

Casco Bay Shorebird Monitoring Project

Year-Four (2012) Progress Report



Roosting Least Sandpipers (*Calidris minutilla*), Royal River marshes, Casco Bay.

June 2013

Biological Conservation
Bristol, Maine

Please cite this report as:

Moore, S. 2013. Casco Bay Shorebird Monitoring Project: year-four (2012) progress report. Biological Conservation, Bristol, Maine.

Acknowledgements

This project was funded in part by grant#CE961695010 from the US EPA to the Casco Bay Estuary Partnership. We thank the EPA, Casco Bay Estuary Partnership, Maine Coastal Program (Maine Department of Agriculture, Conservation and Forestry), Maine Outdoor Heritage Fund, and Maine Department of Inland Fisheries and Wildlife State Wildlife Grants Program for their financial support of this project. Our project partners have included Casco Bay Estuary Partnership, Maine Coastal Program, Maine Department of Inland Fisheries and Wildlife (Lindsay Tudor), and US Fish and Wildlife Service (Robert Houston). Access to private lands is critical to our work; we gratefully acknowledge the Otis, Pfeifly, Juniewicz and York families for their hospitality and patience. Thanks to David Ladd, Derek Lovitch, and Doug Sutor for their field crew services.



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INTRODUCTION

This document provides a summary of shorebird-use during the fourth field season of the Casco Bay Shorebird Monitoring Project. Relative to other coastal areas in Maine, Casco Bay shorebird habitats are particularly vulnerable to degradation, given the heightened potential for coastal development, disturbance, and other factors in a landscape where industrial, commercial, and residential land-use patterns prevail. In 2012 this collaborative project provided enhanced monitoring resolution at key shorebird feeding areas designated as Significant Wildlife Habitat by the Maine Department of Inland Fisheries and Wildlife (MDIFW). Dependent upon available funding, annual project objectives have included some or all of the following:

1. Evaluate the effectiveness of existing Significant Wildlife Habitat mapping and other habitat protection measures for shorebirds in Casco Bay, based on the most current data demonstrating status and trends in habitat-use.
2. Identify and map areas used by shorebirds that are not currently documented as shorebird feeding or roosting areas in Casco Bay, including habitats located on islands and ledges where data are currently lacking.
3. Apply enhanced knowledge of shorebird use in Casco Bay by the following means:
 - a. distribute key findings of the project to coastal municipalities to inform local planning decisions
 - b. integrate refined and updated shorebird status, distributional data, and trends into State of Maine permit review processes
 - c. submit data to the Manomet Center for Conservation Sciences for inclusion in the International Shorebird Survey database.

METHODS

Survey Sites

In 2012, surveyed sites designated as mainland shorebird feeding areas by MDIFW included: Maquoit Bay, Royal River, Presumpscot River, Back Cove, Mackworth Island Flats, and the Upper Fore River (referred as “Stroudwater” in 2009-2010 reports) (Appendix A). The Upper New Meadows River site was dropped from the list of surveyed sites in 2012 because 2009-2011 data suggested little feeding or roosting activity by shorebirds at that area (Moore 2009, 2010). Also a change in 2012, MDIFW assumed responsibility for island/ledge surveys. Results of these surveys are available upon request from MDIFW. Finally, roosting surveys were dropped from the list of tasks in 2012.

Feeding Surveys

The survey methodology and protocol for mainland sites adopted the basic framework for field methods/protocols provided by the Program for Regional and International Shorebird Monitoring Manager's Monitoring Manual (Skagen et al. 2009) and the International Shorebird Survey (ISS). ISS "Option 2" guidelines were adapted to reflect regional shorebird phenology and migration patterns. For monitoring of feeding areas, field crew conducted one survey during each of these periods: July 15-31, August 1-15, August 16-31, September 1-15, September 16-30, and October 1-15. Migrating shorebirds may spend weeks at a given staging area in Maine, accumulating critical energy reserves for the next leg of their journey. We don't know how long they spend in Casco Bay habitats. To somewhat lessen the chance of counting the same birds more than once; we try to maintain at least a two-week interval between surveys.

At each site, field crew identified a tidal elevation at each pre-designated observation point/area that afforded the most representative and efficient counts of birds. The daily timing of surveys was determined first by NOAA tide predictions (locally corrected for each site) and then modified if weather effects (onshore wind or rain/runoff) were likely to offset the timing of locally corrected high and low tide predictions. Our survey protocol also provided that surveys could be conducted from morning to as late in the day as two hours before sunset. Surveys were rescheduled when high winds, heavy rains, or unexpected tidal shifts were likely to influence either habitat-use by shorebirds or survey accuracy. Field crew surveyed assigned sites alone, with the exception of the Presumpscot River and Upper Fore River, which encompass expansive mudflats that required two surveyors working simultaneously in close coordination and using cell phones or radios to alert one another of notable bird movements in the area.

