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BASELINE BIRD SURVEYS OF PLUM TREE ISLAND NATIONAL WILDLIFE REFUGE: 2017, 2018 and 2019 Seasons

Final Results

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Context

The Chesapeake Bay is one of the most productive aquatic ecosystems in the world and plays an important role in the life cycle of many bird species (Duerr and Watts 2012). Each year, the rich resources of the Bay attract millions of waterbirds of 140 species from throughout the western hemisphere (Erwin et al. 2007, Watts 2013). Dependency on the Bay varies from species that stopover for a few days during migration to species that live out their entire life cycle within a single tributary. Because many waterbirds are top consumers and collectively require a broad array of resources they represent sensitive, cost-effective indicators of overall ecosystem health. Many species that depend on the Bay are of high international, national or regional conservation concern (Watts 1999, 2016).

Plum Tree Island National Wildlife Refuge includes some of the most significant marsh habitat within the lower Chesapeake Bay. Established in 1972 when the site was transferred from the U. S. Department of Defense to the U. S. Department of the Interior, the site supports the largest contiguous patch of tidal salt marsh within the lower Chesapeake Bay including extensive low marsh (dominated by smooth cordgrass - *Spartina alterniflora* and black needlerush - *Juncus roemerianus*), high marsh (dominated by salt grass - *Distichlis spicata* and salt meadow hay – *S. patens*), a long marsh-upland ecotone (dominated by shrubs including saltbush - *Iva frutescens* or *Baccharis hamilifolia* and wax myrtle – *Myrica cerifera*), and scattered hummocks of maritime forest and low-profile dunes and beaches. Although the site is included within an Important Bird Area (Watts 2006) and is known to support bird species of conservation concern (e.g., Watts and Rottenborn 2002, Wilke et al. 2005, Watts and Smith 2015) there has been no attempt to survey the site in order to build a baseline dataset needed to understand the importance and role of the site within a regional context.

Objectives

Monitoring is an essential component of conservation. Within the conservation community, information on the status and distribution of species is the basis for management decisions and often the primary measure of management success. The overall objective of this effort is to collect baseline information on the status of birds using Plum Tree Island National Wildlife Refuge that may inform future management decisions.

Methods

Shoreline Surveys

We established a 100-m wide band transect positioned along the outer shoreline of Plum Tree Island to conduct surveys of birds using the shoreline and near-shore waters (Figure 1). We piloted a boat approximately 30 to 40 m offshore and parallel to the shoreline and surveyed all birds within the band transect. All birds were counted and identified to species (except on rare occasions when conditions or circumstances did not allow for identification to species). Birds detected were plotted on a GPS-enabled laptop that was loaded with a recent aerial photograph of the study area. Birds observed beyond the shoreline (within the marsh) were not recorded with the exception of species of conservation interest (e.g., peregrine falcon, bald eagle, northern harrier).

Marsh Point Count Survey

We established a network of ten point-count locations within the marsh habitat of Plum Tree Island, NWR to survey for breeding marsh birds (Figure 3). Due to the ongoing unexploded ordinance problems within the site, we restricted points to locations that could reliably be accessed and surveyed by boat. These included sites that were along navigable tidal creeks. We used standardized, off-road, point-count techniques that were developed for secretive marsh-nesting birds (Conway and Nadeau 2006, Conway 2011) to survey breeding marsh birds. The approach uses distance estimation to improve effective sample area, a series of play-back calls to improve detection probabilities, and stratification of count data by time. We used a variation of this technique that was developed for the coastal area of the mid-Atlantic and southern New England (Shriver et al. 2008) and has been used by project SHARP. We used a modified Sharp collection protocol that did not include calls of species most likely found in freshwater systems and thus unlikely to occur at our survey points and recorded data on forms that have been used within the region by project SHARP.

Figure 1. Map of the 100-m wide band transect positioned along the outer shoreline of Plum Tree Island to conduct bird surveys.



Figure 2. Map of the ten point-count locations within the marsh habitat of Plum Tree Island used for the point count survey.



Final Results: Winter 2017, 2018, and 2019

Shoreline Surveys

Thirty-two shoreline surveys were conducted beginning February of 2017 and concluding in July of 2019. Surveys including two in the winter, four during spring migration, two during the summer breeding season and four during fall migration throughout the contract period. A GIS layer of all shoreline survey observations is provided as the final product for the shoreline surveys. Shorebirds and gulls/terns were the most numerous species groups by both number of species and individuals (Table 1). Dunlin was the most numerous species detected accounting for nearly 50% of the individuals detected.

