

East Sand Island Biological Assessment: 2010-2012

Final Technical Memorandum



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FINAL TECHNICAL MEMORANDUM
EAST SAND ISLAND
BIOLOGICAL ASSESSMENT, 2010-2012

Prepared by
Bird Research Northwest

Island areas and land cover classes

The island area available to nesting and roosting waterbirds on East Sand Island comprises both upland and intertidal habitat. The amount of intertidal habitat, defined as the island area below the maximum high tide line, varies by tidal phase, with more habitat available to waterbirds during ebb and low tides. This habitat is primarily used by roosting waterbirds, yet occasionally waterbirds will nest in the upper intertidal zone only to have their nests inundated and destroyed during extreme high tide or storm events. The minimum estimate of intertidal habitat available during low tide stages on East Sand Island during 2010-2012 was between 84 and 92 acres, nearly twice the amount of upland habitat available on the island during those years (Table 1).

The amount of island-wide upland habitat, defined as the East Sand Island above the maximum high tide line, was estimated to be approximately 49 acres (ca. 20 ha) during 2010-2012 (Table 1). The upland habitat consisted of 4 different land cover classes; herbaceous vegetation, bare substrate, trees/shrubs, and rip rap/large woody debris. Of these land cover classes, herbaceous vegetation occupied the largest upland land area (ca. 19 acres [ca. 7.5 ha], or 39% of the total upland habitat), followed by bare substrate (ca. 14 acres [ca. 5.5 ha], or 28% of the total upland habitat), trees/shrubs substrate (ca. 11 acres [ca. 4.5 ha], or 22% of the total upland habitat), and rip rap/large woody debris (ca. 5 acres [ca. 2 ha], or 11% of the total upland habitat; Table 1).

The double-crested cormorant use area, defined as all of the upland area west of the eastern-most habitat used by cormorants (nesting or roosting) based on aerial photography of the island in August, was restricted to the western half of East Sand Island. The cormorant use area consists of about 21 acres [ca. 8.5 ha], or 43% of the total upland land area of East Sand Island during 2010-2012 (Table 1). Cormorants have not utilized the eastern half of East Sand Island for nesting; however, occasionally small groups of cormorants (< 100 individuals) have used habitat on the east end for roosting or collecting nest material. The dominant land cover class in the cormorant use area was bare substrate (ca. 11 acres [ca. 4.5 ha], or 53% of the total upland habitat in the cormorant use area), followed by rip rap/large woody debris (ca. 5 acres [ca. 2 ha], or 22% of the total upland habitat in the cormorant use area), herbaceous vegetation (ca. 4 acres [1.5 ha], or 19% of the total upland habitat in the cormorant use area), and trees/shrubs (ca. 1 acre [ca. 0.4 ha], or 5% of the total upland habitat in the cormorant use area; Table 1).

The double-crested cormorant nesting area, defined as all of the land area west of the eastern-most cormorant nest identified in aerial photography taken of the island during May, comprised roughly 16 acres [ca. 6.5 ha], or 76% of the total upland land area in the cormorant use area, or 33% of all of the upland area of East Sand Island during 2010-2012 (Table 1). The dominant land cover class in the cormorant nesting area was bare substrate (ca. 11 acres [ca. 4.5 ha], or 66% of the total upland habitat in the cormorant nesting area), followed by rip rap/large woody debris (ca. 4 acres [ca. 1.5 ha], or 26% of the total upland habitat in the cormorant nesting area), herbaceous vegetation (ca. 1 acre [0.4 ha], or 7% of the total upland habitat in the cormorant nesting area), and trees/shrubs (ca. 0.03 acres [ca. 0.01 ha], or < 1% of the total upland habitat in the cormorant nesting area; Table 1).

Double-crested cormorants

During the study period, East Sand Island was home to the largest breeding colony of double-crested cormorants in western North America, and perhaps the world. The colony is located on the western portion of the island, primarily on bare substrate, rip-rap revetment, and amongst large woody debris deposited on the island during winter storms (Table 2). Cormorants first arrive on East Sand Island in late March – early April and begin to disperse from the island after the breeding season in July, with the last cormorants leaving the island as late as October. The number of cormorant nests (either double-crested or Brandt's cormorants) counted in aerial photography taken at the peak of nesting (May-June) was about 14,293 nests in 2010, 13,4367 nests in 2011, and 14,024 nests in 2012 (Table 2). Because Brandt's cormorants nest in amongst nesting double-crested cormorants, and because the two species are indistinguishable in aerial photography, we made no attempt to separate the two species in this analysis. Based on our estimates of colony size, double-crested cormorants make up the vast majority of cormorants included in this analysis (ca. 90%). The land cover classes used by nesting cormorants during the late nesting period (July) were generally the same as was observed during peak nesting; however, the counts of cormorant nests were lower due to nest abandonment associated with the onset of chick fledging and nest failure, the latter of which was believed to be greater in 2011 and 2012 compared to 2010 (Table 2).

By August, most cormorants have either left the island or can be found roosting with their young throughout the western half of the island. Many roosting individuals (adults and chicks) disperse from the colony area to the intertidal zone (ca. 44%); however, most (ca. 52%) remain in the same or similar habitats utilized for nesting (Table 3). The number of cormorants (either double-crested or Brandt's cormorants; adults and chicks) counted in aerial photography taken at the peak of fledging (August) was 46,443 individuals in 2010, 33,267 individuals in 2011, and 31,680 individuals in 2012 (Table 3).

