# 2018 Western Gulf Coast Mottled Duck Survey

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This report summarizes the 2018 status of the breeding mottled duck population along the Gulf Coast in Louisiana and Texas. These results are based on an aerial survey conducted April 9-12, 2018 as a joint effort of USFWS Division of Migratory Bird Management, Texas Parks and Wildlife Department (TPWD), and Louisiana Department of Wildlife and Fisheries (LDWF). This experimental visibility-corrected survey has been conducted since 2008 using airplanes and helicopters to count mottled ducks along transects within their breeding range in both states. During this 11-year period the survey design has been modified in order to achieve better precision in the visibility correction factor (VCF) and the resulting population estimates. We report here the population estimates for 2018, and compare these to those from 2017.

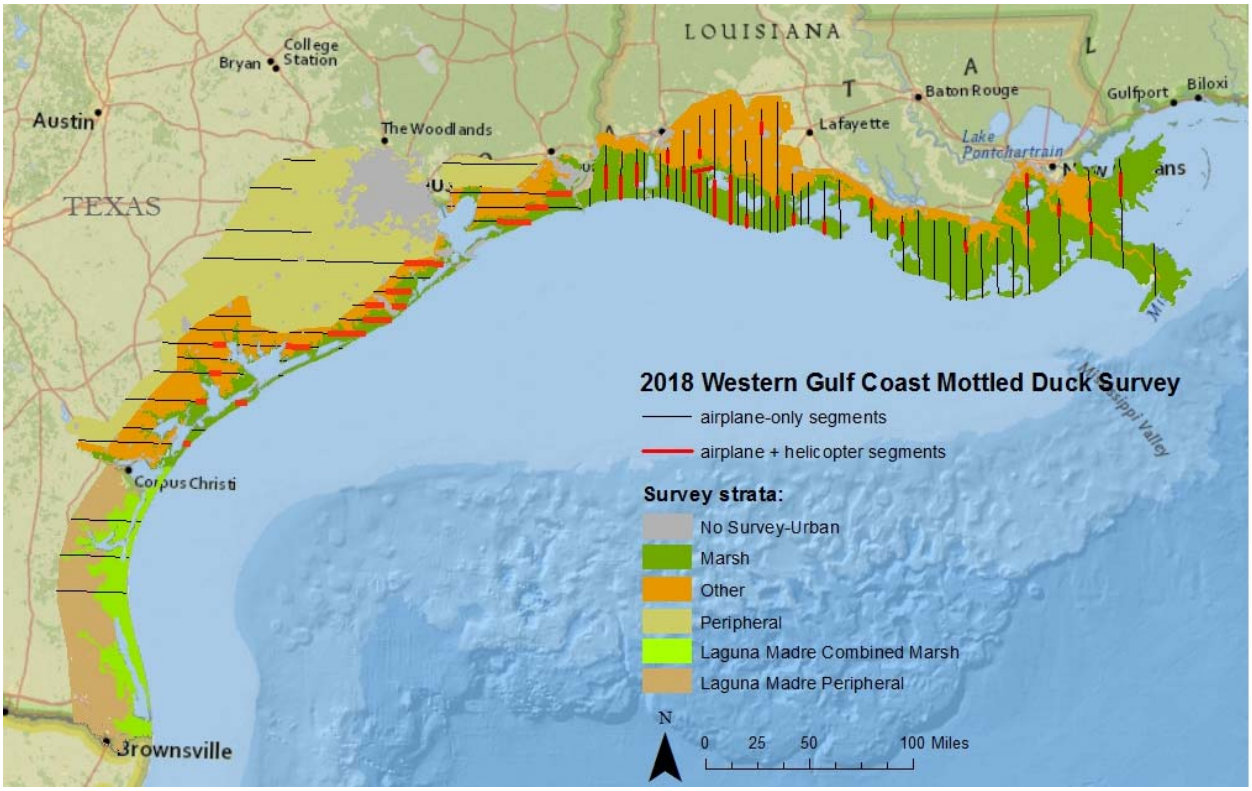


Figure 1. 2018 western Gulf Coast mottled duck survey design.

