

A photograph of two shorebirds, likely sandpipers, on a sandy beach. The bird in the foreground is facing left, with its head slightly turned. It has a mottled pattern of brown, black, and white on its back and wings, and a white underbelly. The bird in the background is facing away from the camera, showing its back and tail. The ground is sandy with some scattered seaweed and small debris. The image is framed by a blue border.

2015 FIELD OPERATIONS REPORT

MIGRATORY SHOREBIRD MONITORING ON FIRE ISLAND, NY

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INTRODUCTION

This study aids in developing a synergistic ecological-coastal resiliency framework for a significant portion of the coastal habitat on Fire Island. It is envisioned that the study will provide key information on beach restoration, management, and conservation actions for other beach-dependent species, in addition to the federally-listed piping plover, that will be relevant to the entire Long Island south shore barrier island system chain.

The three major goals of this project are:

- (1) Intensive field work monitoring the piping plover population west of the new inlet in the Federal Wilderness Area, thereby greatly increasing the range of habitat conditions that can be assessed for resiliency under both natural processes and coastal stabilization.
- (2) Fine and coarse scaled collection of habitat data for expansion and scaling of the SLR modeling to Long Island; and
- (3) Data on migratory shorebird habitat use during spring and fall migration and concurrent with the early part of the hurricane season and piping plover breeding season on Fire Island, including analysis of an assessment of the use of piping plovers as a surrogate species for beach habitat conservation.

Piping plover monitoring data for the population west of the new inlet, as well as additional monitoring data and initial analyses for the entire study population, were presented in Virginia Tech's 2015 annual report (Monk et al. 2015).

Habitat data for the SLR model was provided to collaborators at the USGS at the end of the 2015 season.

Here we present data on migratory shorebird habitat use from April–September 2015, including an assessment of the use of piping plovers as a surrogate species for beach habitat conservation.

METHODS

Study Area

We surveyed 27 km of barrier islands within the administrative boundaries of the National Park Service (5.8 km of Otis Pike Wilderness Area and 1.5 km of the Fire Island Lighthouse Tract), Suffolk County (Cupsogue County Park and Smith Point County Park), and New York State (Robert Moses State Park), on Fire Island and Westhampton Island. Habitat surveyed consisted of sandy beaches backed by dunes, flood shoals, mudflats, habitats created by Hurricane Sandy in October 2012 (including overwashes, a new breach at Old Inlet, and breaches or near-breaches created by Sandy and subsequently filled by the U.S. Army Corps of Engineers (USACE), and restoration areas built by the USACE (at Great Gun and New Made). We surveyed 5.46 km of bay shoreline and 26.69 km of ocean shoreline, 6.05 km of mud flat and sandbar shoreline at Cupsogue County Park, and 10.97 km of flood shoal shoreline near Old Inlet.

We divided the study area into units of habitat small enough that we could survey the entire unit on each visit. Each subsite consisted primarily of storm-created habitats (mudflats, flood shoals, and breaches), artificially filled breaches and stabilized overwashes, restoration areas, or beach (Figures 1–2, Tables 1–2).

Table 1. Subsite names, relative locations, and general habitat descriptions at Fire Island and Westhampton Island, 2015

Name	Subsite Code	Description	Habitat Type
Cupsogue Mud Flats	CMF	Mud flats north of the Cupsogue parking lot, and south of the high bare island in Moriches Bay.	Mud flat
Cupsogue Sand Bar	CSB	Large low energy sandbar/shoal north of Cupsogue West	Sand bar
Cupsogue East	CSE	Beach and narrow strip of bayside intertidal zone at east end of Cupsogue Beach County Park. Begins at the east edge of the breach-fill and extends east to the west end of the parking lot.	Beach
Cupsogue West	CSW	Breach-fill and Moriches Inlet area of Cupsogue County Park. Begins at Moriches Inlet and extends east to the west edge of the breach-fill.	Filled breach
Smith Point East	SPT E	Begins on west side of Moriches Inlet and extends west to Cut 3 on Burma Road.	Beach
Smith Point West	SPT W	Begins at Cut 3 on Burma Road and extends to Cut 2 of Burma Road.	Beach
Narrow Bay East	NBE	Begins at Cut 2 on Burma Road and extends west to the east end of the filled dredge spoil.	Overwash
New Made	MWPF	Begins at the east end of the filled dredge spoil and extends west to the east edge of the small breach-fill.	Filled dredge spoil
Narrow Bay West	NBW	Includes the overwash and small breach-fill west of the New Made dredge spoil-fill.	Overwash and filled breach
Pattersquash East	PSE	Stretch of beach with primary duneline between Narrow Bay West and Pattersquash overwashes.	Beach
Pattersquash Overwash	PSO	Overwash west of Pattersquash East.	Overwash
Bridge East	BRE	Begins where the primary duneline begins at west end of Pattersquash Overwash and extends to the Otis Pike Wilderness at the NPS Visitor Center.	Beach
Bridge Overwash	BRO	Overwash in the Otis Pike Wilderness just west of the NPS visitor Center.	Overwash
Bridge West	BRW	Stretch of beach with primary duneline between Bridge Overwash and Old Inlet East.	Beach
Old Inlet East	OIE	Begins where the primary duneline ends and extends west to Old Inlet.	Overwash and inlet

Old Inlet West	OIW	Begins at west side of Old Inlet and extends to the point where large primary dunes begin.	Overwash and inlet
Old Inlet West Reference	OIWR	Stretch of beach between the east end of Old Inlet West and Bellport Beach.	Beach and overwash
Flood Shoals	FS	Flood shoals associated with Old Inlet.	Flood shoals
Fire Island Lighthouse	FIL	Fire Island Lighthouse Tract of NPS; begins at eastern edge of sand ORV track running inland before housing begins and extends west to signage indicating the boundary with Robert Moses State Park.	Mature dunes
Field 5	FLD5	Begins at signage at west end of Fire Island Lighthouse and extends west to the blue hut at the boundary of Field 4.	Beach
Field 4	FLD4	Begins at blue hut at the west end of Field 5 and extends west to the next blue hut in front of the Field 3 parking lot.	Beach
Field 3	FLD3	Begins at blue hut at the west end of Field 4 and extends west to the next blue hut in front of the Field 2 parking lot.	Beach
The Golf Course	GOLF	Begins at the west side of the Field 2 parking lot behind the primary dune line and extends west to the beginning of the sand stock pile area and north to the major roadway. Not plover habitat.	Golf course
Ocean South Side	OSS	Begins at blue hut at the west end of Field 3 and extends west to the western stone jetty on the ocean side.	Beach
Stockpile	STP	Sand stock pile area on bay side of island; begins at west end of golf course and extends west to the northernmost rock jetty.	Sand stock pile
Demo Point	DMP	Begins at stone jetties on bay and ocean side at the east ends of OSS and STP, and extends west to the inlet.	Mature dunes and inlet

Table 2. Linear miles of shoreline for habitats surveyed on Fire Island and Westhampton Island, April – August, 2015.

Habitat Type	Ocean shoreline (meters)	Ocean shoreline (miles)
Beach	8704	5.41
Filled breach/stabilized overwash	8282	5.15
Natural overwash	3232	2.01
Restoration area	2509	1.56
Flood shoal	1769	1.10

