

Rest and Refuel:

Conserving Stopover Sites for Migrating Shorebirds Along the New Hampshire Seacoast



Semipalmated Plovers and Semipalmated Sandpipers at the Plaice Cove roost site, 8/29/19. Photo by Pam Hunt

Summary of field work conducted during 2018-2020

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Introduction

Shorebirds are hemispheric travelers, with most species breeding in the arctic and wintering in tropical areas of the Caribbean and Latin America. As they fly south and north on their migratory journeys, they often rely on a small number of stopover sites along the way. Stopover sites are locations where migratory birds rest and feed, thus enabling them to complete the next leg of migration. For shorebirds, these areas need to have abundant food and be relatively safe from predators and other disturbances, and in some cases a handful of sites may serve a significant portion of a species' global population. Although there are no such major stopover sites in New Hampshire, the state still hosts hundreds of shorebirds each year – primarily during southbound migration (July-October) – and conserving the areas that birds use while here can still contribute to their conservation.

With this in mind, New Hampshire Audubon (NHA) conducted a comprehensive study of shorebird use in the Hampton-Seabrook Estuary in 2006-07 (McKinley and Hunt 2008). This project included an assessment of local population sizes and migration timing, and identified the most important sites within the estuary. These sites included only a handful of relatively small locations used for roosting and foraging, and we speculated that alteration or disturbance of these sites would have a disproportionate effect on the well-being of shorebirds that use New Hampshire's coast.

Over a decade has passed, and many things have changed. Research on the continental scale has shown that populations of many shorebirds are declining (Andres et al. 2012), often to the extent that their conservation has become the subject of detailed planning (e.g., Winn et al. 2013). Six species of non-breeding sandpipers (Whimbrel, Ruddy Turnstone, Sanderling, Red Knot, and Purple and Semipalmated Sandpipers) were recognized as "Species of Greatest Conservation Need" in the 2015 revision of the NH Wildlife Action Plan (WAP, NHFG 2015). The NH WAP also identified several threats that specifically affect shorebirds during the non-breeding season. Foremost of these is climate change, which through sea-level rise may eliminate significant amounts of coastal habitat (Galbraith et al. 2014). Human responses to sea-level rise, such as shoreline hardening and beach renourishment, may further reduce already declining habitat availability for shorebirds. At the same time, birds are easily flushed by human recreational use (e.g., walking or driving on beaches), causing them to expend energy in avoidance flights and reduce energy intake via foraging. Studies of shorebird behavior combined with physiological models suggest that repeated disturbance can reduce individual birds' chances of successfully completing migration (Harrington and Drilling 1996, Burger et al. 2007). As recreation increases and habitat decreases, shorebirds may be forced into marginal habitats that don't meet all their stopover needs. Other activities, such as harbor dredging and habitat restoration, also have the potential to impact migratory shorebirds, although they have not been studied in any detail.

Although the New Hampshire coast is short from the perspective of birds that travel thousands of miles, for some of them it is a vital link in their annual cycle, and anything we do can potentially contribute to the overall conservation of these species. It was thus appropriate to revisit our 2006-07 with an eye toward detecting any changes in shorebird use and also increasing awareness of shorebird conservation issues in coastal New Hampshire. Our primary

objective was to identify important roosting and feeding sites and compare them to those identified in the previous study. We also attempted to collect data on the nature and prevalence of shorebird disturbance at these areas, with a longer-term goal of communicating these risks to coastal stakeholders (conservation commissions, planning boards, state parks, etc.).

Methods

The project had three core components as originally conceived: analysis of existing data, field surveys, and stakeholder outreach. For the first component, I downloaded 2005-18 shorebird data from eBird, a global bird sightings database managed by the Cornell Laboratory of Ornithology (eBird 2018). These data were searched for indications of shorebird concentration areas so that additional sites could be more carefully surveyed as needed in 2018. We obtained 26,000 records through this request, but the inconsistent use of location names, duplicate entries, and the sheer volume of data precluded a thorough and efficient analysis. Instead, the eBird data were primarily used to identify “new” sites with consistently large numbers of birds, rather than a more detailed attempt to look at patterns as this time. A less site-specific approach to eBird data was used to generate the seasonal patterns illustrated in Figure 1 and the appendix.

Data submitted to eBird are often collected opportunistically and don’t necessarily cover all areas of habitat equally or at regular time intervals, so there was a clear need for more systematic surveys. Thus, in August 2018 I initiated regular surveys of key areas along the New Hampshire coast, with the focus remaining on the Hampton-Seabrook Estuary. These surveys occurred roughly 10-14 days apart over four migration seasons (three southbound or “fall,” one northbound or “spring,” Table 1) and each covered at minimum a full tidal cycle from low to high (or vice versa). Travel and access restrictions imposed by the Covid-19 pandemic prevented a second spring season in 2020. All surveys involved counting individuals of each species present at a site, often with repeated visits to sites to assess how numbers changed over the course of the tidal cycle. Because of limited survey time on any event given visit, priority was assigned to quantifying roost sites over foraging sites. This was largely because roosting shorebirds are generally believed to be more at risk from disturbance and because suitable roosting habitat appears more limited. Results from southbound 2018 surveys allowed us to conduct more targeted surveys in the falls of 2019-20. The resulting data were used to prioritize sites based on extent of use (abundance and duration), type of use (feeding vs. roosting), and perceived threats (e.g., human disturbance, extreme flooding).

Results and Discussion

A total of 23 surveys were conducted between August 2018 and October 2020 (Table 1). Twenty-five species of shorebirds were detected on these surveys, with higher numbers and diversity southbound than northbound (Table 1). These differences stem in part from the ellipsoid migration routes of most arctic and boreal-nesting shorebirds. Southbound birds use stopover sites in the northeastern United States and southeastern Canada prior to making long overwater flights to the Caribbean and South America. In contrast, many northbound species take an inland route through the Mississippi Valley and Great Plains and bypass the Northeast entirely. Southbound migration also occurs over a longer period, with post-breeding adults

leaving breeding areas prior to young birds hatched that season. In spring, northbound birds migrate during a much narrower window in late May and the very beginning of June (Figure 1).

Semipalmated Plover and Semipalmated Sandpiper were by far the most common species overall, with both often numbering over 100 at key sites during southbound migration (Table 1). Black-bellied Plover and Greater Yellowlegs were the next most common overall, while Sanderling, Dunlin, and Least Sandpiper were occasionally abundant depending on time of year. All other species averaged less than ten per site on a given survey day. Species richness was highest in late August and early September. These broad patterns are similar to those of the 2006-07 study, which also found Semipalmated Plover and Semipalmated Sandpiper to be the most common species, with over 1000 individuals of each passing through the NH coast each fall. Details of each species' use of the Hampton-Seabrook Estuary are presented below and in the Appendix.

Priority Areas

Five areas (see Figure 2) showed the most consistent use by high numbers of shorebirds, with their importance varying by species and time of year. Details on each site follow from north to south.

- 1) Plalice Cove, Hampton. This is a significant roost site for southbound Semipalmated Plovers and Semipalmated Sandpipers, with numbers sometimes in the hundreds. Other species are regularly found here in smaller numbers, making it the best roost site in terms of species diversity as well. Birds roost in a narrow strip of gravel beach between the rocky shore and remnant dunes north of the end of Shaw Street. This site is not used in May and June, nor in southbound migration before early-to-mid August.
- 2) Meadow Pond, Hampton: Meadow Pond is the northernmost upstream portion of the Hampton-Seabrook estuary. Water levels here fluctuate in response to upstream inputs and surface run-off, as well as with tides, and the site is heavily impacted by invasive *Phragmites*. Shorebird use is highly variable because of water levels, but it is consistently used by longer-legged species such as yellowlegs and dowitchers. If water levels allow, extensive mudflats can support hundreds of smaller species (e.g., counts of 1500-2000 Semipalmated Sandpipers in August 2019).
- 3) Northeast portion of Hampton salt marsh: The area north of Route 101 is considered one of the ecologically least impacted portions of the Hampton-Seabrook estuary, and supports significant numbers of breeding salt marsh birds (Willet, Common Tern, Saltmarsh Sparrow) in addition to migrating shorebirds. Two sites are particularly important for the latter: a) Henry's Pool, a deep non-vegetated area just downstream from Meadow Pond and b) an area of salt pans adjacent to Route 1A at the opposite side of the marsh (west of Great Boars Head). Of particular interest in the latter area is a large shallow pool that originated after a storm in the early 2010s, when large amounts of dead vegetation were deposited along the upper edge of the marsh and killed off existing plants. This pool is

used for foraging and roosting by a variety of species. Henry's Pool is primarily used for foraging on an outgoing tide.