## Methods

The survey area covered 10,111 sq mi in Louisiana and 16,659 sq mi in Texas (Figure 1). Survey transects were flown by airplane crews in each state, with a subsample of transects reflown by helicopter crews. In Louisiana, total transect area surveyed by airplanes in 2018 was 270 sq mi; due to logistical problems, the Texas airplane crew did not survey 57 segments (75 sq mi)

resulting in a total of 201 sq mi surveyed in Texas. Airplanes flew each transect at approximately 100 mph at 30–50 m altitude. Two observers, one in the front right seat and one behind the pilot, recorded all mottled ducks seen within 200 m of the transect. Helicopters containing a pilot and two observers surveyed a subsample of transects after the airplane, using a "beat out" pattern of flying tight curves low to the ground. In 2018, 52 sq mi was surveyed by helicopter in Louisiana and 40 sq mi was surveyed in Texas. Observers on either side of the helicopter recorded all ducks seen within the same transect strip width. The helicopter observations were used to calculate a visibility-correction factor (VCF), to account for birds missed by the airplane observers.

**2018 Habitat Conditions**

**Texas** (reported by S. McDowell): At the time of the survey, the natural marshes along the upper Texas coast were slightly deeper than normal due to rainfall in Beaumont and areas north; overall, however, habitat conditions saw very little change over the past year. Habitat conditions along the mid-coast and the Laguna Madre region appeared similar to last year. In the peripheral stratum there were multiple agricultural fields converted to crawfish farms within the past several years. Rice fields in the area were either still fallow or had recently been prepped for planting, and were thus dry. The majority of the agricultural fields between Victoria and Corpus have become either corn or cotton fields and therefore remain dry.

**Louisiana** (reported by L. Reynolds): Water conditions were highly variable across the Chenier Plain of southwest Louisiana. They were higher than average near the Texas border, slightly overtopping the terraces in some areas, but declined to the east in south Vermilion Parish, where water levels were well below average. Vegetative cover appeared healthy after the extremely cold winter with adequate nesting cover in most locations. Expanses of invasive aquatics, mostly water hyacinth and *Salvinia*, were noted in a number of locations, but especially over large portions of marsh south of the Intracoastal Waterway between Calcasieu Lake and Hwy 27 and south of White Lake. Water levels were average to below average in most areas of the SE LA survey area, with a noticeable decline in submerged aquatic vegetation from past years, as was also observed during the fall aerial waterfowl surveys.

**Calculation of Population Estimates**

Mottled duck population estimates and variances were calculated following Smith (1995). The visibility correction factor (VCF) was calculated as the ratio of the total indicated birds [TIBs = (2 x singles) + (2 x pairs) + (1 x groups)] counted by helicopter observers to the total TIBs counted by airplane observers in those segments surveyed by both helicopter and airplane. The total indicated birds/area surveyed was calculated from the airplane count data and multiplied by the VCF to give a visibility-corrected density. Due to substantial differences in bird density between marsh and upland (agriculture) habitats, densities were calculated separately for each habitat type, and scaled to the total area of that habitat within the survey area. In Louisiana, densities were calculated within two habitat strata: marsh, consisting of both freshwater–

Table 1. Population estimates (in thousands), visibility-correction factors (VCF), and area estimates from the 2018 western Gulf Coast mottled duck survey.