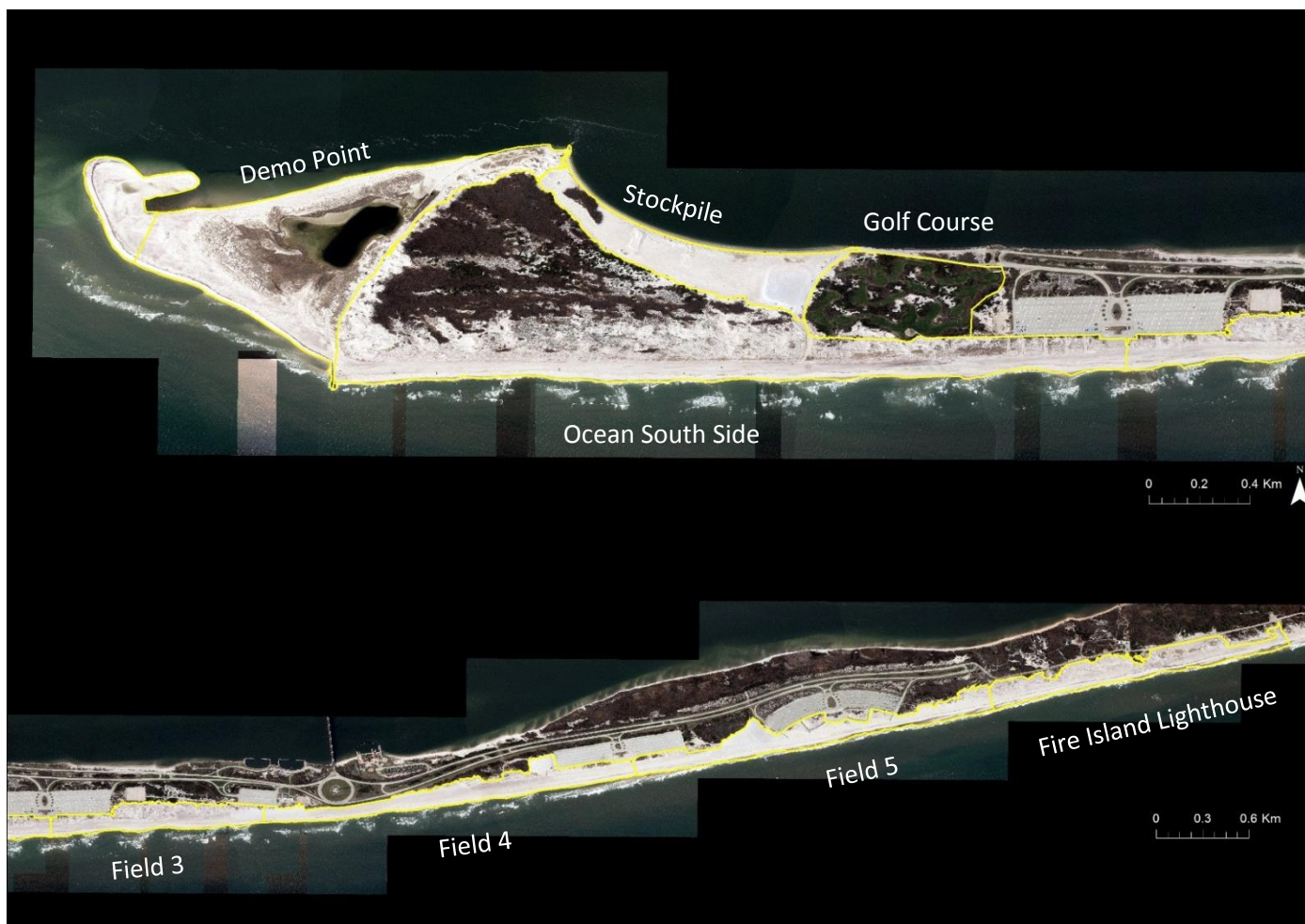


Figure 1. The study area at Robert Moses State Park and the Fire Island National Seashore Lighthouse Tract, depicted from west to east, with subsites delineated in yellow. Background imagery is from April 2015.

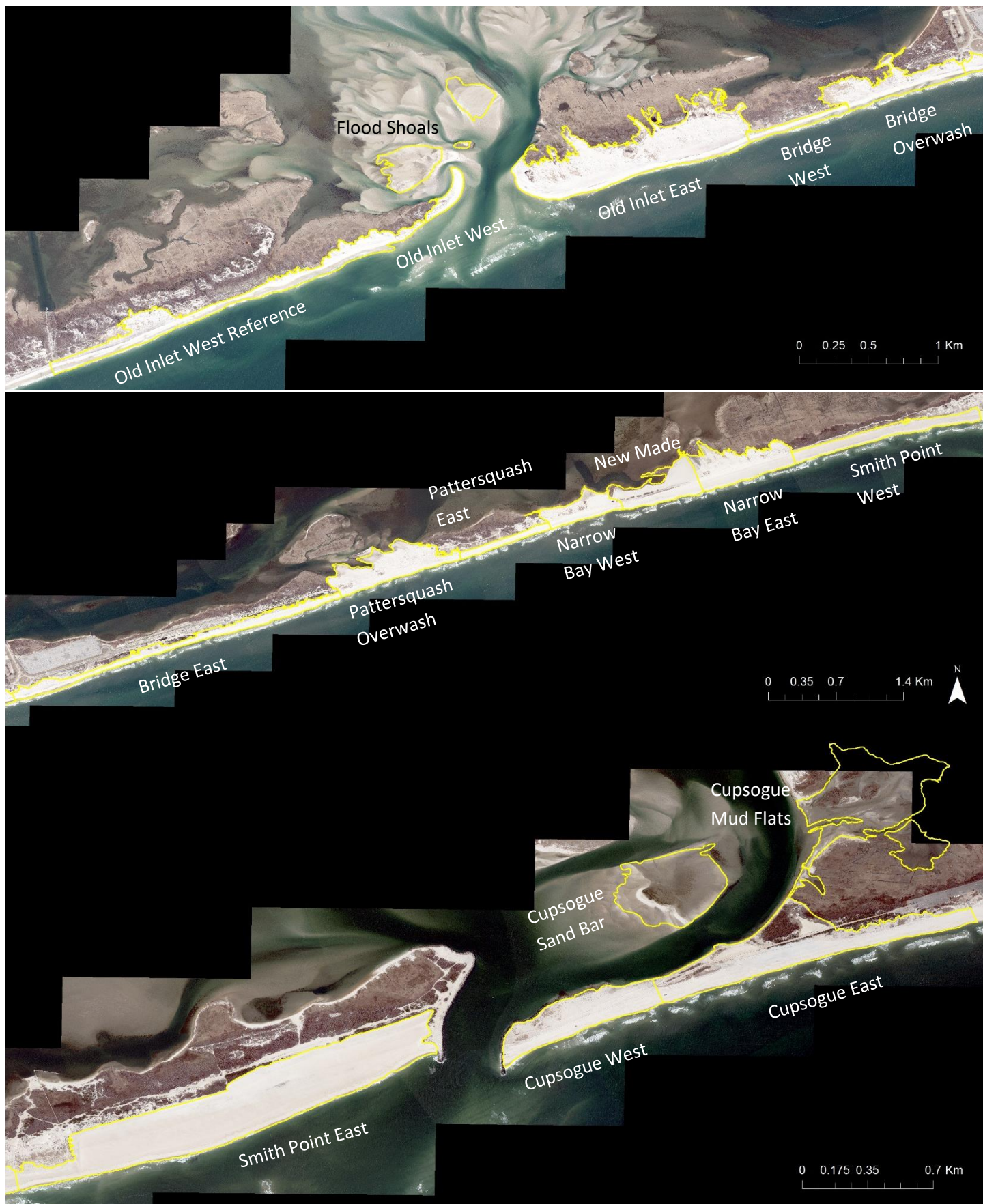


Figure 2. The study area at the Eastern Barrier Islands, including Fire Island and Westhampton Island, depicted from west to east, with subsites delineated in yellow. Background imagery is from April 2015.

Surveys

We counted shorebirds throughout the entire study area 1–2 times per week April–September, 2015 (except in Robert Moses State Park and the Fire Island Lighthouse Tract, where we counted shorebirds once a week May–August, 2015). We surveyed subsites on foot and by ATV. Subsites that did not have bay side habitat and consisted of only narrow ocean beach were surveyed by driving an ATV slowly along the ocean intertidal zone and then along the backshore habitat. When conducting foot surveys, observers walked regular routes through each subsite, usually along the east-west axis, and used spotting scopes to identify and count shorebirds. The route width varied depending on topography and vegetation, and weather conditions that affected visibility, as we adjusted the distance between routes in order to be able to see half the area between adjacent routes. We usually surveyed beach subsites in two passes, one pass along the ocean intertidal zone and one in the backshore area. One–four observers made each pass walking parallel 50–100m apart, depending on the size of the subsite. We attempted to avoid double counting shorebirds by counting forward only. In subsites that had both ocean and bay habitat, we recorded the number of shorebirds in each habitat type separately. We boated to the shoals and sandbars near the new inlet in the Otis Pike Wilderness and near Cupsogue County Park, surveying the shoals, sandbars and mudflats only at low tide. Logistically, we could not survey the entire study area on the same day each week, but we usually surveyed all habitat within each management unit (Cupsogue County Park, Smith Point County Park, Otis Pike Wilderness, and Robert Moses State Park) on the same day, to avoid recounting birds that moved.

RESULTS

We counted nearly 30 thousand shorebirds of 20 different species using the study area in April–September, 2015 (Tables 3–4). We divided shorebird counts into three categories; abundant species which accounted for about 90% of all shorebirds seen, common shorebirds which accounted for roughly 10% of all shorebirds seen, and rare shorebirds which accounted for less than 0.5% of all shorebirds seen (Table 3). We also separated shorebird counts by habitat type, comparing both total shorebird numbers as well as individual species counts at the Cupsogue Sandbar and Mudflat, Old Inlet Flood Shoals, barrier island beach habitat, and barrier island bay habitat (Figures 3–7).

Table 3. Total shorebirds counted by management unit at Fire Island and Westhampton Island, NY, April–September, 2015. The same individuals were almost certainly recounted on multiple surveys.

Management Unit	Abundant Shorebirds	Common Shorebirds	Rare Shorebirds	Shorebird Count
Cupsogue County Park	11889	2090	15	13994
Smith Point County Park	5130	493	10	5633
Otis Pike Wilderness Area	8396	765	20	9181
Robert Moses State Park	761	183	7	951
Total	26176	3531	52	29759

Table 4. Shorebird species counted by management unit at Fire Island and Westhampton Island, NY, April–September, 2015. The same individuals were almost certainly recounted on multiple surveys.

Species*	Cupsogue County Park	Smith Point County Park	Otis Pike Wilderness Area	Robert Moses State Park	Total
American Golden Plover	4	1	0	0	5
American Oystercatcher	586	49	123	95	853
Black-Bellied Plover	1536	678	283	20	2517
Clapper Rail	3	0	0	0	3
Dunlin	1933	30	23	0	1986
Greater Yellowlegs	208	4	37	2	251
Killdeer	5	6	0	0	11
Least Sandpiper	434	92	50	8	584
Lesser Yellowlegs	28	0	4	0	32
Pectoral Sandpiper	3	0	4	7	14
Red Knot	267	43	222	0	532
Ruddy Turnstone	407	122	220	27	776
Sanderling	3270	3505	5671	486	12932
Short-Billed Dowitcher	1757	19	594	11	2381
Semipalmated Plover	1387	453	807	177	2824
Semipalmated Sandpiper	1599	322	798	38	2757
Spotted Sandpiper	18	11	9	34	72
Unknown Chlidrid	0	1	0	2	3
Whimbrel	3	3	16	0	22
Willet	546	294	320	44	1204

*Species listed in bolded font are focal species for the Atlantic Flyway Shorebird Initiative.

