

2011 Western Gulf Coast Mottled Duck Survey

USFWS Division of Migratory Bird Management, Branch of Population and Habitat Assessment

This report summarizes the 2011 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 11–14, 2011 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 4-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 2011, and compare these to those from 2009–2010.

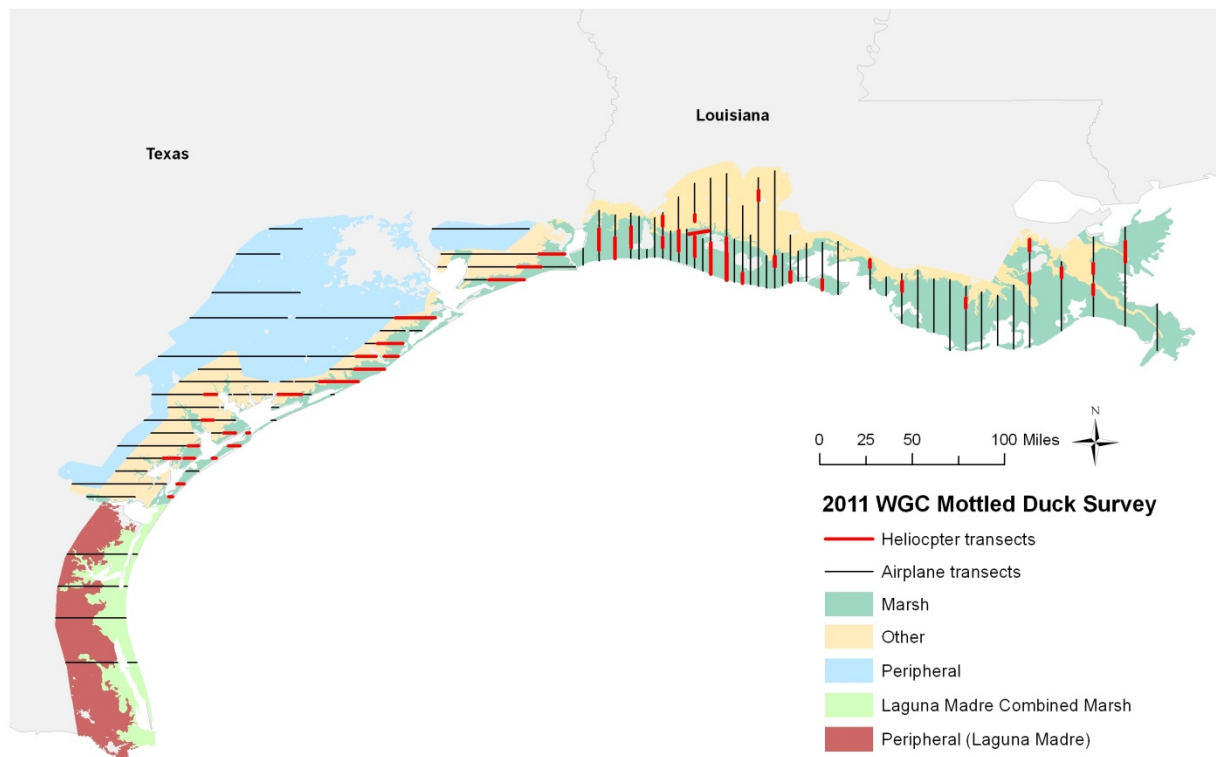


Figure 1. 2011 western Gulf Coast mottled duck survey design.

Methods

The survey area covers 10,111 sq mi in Louisiana and 16,550 sq mi in Texas (including the Laguna Madre strata which were surveyed in 2011 but not in 2010; Figure 1). Survey transects are flown by airplane crews in each state, with a subsample of transects reflown by helicopter crews. Total transect area surveyed by airplanes in 2011 was 268 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 2011, 52 sq mi was surveyed by helicopter in Louisiana (however, due to a computer malfunction data was only recovered from 40 sq mi) 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.

2011 Habitat Conditions

Texas: The areas south of Corpus Christi had water in many inland ponds and stock tanks this year. Coastal marsh wetlands in the Texas Chenier Plain were generally in good to fair condition. Managed wetlands (shallow impoundments) that were supplemented with water during winter provided good to fair habitat for ducks. Coastal marsh wetlands along the Texas mid-coast were generally in poor condition. Overall, the Texas mid-coast and the Chenier Plain were both experiencing drought. Estuarine marsh vegetation appeared to be stressed from lack of freshwater input to temper high salinity. Small ponds and impoundments having deeper water and some kind of vegetative structure within or around the perimeter provided some habitat for ducks. Rice fields near the coast were in early stages of cultivation and few fields were flooded; thus, these fields offered limited breeding habitat at the time of the survey.

