2015 Western Gulf Coast Mottled Duck Survey

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This report summarizes the 2015 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 6–9, 2015 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 7-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 2015, and compare these to those from 2009 to 2014.

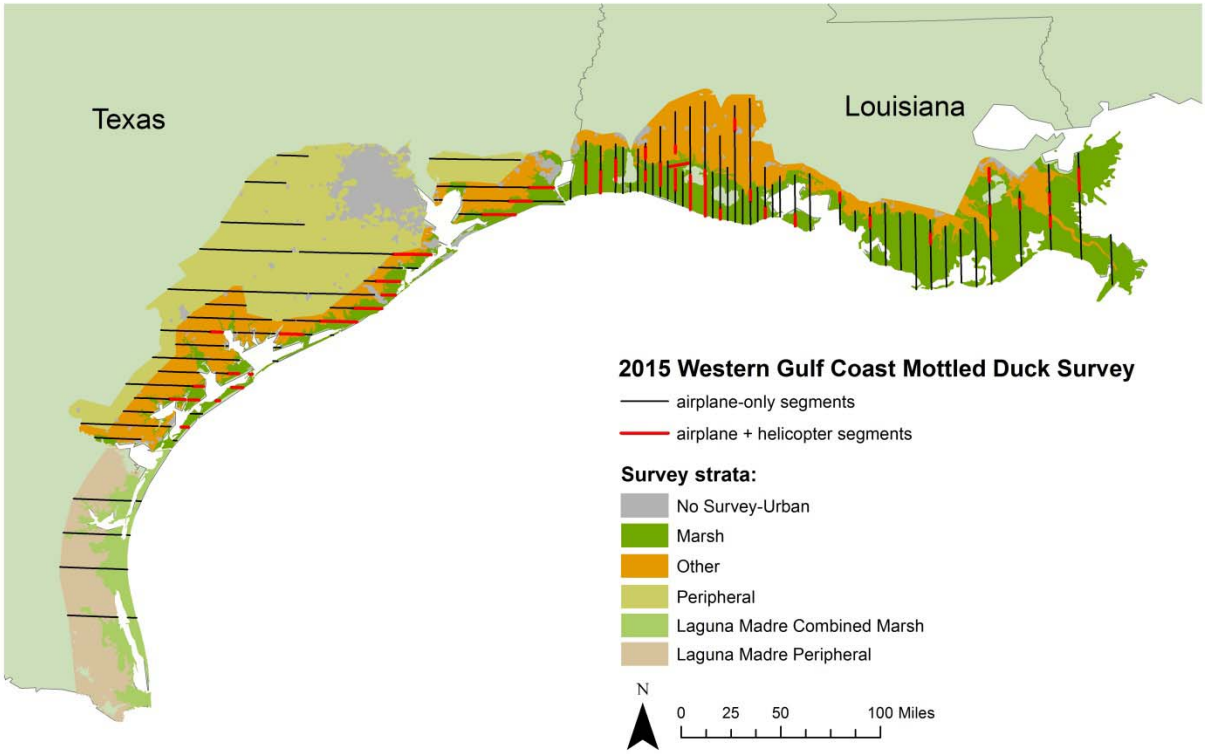

Figure 1. 2015 western Gulf Coast mottled duck survey design.

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 2015 was 269 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 2015, 52 sq mi was surveyed by helicopter in Louisiana and 42 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.

2015 Habitat Conditions

Texas: Habitat conditions along the Texas mid coast were wetter than in 2014, and surface water was observed across much of the coastal portion of the area. Inland areas were drier, but still had small ponds and flooded fields containing standing vegetation. The Palmer Drought Severity Index for the Texas mid coast was designated as near normal, but ranged from very moist soil to extremely moist soil in the Laguna Madre region (National Integrated Drought Information System 2015). The inland area between Beaumont and Houston had more rice fields prepared or under preparation for production this year, and had more significant amounts of surface water available than in past years. The Palmer Drought Severity Index for these areas indicated near normal soil moisture. Extensive surface water was observed across the area between Houston and Victoria, and the Palmer Drought Severity Index for the week ending 04 April 2015 was near normal in this area. Recent salinity data collected by TPWD on and around the J. D. Murphree Wildlife Management Area documented salinity lower than in the previous 12 months, reaching between 2-7 ppt. Rains from March left many interior areas in Jefferson and Chambers counties with standing freshwater, including fields with standing vegetation. Conditions between Galveston and Victoria were wetter than in 2014, but still noticeably drier than the upper Texas coastal counties.