Of the upland area of the island available in the cormorant nesting area, defined as the area west of eastern-most cormorant nest identified in the May 2010 aerial photography, only 17-19% was actually occupied by nesting cormorants during the peak nesting period (Table 4). The density of cormorant nests did not vary much between the most utilized land cover classes (i.e., bare substrate and

rip-rap/large woody debris) or between years, ranging between 1.2 and 1.3 nests/m² in the cormorant nesting area during the peak nesting period.

Brandt's cormorants

During the study period, Brandt's cormorants nested on East Sand Island entirely within the double-crested cormorant colony on the western half of the island. Like double-crested cormorants, Brandt's cormorants were found primarily within the bare substrate and rip rap/large woody debris land cover classes (Table 5). Brandt's cormorant temporal use of the island generally coincides with that of double-crested cormorants (April – October), but their peak nesting period (June) is somewhat delayed in comparison to double-crested cormorants (May-June). The number of Brandt's cormorant nests counted in ground-truthed aerial photography taken at the peak of nesting was 985 nests in 2010, 1,491 nests in 2011, and 1,684 nests in 2012 (Table 5).

Glaucous-winged/western gulls

Glaucous-winged/western gulls utilized East Sand Island for nesting and roosting during the study period. Of all the nesting colonial waterbirds found on East Sand Island, glaucous-winged/western gulls are the only species that nest on both the eastern and western halves of the island, although the majority (61-69%) nested within the cormorant use area on the western half of the island during 2010-2012 (Table 6). Glaucous-winged/western gulls were found primarily in the herbaceous vegetation and bare substrate land cover classes (Table 6). Of all the colonial waterbirds that utilize East Sand Island, glaucous-winged/western gulls are the first to arrive on the island (before March) and initiate nest territory defense (early March). The peak nesting period is in May and June, with some individuals remaining on the island as late as November. The number of glaucous-winged/western gulls counted in aerial photography taken at the peak of nesting was 6,966 individuals in 2010, 6,776 individuals in 2011, and 3,369 individuals in 2012 (Table 6). The reason for the apparent decline in the number of gulls counted in 2012 relative to 2010 and 2011 is not known.

Ring-billed gulls

Ring-billed gulls utilized East Sand Island for nesting during 2010-2012. Nesting chronology of ring-billed gulls on East Sand Island is similar to that of Caspian terns, with nesting ring-billed gulls present on the island from April through July. Ring-billed gull nesting activity is restricted to the eastern end of East Sand Island in and just above the rack line. The number of nesting ring-billed gulls counted in aerial photography taken during May-June was 1,417 individuals in 2010, 1,944 individuals in 2011, and 1,472 individuals in 2012 (Table 7). Although ring-billed gulls may occasionally roost elsewhere on the island, we have not observed large numbers of roosting ring-billed gulls on East Sand Island during the study period outside of the vicinity of the breeding colony.

California brown pelicans

During the study period (2010-2012), large numbers of brown pelicans continued to use East Sand Island as a post-breeding roost site, especially during the night. Brown pelican numbers generally increase throughout the cormorant breeding season, beginning at very low numbers (typically < 100 individuals) in April and usually peaking at more than 10,000 individuals by late summer (i.e., August or September). Use of the island, particularly the intertidal zone and adjacent upland habitat, by roosting brown pelicans is widespread. Brown pelicans tend to avoid roosting on broad mud flats, such as areas along the northeast shoreline of the island, and do not use densely vegetated interior portions of the island. During 2010-2012, the abundance of brown pelicans using East Sand Island as roosting habitat was estimated based on the average of multiple boat-based surveys per month (n = 1 – 5 surveys) conducted late in the evening. Average counts for the entire study period (May-August) were calculated for each zone and for a combination of zones (i.e., East Beach, South Beach, West End, Interior/Lagoon, North Beach, and Total; Table 8; see Figure 21 for a map showing pelican count zones).

Throughout the study period brown pelicans were more abundant on the East Beach and South Beach during the early months of the field season (i.e., May and June), with other areas (i.e., West End, and North Beach) becoming more populated in later months as the total numbers of roosting brown pelicans increased island-wide. Average island-wide counts peaked in August during 2010-2012, with maximum counts of 10,655, 11,377, and 9,750 individual pelicans recorded in each year (Table 8). Substantially increased use of the East Beach region by brown pelicans was noted in 2012, and may have been due to more favorable microclimates at the east end of the island due to greater protection from prevailing winds. In addition, researchers have significantly reduced activity on and access to the southern shore of the east end of East Sand Island. This restriction of researcher activity has opened up a significant amount of shoreline roosting habitat for pelicans that previously experienced a greater level of researcher disturbance.

The primary zones where active dissuasion of nesting cormorants (hazing) occurred in 2011 (S3) and 2012 (S1 - S4) were subject to variable and continuous (except for S4) use by brown pelicans (Table 8). Due to the extensive area included in these survey zones, only a portion of the pelicans using these areas may have been adversely affected by daytime nest dissuasion activities in 2011 and 2012. There appeared to be ample alternative roosting habitat for brown pelicans available elsewhere on East Sand Island, nonetheless pelicans continued to roost in and near the dissuasion areas even while active hazing was occurring (May and June).

Horned larks

Streaked horned larks, a songbird species of conservation concern, have not been regularly seen on East Sand Island. Although there are earlier records of streaked horned larks on East Sand Island, the field crew did not report observing any horned larks on the island during the study period (2010-2012).

TABLES