Table 1. Summary of 2018 shoreline surveys by species group.

Species Group	Species No.	Individuals
Seabirds	5	1,476
Gulls and Terns	13	5,083
Waterfowl	11	1,328
Hérons and Egrets	5	432
Shorebirds	15	22,992
Raptors	6	427
Passerines and Others	10	1,019
Total	65	32,757

Marsh Point Count Survey

Eight rounds of point counts were completed during the breeding seasons, 3 in 2017, 2 in 2018, and 3 in 2019. A GIS layer of all callback survey detections is provided as the final product for the shoreline surveys. The most common birds detected were passerines and associates (Table 2) with seaside sparrows and clapper rails accounting for more than 33% of all detections.

Table 2. Summary of 2018 point-count surveys by species group.

Species Group	Species No.	Individuals
Gulls and Terns	4	268
Waterfowl	3	3
Hérons and Egrets	5	245
Shorebirds	9	234
Raptors	3	64
Passerines and Others	9	749
Total	33	1,563

Anecdotal Observation

Shorebird “Hot Spots”

During shoreline surveys, several segments of shoreline were observed to consistently hold concentrations of shorebirds. These areas were being used as high tide roosts and loafing areas as all surveys were conducted around high tides to enable shallow water access. Shorebirds were consistently observed roosting and foraging at the sites indicated in Figure 3. During extremely high tides bird numbers were reduced and concentrated on the high beach rather than normally exposed sand or sod banks.

Interior Pond and Isolated Flats

The Plumtree Island NWR contains numerous small ponds and isolated flats dispersed throughout the marsh system (Figures 4 and 5). These features are, for the most part, invisible from the outer shoreline and very difficult to effectively survey from the navigable creeks. While navigating to callback points, limited views of these pond/flats were often available. Even from the limited views, it was evident that these features were being used by numerous gulls, heron, egrets, and shorebirds. One of these small flats was very visible from callback point number 10, and was consistently used by a variety of shorebirds, herons and egrets, and laughing gulls. I would expect the number of birds using these features throughout the marsh system to be very high. Features such as these are likely used as both foraging areas and high tide roosts.

Wintering Sharp-tailed sparrows

Plum Tree Island National Wildlife refuge contains a vast amount of habitat preferred by wintering Saltmarsh and Nelson’s sparrow. One day of limited sampling on Cow Island in the late winter of 2011 resulted in the capture of 5 Saltmarsh Sparrows and 7 Nelson’s sparrows (Watts and Smith 2015). Considering the amount of favorable habitat available to these species on the refuge, the wintering population would be expected to be substantial.

Anecdotal Shorebird "Hot Spots" Observed During Shoreline Surveys.

