et al. 2007).

Major spring staging areas for red knots have been identified along the mid-Atlantic (DE Bay through Delmarva Peninsula) and south Atlantic (SC through north FL) coast. Although a great deal of work with spring migrants has been conducted within DE Bay, we know much less about the importance of staging areas south of this area. Over the past two years, numbers of knots using DE Bay have dropped unexpectedly raising questions about possible short-stopping of birds within southerly staging sites. This event has highlighted the need for a more comprehensive monitoring program that includes the portion of the Atlantic Coast that supports staging knots.

METHODS

Study Area

The focal area for the effort includes outer coastal beaches from Cape Henlopen, DE to Little River Inlet, NC.

Survey Protocol

The survey took place on 18 May (Delaware through Virginia Coasts) and 19 May (North Carolina Coast) 2022. We conducted the survey from a high-wing Cessna 172 aircraft at 10-25 m above the ground at an air speed of ~140km/hr to flush birds from the surface and aid in identification and numerical estimation. Flight lines were on the outer edge of the surf zone to encourage birds to fly over the dunes and waterline. Red knot flocks were mapped using a handheld gps at the approximate center of flock. Estimations for flock sizes and habitat

that each flock was located was recorded as a digital audio file and later downloaded, transcribed, and associated with each GPS location to create a geo-referenced survey data file.

RESULTS

During the 2022 field season, we detected 8,298 red knots in 162 flocks (Table 1). This included 18 birds in 1 flocks in DE, 67 birds in 4 flocks in MD, 3,595 birds in 32 flocks in Virginia and 4,618 birds in 125 flocks in NC.

Table 1. Data collection frequency for transmitters at various battery levels and when transmitter is within or outside geofenced areas.

Date	Point	Count	Observers	Latitude	Longitude	State
5/18/2022	1	42	Watts and Hines	37.3636	-76.2600	VA
5/18/2022	2	15	Watts and Hines	37.3789	-76.2477	VA
5/18/2022	3	48	Watts and Hines	37.4499	-76.2571	VA
5/18/2022	4	18	Watts and Hines	38.5250	-75.0518	DE
5/18/2022	5	21	Watts and Hines	38.0953	-75.1931	MD
5/18/2022	6	8	Watts and Hines	38.0711	-75.2090	MD
5/18/2022	7	15	Watts and Hines	38.0621	-75.2152	MD
5/18/2022	8	23	Watts and Hines	38.0364	-75.2343	MD
5/18/2022	9	55	Watts and Hines	37.8598	-75.4500	VA
5/18/2022	10	93	Watts and Hines	37.8564	-75.4567	VA
5/18/2022	11	8	Watts and Hines	37.7980	-75.5194	VA
5/18/2022	12	13	Watts and Hines	37.7840	-75.5294	VA
5/18/2022	13	157	Watts and Hines	37.7721	-75.5377	VA
5/18/2022	14	82	Watts and Hines	37.7581	-75.5448	VA
5/18/2022	15	8	Watts and Hines	37.7216	-75.5674	VA
5/18/2022	16	172	Watts and Hines	37.6453	-75.5976	VA
5/18/2022	17	77	Watts and Hines	37.6296	-75.6042	VA
5/18/2022	18	15	Watts and Hines	37.5958	-75.6165	VA
5/18/2022	19	160	Watts and Hines	37.5553	-75.6125	VA
5/18/2022	20	132	Watts and Hines	37.5453	-75.6205	VA
5/18/2022	21	87	Watts and Hines	37.5301	-75.6328	VA
5/18/2022	22	197	Watts and Hines	37.4886	-75.6619	VA
5/18/2022	23	273	Watts and Hines	37.4401	-75.6668	VA
5/18/2022	24	86	Watts and Hines	37.4237	-75.6798	VA
5/18/2022	25	183	Watts and Hines	37.4164	-75.6849	VA
5/18/2022	26	645	Watts and Hines	37.4051	-75.6935	VA

