

## 2014 Western Gulf Coast Mottled Duck Survey

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This report summarizes the 2014 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 7–11, 2014 as a joint effort of USFWS Division of Migratory Bird Management, Texas Department of Parks and Wildlife (TPWD), and Louisiana Department of Wildlife and Fisheries. 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 2014, and compare these to those from 2009 to 2013.

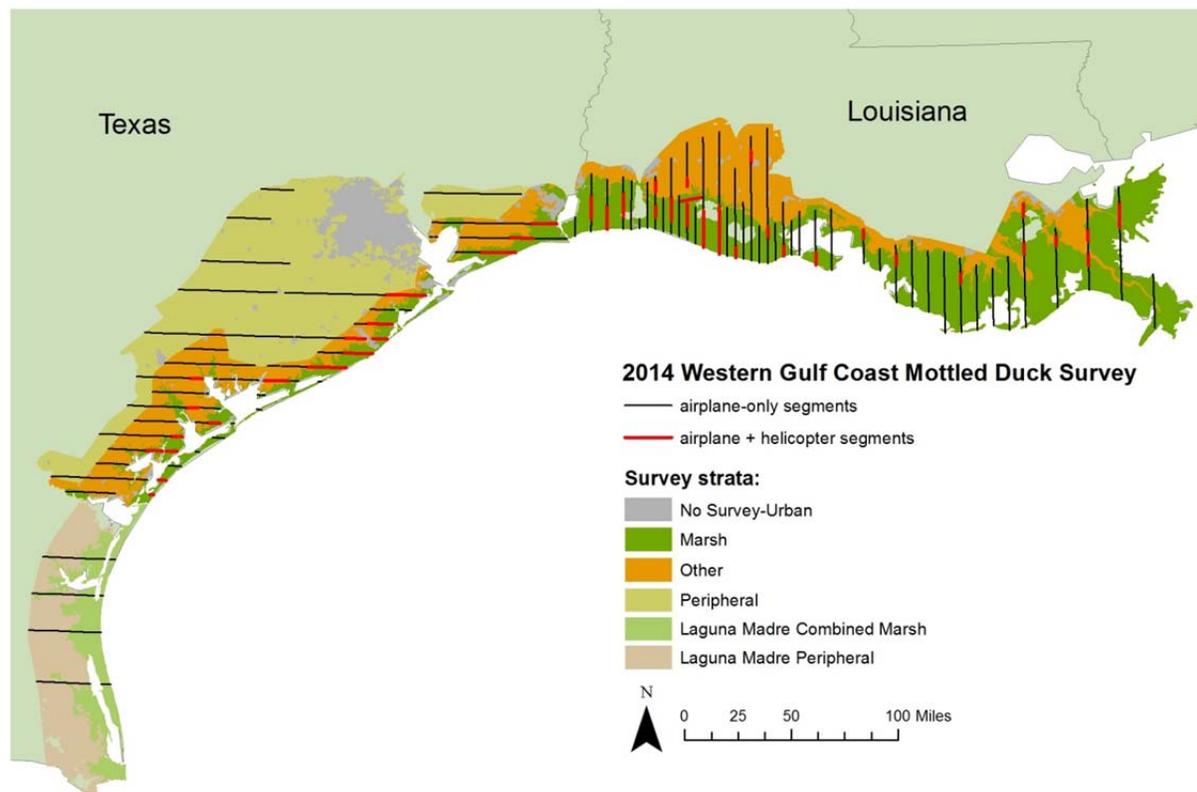


Figure 1. 2014 western Gulf Coast mottled duck survey design.

### 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 2014 was 268 sq mi in Louisiana

and 275 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 2013, 52 sq mi was surveyed by helicopter in Louisiana and 44 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.

## **2014 Habitat Conditions**

**Texas:** Habitat conditions in the Texas Chenier Plain were good, as most of the area has experienced significant precipitation. Within the segments surveyed by helicopter, coastal marsh conditions appeared to be good for mottled ducks. Coastal marshes between Palacios and Rockport showed signs of continued decline from long-term drought conditions. Inland wetland habitat in this area was nearly absent except for ponds with semi-permanent to permanent water. The upper coast of Texas between Sabine Lake and Galveston Bay had substantial surface water available. Recent rains left surface water in many coastal prairie locations within the upper coast. Below Galveston Island, the conditions became drier, with significantly less surface water available to the south toward Corpus Christi. According to the Palmer Drought Severity Index (PDSI), the area between Victoria and Beaumont was near normal for precipitation (PDSI, 12 April 2014). South of Victoria, habitat conditions were dry, with limited amounts of surface water observed. Many areas that had been planted in rice during previous surveys were now planted in corn or other dry land crops. The central coast of Texas was still in moderate drought (PDSI, 12 April 2014). Habitat conditions were dry south of Corpus Christi as well, but not as poor as in past years. A small portion of the Laguna Madre (southernmost transect) was reported as unusually moist (PDSI, 12 April 2014). Surface water was observed on each transect of the Laguna Madre. Habitat conditions west of Houston were near normal (PDSI, 12 April 2014). Some surface water was observed along transects, but habitat conditions were similar to past surveys.

