

2016 Western Gulf Coast Mottled Duck Survey

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This report summarizes the 2016 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 4–7, 2016 (Louisiana) and April 11-14, 2016 (Texas) 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 9-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 2016, and compare these to those from 2009 to 2015.

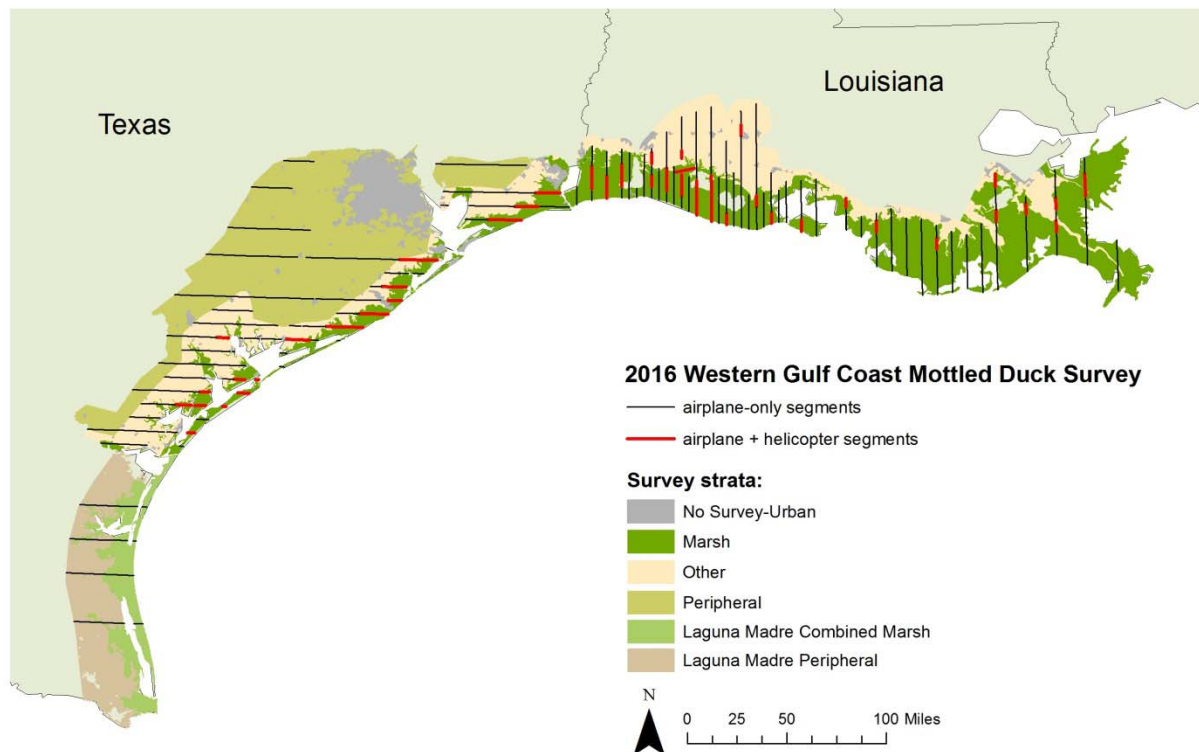


Figure 1. 2016 western Gulf Coast mottled duck survey design.

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 2016 was 270 sq mi in Louisiana

and 275 sq mi in Texas. Airplanes flew each transect at approximately 100 mph at 100-150 ft altitude. Two observers, one in the front right seat and one behind the pilot, recorded all mottled ducks seen within 656 ft (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 to flush birds from the vegetation. In 2016, 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.

2016 Habitat Conditions

Texas (reported by S. McDowell): Habitat conditions along the upper and mid-coast of Texas were similar to 2015. Abundant surface water was observed across the upper coast, from rains earlier in the year. Inland areas were drier but still had many small ponds and flooded fields containing standing vegetation. The Palmer Drought Severity index (PDI) for the upper coast was Near Normal, while the mid-coast ranged from Near Normal to Unusual Moist Spell. The Laguna Madre was unseasonably wet, with PDI of Unusual Moist Spell.