| **Texas** | **Population (SE) (1000s)** | **VCF (SE)** | **TIBs** | **Sampled Area (sq mi)** | **Stratum Area (sq mi)** |
|---|---|---|---|---|---|
| Core Marsh | 31.4 (10.0) | 10.8 (2.47) | 78 | 46 | 1,714 |
| Core Other | 7.8 (5.1) | 10.8 (2.47) | 20 | 90 | 3,255 |
| Peripheral | 24.4 (15.3) | 10.8 (2.47) | 12 | 41 | 7,807 |
| Laguna Madre Combined Marsh | 5.1 (3.6) | 10.8 (2.47) | 4 | 12 | 1,398 |
| Laguna Madre Peripheral | 9.0 (6.3) | 10.8 (2.47) | 4 | 12 | 2,485 |
| **Texas Subtotal** | 77.7 (25.2) | | 118 | 201 | 16,659 |
| **Louisiana** | | | | | |
| Marsh | 18.2 (4.6) | 2.02 (0.44) | 280 | 203 | 6,535 |
| Other | 8.7 (2.6) | 2.02 (0.44) | 81 | 67 | 3,576 |
| **Louisiana Subtotal** | 26.9 (6.5) | | 361 | 270 | 10,111 |
| **Survey Total** | 104.7 (26.1) | | 479 | 471 | 26,770 |

intermediate and salt–brackish marsh, and "other," consisting mostly of agriculture. In Texas, five habitat strata were used: core marsh, consisting of the two marsh types; core "other," consisting mostly of agriculture; peripheral, consisting mostly of agriculture but located farther from the coast than the core strata; and, in the Laguna Madre region, a marsh stratum (Laguna Madre combined marsh) and a peripheral stratum (Figure 1). Urban areas were excluded from the analysis in both states. The total population estimate for each state was the sum of the populations in each habitat type.

**Results**

The 2018 total mottled duck population estimate was 104,678 ± 26,066 (SE) birds (coefficient of variation (CV) = 25%; Table 1). In Louisiana the total estimate was 26,949 ± 6,528 (CV = 24%) and in Texas the estimate was 77,729 ± 25,236 (CV = 32%; this includes the Laguna Madre region which was not surveyed in 2009–2010). The 2018 VCF was 2.02 ± 0.44 (CV = 22%) in Louisiana, and 10.8 ± 2.47 (CV = 23%) in Texas.

**Comparison of 2018 estimates with 2017**

The 2018 western Gulf Coast estimate was not significantly different from the 2017 estimate of 142,606 ± 25,622 birds ($P$ = 0.29). We also calculated the 2009–2017 time series without the

Laguna Madre birds because this region was not surveyed in 2009–2010 (Figure 2). The 2018 western Gulf Coast estimate without Laguna Madre (90,612 ± 22,998) was not significantly different from the 2017 estimate without Laguna Madre (138,861 ± 25,156; $P = 0.16$).