- 4) Hampton-Seabrook Harbor: At low tide, the mudflats here remain the most important foraging area for the majority of species, although numbers are generally lower than a decade ago. This reduced use may be in response to a decline in extent of blue mussel following dredging and other engineering projects in the Seabrook portion of the harbor (see below). Roosting sites are limited in the immediate vicinity of the Hampton-Seabrook flats, and the only one currently known is on the edge of the marsh at the northeastern edge of the harbor (north of the Hampton Marina). This roost is used by larger species, particularly Black-bellied Plover, but only during southbound migration (July-October). Three roost sites used extensively in 2006-07 were not used in 2018-20: Landing Road (Hampton), Yankee Fisherman's Co-op (Seabrook), and Depot Road (Hampton Falls).
- 5) Seabrook Beach: Areas of this beach are used for roosting by small sandpipers and plovers, especially late in southbound migration (September-October) after human seasonal activity has declined. It is possible that birds relocate here from Plaice Cove in mid-September, since counts at the latter often decline by that date. Most roosting occurs above the high tide line where wrack and other detritus have accumulated on the beach. The beach is also used for foraging by Sanderlings and Dunlin, with smaller numbers of other species feeding opportunistically while waiting for other areas to open up on falling tides.

Although the Hampton-Seabrook Estuary was the primary focus of most field work, surveys in the falls of 2018-19 also occurred farther north in portions of North Hampton and Rye. Shorebird use in these areas was far more variable, but some locations were consistently used by the smaller species. Most important were Rye Harbor (for foraging at low tide) and the rocky cove south of Odiorne Point State Park (largely for roosting). Other locations varied depending on the amount of wrack washed ashore, and were largely used for foraging. These included North Hampton State Beach, Foss Beach immediately north of Ragged Neck, and Bicentennial Park in Hampton.

When shorebird use in 2018-20 is compared to that in 2006-07, there are several notable differences. Two roost sites at the marsh periphery: Landing Road in Hampton and Depot Road in Hampton Falls, are hardly used by shorebirds at all. Examination of eBird data showed that these two sites have relatively few records after 2009-10. Anecdotally, birders agree that these two sites are now rarely used, so the absence of more recent data could also reflect less frequent visitation. However, Landing Road was visited multiple times during the 2018 survey period and the only shorebirds detected were yellowlegs. It is possible that the birds which once used these sites have shifted to locations such as Meadow Pond and Plaice Cove. The latter in particular has very little data prior to 2008, although again this could be the result of inconsistent coverage by birders. Seabrook Beach was an important roost site in both studies, and in both cases became more important in September after peak human use. In 2006-07, additional roost sites adjacent to Hampton Harbor included two areas in Seabrook: along the Blackwater River downstream of Route 286 in Seabrook and at the Yankee Fisherman's Co-op. Neither site was used in 2018, nor

in recent years based on eBird data. Instead, species like Black-bellied Plover appear to have shifted to the northeast edge of the harbor as mentioned above, while smaller species may have shifted to Plaice Cove. The Co-op location has probably been rendered less suitable through construction, while increased flooding may be an issue along the Blackwater.

Threats to Migrating Shorebirds

A second objective of the current study was to collect data on types and extent of disturbance, with the goal of identifying areas where outreach or mitigation might be needed. Several disturbance-related threats have been identified by shorebird conservation planners (Mengak et al. 2019), with the most important being, in order of magnitude: 1) beach driving, 2) dogs, 3) direct harassment, 4) beach raking, 5) coastal engineering, and 6) general beachgoing. Of these, beach driving is rare in New Hampshire, and likely only occurs during visits by emergency personnel or during other activities such as beach raking (see below), and as such is not considered a significant source of disturbance.

Dogs can cause disturbance to shorebirds whether leashed or unleashed, although free-running dogs are by far a greater threat. Leashed dogs are likely perceived by shorebirds differently from the people walking them, but at least these dogs do not have free reign to chase shorebirds, or in worse case scenarios kill them. Leashing dogs is also often required on public beaches (e.g., <https://www.seabrookpd.com/Images/SPD%20Beach%20Ordinances.pdf>), although such regulations are difficult to enforce or enforced irregularly.

Direct harassment refers to activities in which people purposefully approach shorebirds, often to observe or photograph. People engaged in this activity do not necessarily intend to disturb shorebirds, but are often not aware of the potential negative effects of a close approach. The same is likely true for “general beachgoing,” which refers to the majority of passive recreational uses of a beach, including walking, swimming, fishing, and similar activities. Another form of direct harassment involves people – usually small children – actively chasing shorebirds to make them run or fly. These behaviors are most analogous to unleashed dogs, and should be discouraged.

Beach raking is the process by which washed up seaweed (wrack) and litter is periodically removed from a beach. This is generally limited to the active recreational season (Memorial Day to Labor Day) and is intended to maintain the beach in a clean and welcoming state. Wrack in particular is often considered unsightly, and when allowed to remain on the beach will eventually begin to decompose and generate undesirable odors. Raking is potentially detrimental for two reasons. Firstly, the presence of vehicles on the beach may be a direct disturbance, especially to shorebirds roosting higher on the beach in or near the wrack line. Secondly, removing wrack removes a source of food for many shorebirds, and by eliminating potential cover may make a given stretch of beach less suitable for roosting.

Coastal engineering includes a variety of activities with generally poorly-understood effects on shorebirds. For example, beach nourishment may actually expand available nesting or roosting substrate, as long as it is done when birds are not present to be disturbed (e.g., winter). Engineering projects targeted at subtidal areas (e.g., dredging, retaining walls or other structures)

have the potential to alter tidal currents, and thus deposition of sediments in important foraging areas, but data on such impacts are limited and anecdotal. Historically, the southern portion of the Hampton-Seabrook Estuary was dominated by extensive mussel beds that provided important foraging habitat for a variety of shorebirds. In 2005, a composite sheet pile wall was installed in this portion of the harbor to protect adjacent clam flats. Since then, the mussel beds have declined in extent, although whether this is directly a result of the wall is unknown. It is certainly possible that deposition patterns in the harbor changed as a result, and the area adjacent to the wall also received dredge spoils in 2012-13. As substrate changed in the harbor, numbers of larger shorebirds such as Whimbrel and Hudsonian Godwits used the mudflats less frequently and in lower numbers. Sand deposition in the navigation channel continues to be a problem in the harbor, necessitating periodic dredging, but the effects of this on either the tidal flats or shorebirds have not been studied in detail. The most recent dredging occurred over the winter of 2019-20, but a planned evaluation of its effects on shorebird use could not be conducted due to limitations imposed by the covid-19 pandemic.

Of the six disturbance-related threats discussed above, dogs and general beachgoing were the most frequently observed during fieldwork in 2018-20. Unleashed dogs were seen at Seabrook Beach on a regular basis, and occasionally at other sites such as North Hampton State Beach and various coastal access points in Rye. In some cases they were observed directly flushing shorebirds, albeit not always intentionally. It is more difficult to assess any impacts of general beach use, usually because people were usually present on beaches when I arrived, meaning that any impacts to shorebirds had likely already occurred. The good news is that both these threats are not present at most of the important shorebird sites discussed above. Meadow Pond and the northeastern portion of Hampton Marsh are not visited by people at all, and there is limited use of the Hampton-Seabrook flats except by clambers. Human activity is also limited at the Plaice Cove and Hampton Marina roost sites, but because both are accessible from developed areas of Hampton Beach there is always potential for inadvertent disturbance. Seabrook Beach is the site most likely to experience disturbance from all main sources, including beach raking.

Conservation Actions

Minimizing human disturbance to migrating shorebirds will require a variety of outreach efforts. To some extent, existing programs to educate beachgoers about nesting Piping Plovers can carry over to migrating birds during the early southbound migration period when Piping Plovers are still present (July and August). Such efforts would likely be facilitated by the general public's tendency to lump Piping Plovers and other shorebirds into the same category, but explaining the distinction would likely benefit migrants by expanding beachgoer's awareness of disturbance issues into the later portion of the season. One way to accomplish this would be by incorporating migrant shorebirds into signage in Piping Plover areas, or by training paid and volunteer plover monitors in broader shorebird conservation issues.

Enforcing regulations concerning dogs in sensitive areas is another strategy that has the potential for significant benefits to shorebirds. This could be accomplished through more prominent signage and community-based outreach, rather than relying on an increase in enforcement. In the most sensitive areas (e.g., roosts such as at Plaice Cove), it may be beneficial to physically limit public access through the use of symbolic fencing, similar to that used at

plover nesting beaches. All these actions could become less critical during September and October when fewer people are using beaches.

Options for managing beach raking are less clear, but could involve focusing raking toward the lower portions of the beach. This would have the effect of leaving more detritus on the upper beach where shorebirds are more likely to roost. In the case of significant wrack deposition following storms, managers could consider options that include leaving seaweed deposits in portions of the beach where human activity is typically lower – often toward rocky shorelines and jetties where it naturally accumulates. Given the variety of coastal engineering projects that are possible, and their largely unknown effects on shorebirds, there are no specific actions identified for this threat.

In all cases, some level of periodic shorebird monitoring is important for several reasons. It can identify changes in use patterns, including new or shifting roosts, as well as changes to conditions at those roosts. Targeted monitoring would be a means of identifying the impacts of specific threats such as new engineering projects or changes to beach use. By observing shorebird behavior in addition to distribution and abundance, monitoring also has the potential to assess any benefits imparted by measures enacted to mitigate human disturbance (e.g., symbolic fencing, signage about dogs, etc.).

