

2013 Western Gulf Coast Mottled Duck Survey

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This report summarizes the 2013 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 8–12, 2013 as a joint effort of USFWS Division of Migratory Bird Management, Texas Department of Parks and Wildlife, 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 6-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 2013, and compare these to those from 2009 to 2012.

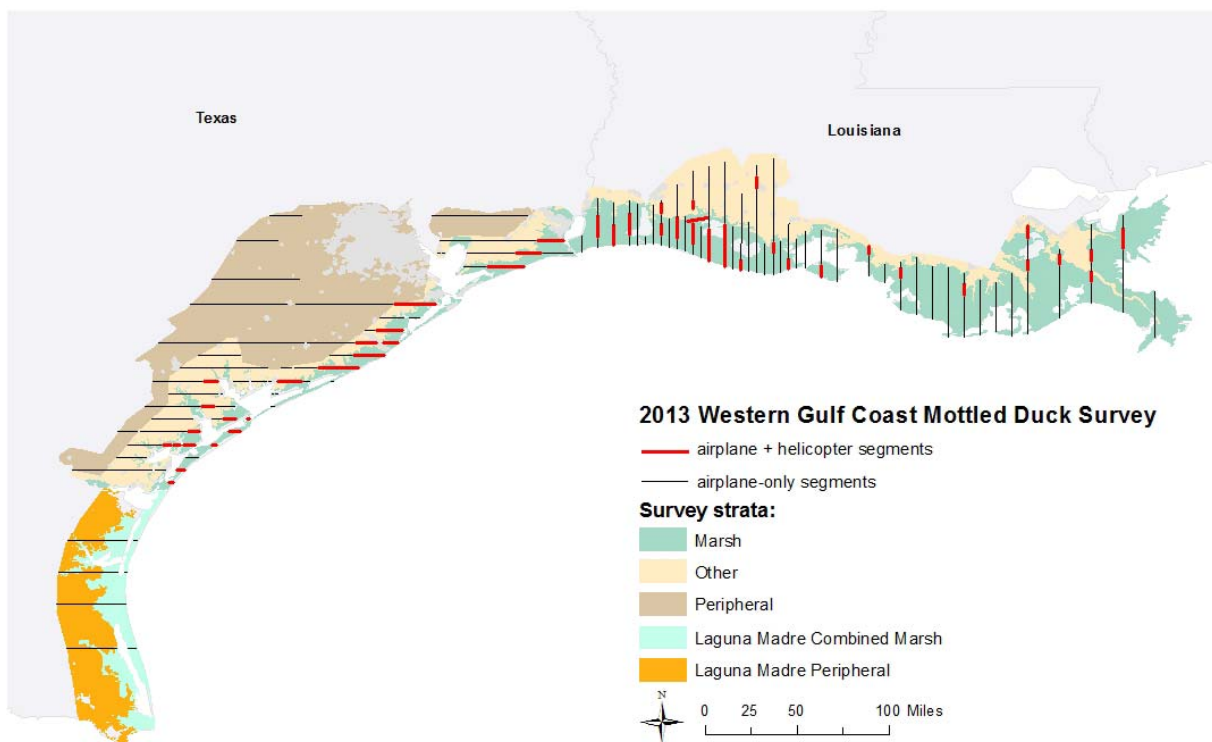


Figure 1. 2013 western Gulf Coast mottled duck survey design.

Methods

The survey area covers 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 2013 was 270 sq mi in Louisiana and 267 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 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.

2013 Habitat Conditions Reported by Survey Observers

Texas: In the majority of rice fields, flooding preparations had not started by the beginning of the survey, although fields that received one or more inches of rainfall were similar in condition to those flooded by farmers. As of March 30, 2013, the Palmer drought severity index (<http://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/palmer-drought-severity-index>) rated both the upper Texas coast and a little more than half of the mid-coast areas as being in moderate drought. These areas had improved to a near normal rating by the week ending April 13, 2013. The rest of the mid coast and Laguna Madre were rated in severe drought on March 30, 2013; by the week ending April 13, 2013 these areas were in moderate (mid coast) and extreme (Laguna Madre) drought.