Total shorebird counts for 2015

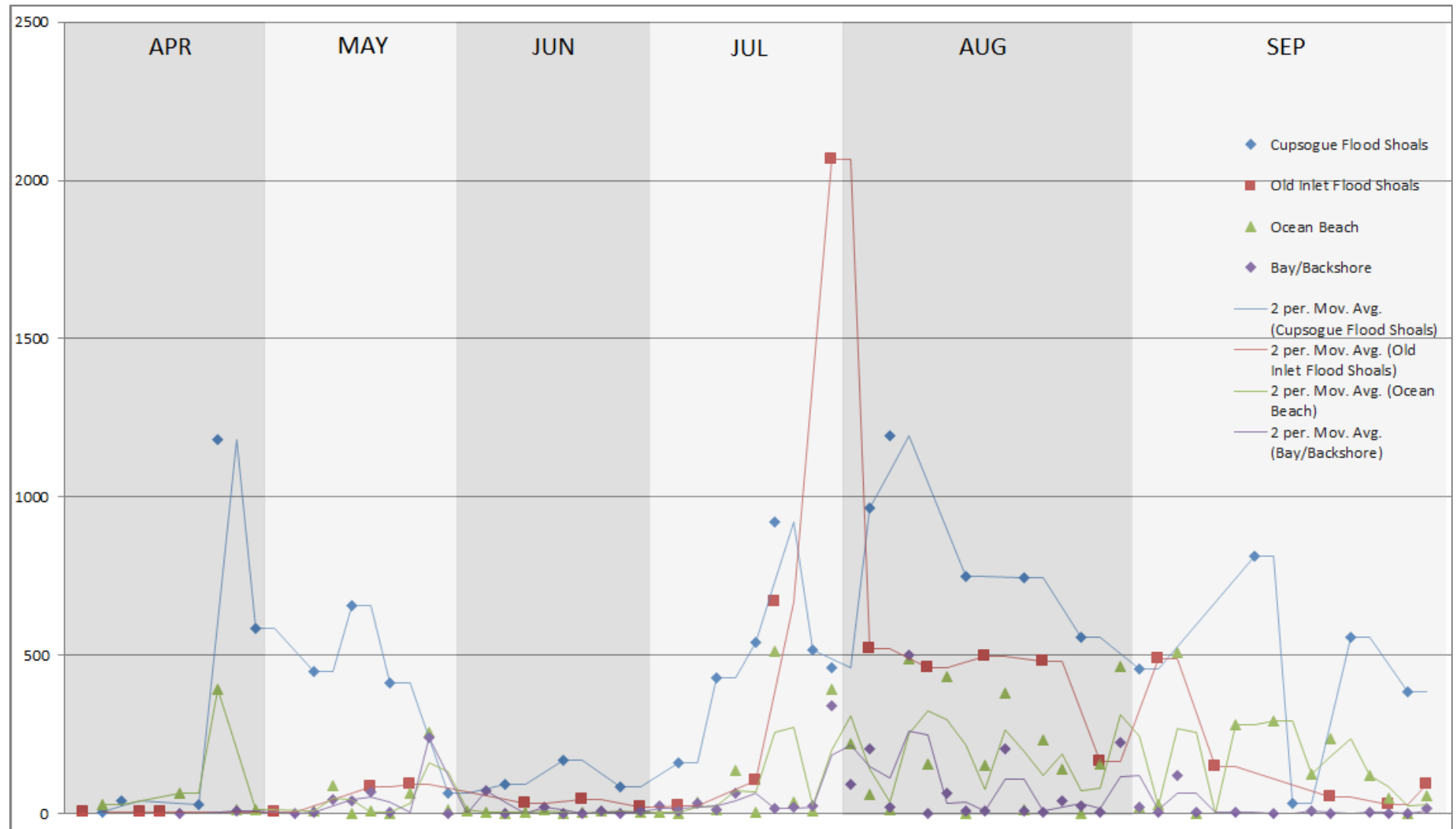


Figure 3. The total number of shorebirds counted at the Cupsogue Sandbar and Mudflat, Old Inlet Flood Shoals, barrier island beach habitat, and barrier island bay habitat on Fire Island and Westhampton Island from April– September, 2015. Surveys were conducted weekly or biweekly. A two period moving average trendline approximates the variation in shorebird numbers over time for each habitat type.

Shorebird counts on Cupsogue Sandbar and Mudflat

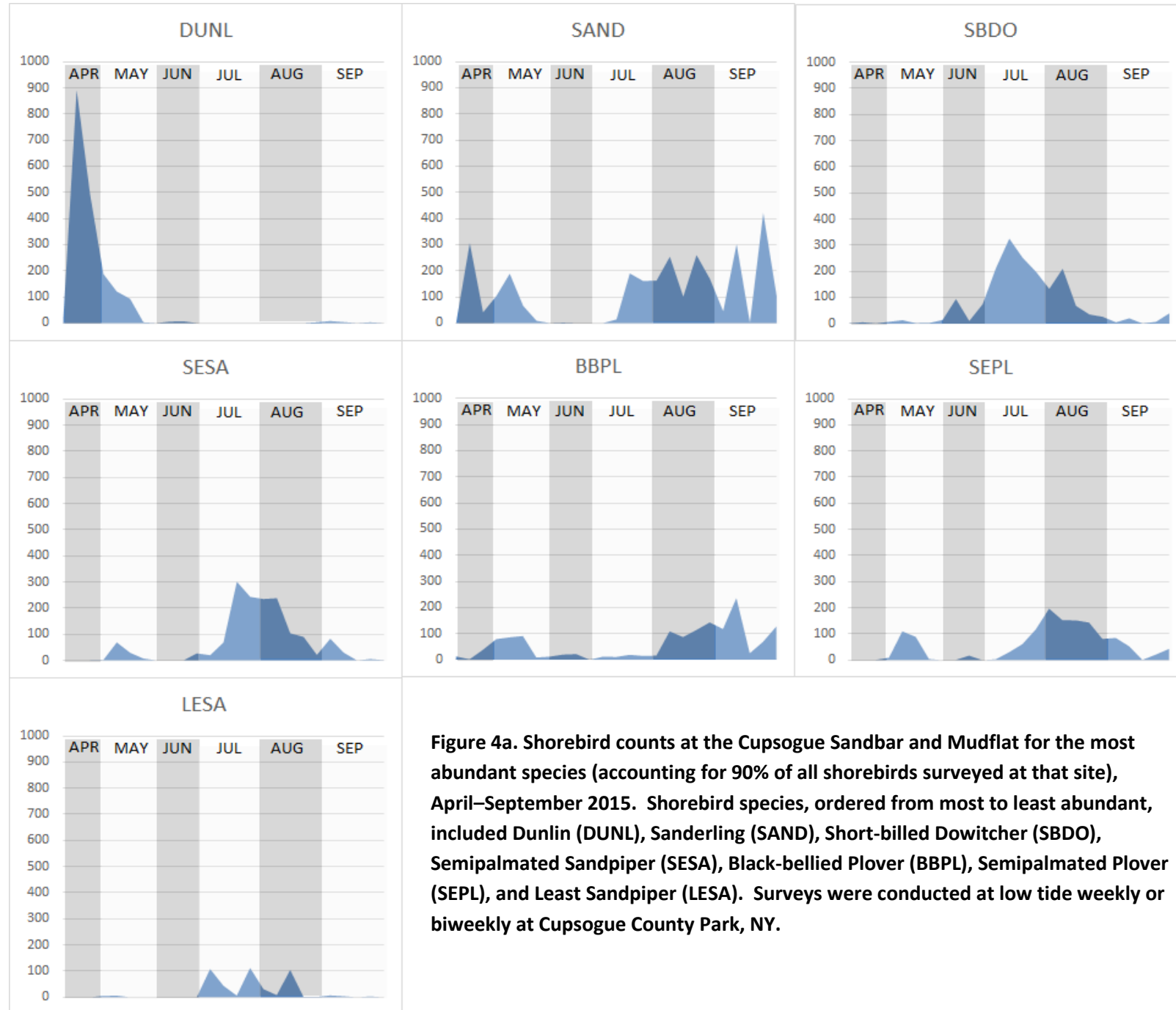


Figure 4a. Shorebird counts at the Cupsogue Sandbar and Mudflat for the most abundant species (accounting for 90% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Dunlin (DUNL), Sanderling (SAND), Short-billed Dowitcher (SBDO), Semipalmated Sandpiper (SESA), Black-bellied Plover (BBPL), Semipalmated Plover (SEPL), and Least Sandpiper (LESA). Surveys were conducted at low tide weekly or biweekly at Cupsogue County Park, NY.