Conclusion

Shorebird use of the New Hampshire seacoast has changed in some significant ways since our first assessment of the Hampton-Seabrook estuary in 2006-07. While the main Hampton-Seabrook mudflats remain the most important site for foraging at low tide, the areas used by roosting shorebirds are often very different. In particular, three locations around the harbor periphery that were extensively used in the earlier study are no longer used at all, and have been replaced by a single large roost on the immediate coast (Plaice Cove) and two smaller roosts in the salt marsh. Only the late-season roost on Seabrook Beach remains in use between the two surveys. Because available roost sites appear more limited than before, and because both main sites are relatively accessible to people and dogs, it is arguable that roosting shorebirds are at greater risk than before, although we lack detailed data on frequency of disturbance. Strategies to minimize future disturbance include general outreach to beachgoers – perhaps through signage, coordination with towns on beach maintenance activities, and in extreme cases closure of important beach segments during critical passage periods.

Acknowledgements

Funding for this project was received in the form of two grants (2018 and 2019) from the Fuller Foundation, and one grant from the Blake-Nuttall Fund of the Nuttall Ornithological Club. Additional funding for the fall 2020 surveys came from the Margery and Lorus Milne Fund at New Hampshire Audubon.

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Figure 1. Overall patterns of shorebird use of coastal New Hampshire. Graphs are based on year-round data from eBird for Rockingham County from 2010-2020, and broken into quarter-month periods. Species included were 16 regularly-occurring species of migrants, plus the Willet (see appendix). Top: Species diversity represented as number of species reported during each period. Bottom: A measure of overall abundance calculated by adding together “average count” for each of these same 17 species. “Average count” is based on the number of individuals reported on q1eBird checklists, and thus tends to be lower than numbers regularly encountered in the field.

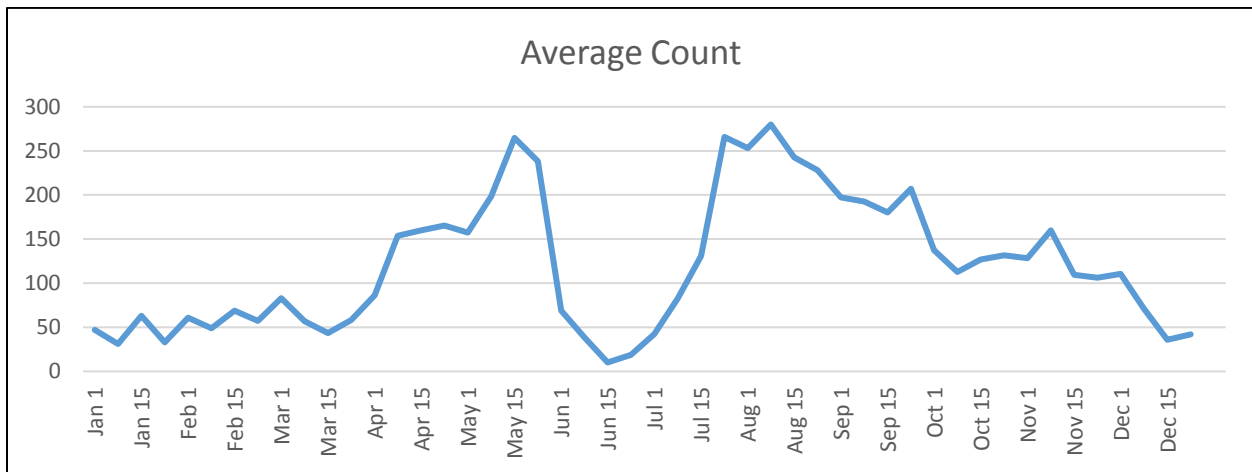
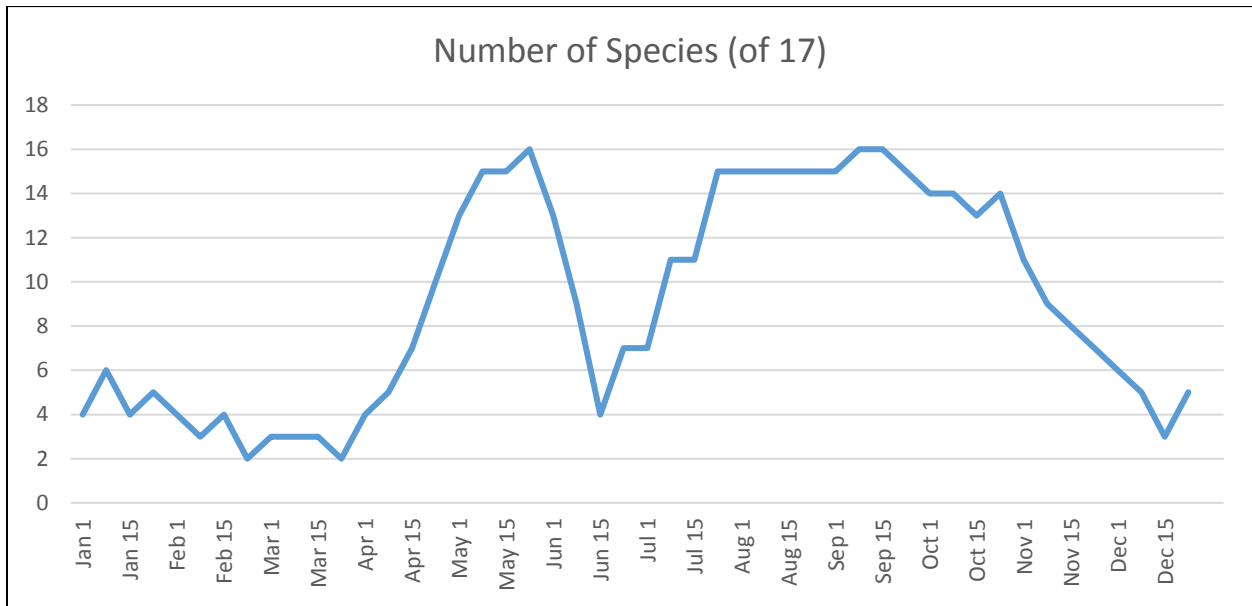
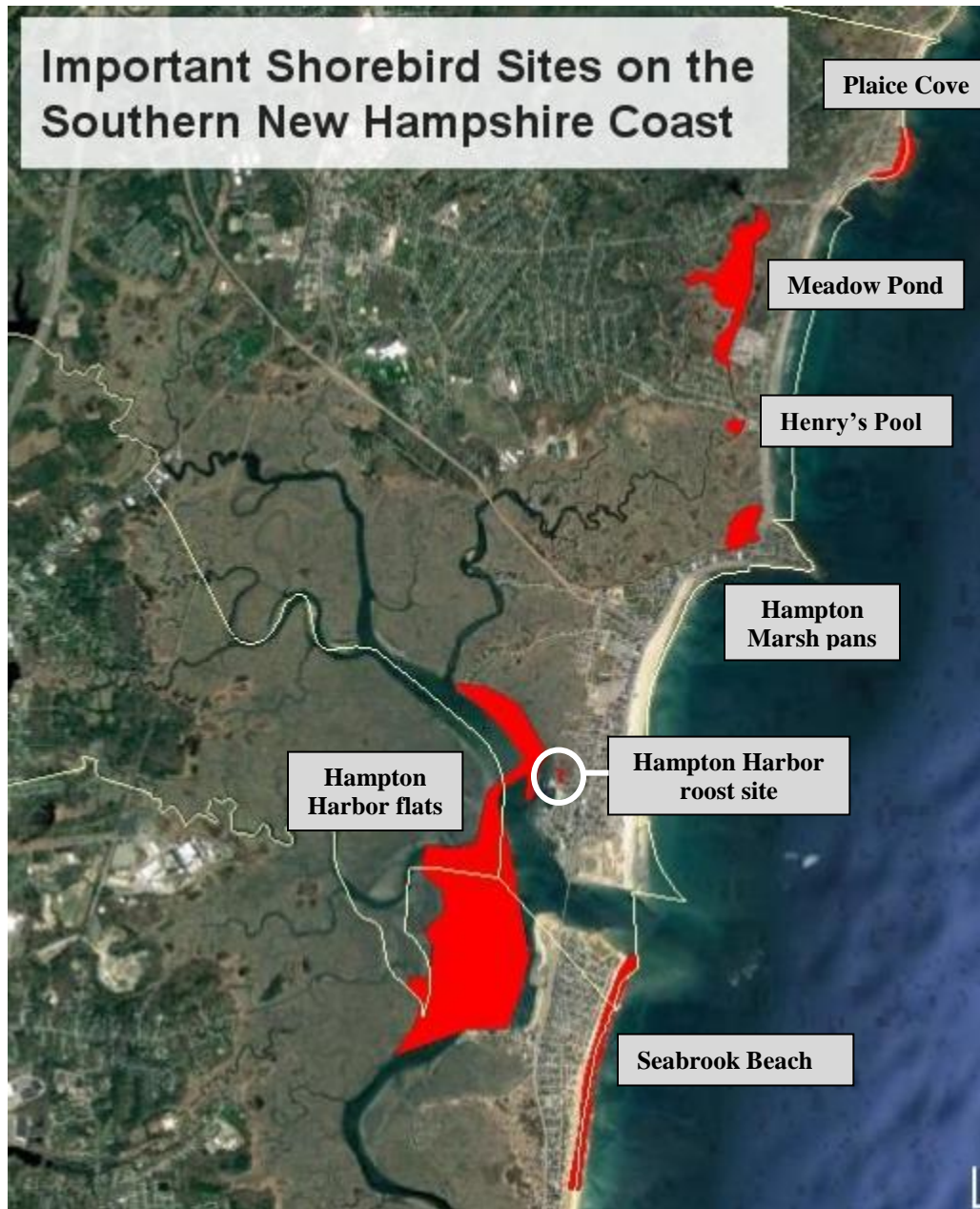


Figure 2. Important sites for migrating shorebirds in the Hampton-Seabrook Estuary.