5/18/2022	27	275	Watts and Hines	37.3868	-75.7045	VA
5/18/2022	28	58	Watts and Hines	37.3028	-75.7719	VA
5/18/2022	29	67	Watts and Hines	37.2772	-75.7955	VA
5/18/2022	30	82	Watts and Hines	37.2613	-75.7939	VA
5/18/2022	31	21	Watts and Hines	37.2466	-75.7985	VA
5/18/2022	32	117	Watts and Hines	37.1864	-75.8251	VA
5/18/2022	33	217	Watts and Hines	37.1768	-75.8318	VA
5/18/2022	34	103	Watts and Hines	37.1632	-75.8498	VA
5/18/2022	35	8	Watts and Hines	37.0860	-75.9428	VA
5/18/2022	36	81	Watts and Hines	37.0838	-75.9486	VA
5/18/2022	37	18	Watts and Hines	37.0811	-75.9570	VA
5/19/2022	38	24	Watts and Hines	36.6010	-75.8787	NC
5/19/2022	39	223	Watts and Hines	36.5838	-75.8740	NC
5/19/2022	40	25	Watts and Hines	36.5743	-75.8718	NC
5/19/2022	41	53	Watts and Hines	36.5665	-75.8704	NC
5/19/2022	42	24	Watts and Hines	36.3634	-75.8189	NC
5/19/2022	43	102	Watts and Hines	36.0771	-75.6947	NC
5/19/2022	44	12	Watts and Hines	35.8525	-75.5643	NC
5/19/2022	45	27	Watts and Hines	35.7966	-75.537	NC
5/19/2022	46	8	Watts and Hines	35.7821	-75.5353	NC
5/19/2022	47	18	Watts and Hines	35.7751	-75.5235	NC
5/19/2022	48	18	Watts and Hines	35.7133	-75.4900	NC
5/19/2022	49	141	Watts and Hines	35.6517	-75.4715	NC
5/19/2022	50	24	Watts and Hines	35.4156	-75.4839	NC
5/19/2022	51	28	Watts and Hines	35.4074	-75.4843	NC
5/19/2022	52	14	Watts and Hines	35.3875	-75.4879	NC
5/19/2022	53	15	Watts and Hines	35.3013	-75.5100	NC
5/19/2022	54	12	Watts and Hines	35.2908	-75.5123	NC
5/19/2022	55	15	Watts and Hines	35.2307	-75.6084	NC
5/19/2022	56	11	Watts and Hines	35.2294	-75.6158	NC
5/19/2022	57	8	Watts and Hines	35.2275	-75.6241	NC
5/19/2022	58	23	Watts and Hines	35.2254	-75.6324	NC
5/19/2022	59	38	Watts and Hines	35.2098	-75.6857	NC
5/19/2022	60	45	Watts and Hines	35.2087	-75.6887	NC
5/19/2022	61	10	Watts and Hines	35.2024	-75.7020	NC
5/19/2022	62	43	Watts and Hines	35.2009	-75.7084	NC
5/19/2022	63	12	Watts and Hines	35.1880	-75.7635	NC
5/19/2022	64	92	Watts and Hines	35.1834	-75.773	NC
5/19/2022	65	18	Watts and Hines	35.1789	-75.7814	NC

5/19/2022	66	73	Watts and Hines	35.1768	-75.7888	NC
5/19/2022	67	16	Watts and Hines	35.1747	-75.7962	NC
5/19/2022	68	24	Watts and Hines	35.1727	-75.8020	NC
5/19/2022	69	14	Watts and Hines	35.1709	-75.8069	NC
5/19/2022	70	48	Watts and Hines	35.1696	-75.8108	NC
5/19/2022	71	126	Watts and Hines	35.1626	-75.8287	NC
5/19/2022	72	72	Watts and Hines	35.1603	-75.8349	NC
5/19/2022	73	28	Watts and Hines	35.1586	-75.8392	NC
5/19/2022	74	24	Watts and Hines	35.1574	-75.8422	NC
5/19/2022	75	51	Watts and Hines	35.1535	-75.8515	NC
5/19/2022	76	19	Watts and Hines	35.1433	-75.8756	NC
5/19/2022	77	27	Watts and Hines	35.1380	-75.8877	NC
5/19/2022	78	15	Watts and Hines	35.1179	-75.9298	NC
5/19/2022	79	37	Watts and Hines	35.1130	-75.9389	NC
5/19/2022	80	21	Watts and Hines	35.1084	-75.9469	NC
5/19/2022	81	21	Watts and Hines	35.1039	-75.9534	NC
5/19/2022	82	42	Watts and Hines	35.1013	-75.9584	NC
5/19/2022	83	33	Watts and Hines	35.0925	-75.9724	NC
5/19/2022	84	34	Watts and Hines	35.0761	-75.9906	NC
5/19/2022	85	11	Watts and Hines	35.0665	-75.9991	NC
5/19/2022	86	16	Watts and Hines	35.0753	-76.0128	NC
5/19/2022	87	172	Watts and Hines	35.0628	-76.0426	NC
5/19/2022	88	183	Watts and Hines	35.0580	-76.0393	NC
5/19/2022	89	72	Watts and Hines	35.0523	-76.0444	NC
5/19/2022	90	32	Watts and Hines	35.0485	-76.0522	NC
5/19/2022	91	33	Watts and Hines	35.0463	-76.0568	NC
5/19/2022	92	75	Watts and Hines	35.0437	-76.0619	NC
5/19/2022	93	28	Watts and Hines	35.0416	-76.0655	NC
5/19/2022	94	82	Watts and Hines	35.0377	-76.0712	NC
5/19/2022	95	84	Watts and Hines	35.0332	-76.0796	NC
5/19/2022	96	48	Watts and Hines	35.0314	-76.0823	NC
5/19/2022	97	61	Watts and Hines	35.0280	-76.0859	NC
5/19/2022	98	83	Watts and Hines	35.0263	-76.0899	NC
5/19/2022	99	48	Watts and Hines	35.0172	-76.1027	NC
5/19/2022	100	58	Watts and Hines	35.0049	-76.1188	NC
5/19/2022	101	28	Watts and Hines	34.9958	-76.1315	NC
5/19/2022	102	18	Watts and Hines	34.9907	-76.1380	NC
5/19/2022	103	26	Watts and Hines	34.9861	-76.1438	NC
5/19/2022	104	205	Watts and Hines	34.9829	-76.1478	NC