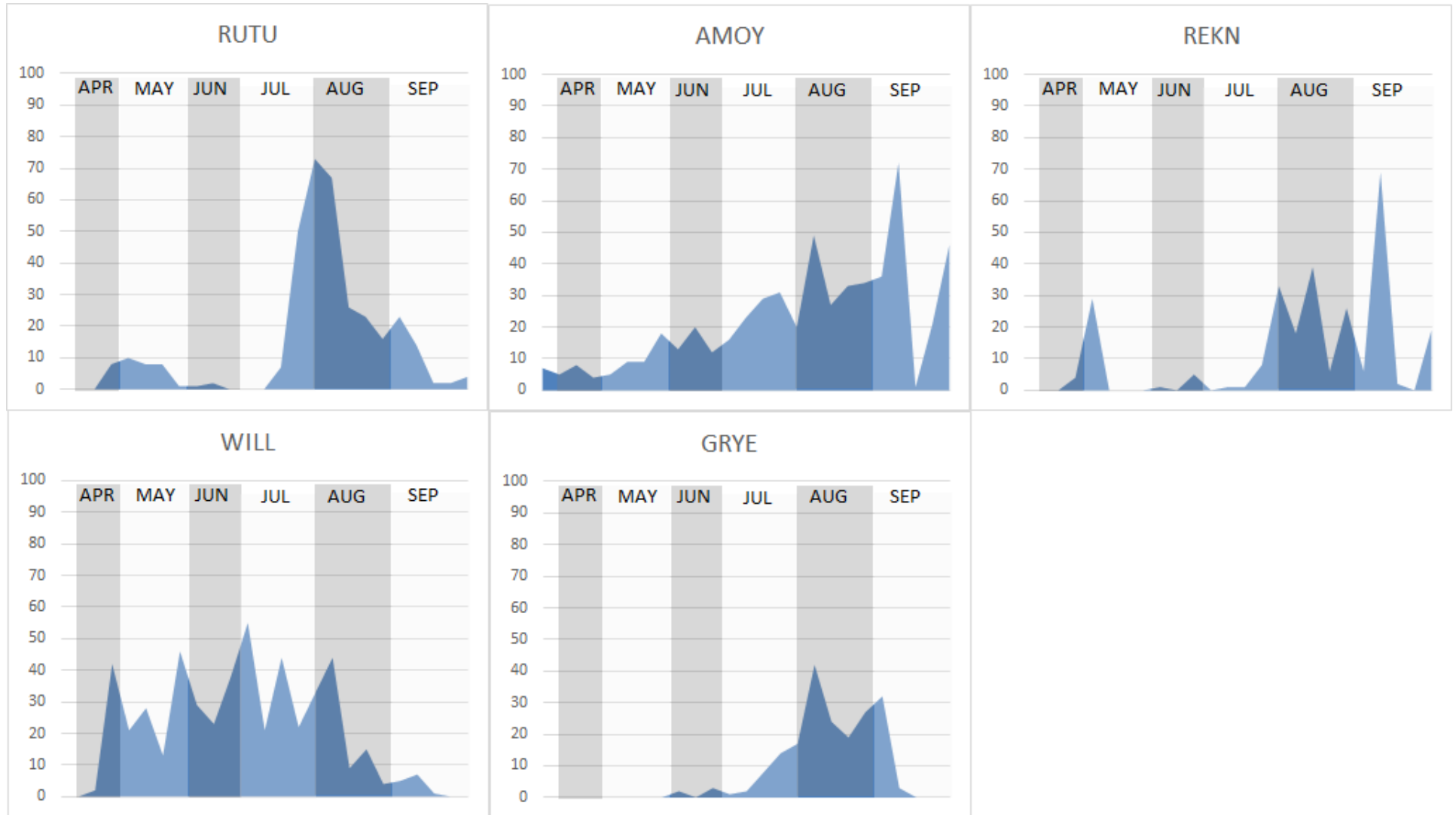


Figure 4b. Shorebird counts at the Cupsogue Sandbar and Mudflat for common species (accounting slightly over 10% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Ruddy Turnstone (RUTU), American Oystercatcher (AMOY), Red Knot (REKN), Willet (WILL), and Greater Yellowlegs (GRYE). Surveys were conducted at low tide weekly or biweekly at Cupsogue County Park, NY.

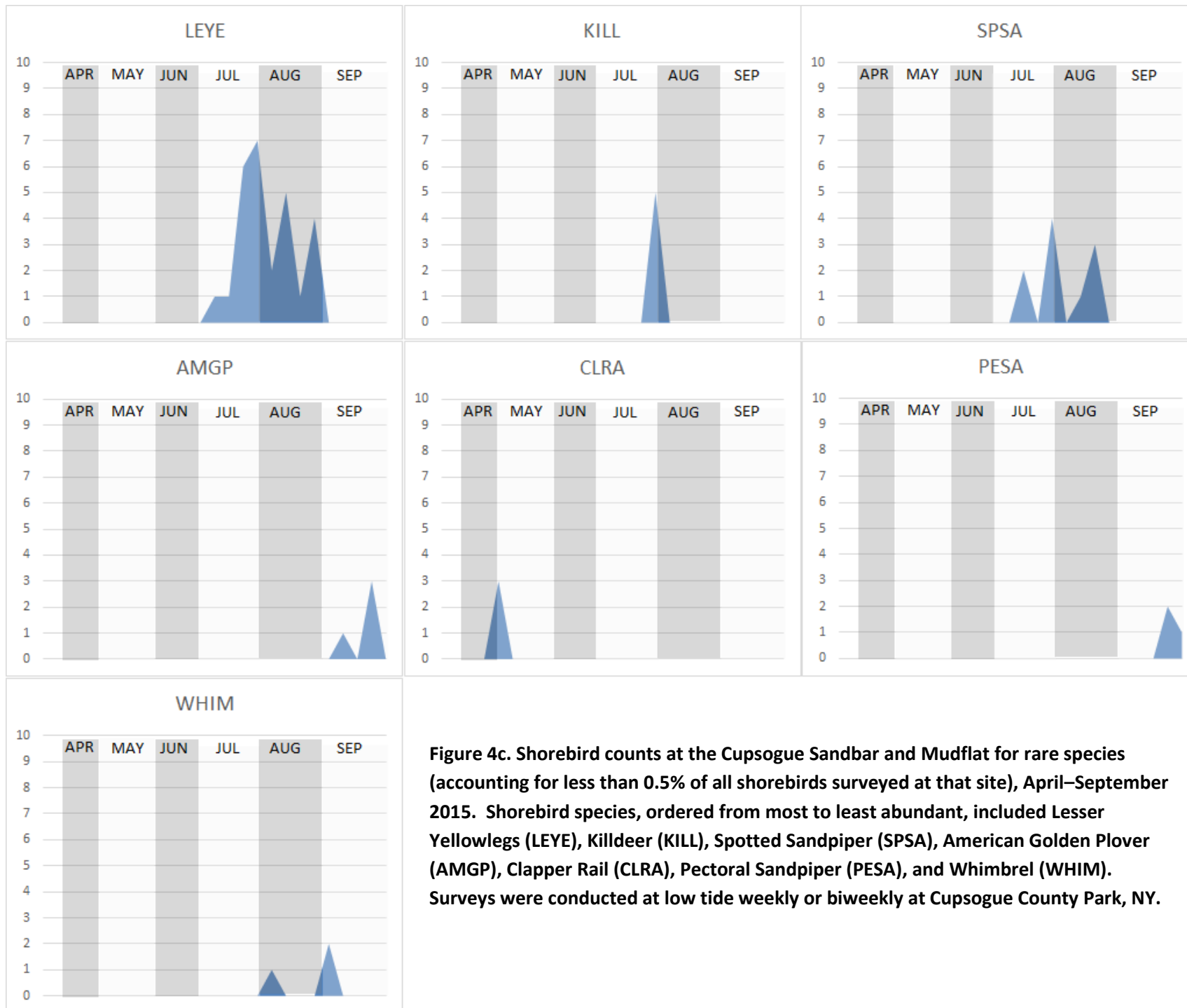


Figure 4c. Shorebird counts at the Cupsogue Sandbar and Mudflat for rare species (accounting for less than 0.5% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Lesser Yellowlegs (LEYE), Killdeer (KILL), Spotted Sandpiper (SPSA), American Golden Plover (AMGP), Clapper Rail (CLRA), Pectoral Sandpiper (PESA), and Whimbrel (WHIM). Surveys were conducted at low tide weekly or biweekly at Cupsogue County Park, NY.

Shorebird counts on Old Inlet Flood Shoals

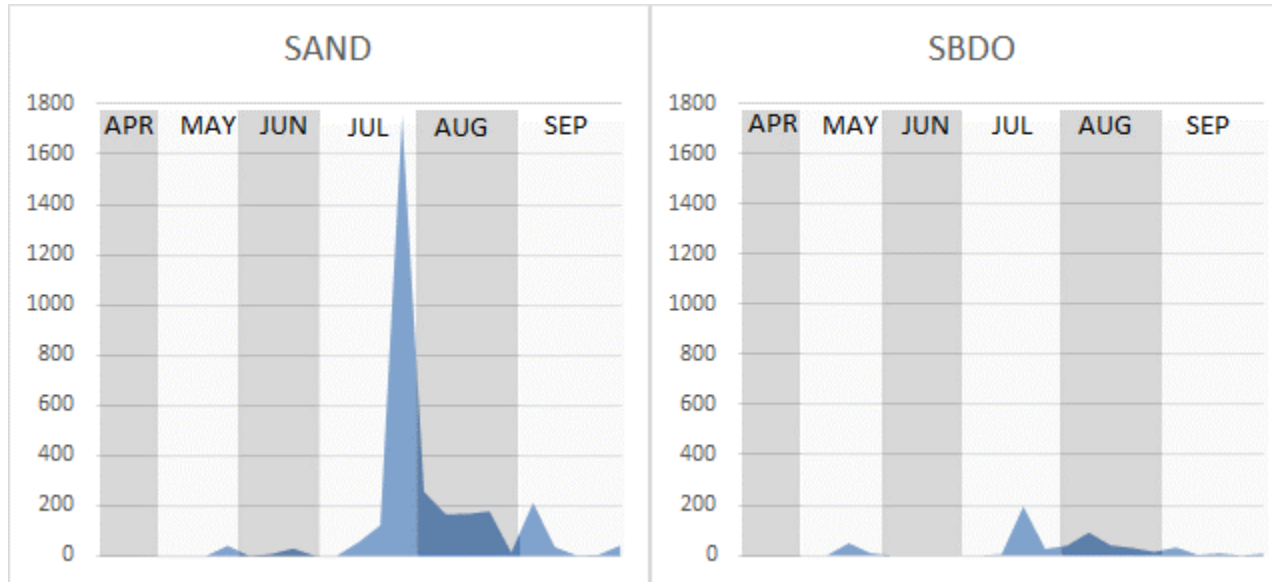


Figure 5a. Shorebird counts at the Old Inlet Flood Shoals for the most abundant (accounting for ABOUT 90% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Sanderling (SAND), and Short-billed Dowitcher (SBDO). Surveys were conducted at low tide weekly or biweekly at the Otis Pike Wilderness, NY.