Louisiana (reported by L. Reynolds): Water conditions were highly variable across the surveyed area. Water levels were high in the marsh and into surrounding grasslands in the western portion of the coastal marsh, but on some transects between Calcasieu and Grand lakes there were locations where the water levels were extremely low, possibly due to active management. In some locations, a dull film of silt residue on the marshgrass was noted, indicating recent flooding. The winter was extremely wet, and waterways have dropped low enough to allow de-watering of some marsh units only recently. Invasive aquatic vegetation, notably *Salvinia* spp., has expanded to the point of being noted on some western transects. In the agricultural habitats at the north end of western transect lines, there was substantial acreage of crawfish ponds with active harvest, and flooding in other agricultural fields was still evident from recent rainfall. Large numbers of blue-winged teal, northern shovelers and gadwalls were using those habitats.

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 2016 western Gulf Coast mottled duck survey.

	Population (SE) (1000s)	VCF (SE)	TIBs	Sampled Area	Stratum Area
Texas					
Core Marsh	23.7 (5.0)	4.63 (0.64)	164	55	1,714
Core Other	6.3 (2.3)	4.63 (0.64)	44	105	3,255
Peripheral	34.4 (14.4)	4.63 (0.64)	80	84	7,807
Laguna Madre Combined Marsh	10.5 (8.3)	4.63 (0.64)	23	14	1,398
Laguna Madre Peripheral	8.0 (5.5)	4.63 (0.64)	12	17	2,485
Texas Subtotal	83.0 (20.8)		323	275	16,659
Louisiana					
Marsh	41.5 (9.2)	2.46 (0.48)	523	203	6,535
Other	12.0 (3.4)	2.46 (0.48)	91	67	3,576
Louisiana Subtotal	53.5 (11.5)		614	270	10,111
Survey Total	136.4 (23.8)		846	545	26,770

Results

The 2016 total mottled duck population estimate was $136,462 \pm 23,790$ (SE) birds (coefficient of variation (CV) = 17%; Table 1). In Louisiana the total estimate was $53,494 \pm 11,549$ (CV = 22%) and in Texas the estimate was $82,968 \pm 20,798$ (CV = 25%; this includes the Laguna Madre region which was not surveyed in 2009–2010). The 2016 VCF was 2.46 ± 0.48 (CV = 20%) in Louisiana, and 4.63 ± 0.64 (CV = 14%) in Texas.

Comparison of 2016 estimates with 2009-2015

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 2016 western Gulf Coast estimate was not significantly different from the 2015 estimate of $159,255 \pm 29,947$ birds ($P = 0.55$). We also calculated the 2009–2016

time series without the Laguna Madre birds because this region was not surveyed in 2009–2010 (Figure 2). The 2016 western Gulf Coast estimate without Laguna Madre ($117,889 \pm 20,431$) was not significantly different from the 2015 estimate without Laguna Madre ($139,086 \pm 26,560$; $P = 0.53$).