Observations

Observations were recorded on data sheets provided to field crew. Even with large numbers of highly mobile birds present on the flats, actual counts of individuals were often possible. When conditions prevented counts, estimates were made. At times, observer distance to birds precluded identification of diagnostic features necessary for species identification. For instance, the smallest species of the genera *Calidris*, which include the Semipalmated (*C. pusilla*), Western (*C. mauri*), and Least (*C. minutilla*) Sandpipers, among others, present a particular identification challenge when viewed at considerable distances. When identification to species was not possible, the small calidrid species were collectively referred to as "peeps."

Along with counts and estimates, the survey crew also documented the timing of notable bird movements such as ingress/egress from each site. Along with each day's data sheets, crew provided annotated maps indicating the locations of observation sites and concentrations of shorebirds observed.

Quality Assurance and Data Handling

Surveyors were asked to review data sheets for missing and/or erroneous entries immediately following each survey. The Project Coordinator reviewed incoming data sheets to ensure fidelity to the established data collection protocol. After data entry was complete, the Project Coordinator compared a sample of the data sheets against keyed data to characterize the accuracy of data entry.

RESULTS AND DISCUSSION

Mainland Shorebird Feeding Areas

Results of 2012 feeding surveys are provided in Tables 1a and 1b. The total number of shorebirds observed in 2011 was 20,054, versus 13,246 for 2012. Most of that change was related to a decrease of 38% in the observed numbers of “peeps” (small calidrids), which in Casco Bay habitats are comprised mostly of Semipalmated Sandpipers. Seen another way, 2012 peep numbers (11,293) are just 11% less than the average of the previous three years (12,684). Although it’s worth noting the average of the previous three years is suppressed by exceptionally low numbers of observed in 2009.

Considering the three-year average of each site provides another perspective. At most sites, observed numbers of peeps in 2012 experienced a decline that may be within natural variation. However, at Mackworth Flats, the number of peeps observed (25) was 97% less than the average of 1,227 observed over the previous three years. The only observed change at that site in 2012 was uncharacteristically frequent bloodworm harvesting. Shorebirds at Mackworth point have been observed to drop downstream from the Presumpscot site on their way to roosting areas as the flowing tide gains elevation. Whether the intertidal harvest pressure at Mackworth in 2012 interfered with the normal sequence of daily habitat use from Presumpscot to Mackworth, is difficult to know. It is conceivable that if birds were displaced from one site they would likely use another, but no nearby sites of significance were observed to experience an increase in usage. Lastly, one site, Maquoit Bay, was observed to host considerably larger numbers of birds in 2012 – over three times the average from the previous three years.

Peak abundances of peeps were observed during the late August to mid September period (Figure 1), reflecting the height of juvenile Semipalmated Sandpiper migration through southern Maine.

Table 1a. Seasonal shorebird abundance observed during six visits each to designated feeding areas in Casco Bay, July 15 - October 15, 2009-2012.

Species observed	Maquoit Bay				Royal River				Presumpscot River			
	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Black-bellied Plover	155	179	210	190	17	2	1	31	118	219	412	331
American Golden Plover	0	0	0	1	0	0	0	0	0	0	0	0
Semipalmated Plover	53	93	52	123	74	114	147	357	9	28	278	250
Killdeer	0	0	1	0	0	0	0	0	0	0	0	1
American Avocet	0	0	0	0	0	0	1	0	0	0	0	0
Greater Yellowlegs	85	71	69	48	14	17	30	42	7	32	28	17
Lesser Yellowlegs	33	37	40	42	6	1	4	20	3	9	4	4
Yellowlegs spp.	9	0	0	0	0	2	15	2	0	0	0	0
Solitary Sandpiper	0	0	0	0	0	0	0	0	0	0	3	0
Willet	7	0	1	0	0	0	0	0	0	0	0	0
Spotted Sandpiper	1	6	1	4	1	0	0	2	1	9	2	5
Whimbrel	0	0	1	15	0	0	0	0	0	0	0	0
Hudsonian Godwit	0	2	0	0	0	0	0		0	0	0	0
Ruddy Turnstone	0	0	0	0	0	0	0	0	0	0	0	0
Red Knot	0	0	0	0	0	0	0	0	0	0	0	0
Semipalmated Sandpiper	130	609	342	1,418	237	458	643	1,508	308	3,513	10,400	6,536
Western Sandpiper	0	0	0	0	1	0	0	0	0	0	2	0
Least Sandpiper	60	78	73	31	29	55	16	2	1	19	6	3
White-rumped Sandpiper	0	12	8	2	1	0	0	1	0	0	12	4
Baird's Sandpiper	0	1	1	0	0	0	0	0	0	0	2	0
Pectoral Sandpiper	0	4	2	1	0	0	0	1	0	0	0	0
Unidentified Peep spp. ^B	0	0	0	0	307	1,874	2,493	40	2,665	3,491	30	0
Dunlin	18	38	23	18	0	0	0	0	0	0	5	2
Buff-breasted Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0
Short-billed Dowitcher	76	48	56	3	0	0	0	1	13	12	4	1
Long-billed Dowitcher	0	1	0	0	0	0	0	0	0	0	0	0
Unidentified Dowitcher spp.	0	0	0	0	1	0	0	0	0	0	0	0
Unidentified short-leg spp.	0	0	0	0	0	0	4	0	0	0	0	0
Total, by site	627	1,179	880	1,896	688	2,523	3,354	2,007	3,125	7,332	11,188	7,154