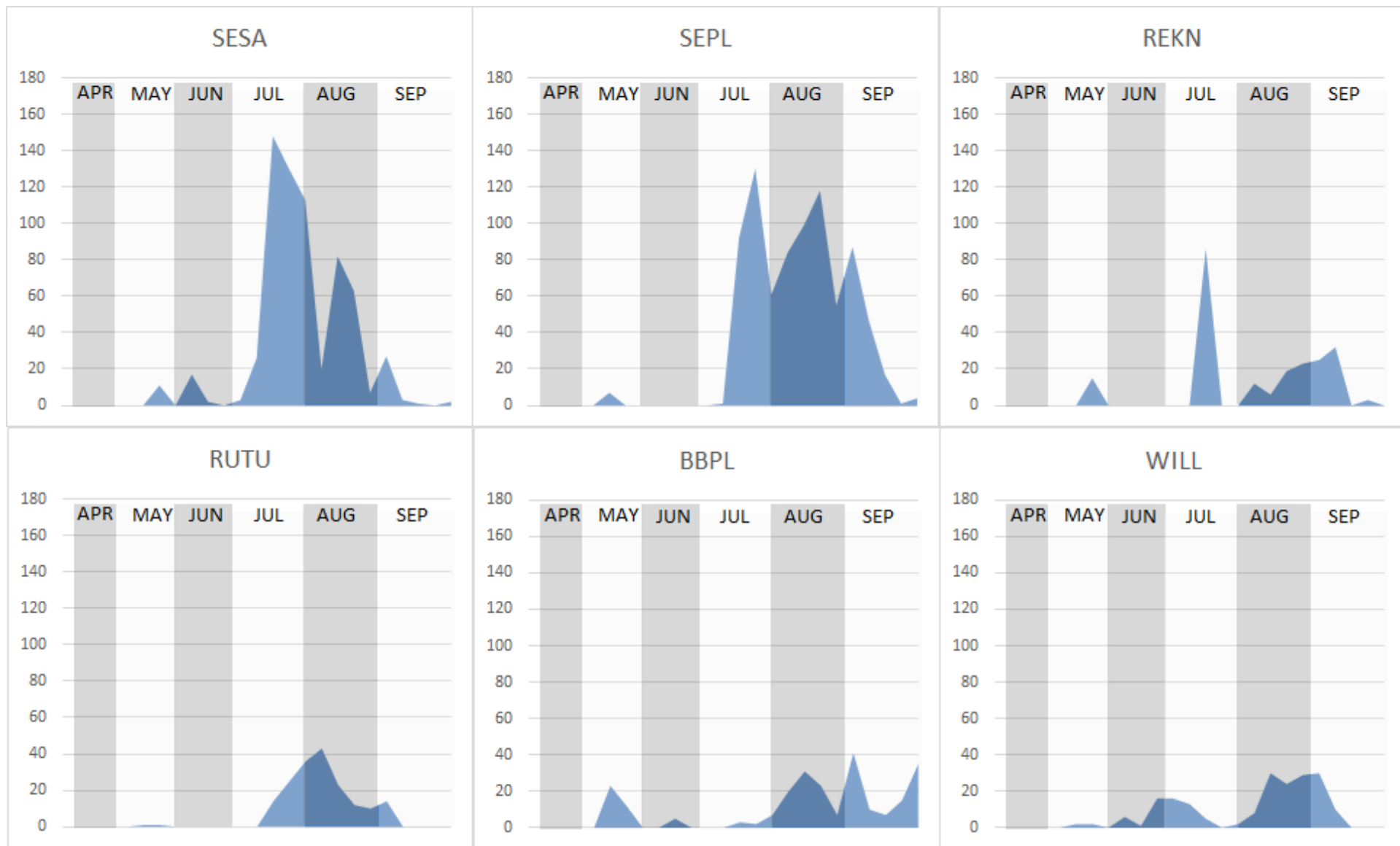


Figure 5b. Shorebird counts at the Old Inlet Flood Shoals for common species (accounting for about 8% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Semipalmated Sandpiper (SESA), Semipalmated Plover (SEPL), Red Knot (REKN), Ruddy Turnstone (RUTU), Black-bellied Plover (BBPL), and Willet (WILL). Surveys were conducted at low tide weekly or biweekly at the Otis Pike Wilderness, NY.

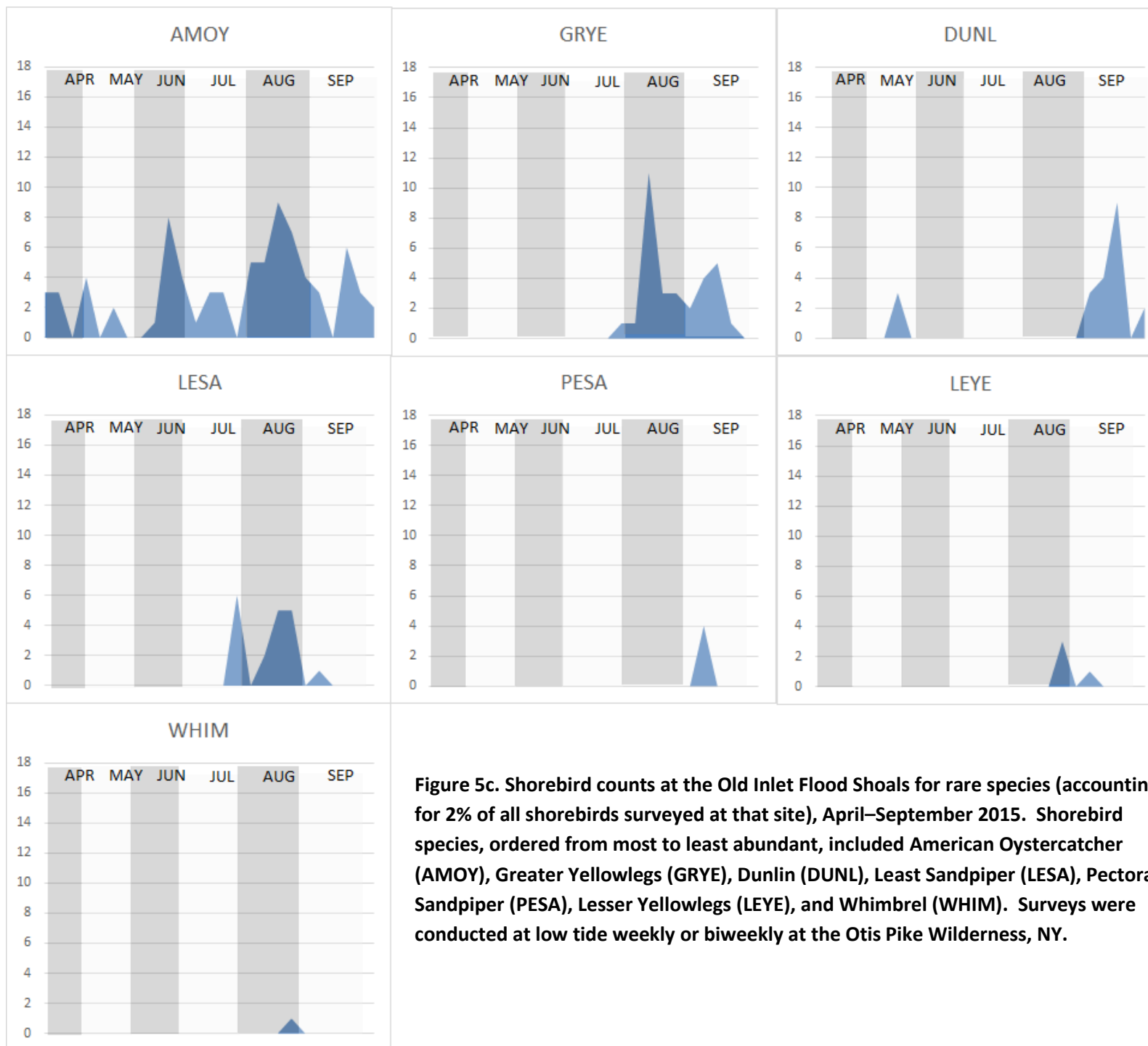


Figure 5c. Shorebird counts at the Old Inlet Flood Shoals for rare species (accounting for 2% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included American Oystercatcher (AMOY), Greater Yellowlegs (GRYE), Dunlin (DUNL), Least Sandpiper (LESA), Pectoral Sandpiper (PESA), Lesser Yellowlegs (LEYE), and Whimbrel (WHIM). Surveys were conducted at low tide weekly or biweekly at the Otis Pike Wilderness, NY.