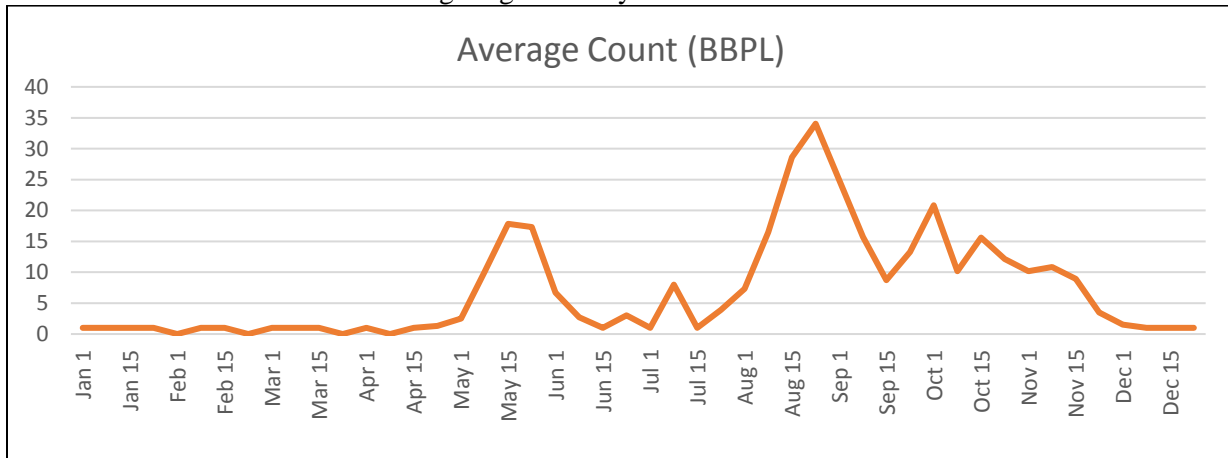


Appendix. Summary information for the regularly-occurring shorebird species of the Hampton-Seabrook estuary. In the “Conservation Status” sections: NH SGCN = Species of Greatest Conservation Need in the *New Hampshire Wildlife Action Plan* (2015), and USSCP = United States Shorebird Conservation Plan (Brown et al. 2001). Abundance descriptions roughly as follows: “abundant” = average daily counts regularly over 100 birds, “common” = daily counts 25-100 birds, “uncommon” = daily counts 5-25 birds, and “rare” = almost always fewer than five birds, and not recorded on all visits. Seasonal abundance graphs are based on eBird data for Rockingham County from 2010-2020, and show the average number of individuals of each species based on all checklists on which it was reported.

Black-bellied Plover (*Pluvialis squatarola*)

Conservation Status: USSCP Moderate Concern, strong declines

Occurrence in coastal New Hampshire: Uncommon spring and common fall migrant, with occasional individuals lingering into early winter.



American Golden-Plover (*Pluvialis dominica*)

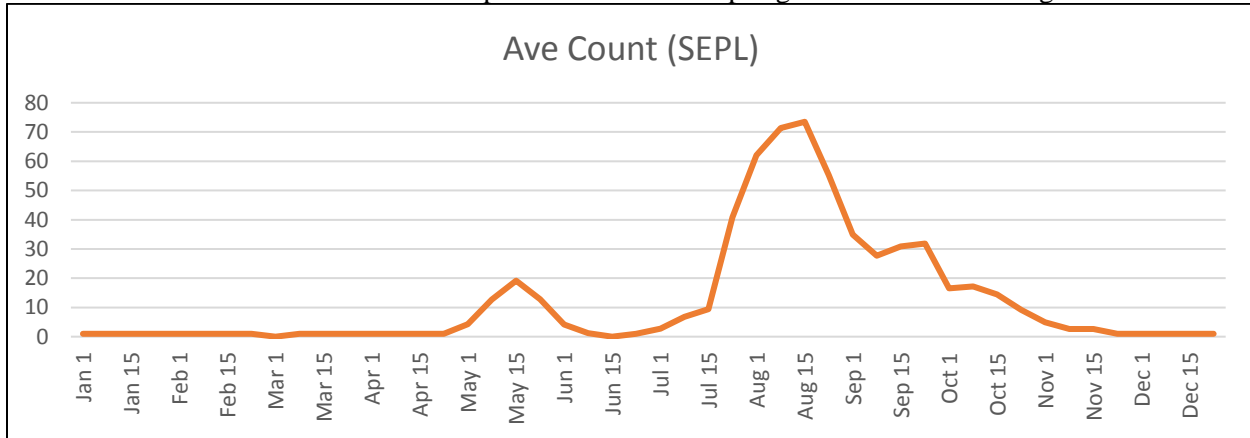
Conservation Status: USSCP High Concern, stable populations

Occurrence in coastal New Hampshire: Rare. One to three individuals reported most falls (usually Sept-Oct), usually in the company of Black-bellied Plovers. More common at inland fields than along the immediate coast.

Semipalmated Plover (*Charadrius semipalmatus*)

Conservation Status: USSCP Least Concern, uncertain population trend

Occurrence in coastal New Hampshire: Uncommon spring and abundant fall migrant.

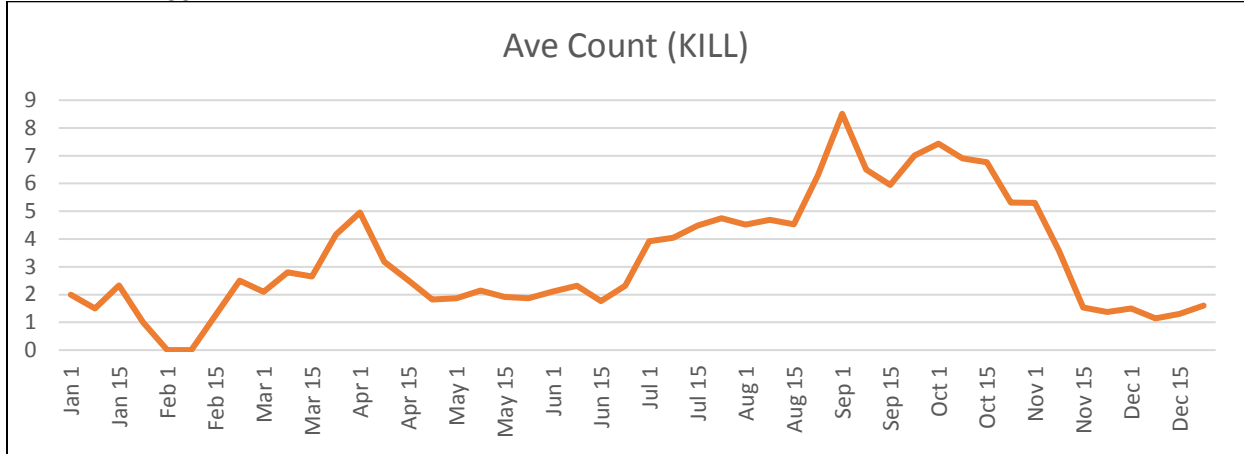


Piping Plover (*Charadrius melodus*)

Conservation Status: State Endangered, Federally Threatened, USSCP highly imperiled, increase
Occurrence in coastal New Hampshire: BREEDS (May-July). 5-10 pairs nest on Hampton and Seabrook Beaches, with some individuals lingering into October

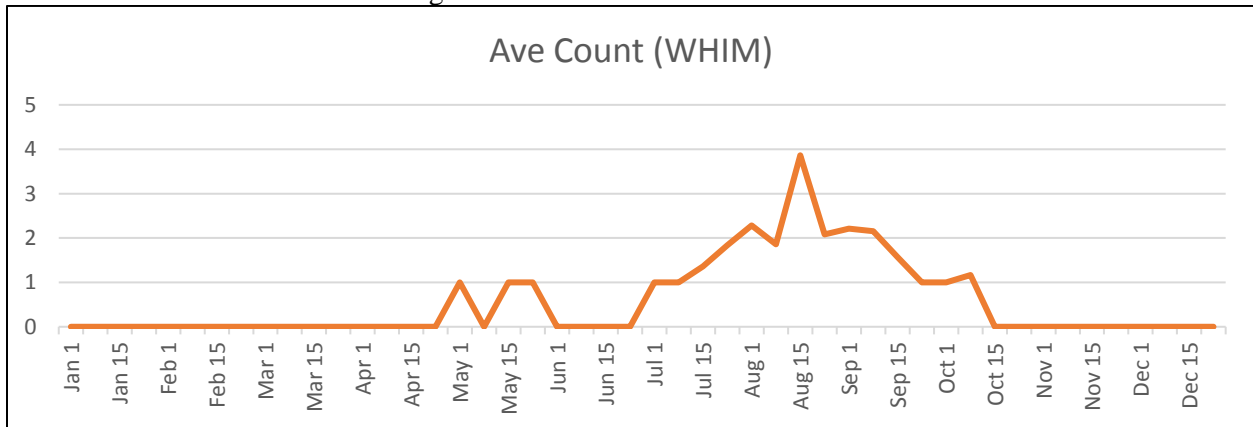
Killdeer (*Charadrius vociferus*)

Conservation Status: USSCP Moderate Concern, strong decline
Occurrence in coastal New Hampshire: BREEDS (May-July). Spring migrants arrive in March and most birds are gone by mid-November. Far less common in winter than the graph below suggests.