Louisiana: Habitat conditions in the marsh seemed a little better this year than in the past two years, with lower water levels and less flooding. In the marsh areas west and east of Calcasieu Lake, water seemed low, and marsh vegetation was observed growing from exposed mudflats on many sites. Southwest Louisiana marshes contained many acres of either unbroken marsh, with few openings, or open water. The best habitat in this area was found on national wildlife refuges. Extensive unbroken marsh was observed west and east of White Lake, with excellent habitat conditions on Marsh Island. Water levels were average in this area. Conditions in agricultural habitats seemed similar to past years with the majority of the water found in fields managed for crawfish. Most agricultural areas were either very dry or deeply flooded for crawfish production. However, disturbance in those habitats is high and regular as April is the peak of the crawfish season in Louisiana.

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 2015 western Gulf Coast mottled duck survey.

Texas	**Population (SE) (1000s)**	**VCF (SE)**	**TIBs**	**Sampled Area**	**Stratum Area**
Core Marsh	30.0 (7.9)	7.84 (1.46)	122	55	1,714
Core Other	7.3 (2.5)	7.84 (1.46)	30	105	3,255
Peripheral	42.2 (19.4)	7.84 (1.46)	58	84	7,807
Laguna Madre Combined Marsh	5.5 (3.6)	7.84 (1.46)	7	14	1,398
Laguna Madre Peripheral	14.6 (9.9)	7.84 (1.46)	12	16	2,485
Texas Subtotal	99.7 (26.8)		229	273	16,659
Louisiana					
Marsh	40.8 (9.5)	2.71 (0.29)	466	202	6,535
Other	18.7 (5.0)	2.71 (0.29)	129	67	3,576
Louisiana Subtotal	59.5 (13.3)		595	269	10,111
Survey Total	159.2 (29.9)		824	542	26,770

Results

The 2015 total mottled duck population estimate was 159,254 ± 29,947 (SE) birds (coefficient of variation (CV) = 18%; Table 1). In Louisiana the total estimate was 59,517 ± 13,288 (CV = 22%) and in Texas the estimate was 99,737 ± 26,837 (CV = 27%; this includes the Laguna Madre region which was not surveyed in 2009–2010). The 2015 VCF was 2.71 ± 0.29 (CV = 20%) in Louisiana, and 7.84 ± 1.46 (CV = 15%) in Texas.

Comparison of 2015 estimates with 2009-2014

Several changes have been made to the survey design in the eight 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 4 years, in 2012 some transects in Texas were not surveyed due to weather delays. The 2015 western Gulf Coast estimate was not significantly different from the 2014 estimate of 104,107 ± 14,970 birds (P = 0.10). We also calculated the 2009–2015 time series without the Laguna Madre birds because this region was not surveyed in 2009–2010 (Figure 2). The 2015 western Gulf Coast estimate without Laguna Madre (139,086 ± 26,559) was not significantly different from the 2014 estimate without Laguna Madre (96,433 ± 13,653; P = 0.15).