Shorebird counts on ocean beaches

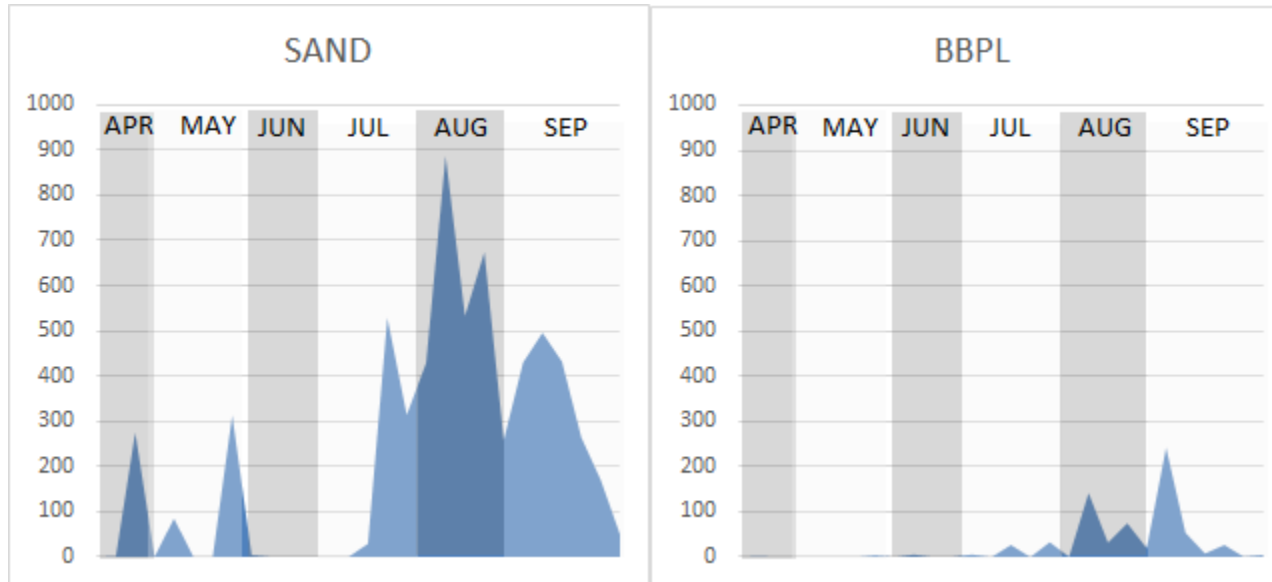


Figure 6a. Shorebird counts on ocean beaches for the most abundant species (accounting for about 90% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most abundant to least abundant, included Sanderling (SAND), and Black-bellied Plover (BBPL). Surveys were conducted weekly or biweekly at Cupsogue County Park, Smith Point County Park, the Otis Pike Wilderness, and Robert Moses State Park, NY.

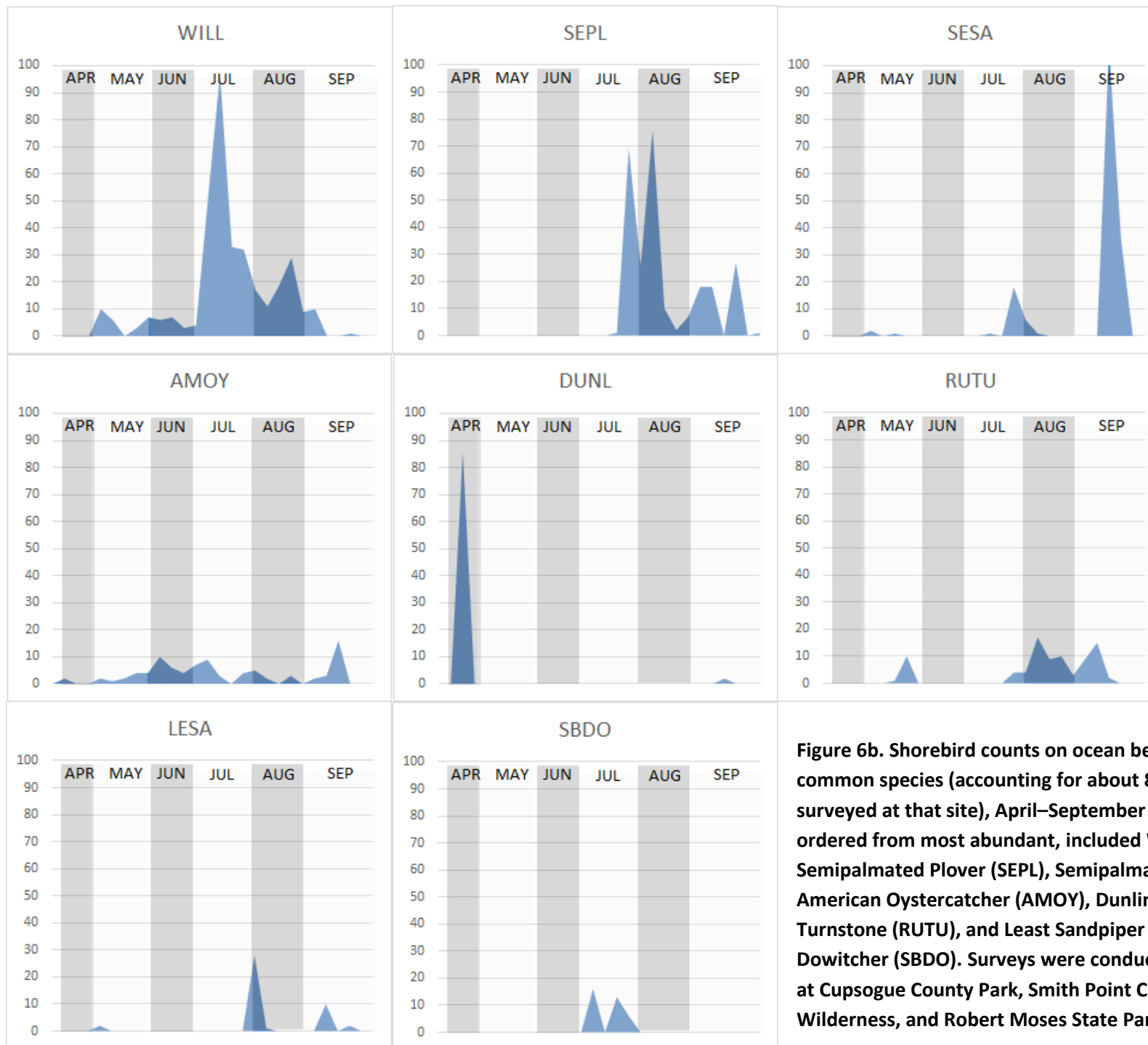


Figure 6b. Shorebird counts on ocean beaches for the most common species (accounting for about 8% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most abundant, included Willet (WILL), Semipalmated Plover (SEPL), Semipalmated Sandpiper (SESA), American Oystercatcher (AMOY), Dunlin (DUNL), Ruddy Turnstone (RUTU), and Least Sandpiper (LESA), and Short-billed Dowitcher (SBDO). Surveys were conducted weekly or biweekly at Cupsogue County Park, Smith Point County Park, the Otis Pike Wilderness, and Robert Moses State Park, NY.