**Louisiana:** Spring was late; gadwalls, blue-winged teal, and northern shovelers were evident in larger numbers than on past surveys, and the marsh had greened up in just the two weeks prior to the survey. Habitat conditions in the Chenier Plain seemed about average with slightly higher-than-average water levels in the marshes in the western portion. Good submerged aquatic vegetation cover was noted in a number of locations, which has been absent the past few years. Agricultural fields were mostly dry, including many rice fields, but managed water in the form of crawfish ponds was abundant in a number of locations, and acreage of crawfish production seems to be increasing. There was a frontal passage the first day of the survey resulting in clear weather and north winds the next two days which pushed water out of the marshes in tidal locations over the rest of the survey. As a result, water conditions in the survey area of the Deltaic Plain were lower than average in tidal areas and about average or possibly a bit higher in impounded/managed habitats. Good submerged aquatic vegetation

cover was also noted in the eastern portion of the survey area compared to past years, which was consistent with habitat conditions throughout the winter.

### 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 2014 western Gulf Coast mottled duck survey.

	Population (SE) (1000s)	VCF (SE)	TIBs	Sampled Area	Stratum Area
<b>Texas</b>					
Core Marsh	25.5 (5.9)	1.68 (0.24)	486	55	1,714
Core Other	5.0 (1.9)	1.68 (0.24)	97	105	3,255
Peripheral	8.1 (2.4)	1.68 (0.24)	52	84	7,807
Laguna Madre Combined Marsh	2.3 (1.4)	1.68 (0.24)	14	14	1,398
Laguna Madre Peripheral	5.4 (4.8)	1.68 (0.24)	22	17	2,485
<b>Texas Subtotal</b>	46.3 (9.9)		671	275	16,659
<b>Louisiana</b>					
Marsh	47.5 (11.1)	2.10 (0.43)	312	201	6,535
Other	10.4 (3.1)	2.10 (0.43)	382	67	3,576
<b>Louisiana Subtotal</b>	57.8 (11.3)		786	270	10,111
<b>Survey Total</b>	104.1 (15.0)		1457	545	26,770

## Results

The 2014 total mottled duck population estimate was  $104,107 \pm 14,970$  (SE) birds (coefficient of variation (CV) = 14%; Table 1). In Louisiana the total estimate was  $57,850 \pm 11,272$  (CV = 19%) and in Texas the estimate was  $46,257 \pm 9,851$  (CV = 21%; this includes the Laguna Madre region which was not surveyed in 2009–2010). The 2014 VCF was  $2.10 \pm 0.43$  (CV = 20%) in Louisiana, and  $1.68 \pm 0.24$  (CV = 14%) in Texas.

### Comparison of 2014 estimates with 2009–2013

Several changes have been made to the survey design in the seven 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 2014 western Gulf Coast estimate was similar to the 2013 estimate of  $117,575 \pm 22,270$  birds ( $P = 0.616$ ). For the 2009–2014 time series, we also calculated the 2014 estimate without the Laguna Madre birds because this region was not surveyed in 2009–2010 (Figure 2). The 2014 western Gulf Coast estimate without Laguna Madre ( $96,433 \pm 13,653$ ) was similar to the 2013 estimate without Laguna Madre ( $112,946 \pm 21,731$ ;  $P = 0.52$ ).