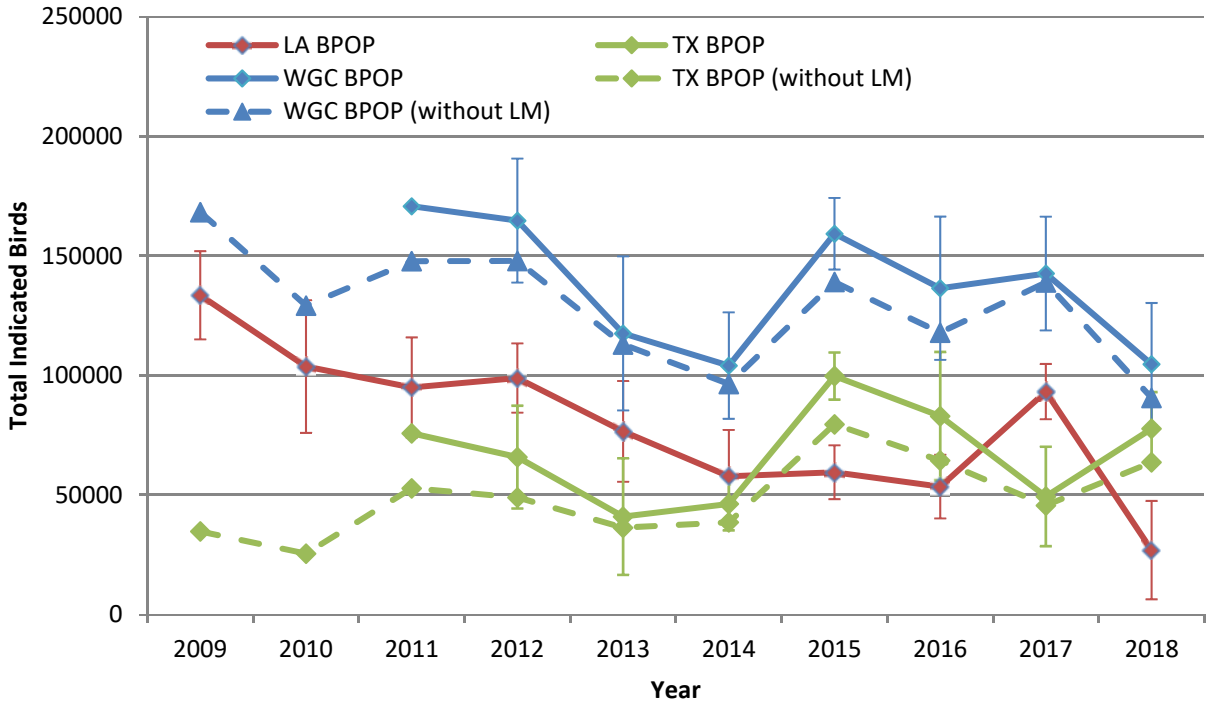


Figure 2. Louisiana, Texas, and combined western Gulf Coast (WGC) mottled duck population estimates ± standard errors from 2009 to 2018, including the Laguna Madre region of Texas (dashed lines) and without the Laguna Madre (solid lines). The 2008 estimates were not included due to substantial differences in survey design and methodology.

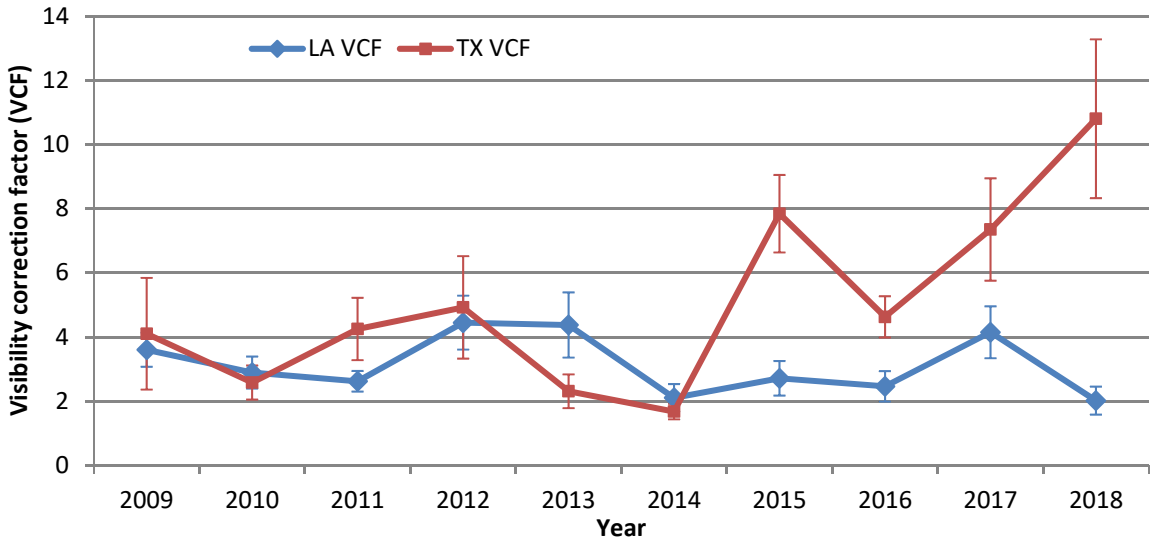


Figure 3. Mottled duck visibility-correction factors (VCF) ± standard errors from 2009 to 2018. The 2008 estimates were not included due to substantial differences in survey design and methodology.

**Literature Cited**

Smith, G. W. 1995. A critical review of the aerial and ground surveys of breeding waterfowl in North America. U.S. Department of Interior Biological Science Report 5, Washington, D.C.