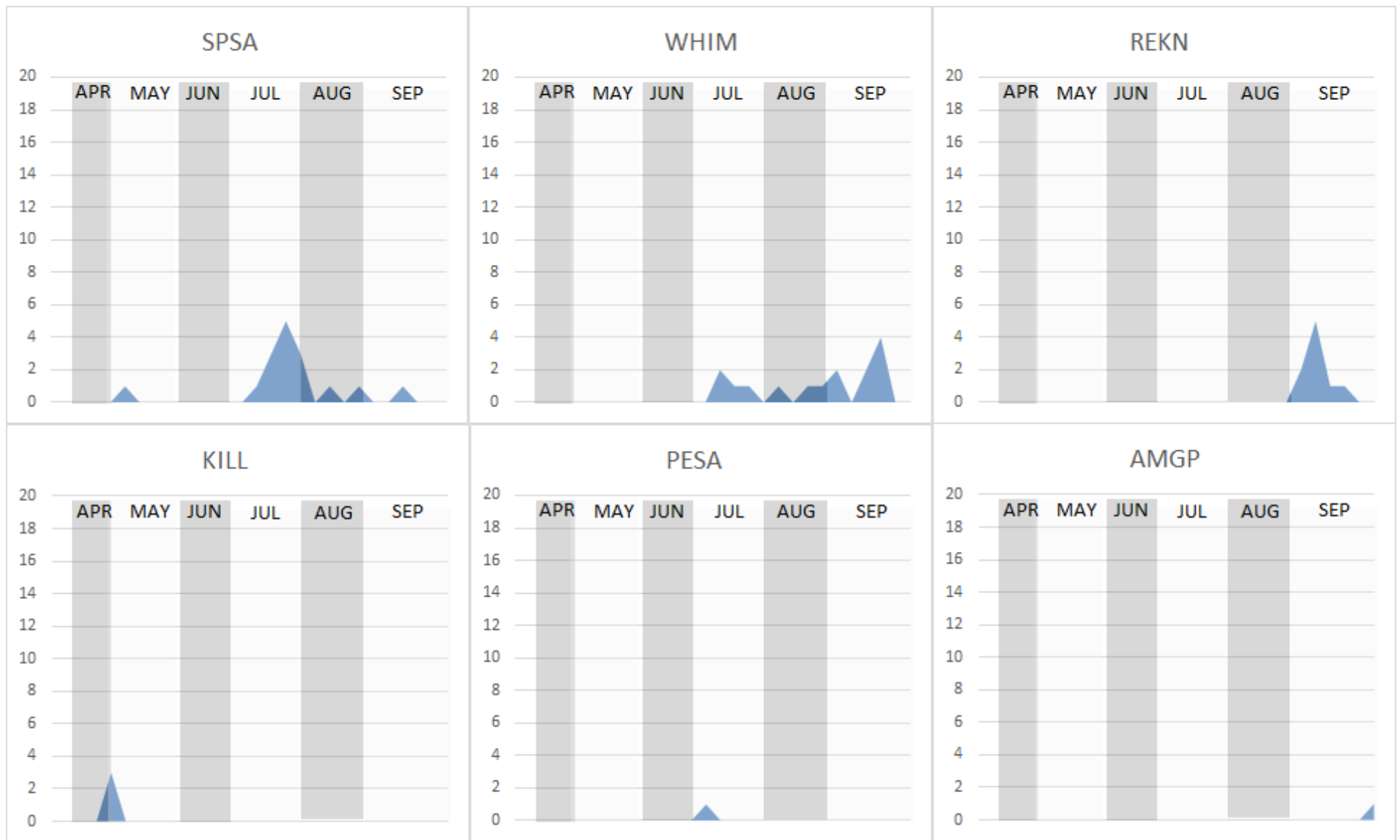


Figure 6c. Shorebird counts on ocean beaches for rare species (accounting for 2% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Spotted Sandpiper (SPSA), Whimbrel (WHIM), Red Knot (REKN), Killdeer (KILL), Pectoral Sandpiper (PESA), and American Golden Plover (AMGP). Surveys were conducted weekly or biweekly at Cupsogue County Park, Smith Point County Park, the Otis Pike Wilderness, and Robert Moses State Park, NY.

Shorebird counts on bay beaches

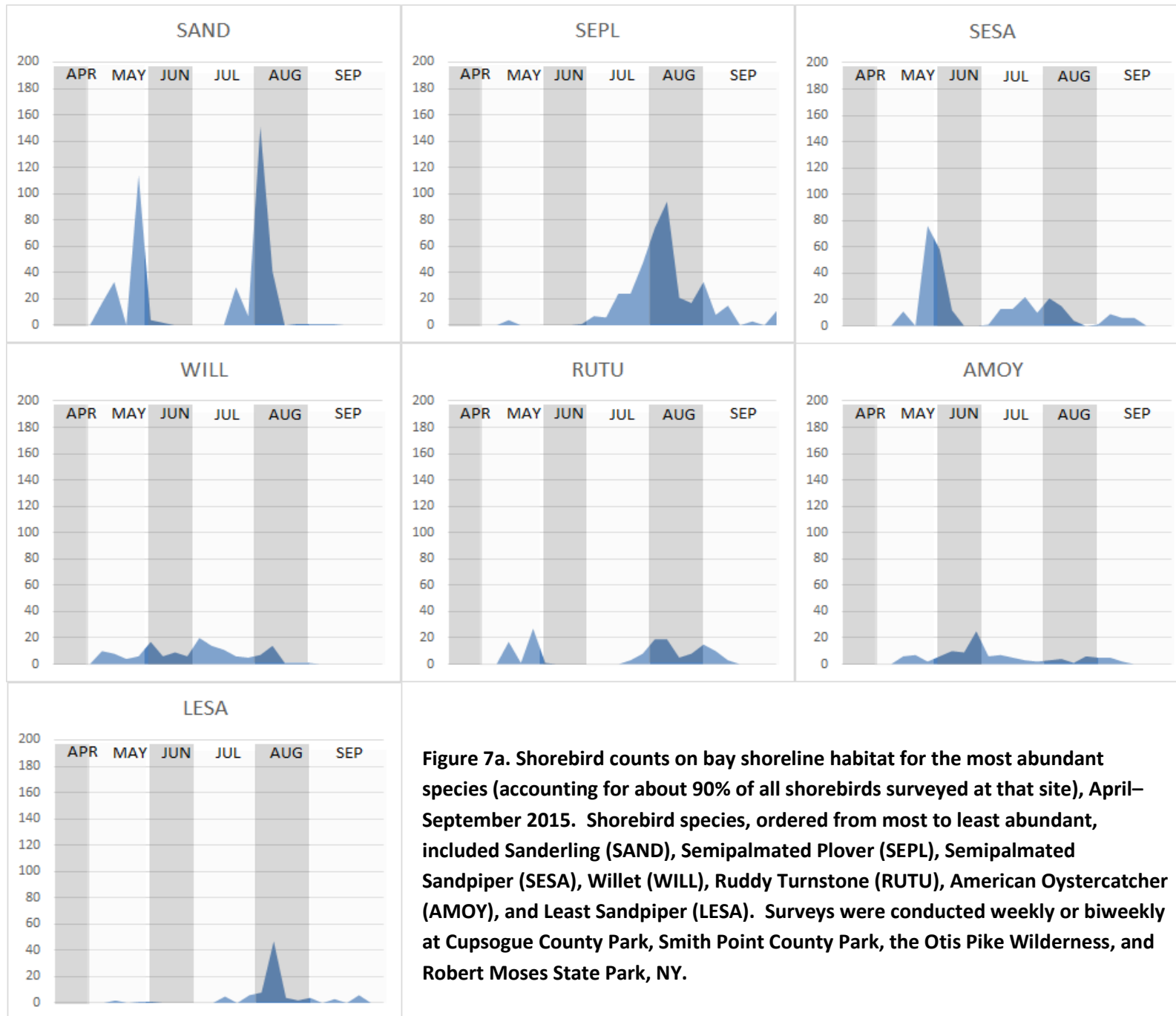


Figure 7a. Shorebird counts on bay shoreline habitat for the most abundant species (accounting for about 90% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Sanderling (SAND), Semipalmated Plover (SEPL), Semipalmated Sandpiper (SESA), Willet (WILL), Ruddy Turnstone (RUTU), American Oystercatcher (AMOY), and Least Sandpiper (LESA). Surveys were conducted weekly or biweekly at Cupsogue County Park, Smith Point County Park, the Otis Pike Wilderness, and Robert Moses State Park, NY.

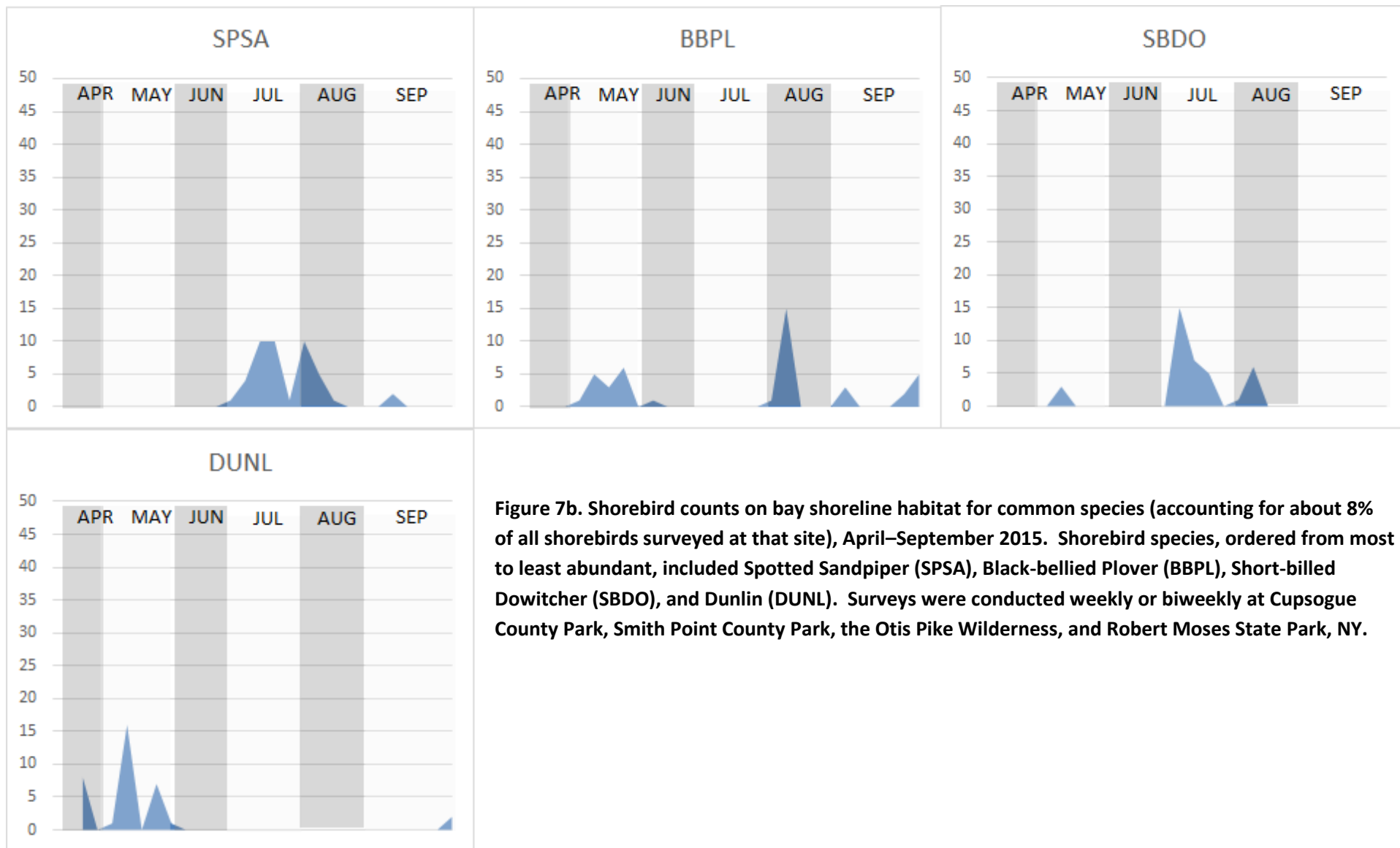


Figure 7b. Shorebird counts on bay shoreline habitat for common species (accounting for about 8% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Spotted Sandpiper (SPSA), Black-bellied Plover (BBPL), Short-billed Dowitcher (SBDO), and Dunlin (DUNL). Surveys were conducted weekly or biweekly at Cupsogue County Park, Smith Point County Park, the Otis Pike Wilderness, and Robert Moses State Park, NY.