Whimbrel (*Numenius phaeopus*)

Conservation Status: NH SCGN, USSCP High Concern, moderate decline
Occurrence in coastal New Hampshire: Rare spring and uncommon fall migrant. Appears less common than a decade ago.



Hudsonian Godwit (*Limosa haemastica*)

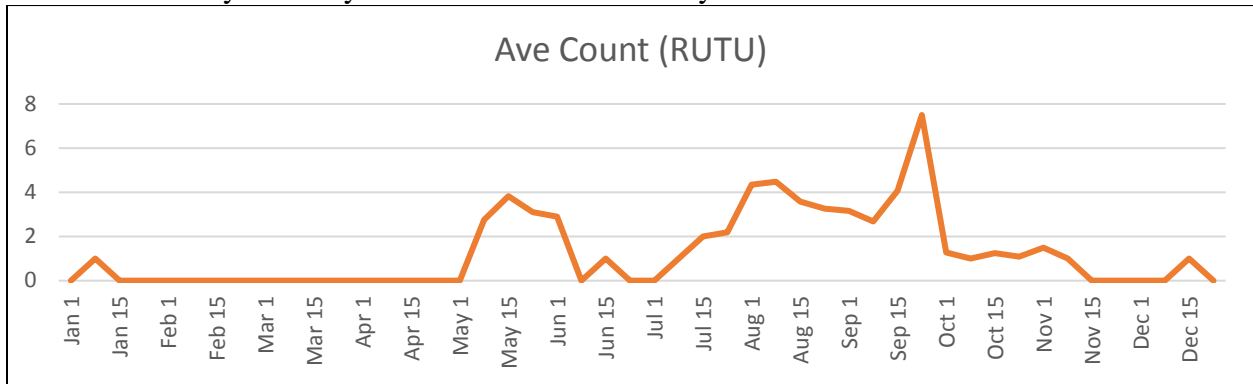
Conservation Status: USSCP High Concern, uncertain population trend
Occurrence in coastal New Hampshire: Rare fall migrant from late July to early November (peak in Aug-Sept), less common and regular than a decade ago.

Ruddy Turnstone (*Arenaria interpes*)

Conservation Status: NH SGCN, USSCP High Concern, strong decline

Occurrence in coastal New Hampshire: Uncommon to rare spring and fall migrant.

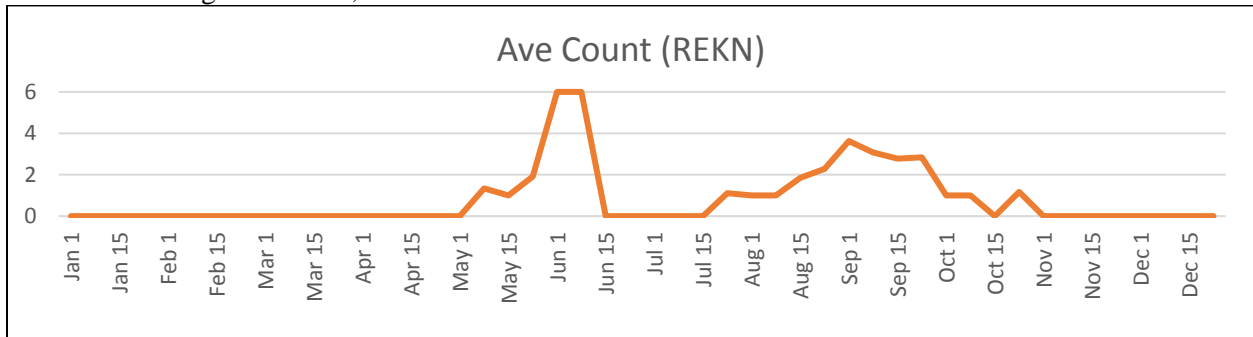
Usually on rocky shorelines but occasionally on mudflats.



Red Knot (*Calidris canutus*)

Conservation Status: State and Federally Threatened, USSCP highly imperiled, strong decline

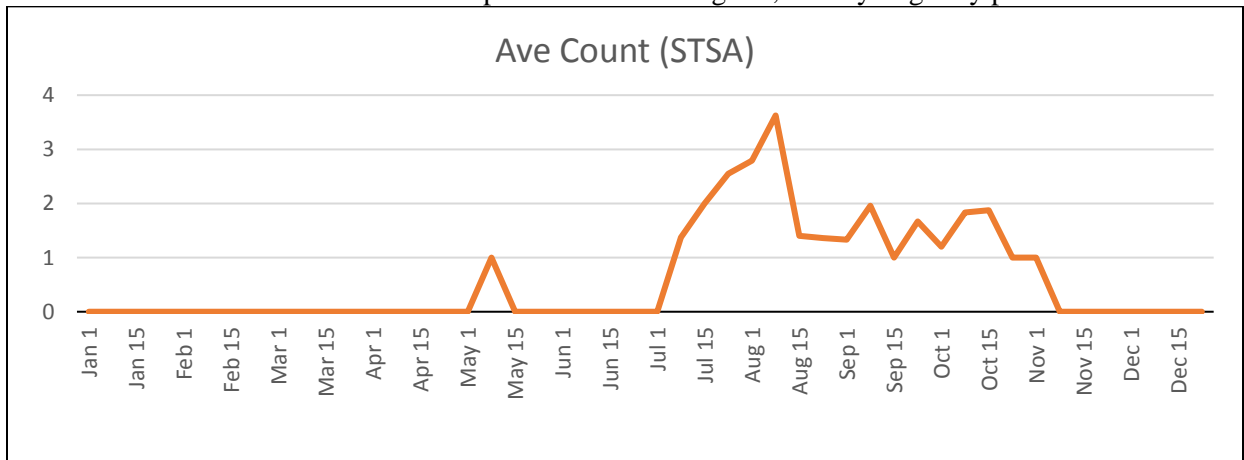
Occurrence in coastal New Hampshire: Uncommon to rare in spring and fall, with most records of 1-5 birds on Seabrook Beach or Hampton-Seabrook Harbor mudflats. More common through the 1990s, when counts of over 20 birds were not unusual.



Stilt Sandpiper (*Calidris himantopus*)

Conservation Status: USSCP Moderate Concern, uncertain population trend

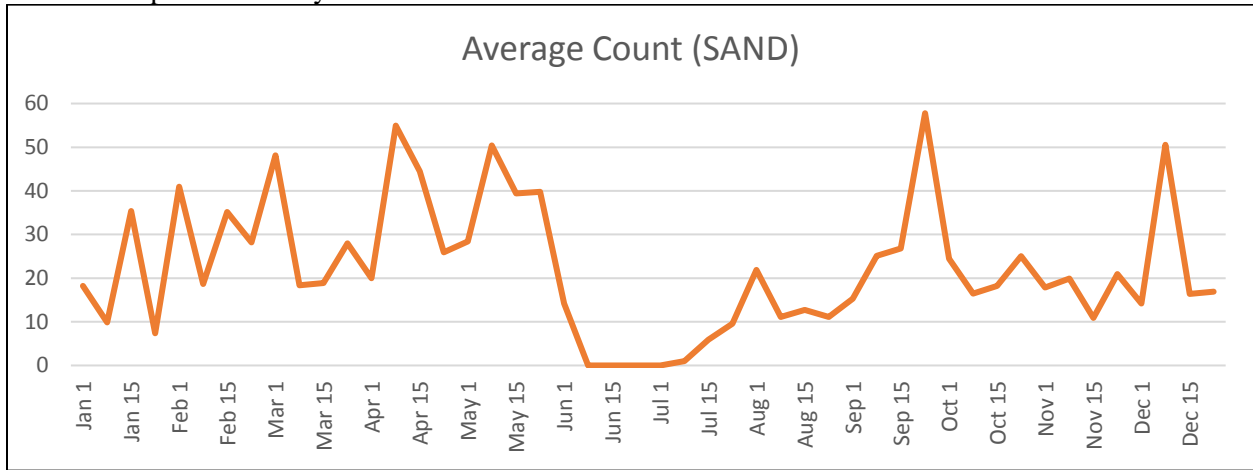
Occurrence in coastal New Hampshire: Rare fall migrant, usually in grassy pools.