^A Any small calidrid sandpiper species often lumped under the heading "peeps" when conditions prevent identification to species. Most peeps observed in our study area are Semipalmated Sandpipers.

Table 1b. Seasonal shorebird abundance observed during six visits each to designated feeding areas in Casco Bay, July 15 - October 15, 2009-2012.

Species observed	Mackworth Flats				Back Cove				Upper Fore River				Annual Total			
	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Black-bellied Plover	0	4	0	2	83	65	51	24	0	2	21	0	373	471	695	578
American Golden Plover	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	1
Semipalmated Plover	259	12	24	4	90	64	126	79	27	60	187	205	512	371	814	1,018
Killdeer	0	0	0	0	2	0	0	0	0	7	0	2	2	7	1	3
American Avocet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Greater Yellowlegs	0	1	1	1	96	50	44	100	1	1	13	16	203	172	185	224
Lesser Yellowlegs	1	0	1	0	2	1	1	3	3	1	0	1	48	49	50	70
Yellowlegs spp.	0	0	0	0	0	0	0	0	0	0	0	0	9	2	15	2
Solitary Sandpiper	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	0
Willet	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0
Spotted Sandpiper	0	1	0	1	1	0	1	0	0	2	9	3	4	18	13	15
Whimbrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15
Hudsonian Godwit	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Ruddy Turnstone	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Red Knot	0	0	0	0	0	0	1	0	0	0	2	0	0	0	3	0
Semipalmated Sandpiper	47	1,900	1,693	19	656	798	849	487	259	936	1,510	1,218	1,637	8,214	15,437	11,186
Western Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0
Least Sandpiper	1	18	3	6	18	16	12	11	13	12	34	3	122	198	144	56
White-rumped Sandpiper	0	0	0	0	0	1	7	0	1	0	5	0	2	13	32	7
Baird's Sandpiper	0	0	0	0	1	0	0	0	0	0	0	0	1	1	3	0
Pectoral Sandpiper	0	0	0	0	0	3	0	0	0	0	0	0	0	7	2	2
Unidentified Peep spp. ^B	0	11	8	0	0	49	1	2	719	587	0	0	3,691	6,012	2,532	42
Dunlin	0	0	0	0	0	2	2	0	0	0	3	0	18	40	33	20
Buff-breasted Sandpiper	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Short-billed Dowitcher	2	10	0	1	1	10	16	1	0	0	2	0	92	80	78	7
Long-billed Dowitcher	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Unidentified Dowitcher spp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Unidentified short-leg spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Total, by site	310	1,957	1,730	34	951	1,059	1,113	707	1,023	1,608	1,789	1,448	6,724	15,658	20,054	13,246

^A Any small calidrid sandpiper species often lumped under the heading "peeps" when conditions prevent identification to species. Most peeps observed in our study area are Semipalmated Sandpipers.