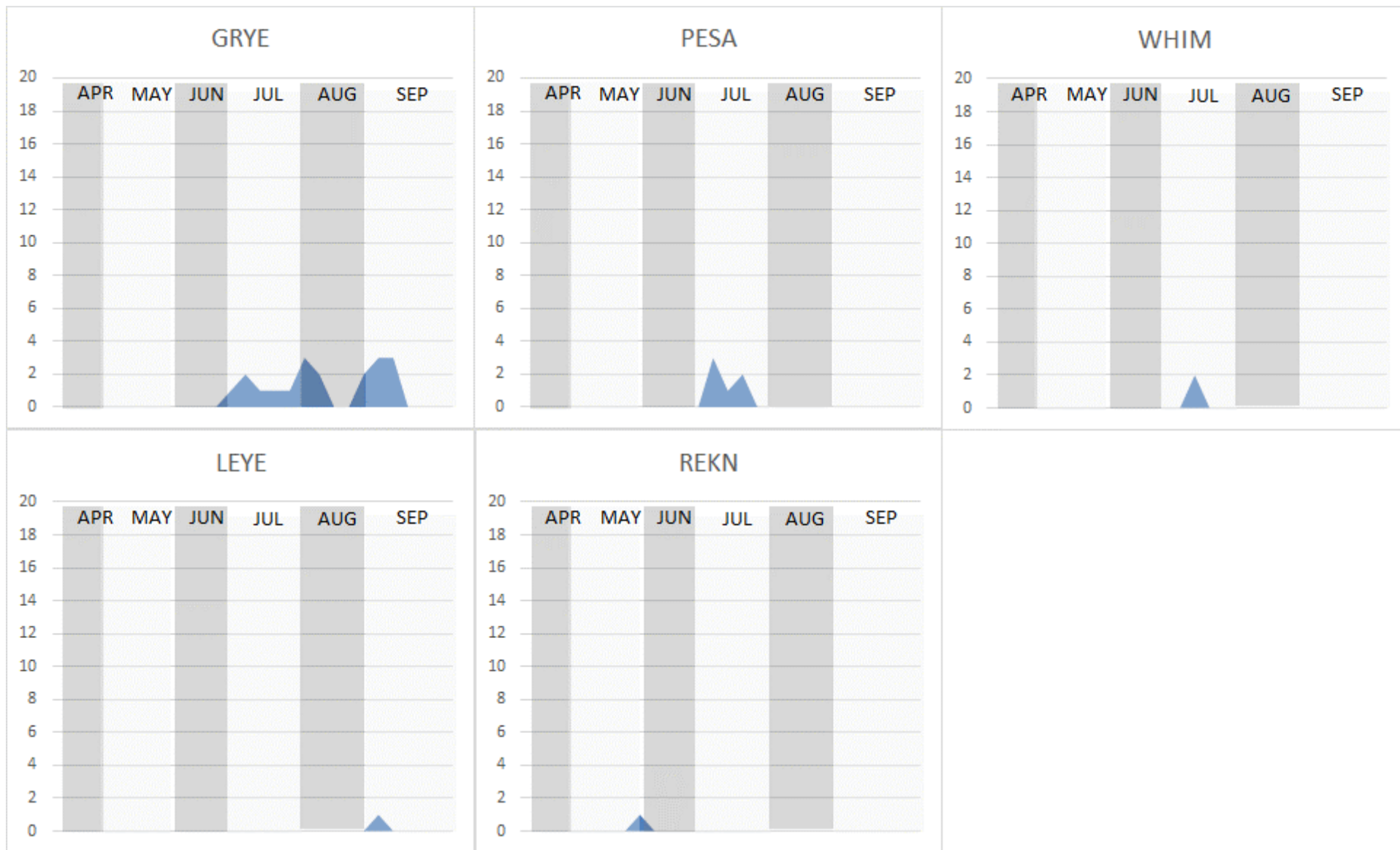


Figure 7c. Shorebird counts on bay shoreline habitat for rare species (accounting for about 2% of all shorebirds surveyed at that site), April–September 2015. Shorebird species, ordered from most to least abundant, included Greater Yellowlegs (GRYE), Pectoral Sandpiper (PESA), Whimbrel (WHIM), Lesser Yellowlegs (LEYE), and Red Knot (REKN). Surveys were conducted weekly or biweekly at Cupsogue County Park, Smith Point County Park, the Otis Pike Wilderness, and Robert Moses State Park, NY.

BANDED SHOREBIRDS

We saw 5 banded shorebirds other than piping plovers during our surveys (Table 5). We reported all band combinations to the Bird Banding Lab.

Table 5. Banded shorebirds seen on Fire Island and Westhampton Island, April–September 2015.

Date	Subsite	Time In	Species	ULU	ULL	LLU	LLL	URU	URL	LRU	LRL	Comments
6/29/2015	Robert Moses State Park		AMOY	-	Red	-	Dark Blue	-	Red	-	Unknown	
7/29/2015	Robert Moses State Park	7:59	SAND	-	Green Flag (Unknown)	-	-	-	-	-	Metal	
8/12/2015	Cupsogue Flood Shoals	15:07	SEPL	-	-	Yellow	Orange	-	-	-	Metal	
8/14/2015	Smith Point County Park	9:00	REKN	-	Mint Flag (SP)	-	-	-	-	-	Metal	Banded in NJ
8/24/2015	Cupsogue Flood Shoals	10:15	SAND	-	Green Flag (M2L)	-	-	-	-	-	Metal	Banded in NJ

DISCUSSION

Overall, we observed higher counts of shorebirds over a longer duration of time during the southward migration compared to the northward migration. Shorebirds were most abundant at the flood shoals, sandbar, and mudflat, and were less abundant on ocean and bay beaches. During northward migration, shorebird use of the Old Inlet Flood Shoals was low compared to the Cupsogue Sandbar and Mudflat, whereas shorebird numbers were similar at both of these sites during southward migration. We did observe significant shifting of sand at Old Inlet and its associated flood shoals during the spring and summer, and the Old Inlet flood shoal habitat may have changed between the northward and southward migration to become more attractive to foraging shorebirds.

Piping plover as a surrogate for beach habitat conservation

There is increased interest about the degree to which piping plovers can act as a surrogate for other shorebird species. We assume the central question here is the degree to which protection of piping plovers, in itself, confers protection to other shorebird species. For this purpose, we assume protection can be divided into protection from disturbance in the sense of harming or harassing the birds themselves, and protection of habitat. In order for protective measures to provide shorebirds from disturbance, there must be temporal and spatial overlap between plover protection and shorebird presence. In order for protection of plover habitat to be also protective of habitat for other shorebirds, there must be overlap in the habitat protected for plovers and the habitat used by other species. We will examine these questions in the final report.

Red knots

We counted a total of 532 red knots, including one banded individual, during our surveys. Some of these were certainly the same individuals counted on multiple surveys. Most of the red knots were seen at the Cupsogue Sandbar and Old Inlet Flood Shoals, with only a few small flocks of 5–15 red knots observed on ocean and bay beaches. Red knots were historically abundant on Long Island during the spring and fall migrations (Eaton 1910, Hallock 1877).

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APPENDIX

Abundant, common and rare shorebird species at each site

Table 6. Shorebird abundance at four sites on Fire Island and Westhampton Island, May–August, 2015.

Species Code	Common Name	Abundance at each site			
		Cupsogue Sandbar and Mudflat	Old Inlet Flood Shoals	Bay beach	Ocean beach and backshore
AMGP	American Golden Plover	Rare	Not Observed	Not Observed	Rare
AMOY	American Oystercatcher	Common	Rare	Abundant	Common
BBPL	Black-bellied Plover	Abundant	Common	Common	Abundant
CLRA	Clapper Rail	Rare	Not Observed	Not Observed	Not Observed
DUNL	Dunlin	Abundant	Rare	Common	Common
GRYE	Greater Yellow-legs	Common	Rare	Rare	Not Observed
KILL	Killdeer	Rare	Not Observed	Not Observed	Rare
LESA	Least Sandpiper	Abundant	Rare	Abundant	Common
LEYE	Lesser Yellow-legs	Rare	Rare	Rare	Not Observed
PESA	Pectoral Sandpiper	Rare	Rare	Rare	Rare
REKN	Red Knot	Common	Common	Rare	Rare
RUTU	Ruddy Turnstone	Common	Common	Abundant	Common
SAND	Sanderling	Abundant	Abundant	Abundant	Abundant
SBDO	Short-billed Dowitcher	Abundant	Abundant	Common	Common
SEPL	Semipalmated Sandpiper	Abundant	Common	Abundant	Common
SESA	Semipalmated Plover	Abundant	Common	Abundant	Common
SPSA	Spotted Sandpiper	Rare	Not Observed	Common	Rare
WHIM	Whimbrel	Rare	Rare	Rare	Rare
WILL	Willet	Common	Common	Abundant	Common