Sanderling (*Calidris alba*)

Conservation Status: NH SGCN, USSCP High Concern, moderate decline

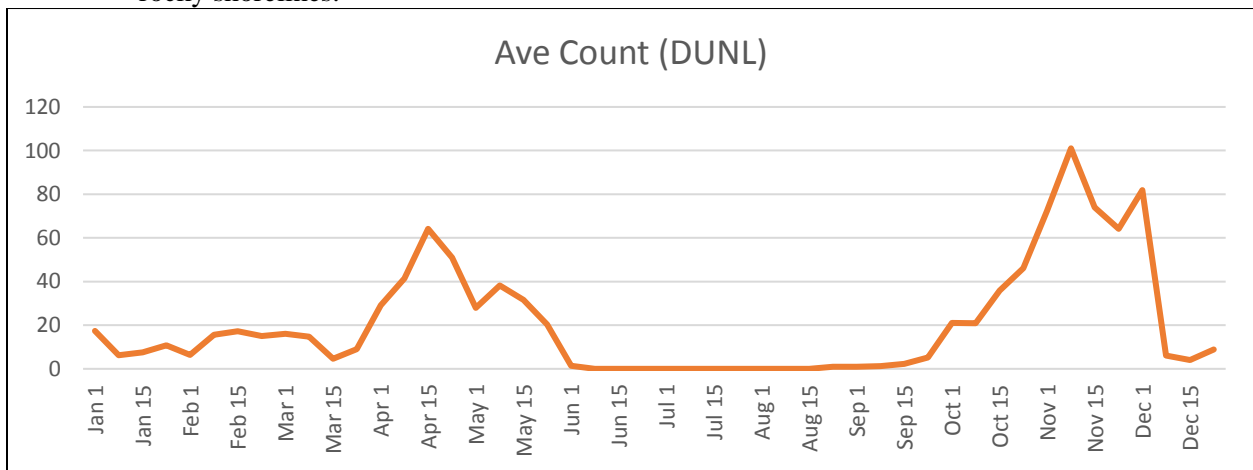
Occurrence in coastal New Hampshire: Common spring and fall migrant, with variable numbers overwintering. Occurs primarily on sandy beaches and mudflats, but will roost with other species in rocky areas.



Dunlin (*Calidris alpina*)

Conservation Status: USSCP High Concern, strong decline

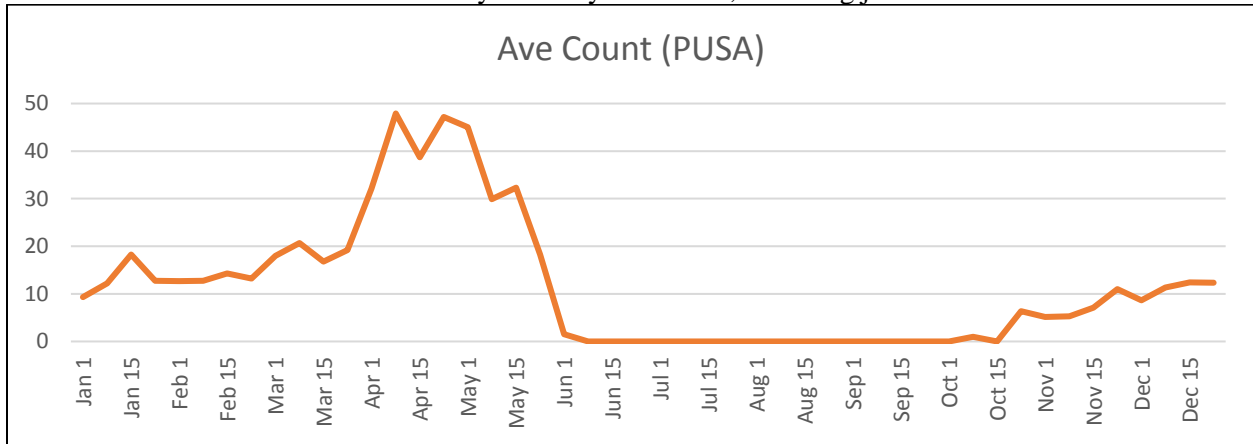
Occurrence in coastal New Hampshire: Common to abundant from fall to spring. One of three regularly overwintering shorebirds. Feeds on beaches and mudflats and roosts on beaches or rocky shorelines.



Purple Sandpiper (*Calidris maritima*)

Conservation Status: NH SGCN, USSCP High Concern, moderate decline

Occurrence in coastal New Hampshire: Common from late fall (November) to spring, with a pulse of northbound migrants in April and May. One of three regularly overwintering shorebirds. Found exclusively on rocky shorelines, including jetties.



Baird's Sandpiper (*Calidris bairdii*)

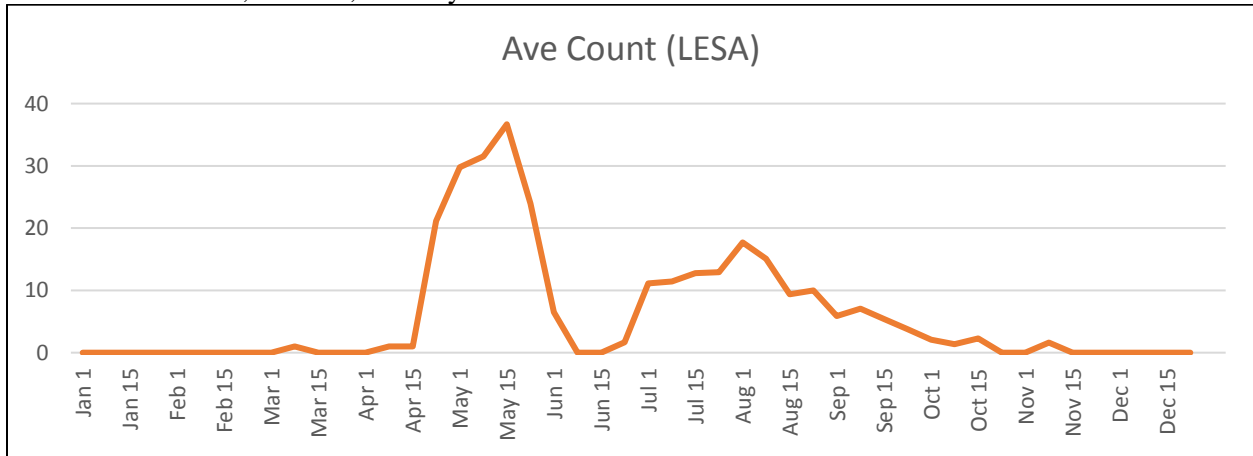
Conservation Status: USSCP Least Concern, uncertain population trend

Occurrence in coastal New Hampshire: Rare fall migrant in August and September. Usually no more than one bird at a time.

Least Sandpiper (*Calidris minutilla*)

Conservation Status: USSCP Least Concern, strong decline

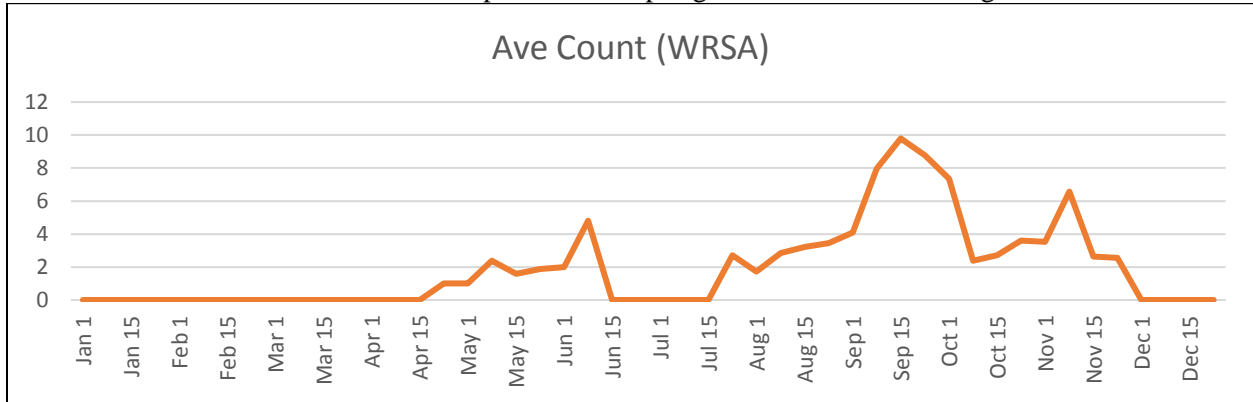
Occurrence in coastal New Hampshire: Uncommon to common spring and fall migrant. Always less common than Semipalmated Sandpiper and more likely in marshes and pools than on mudflats, beaches, or rocky shores.



White-rumped Sandpiper (*Calidris fuscicollis*)

Conservation Status: USSCP Least Concern

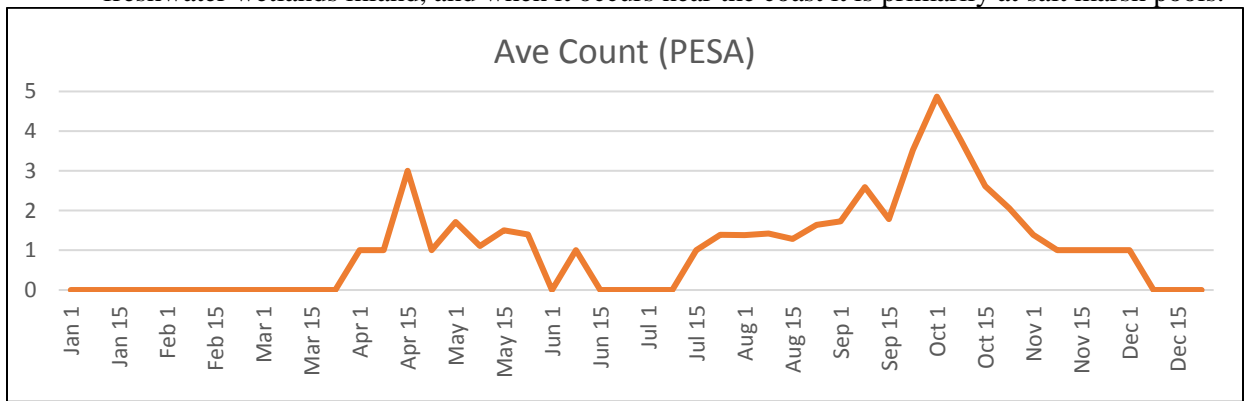
Occurrence in coastal New Hampshire: Rare spring and uncommon fall migrant.