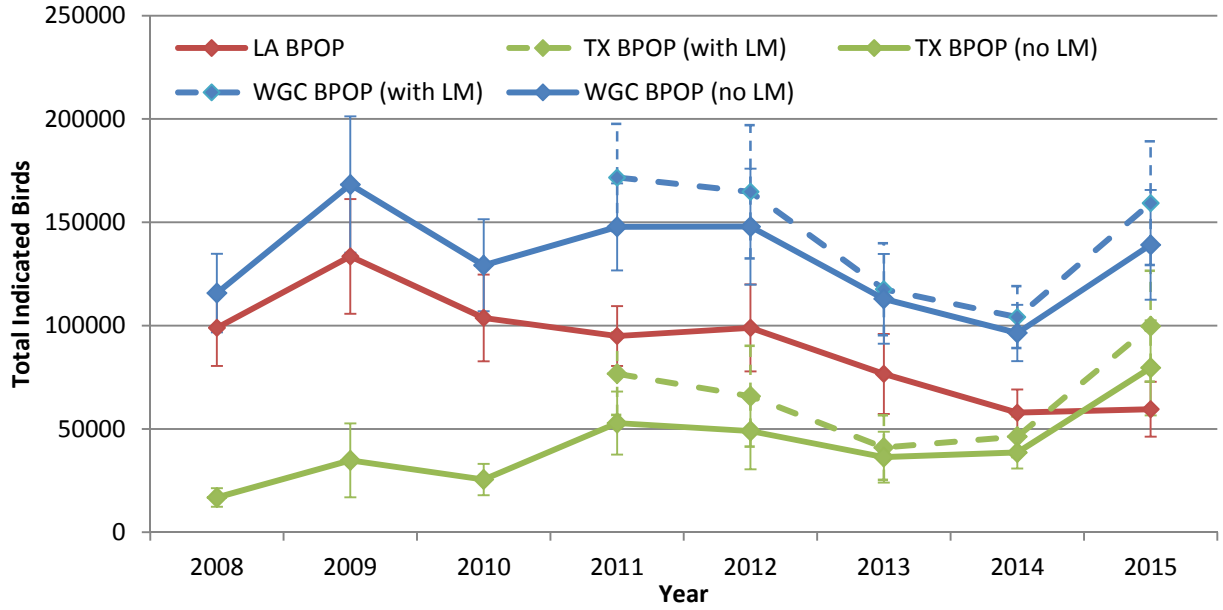

Figure 2. Louisiana, Texas, and combined western Gulf Coast (WGC) mottled duck population estimates ± standard errors from 2009 to 2015, including the Laguna Madre region of Texas (dashed lines) and without the Laguna Madre (solid lines). The 2008 estimates were not included due to substantial differences in survey design and methodology.

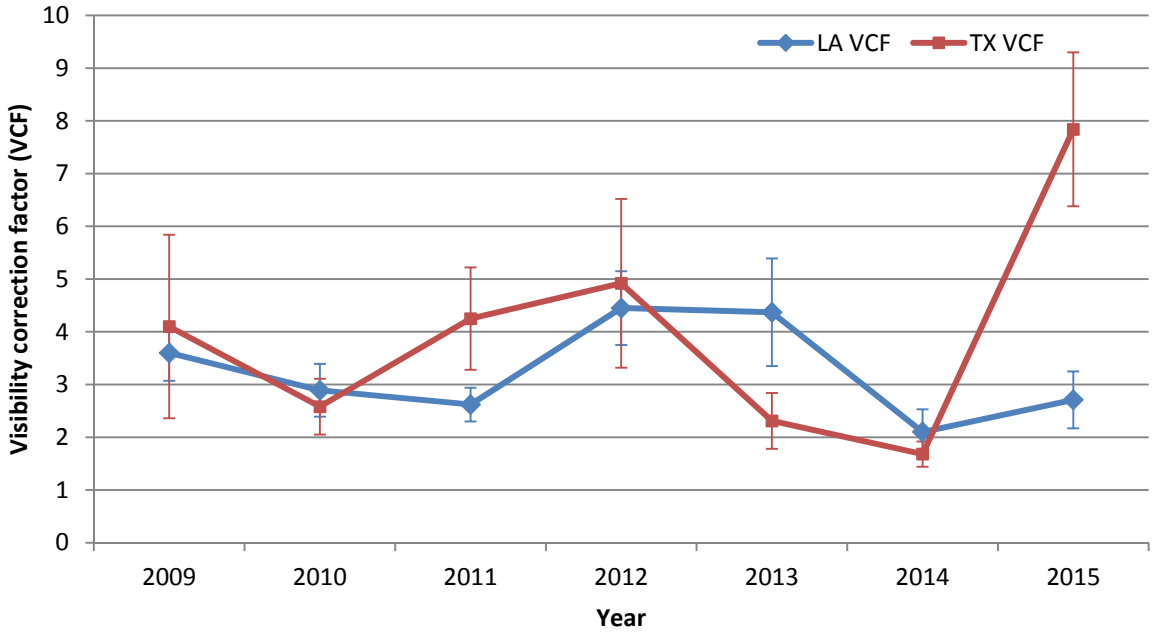

Figure 3. Mottled duck visibility-correction factors (VCF) ± standard errors from 2009 to 2015. The 2008 estimates were not included due to substantial differences in survey design and methodology.

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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