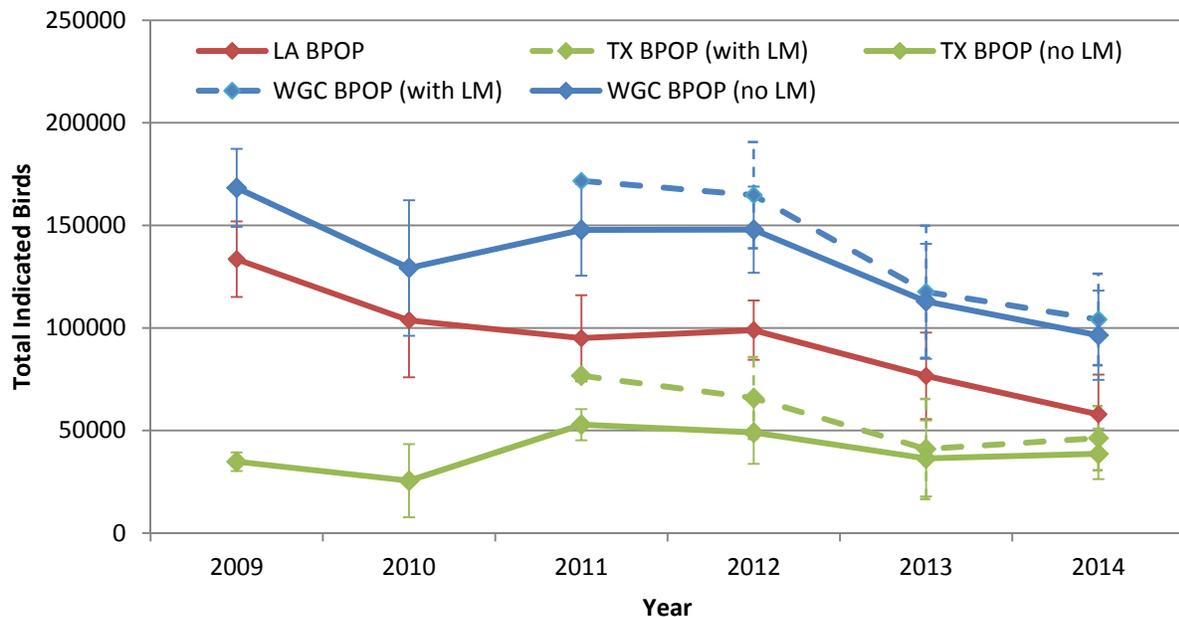


Figure 2. Louisiana, Texas, and combined western Gulf Coast (WGC) mottled duck population estimates  $\pm$  standard errors from 2009 to 2014, including the Laguna Madre region of Texas (dashed lines) and without the Laguna Madre (solid lines). The 2008 estimates were not included due to substantial differences in survey design and methodology.

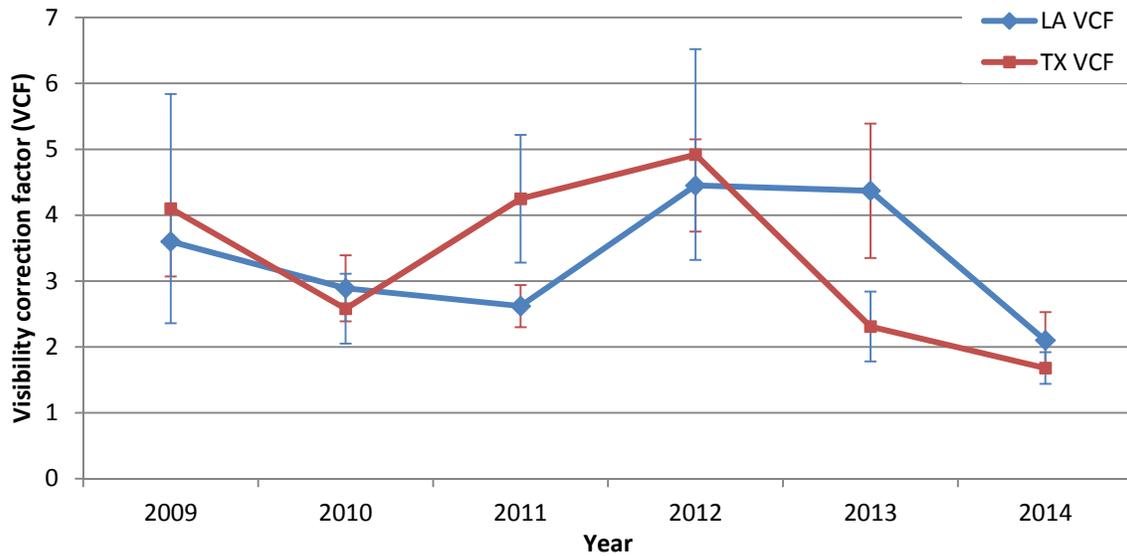


Figure 3. Mottled duck visibility-correction factors (VCF)  $\pm$  standard errors from 2009 to 2014. The 2008 estimates were not included due to substantial differences in survey design and methodology.

#### 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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