Louisiana: Habitat conditions were wetter than average due to twice the normal amount of rain which fell in the two weeks prior to and the week of the survey. There was noticeable shallow flooding in many fields and pastures of the agricultural region of southwest Louisiana in addition to increasing amounts of managed water for crawfish farming. In addition to rainfall, strong southerly winds during the survey brought higher than average water levels to the coastal marshes across the state. Spring was late, and many shovelers, blue-winged teal, and scaup were evident in wetland habitats and flooded fields/pastures, but marshes appeared healthy with substantial persistent emergent growth despite evident flooding. In southeast Louisiana, habitat damage from Hurricane Isaac was still evident in the marshes south of New Orleans east to Lake Borgne, and spring growth in these areas was reduced at the time of the survey.

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 number of ducks counted by helicopter observers to the total number counted by airplane observers in those segments surveyed by both helicopter and airplane. The total indicated birds (TIBs)/area surveyed was calculated from the raw airplane count data [TIBs = (2 x singles) + (2 x pairs) + (1 x groups)], 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 2013 WGC mottled duck survey.

	Population (SE) (1000s)	VCF (SE)	TIBs	Sampled Area	Stratum Area
Texas					
Core Marsh	18.2 (5.6)	2.31 (0.53)	240	52	1,714
Core Other	7.0 (2.6)	2.31 (0.53)	93	99	3,255
Peripheral	11.0 (4.1)	2.31 (0.53)	52	85	7,807
Laguna Madre Combined Marsh	2.3 (2.0)	2.31 (0.53)	10	14	1,398
Laguna Madre Peripheral	2.3 (1.3)	2.31 (0.53)	7	17	2,485
Texas Subtotal	41.0 (11.0)		402	267	16,659
Louisiana					
Marsh	50.9 (13.0)	4.37 (1.02)	361	203	6,535
Other	25.7 (8.0)	4.37 (1.02)	110	67	3,576
Louisiana Subtotal	76.6 (19.4)		471	270	10,111
Survey Total	117.6 (22.3)		873	537	26,770

Results

The 2013 total mottled duck population estimate was $117,575 \pm 22,270$ (SE) birds (coefficient of variation (CV) = 19%; Table 1). In Louisiana the total estimate was $76,605 \pm 19,351$ (CV = 25%) and in Texas the estimate was $40,970 \pm 11,021$ (CV = 27%; this includes the Laguna Madre region which was not surveyed in 2009–2010). The 2013 VCF was 4.37 ± 1.02 (CV = 23%) in Louisiana, and 2.31 ± 0.53 (CV = 23%) in Texas.

Comparison of 2013 estimates with 2009–2012

Several changes have been made to the survey design in the six 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 3 years, in 2012 some transects in Texas were not surveyed due to weather delays. The 2013 western Gulf Coast estimate was similar to the 2012 estimate of $164,745 \pm 32,227$ birds ($P = 0.22$). For the 2009–2013 time series, we also calculated the 2013 estimate without the Laguna Madre birds because this region was not surveyed in 2009–

2010 (Figure 2). The 2013 western Gulf Coast estimate without Laguna Madre (112,946 ± 21,731) was similar to the 2012 estimate without Laguna Madre (147,882 ± 28,055; P = 0.18).