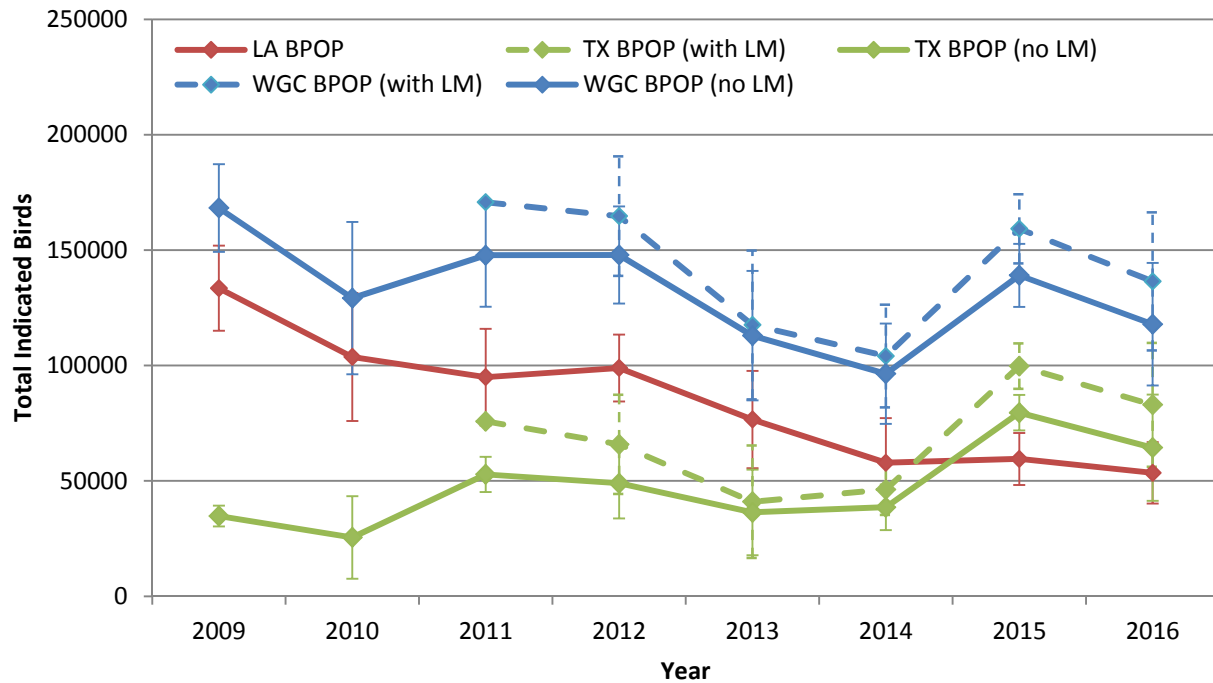


Figure 2. Louisiana, Texas, and combined western Gulf Coast (WGC) mottled duck population estimates \pm standard errors from 2009 to 2016, including the Laguna Madre region of Texas (dashed lines) and without the Laguna Madre (solid lines). The 2008 estimates were not included due to substantial differences in survey design and methodology.

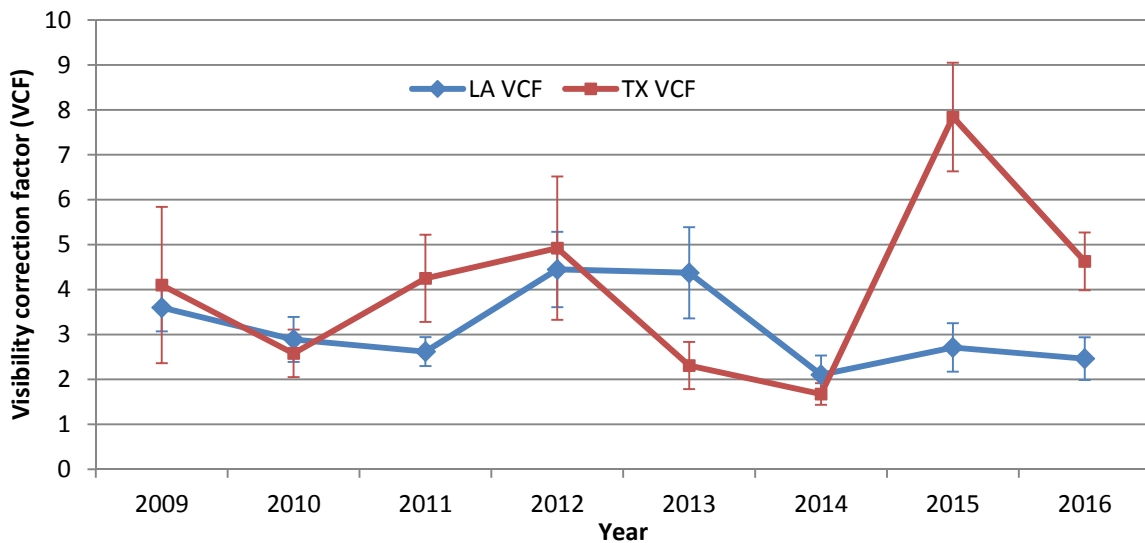


Figure 3. Mottled duck visibility-correction factors (VCF) \pm standard errors from 2009 to 2016. The 2008 estimates were not included due to substantial differences in survey design and methodology.

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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