2017 Western Gulf Coast Mottled Duck Survey

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This report summarizes the 2017 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 10-13, 2017 as a joint effort of Texas Parks and Wildlife Department (TPWD), Louisiana Department of Wildlife and Fisheries (LDWF), and USFWS Division of Migratory Bird Management. 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 10-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 2017, and compare these to those from 2009 to 2016.

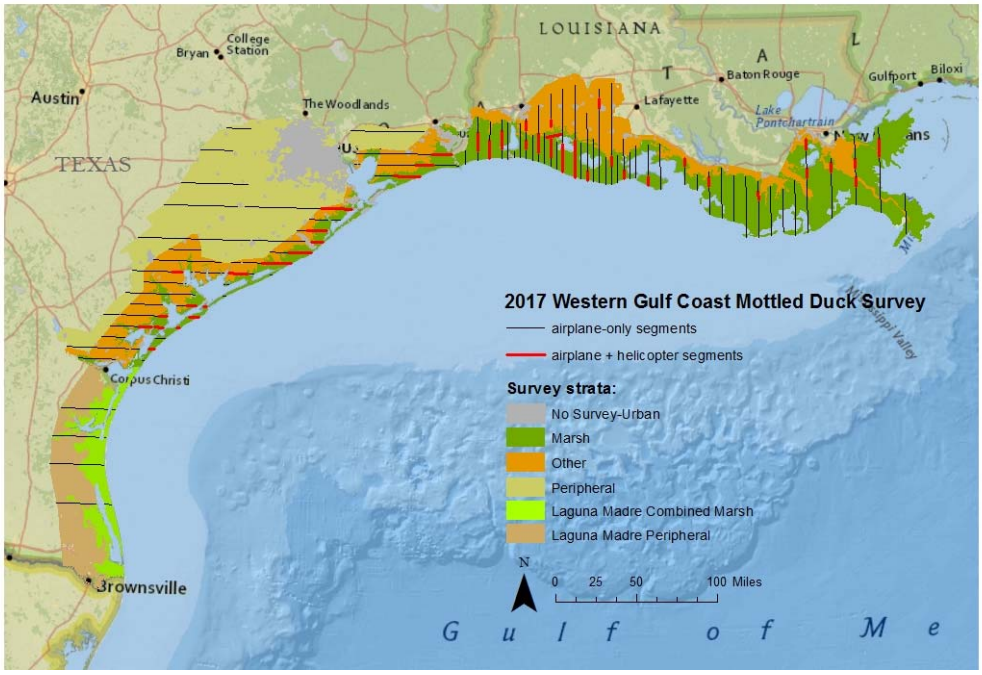

Figure 1. 2017 western Gulf Coast mottled duck survey design.

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. Total transect area surveyed by airplanes in 2017 was 270 sq mi in Louisiana and 273 sq mi 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 2017, 52 sq mi was surveyed by helicopter in Louisiana and 46 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.

2017 Habitat Conditions

Texas (reported by S. McDowell): Habitat conditions along the upper coast of Texas were similar to 2016. Along the mid-coast, there was much less surface water in the survey areas compared to the previous year. The Palmer Drought Index for these areas was recorded to be mid-range for the month of April 2017. In the agricultural areas north of Galveston Bay, much of the wetland habitat consisted of crawfish ponds which are often deeper than those habitats preferred by mottled ducks.

Louisiana (reported by L. Reynolds): Water levels in the marsh in southwest LA were lower than in recent years, and lower than they were in late winter. The crawfish farming industry is clearly expanding, and there appeared to be an increase in the amount of aquaculture on the agricultural landscape. Other than this water, there was little natural or rainfall-based flooding in agricultural areas. In the marsh, expanding areas of invasive aquatics (water hyacinth and Salvinia) were observed south of the Intracoastal Waterway around Hwy 27 and south of White Lake. Otherwise, marsh conditions in southwest LA appeared good for breeding mottled ducks. Habitat conditions seemed comparable across the coast, with increased water levels in the east; these were still no higher than average, and lower than in recent years.