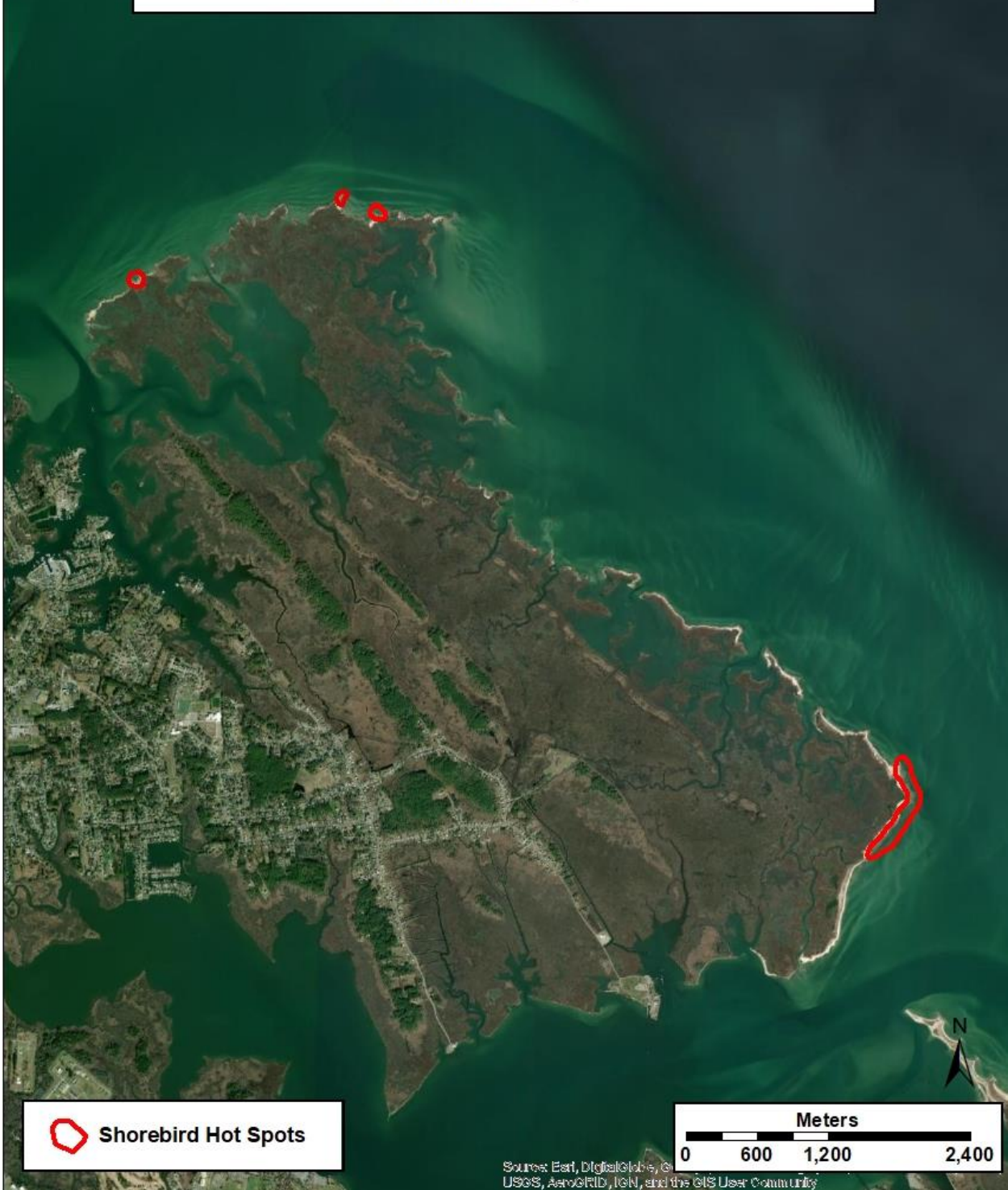


Figure 3. Anecdotal shorebird "hot spots" observed during shoreline surveys.