Pectoral Sandpiper (*Calidris melanotos*)

Conservation Status: USSCP High Concern, uncertain population trend

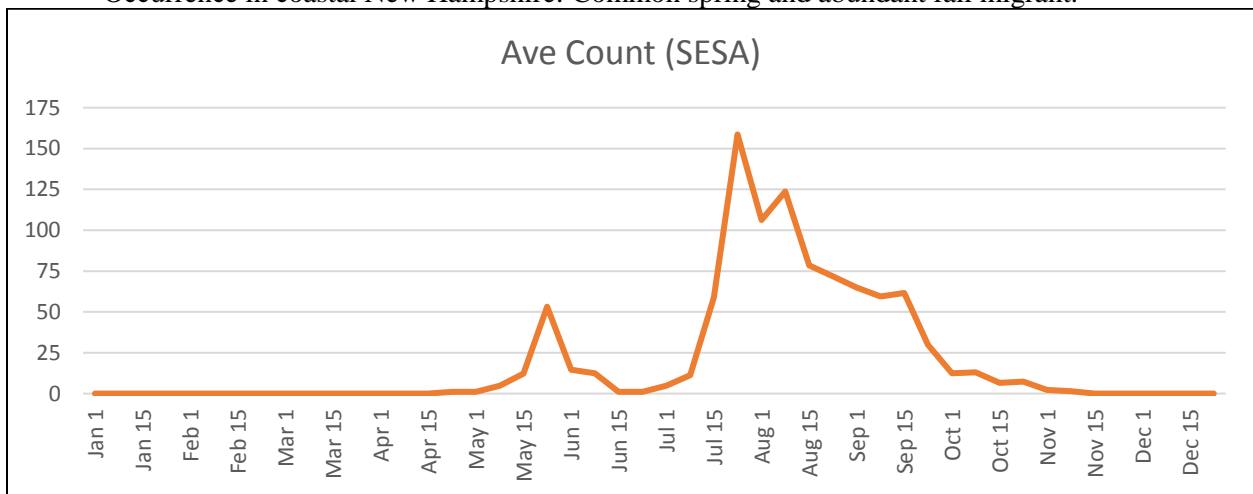
Occurrence in coastal New Hampshire: Rare spring and fall migrant. More likely in grassy freshwater wetlands inland, and when it occurs near the coast it is primarily at salt marsh pools.



Semipalmated Sandpiper (*Calidris pusilla*)

Conservation Status: NH SGCN, USSCP High Concern, strong decline

Occurrence in coastal New Hampshire: Common spring and abundant fall migrant.



Western Sandpiper (*Calidris mauri*)

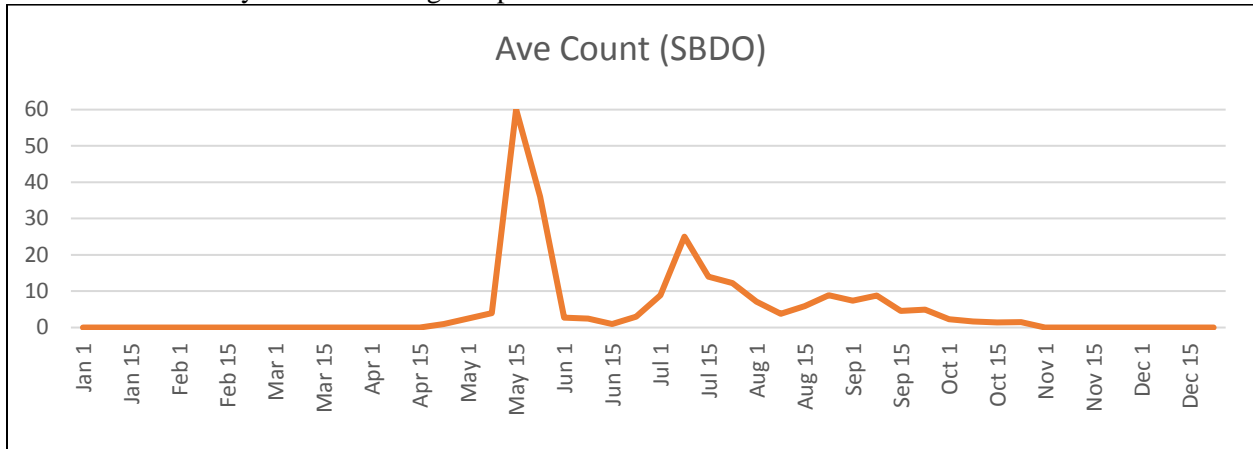
Conservation Status: USSCP Moderate Concern (Atlantic), strong decline

Occurrence in coastal New Hampshire: Rare but regular fall visitor from mid-August through September, almost always with Semipalmated Sandpipers.

Short-billed Dowitcher (*Limnodromus griseus*)

Conservation Status: USSCP High Concern, strong decline

Occurrence in coastal New Hampshire: Uncommon to common spring and fall migrant, generally in marshy areas including salt pans.



Long-billed Dowitcher (*Limnodromus scolopaceus*)

Conservation Status: USSCP Moderate Concern, stable population

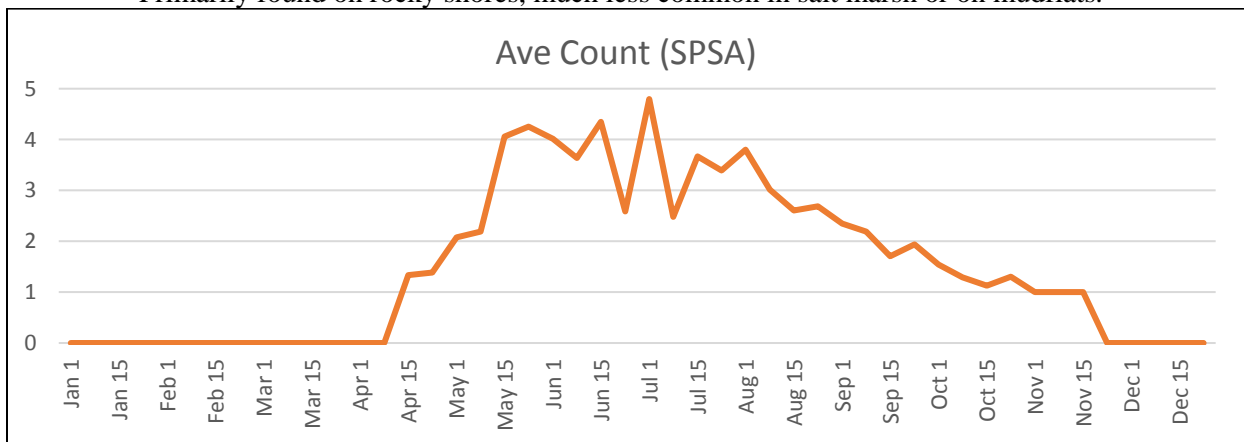
Occurrence in coastal New Hampshire: Rare fall migrant (late July to early November), almost always with Short-billed Dowitchers.

Spotted Sandpiper (*Actitis macularia*)

Conservation Status: USSCP Least Concern, uncertain population trend (NH breeding decline)

Occurrence in coastal New Hampshire: BREEDS (May-July). Migrants occur April-May and August to mid-September, with smaller numbers irregularly through early November.

Primarily found on rocky shores, much less common in salt marsh or on mudflats.