5/19/2022	105	39	Watts and Hines	34.9768	-76.1549	NC
5/19/2022	106	58	Watts and Hines	34.9750	-76.1574	NC
5/19/2022	107	69	Watts and Hines	34.9721	-76.1616	NC
5/19/2022	108	15	Watts and Hines	34.9668	-76.1690	NC
5/19/2022	109	58	Watts and Hines	34.9624	-76.1744	NC
5/19/2022	110	34	Watts and Hines	34.9595	-76.1786	NC
5/19/2022	111	44	Watts and Hines	34.9575	-76.1812	NC
5/19/2022	112	28	Watts and Hines	34.9508	-76.1899	NC
5/19/2022	113	28	Watts and Hines	34.9484	-76.1927	NC
5/19/2022	114	18	Watts and Hines	34.9421	-76.2003	NC
5/19/2022	115	12	Watts and Hines	34.9386	-76.2046	NC
5/19/2022	116	34	Watts and Hines	34.9316	-76.2128	NC
5/19/2022	117	18	Watts and Hines	34.9295	-76.2152	NC
5/19/2022	118	26	Watts and Hines	34.9202	-76.2263	NC
5/19/2022	119	14	Watts and Hines	34.9163	-76.2309	NC
5/19/2022	120	26	Watts and Hines	34.8963	-76.2564	NC
5/19/2022	121	32	Watts and Hines	34.8879	-76.2686	NC
5/19/2022	122	25	Watts and Hines	34.8844	-76.2729	NC
5/19/2022	123	23	Watts and Hines	34.8761	-76.2842	NC
5/19/2022	124	15	Watts and Hines	34.8627	-76.3027	NC
5/19/2022	125	22	Watts and Hines	34.8358	-76.3468	NC
5/19/2022	126	24	Watts and Hines	34.8339	-76.3442	NC
5/19/2022	127	21	Watts and Hines	34.8304	-76.3436	NC
5/19/2022	128	35	Watts and Hines	34.8274	-76.3463	NC
5/19/2022	129	27	Watts and Hines	34.7511	-76.4172	NC
5/19/2022	130	27	Watts and Hines	34.7319	-76.4348	NC
5/19/2022	131	20	Watts and Hines	34.7216	-76.4438	NC
5/19/2022	132	42	Watts and Hines	34.7070	-76.4565	NC
5/19/2022	133	16	Watts and Hines	34.6995	-76.4633	NC
5/19/2022	134	27	Watts and Hines	34.6678	-76.4897	NC
5/19/2022	135	12	Watts and Hines	34.6473	-76.5039	NC
5/19/2022	136	26	Watts and Hines	34.6391	-76.5082	NC
5/19/2022	137	18	Watts and Hines	34.6299	-76.5137	NC
5/19/2022	138	27	Watts and Hines	34.6108	-76.5257	NC
5/19/2022	139	27	Watts and Hines	34.5952	-76.5303	NC
5/19/2022	140	17	Watts and Hines	34.5802	-76.5284	NC
5/19/2022	141	11	Watts and Hines	34.6925	-76.8220	NC
5/19/2022	142	11	Watts and Hines	34.6828	-76.8980	NC
5/19/2022	143	18	Watts and Hines	34.6779	-76.9320	NC

5/19/2022	144	8	Watts and Hines	34.6768	-76.9402	NC
5/19/2022	145	18	Watts and Hines	34.6758	-76.9463	NC
5/19/2022	146	24	Watts and Hines	34.6661	-77.0021	NC
5/19/2022	147	21	Watts and Hines	34.6622	-77.0211	NC
5/19/2022	148	28	Watts and Hines	34.4997	-77.4006	NC
5/19/2022	149	8	Watts and Hines	34.4968	-77.4078	NC
5/19/2022	150	22	Watts and Hines	34.4948	-77.4122	NC
5/19/2022	151	17	Watts and Hines	34.4902	-77.4208	NC
5/19/2022	152	10	Watts and Hines	34.4396	-77.5187	NC
5/19/2022	153	21	Watts and Hines	34.3967	-77.5863	NC
5/19/2022	154	9	Watts and Hines	33.8898	-78.0230	NC
5/19/2022	155	42	Watts and Hines	33.8945	-78.051	NC
5/19/2022	156	24	Watts and Hines	33.8958	-78.0553	NC
5/19/2022	157	25	Watts and Hines	33.9000	-78.0695	NC
5/19/2022	158	22	Watts and Hines	33.9056	-78.0968	NC
5/19/2022	159	22	Watts and Hines	33.9006	-78.3685	NC
5/19/2022	160	22	Watts and Hines	33.8709	-78.4826	NC
5/19/2022	161	44	Watts and Hines	33.8701	-78.4885	NC
5/19/2022	162	16	Watts and Hines	33.8516	-78.5401	NC

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