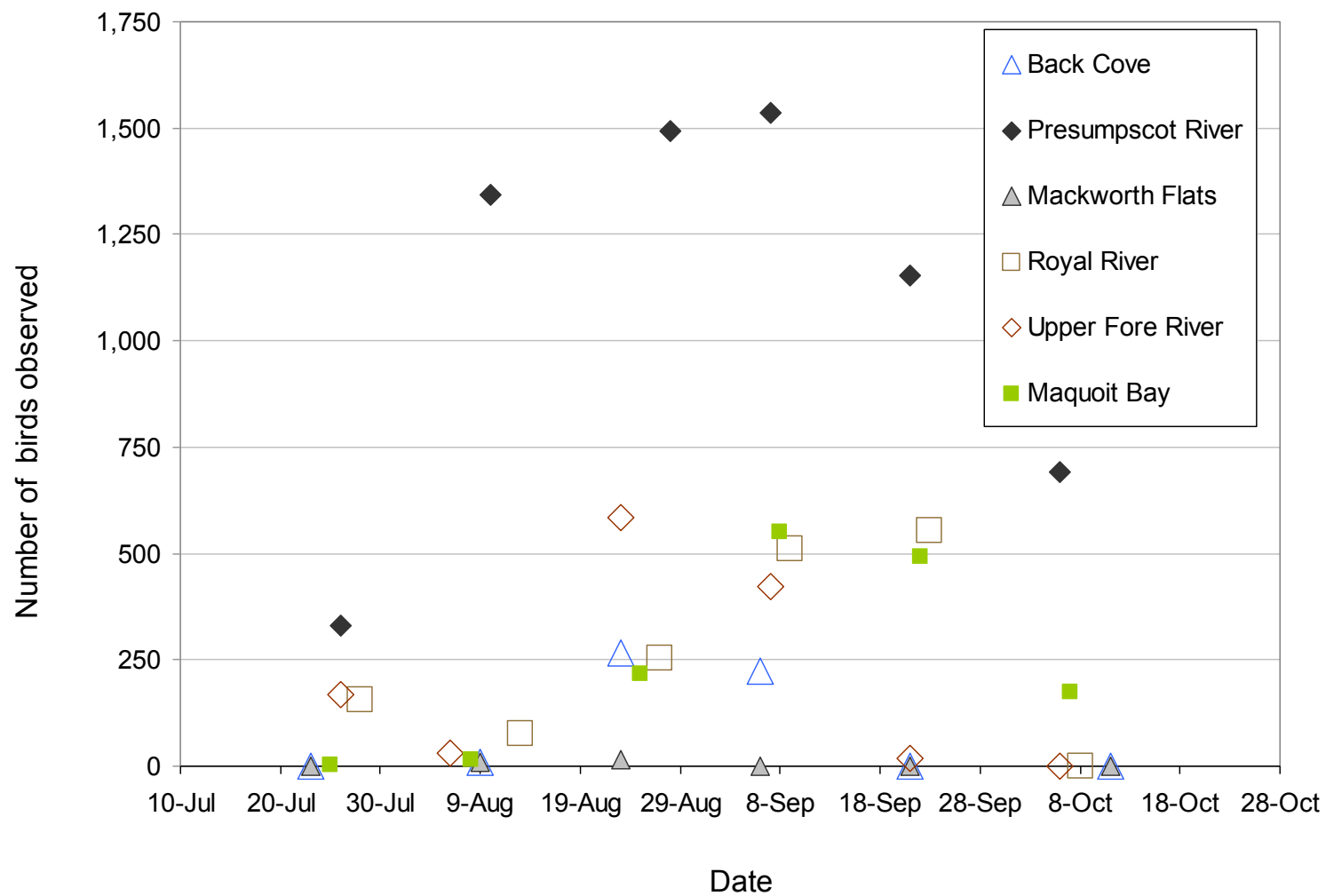


Figure 1. Phenology of shorebird abundance at Casco Bay survey sites, 2012.

Table 2. Differences between 2009-2011 averages and 2012 counts of peeps (small calidrids) observed at Casco Bay shorebird feeding areas July-October.

	Range	Average 2009-2011	2012 counts	Percent difference
Maquoit Bay	190-426	440.0	1,452	330.0
Royal River	575-3,152	2,038.0	1,552	-23.8
Presumpscot River	2,974-10,452	6,816.3	6,543	-4.0
Mackworth Flats	48-1,929	1,227.0	25	-98.0
Back Cove	675-869	803.7	500	-37.8
Upper Fore River	992-1,549	1,358.7	1,221	-10.1

CONCLUSIONS AND RECOMMENDATIONS

Surveys at the monitored sites continued to provide valuable insights into use of Casco Bay habitats by shorebirds, including a more refined understanding of where shorebird use routinely spills outside of designated shorebird areas. Variations in numbers of birds observed between years continue to emphasize the need for long-term monitoring. With support for continued monitoring of designated sites, it is possible to accrue a dataset whose duration and resolution will provide decision makers with defensible, science-based information that enhances the conservation of shorebirds in Casco Bay.

LITERATURE CITED

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Appendix A. MDIFW-designated shorebird survey sites surveys in 2012.