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–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.

Table 1. Population estimates (in thousands), visibility-correction factors (VCF), and area estimates from the 2017 western Gulf Coast mottled duck survey.

Texas	**Population (SE) (1000s)**	**VCF (SE)**	**TIBs**	**Sampled Area**	**Stratum Area**
Core Marsh	31.7 (11.2)	7.35 (1.60)	138	55	1,714
Core Other	0.9 (0.7)	7.35 (1.60)	4	104	3,255
Peripheral	13.0 (6.5)	7.35 (1.60)	19	84	7,807
Laguna Madre Combined Marsh	1.5 (1.5)	7.35 (1.60)	2	14	1,398
Laguna Madre Peripheral	2.3 (2.2)	7.35 (1.60)	2	16	2,485
Texas Subtotal	49.4 (15.3)		165	273	16,659
Louisiana					
Marsh	60.5 (13.9)	4.15 (0.81)	452	203	6,535
Other	32.8 (8.9)	4.15 (0.81)	148	67	3,576
Louisiana Subtotal	93.2 (13.6)		600	270	10,111
Survey Total	142.6 (20.5)		765	542	26,770

Results

The 2017 total mottled duck population estimate was 142,606 ± 20,455 (SE) birds (coefficient of variation (CV) = 14%; Table 1). In Louisiana the total estimate was 93,237 ± 13,598 (CV = 14%) and in Texas the estimate was 49,369 ± 15,281 (CV = 31%; this includes the Laguna Madre region which was not surveyed in 2009–2010). The 2017 VCF was 4.15 ± 0.81 (CV = 19%) in Louisiana, and 7.35 ± 1.60 (CV = 22%) in Texas.

Comparison of 2017 estimates with 2009-2016

Several changes have been made to the survey design in the nine years in which this experimental survey has been conducted. In particular, the 2008 survey design and visibility-correction methodology differed substantially from subsequent years. Although the survey design has not changed in the last 5 years, in 2012 some transects in Texas were not surveyed due to weather delays. The 2017 western Gulf Coast estimate was not significantly different from the 2016 estimate of 136,462 ± 23,790 birds (P = 0.86).