Louisiana: The coastal marshes in the Chenier Plain of southwest Louisiana were drier than last year. Substantial numbers of ducks were observed in inland agricultural areas, where crawfish ponds and rice fields may provide sufficient brood habitat. Similar to last fall, the habitat conditions in the marshes of southeast Louisiana looked very good with abundant emergent vegetation.

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

Table 1. Population estimates (in thousands), visibility-correction factors (VCF), and area estimates from the 2011 WGC mottled duck survey.

Texas	Population (SE) (1000s)	VCF (SE)	TIBs	Sampled Area	Stratum Area
Core Marsh	29.4 (8.98)	4.25 (0.97)	218	54	1,714
Core Other	10.2 (4.60)	4.25 (0.97)	75	102	3,255
Peripheral	13.1 (6.70)	4.25 (0.97)	32	80	7,699
Laguna Madre Combined Marsh	16.8 (8.70)	4.25 (0.97)	40	14	1,398
Laguna Madre Peripheral	6.2 (4.01)	4.25 (0.97)	10	17	2,485
Texas Subtotal	76.7 (21.49)		375	267	16,551
Louisiana					
Marsh	77.8 (12.27)	2.62 (0.32)	913	201	6,535
Other	17.2 (4.40)	2.62 (0.32)	123	67	3,576
Louisiana Subtotal	95.0 (14.49)		1036	268	10,111
Survey Total	171.7 (25.92)		1,411	535	26,662

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.

Results

The 2011 total mottled duck population estimate was $171,684 \pm 25,922$ (SE) birds (coefficient of variation (CV) = 15%; Table 1). In Louisiana the total estimate was $94,964 \pm 14,494$ (CV = 15%) and in Texas the estimate was $76,720 \pm 21,491$ (CV = 28%; this includes the Laguna Madre region which was not surveyed in 2010). The 2011 VCF was 2.62 ± 0.32 (CV = 12%) in Louisiana, and 4.25 ± 0.97 (CV = 23%) in Texas. In both states, mottled duck density was much higher in marsh than “other” habitats (i.e., agriculture; Table 1).

Comparison of 2011 estimates with 2009-2010

Several changes have been made to the survey design in the four years in which this experimental survey has been conducted. In particular, the 2008 survey design and visibility-correction methodology differed substantially from subsequent years. The survey design in 2011 was similar to that of 2010, but included an additional 131 mi (33 sq mi) of transects in the peripheral stratum of Texas, and the additional 127 mi (31 sq mi) flown in the Laguna Madre. We compared the 2011 estimate to that of 2010 without including the Laguna Madre birds: the 2011 western Gulf Coast estimate without the Laguna Madre was $147,770 \pm 21,038$ (the Texas estimate without the Laguna Madre was $52,806 \pm 15,248$ birds), which was 14%

higher than the 2010 estimate of 129,207 birds. We also compared the 2011 estimates without the Laguna Madre to the 2009-2010 estimates calculated for the same survey area as in 2011 (Figure 2).

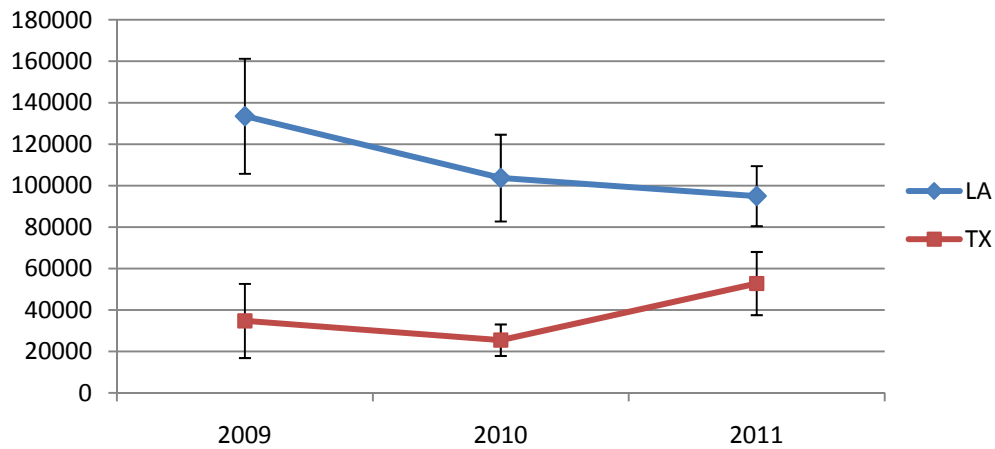


Figure 2. 2009-2011 mottled duck population estimates and associated standard errors, not including the Laguna Madre region of Texas (the 2008 estimates were not included due to substantial differences in survey design and methodology).

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.