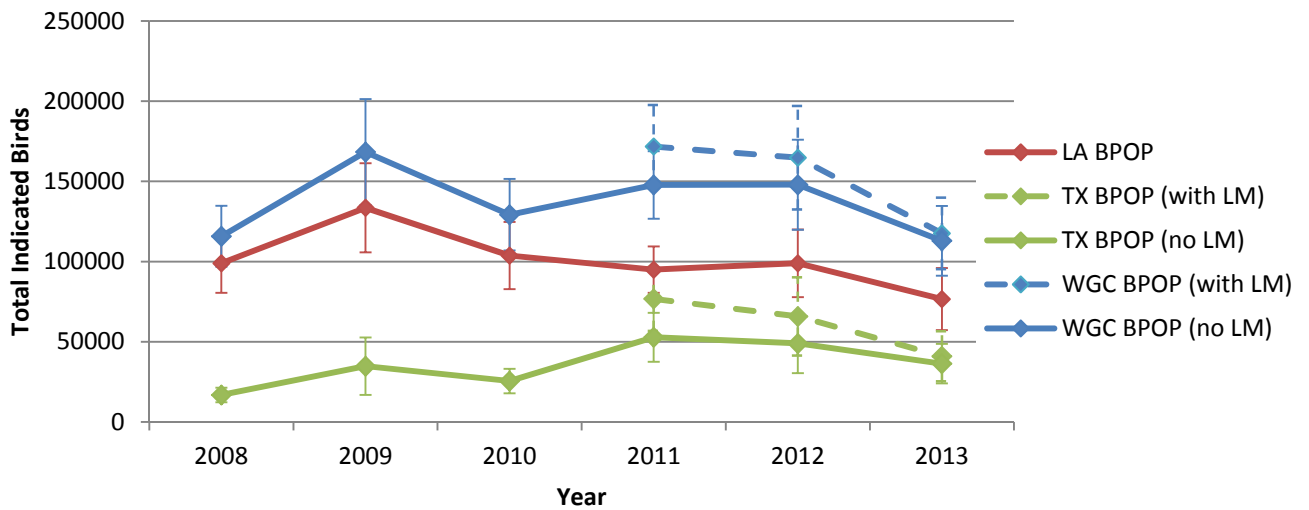


Figure 2. Mottled duck population estimates ± standard errors from 2009 to 2013, including the Laguna Madre region of Texas (dashed lines) and without the Laguna Madre (solid lines). The 2008 estimates were not included due to substantial differences in survey design and methodology.

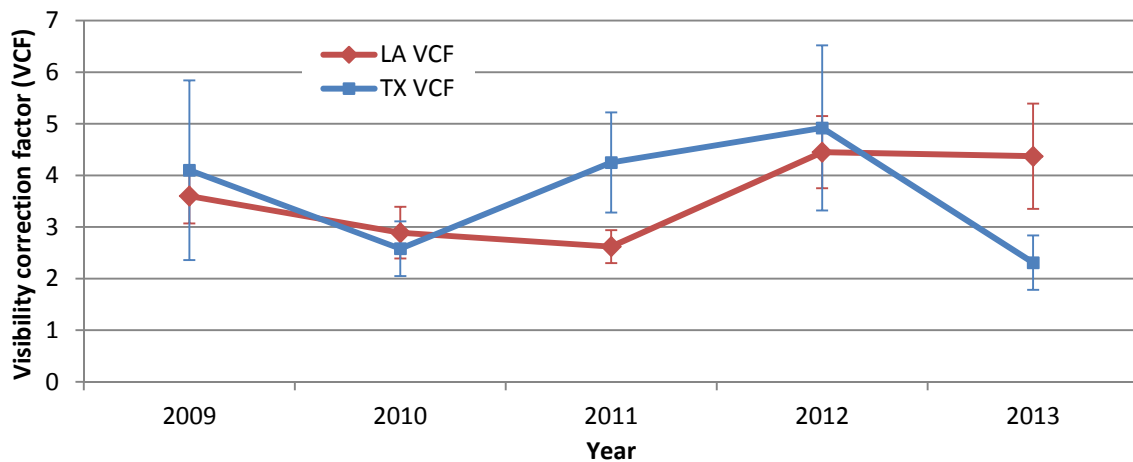


Figure 3. Mottled duck visibility-correction factors (VCF) ± standard errors from 2009 to 2013.

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.