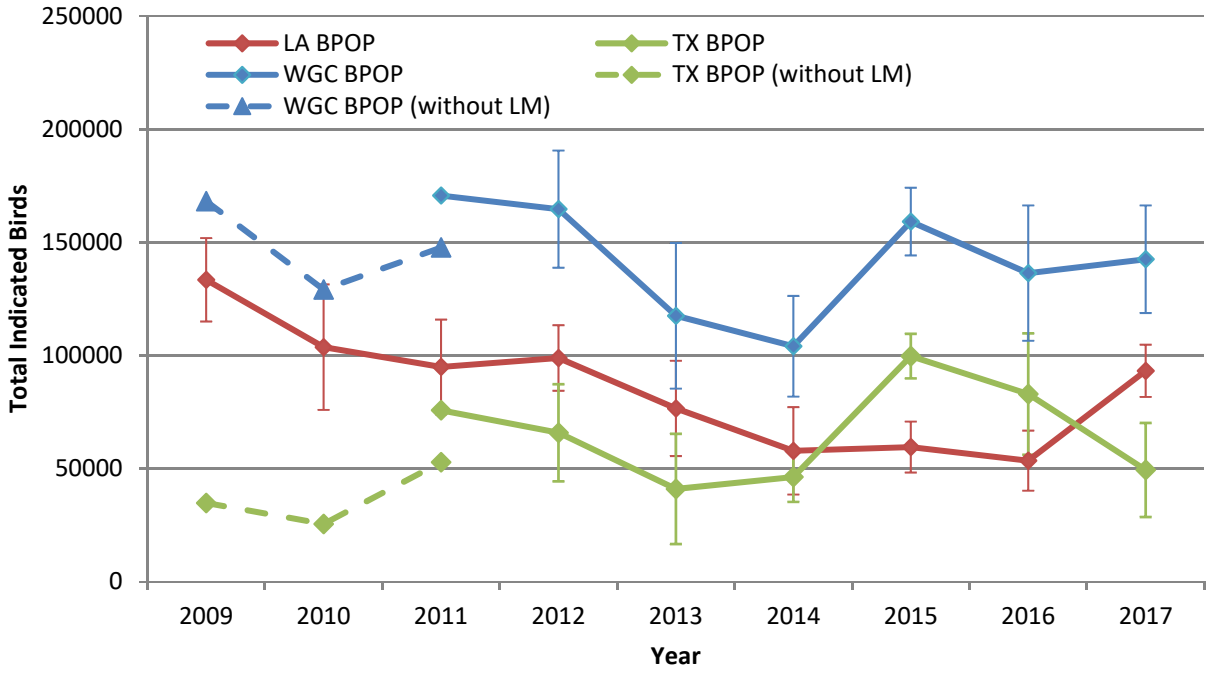

Figure 2. Louisiana, Texas, and combined western Gulf Coast (WGC) mottled duck population estimates ± standard errors from 2009 to 2017, including the Laguna Madre region of Texas. Dashed lines show population estimates for Texas and combined western Gulf Coast without the Laguna Madre, which was not surveyed in 2009-10. The 2008 estimates were not included due to substantial differences in survey design and methodology.

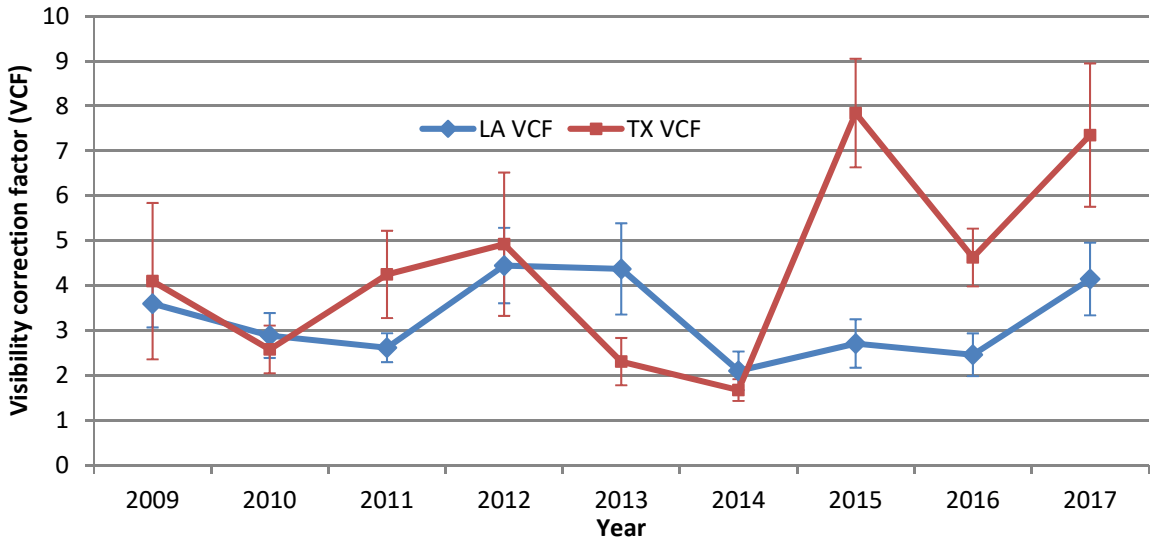

Figure 3. Mottled duck visibility-correction factors (VCF) ± standard errors from 2009 to 2017. The 2008 estimates were not included due to substantial differences in survey design and methodology.

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.

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