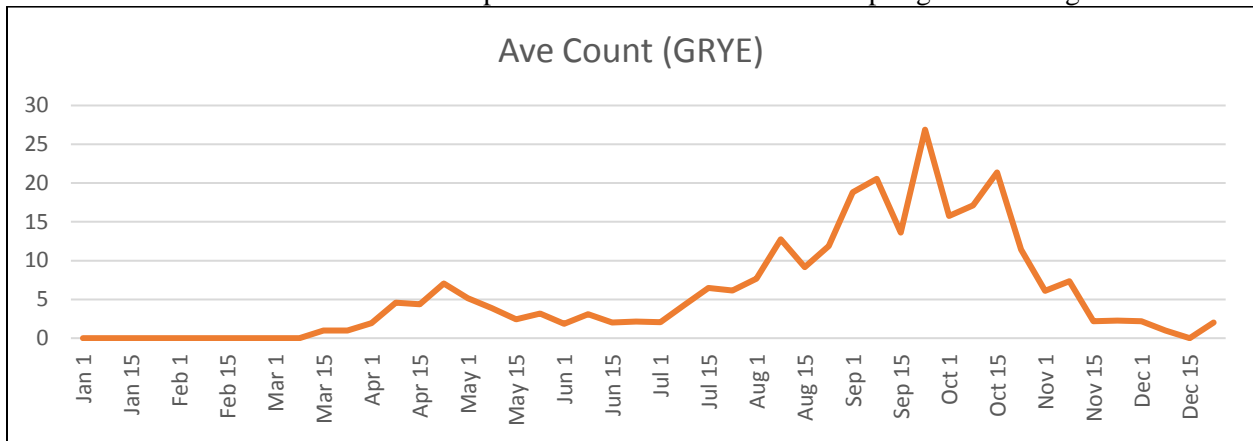


Solitary Sandpiper (*Tringa solitaria*)

Conservation Status: USSCP Moderate Concern (Atlantic), uncertain population trend
Occurrence in coastal New Hampshire: Rare spring (May) and fall (July-October) migrant. This species is more likely in shallow freshwater wetlands inland, and when it occurs near the coast it is primarily in salt marsh pools.

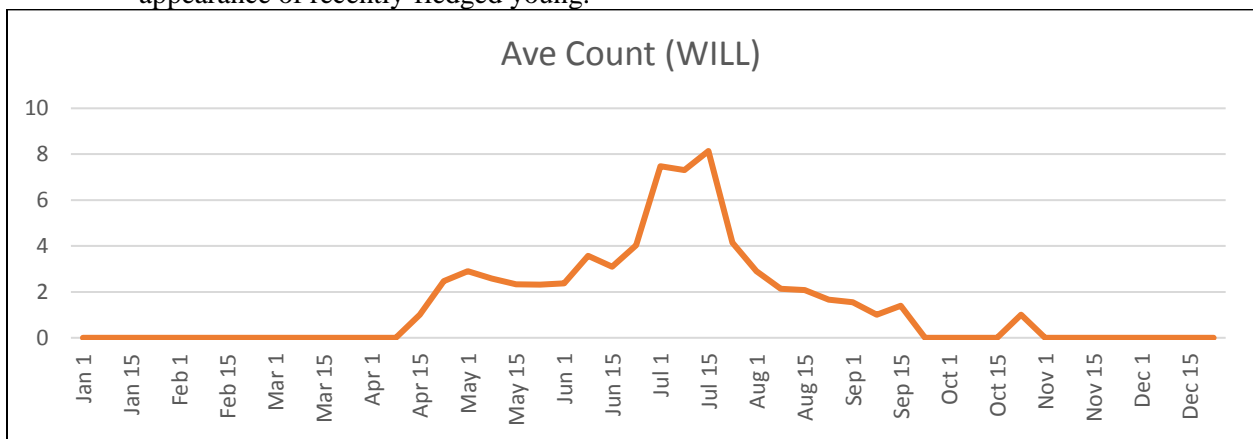
Greater Yellowlegs (*Tringa melanoleuca*)

Conservation Status: USSCP High Concern (Atlantic), moderate increase
Occurrence in coastal New Hampshire: Uncommon to common spring and fall migrant.



Willet (*Tringa semipalmatus*)

Conservation Status: NH SGCN, USSCP High Concern, uncertain population trend
Occurrence in coastal New Hampshire: BREEDS (May-July), with an estimated 30 pairs scattered along the New Hampshire coast. Migrants arrive in late April and have mostly departed by early September. Nesting occurs in salt marsh, but migrants also occur occasionally on rocky shores. The July peak in the graph below reflects the widespread appearance of recently-fledged young.



Lesser Yellowlegs (*Tringa flavipes*)

Conservation Status: USSCP High Concern, strong decline

Occurrence in coastal New Hampshire: Uncommon to common spring and fall migrant.

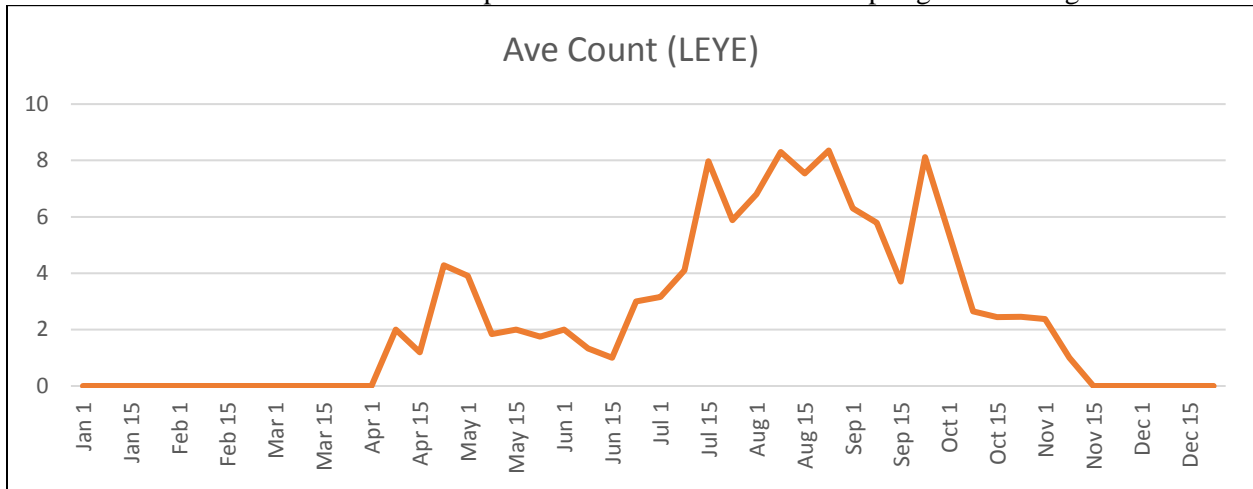


Table 1. Shorebirds detected along the NH coast during migration surveys in 2018-20. The number of x's in a cell represents the relative abundance of each species on each survey date, with x = less than 10, xx = 10-99, and xxx = 100 or more. Asterisk (*) indicates rarer species that are not to be expected regularly. **Bold** indicates species that breed locally.

Species	Fall 2018						Spring 2019					Fall 2019							Fall 2020									
	Aug 20	Aug 31	Sep 10	Sep 27	Oct 12	Peak Count	May 15	May 23	May 30	Jun 7	Peak Count	Jul 22	Aug 1	Aug 14	Aug 29	Sep 12	Sep 26	Peak Count	Jul 24	Aug 5/10	Aug 19	Aug 27	Sep 8	Sep 17	Sep 28	Oct 9	Peak Count	
Black-bellied Plover	xx	xx	xx	xx	x	93	xx	xx	xx	x	58	x	x	xx	xx	xx	xx	87		x	xx	xx	xx	xx	xx	xx	xx	76
American Golden-Plover *			x			1																			x		1	
Piping Plover							x	x			2		x					3										
Semipalmated Plover	xxx	xx	xxx	xx	xx	325	x	xx	xx		41	xx	xxx	xxx	xxx	xxx	xxx	466	xx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	500	
Killdeer		x	x	x		7	x	x	x	x	4	x	xx	xx	xx	x	x	10	x	x	xx	xx	x		x	x	12	
Whimbrel	x	x	x			3									x			2			x	x		x			8	
Ruddy Turnstone		x	x		x	5	x	x			9				x			4										
Red Knot *										x	10																	
Stilt Sandpiper *														x				2		x						x	2	
Sanderling			x		x	2									xx	xx	xxx	102			x	xx	xx	xx	x	xx	70	
Dunlin			x	x	xx	65	xx	xx	xx		100						x	6						x	x	xx	78	
Purple Sandpiper							x				4																	
Baird's Sandpiper *		x				1																						
Least Sandpiper	x	x	x			6	xxx	xx	x		450	xx	xx	xx	x	x		50	xx	x	x	xx	xx	x	x	x	22	
White-rumped Sandpiper	x		x		x	7								x	x		x	5		x			x	x			1	
Pectoral Sandpiper												x			x			1								x	4	
Semipalmated Sandpiper	xxx	xx	xxx	xx	xx	815	xx	xxx	xx	x	250	xxx	xxx	xxx	xxx	xxx	xx	1800	xxx	xxx	xxx	xxx	xxx	xxx	xx	xx	260	
Western Sandpiper *															x			2			x	x					1	
Short-billed Dowitcher		x	x	x		16						x		xx	xx	x	x	19	x		x	x	xx			x	22	
Long-billed Dowitcher *														x				1										
Spotted Sandpiper	x	x	x			6	x	x	x		7	x		x	x	x		4	xx		x	x	x				10	
Solitary Sandpiper *				x		1																						
Greater Yellowlegs	x	xx	x	xx	x	112	x				7	xx	xx	xx	x	xx	x	70	x	x	x	x	xx	xx	x	x	50	
Willet	x	x				2	x	x	x	x	4	x	x	x	x			5	x								3	
Lesser Yellowlegs	x	x	x	x		20						x	x	xx	x	x	x	20	x	x	x	x	xx	x	x	x	25	
# Species for survey date	10	13	15	9	8		11	9	8	5		11	9	12	15	11	10		9	9	12	12	11	10	10	12		
# Species for season	18						13					18							18									