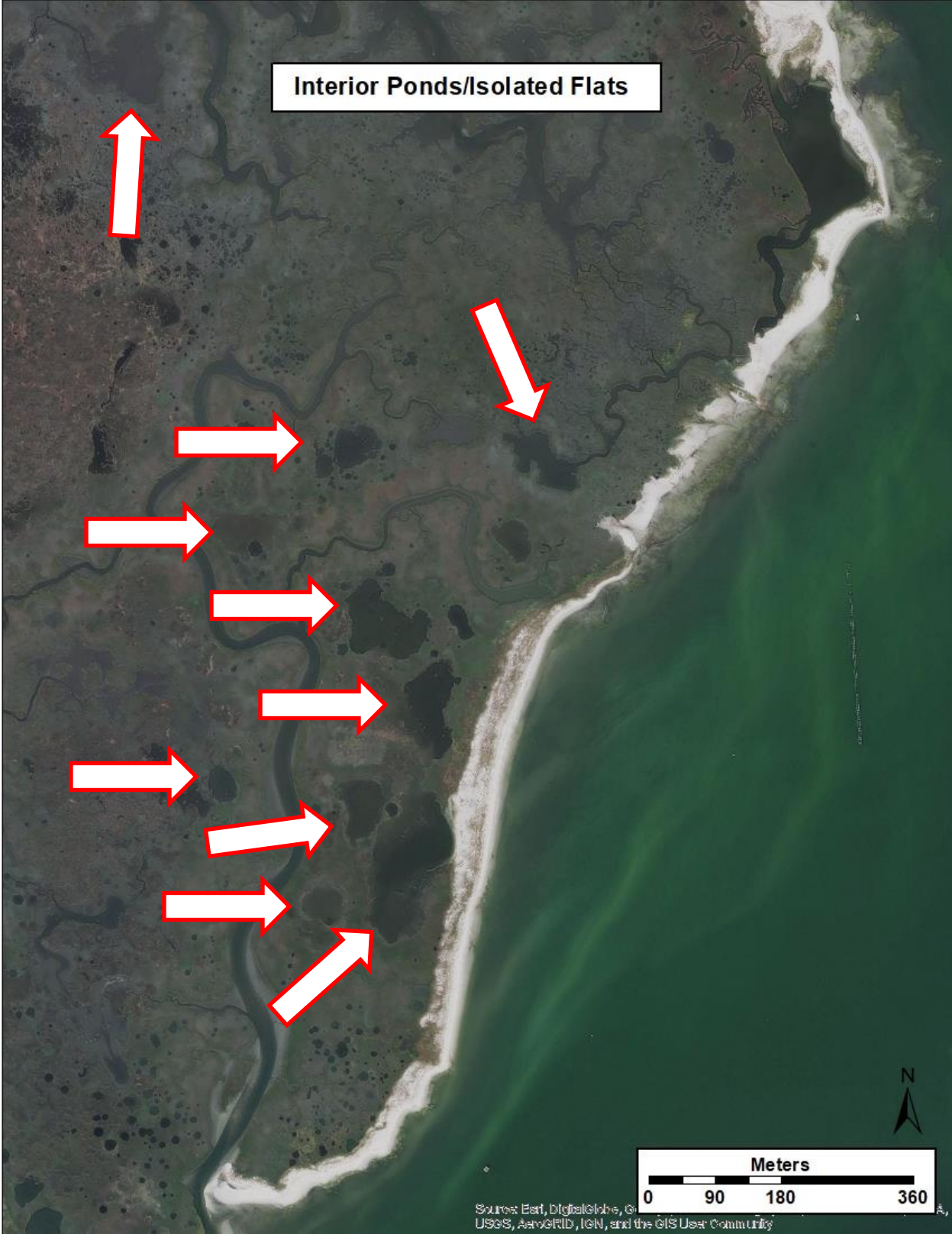


Figure 4. Examples of inland ponds and isolated flats.



Figure 5. Examples of inland ponds and isolated flats.

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Appendix IV. American Ornithologist Union four-letter avian species codes and common names included in the 2018 survey.

AOU Code	Species Name
ABDU	American Black Duck
AMAV	American Avocet
AMOY	American Oystercatcher
AMWI	American Widgeon
ATBR	Atlantic Brant
BAEA	Bald Eagle
BARS	Barn Swallow
BBPL	Black-bellied Plover
BEKI	Belted Kingfisher
BLSK	Black Skimmer
BOGU	Bonaparte's Gull
BRPE	Brown Pelican
BTGR	Boat-tailed Grackle
BUFF	Bufflehead
CAGO	Canada Goose
CATE	Caspian Tern
CLRA	Clapper Rail
COGR	Common Grackle
COLO	Common Loon
COTE	Common Tern
DCCO	Double-crested Cormorant
DUNL	Dunlin
FICR	Fish Crow
FOTE	Forster's Tern
GBBG	Great Black-backed Gull
GBHE	Great Blue Heron
GREG	Great Egret
GRHE	Green Heron
GRYE	Greater Yellowlegs
HERG	Herring Gull
HOGR	Horned Grebe
LAGU	Laughing Gull
LBHE	Little Blue Heron
LESA	Least Sandpiper
LETE	Least Tern
LEYE	Lesser Yellowlegs
MALL	Mallard
NESP	Nelson's Sparrow

AOU Code	Species Name
NOMO	Northern Mockingbird
NOHA	Northern Harrier
OSPR	Osprey
NOMO	Norther Mockingbird
PEEP	unidentified small shorebird
PEFA	Peregrine Falcon
RBGU	Ring-billed Gull
RBME	Red-breasted Merganser
ROYT	Royal Tern
RTHA	Red-tailed Hawk
RTLO	Red-throated Loon
RUDU	Ruddy Duck
RUTU	Ruddy Turnstone
RWBL	Red-winged Blackbird
SAND	Sanderling
SATE	Sandwich Tern
SBDO	Short-billed Dowitcher
SEPL	Semipalmated Plover
SESA	Semipalmated Sandpiper
SESP	Seaside Sparrow
SNEG	Snowy Egret
SPSA	Spotted Sandpiper
SUSC	Surf Scoter
TCHE	Tricolored Heron
TUVU	Turkey Vulture
WESA	Western Sandpiper
WILL	Willet