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Occurrence of mottled duck nests on constructed marsh terraces in Louisiana and Texas – a pilot study

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Introduction

The construction of raised, earthen berms (i.e., marsh terraces) in open water areas of coastal marshes is a common marsh restoration strategy in south Louisiana and Texas. Marsh terraces are designed to reduce wave action, fetch, and turbidity and ultimately create conditions more favorable for the growth of submersed aquatic vegetation. Researchers and biologists have speculated that the elevated and vegetated nature of marsh terraces may provide suitable nesting substrate for resident mottled ducks (*Anas fulvigula*). Indeed, the mottled duck range spans the coastal areas of Louisiana and Texas and frequently nests in coastal marsh environments (Stutzenbaker 1988). However, no effort has been made to determine if and to what extent mottled ducks or other wetland dependent bird species may nest on marsh terraces in coastal Louisiana or Texas. Addressing this uncertainty may have relevance to the design and location of future marsh terracing projects and enhance our understanding of mottled duck nesting habits.

We conducted a pilot study during March - May 2007 on selected marsh terraces in south Louisiana to 1) gain a cursory understanding of the extent to which mottled ducks may nest on marsh terraces and 2) to determine if more rigorous investigations into this possible phenomenon are warranted. Although marsh terraces are common in Louisiana and Texas, we chose to conduct this pilot study only in Louisiana because it was more logistically convenient for the co-investigators and we primarily desired only to document whether this phenomenon was occurring. We reasoned that if this phenomenon was occurring in Louisiana then it likely was also in Texas.

Study areas

We worked with Gulf Coast Joint Venture staff (Barry Wilson, GCJV Coordinator) and partners (Chad Courville, Land Manager, Miami Corp.) to identify known marsh terrace projects in coastal Louisiana. We selected 8 study areas non-randomly from these identified projects based on a collective, reasoned opinion of which would be most likely to have mottled ducks

nesting on them (e.g., in fresh marsh areas traditionally having relatively high numbers of mottled ducks) and which combination of projects would best represent the range of marsh terrace designs present on the landscape. In addition, we used this non-random selection process because if we failed to discover mottled ducks nesting on terraces, we wanted that failure to occur in the presence of searches on terrace projects we believed *a priori* would most likely have mottled ducks nesting on them. We selected terrace projects at 5 locations in southwest Louisiana (Miami Corp, Cameron Prairie NWR, Sweet Lake Land and Oil Co., Vermillion Corp, and Jermyn tract of the M. O. Miller, MD Estate), 2 locations in southcentral Louisiana (Little White Lake, Little Vermillion Bay), and 1 location in southeast Louisiana (Pointe-aux-Chenes WMA) (Figure 1). Technically, some of these locations comprised multiple terrace "projects" (e.g., Miami Corp property), but we considered them functionally as a single search location.

Methods

We searched marsh terraces between 28 March and 8 May 2007. We searched terraces on each study area only once and did not revisit discovered nests. We usually searched all terraces at each study area, but we systematically searched only a subset of the terraces on one study area (i.e., Jermyn tract) because of the large number of terraces present. We searched terraces and flushed nesting mottled ducks using various techniques including walking the terraces and thrashing the vegetation with PVC pipes, traveling via boat along the side of terraces and dragging the vegetation with PVC pipes, and traveling via airboat along the side of terraces and viewing them from an elevated position (Figure 2). We documented the occurrence of active and inactive (if detected) mottled duck nests discovered on terraces, and recorded date, time, UTM coordinates, and number of eggs for all discovered nests. We estimated clutch sizes for hatched or destroyed nests by counting eggshell membranes or egg fragments. We candled eggs of active nests to determine stage of incubation (Weller 1956). We also recorded the occurrence of nests belonging to other bird species.

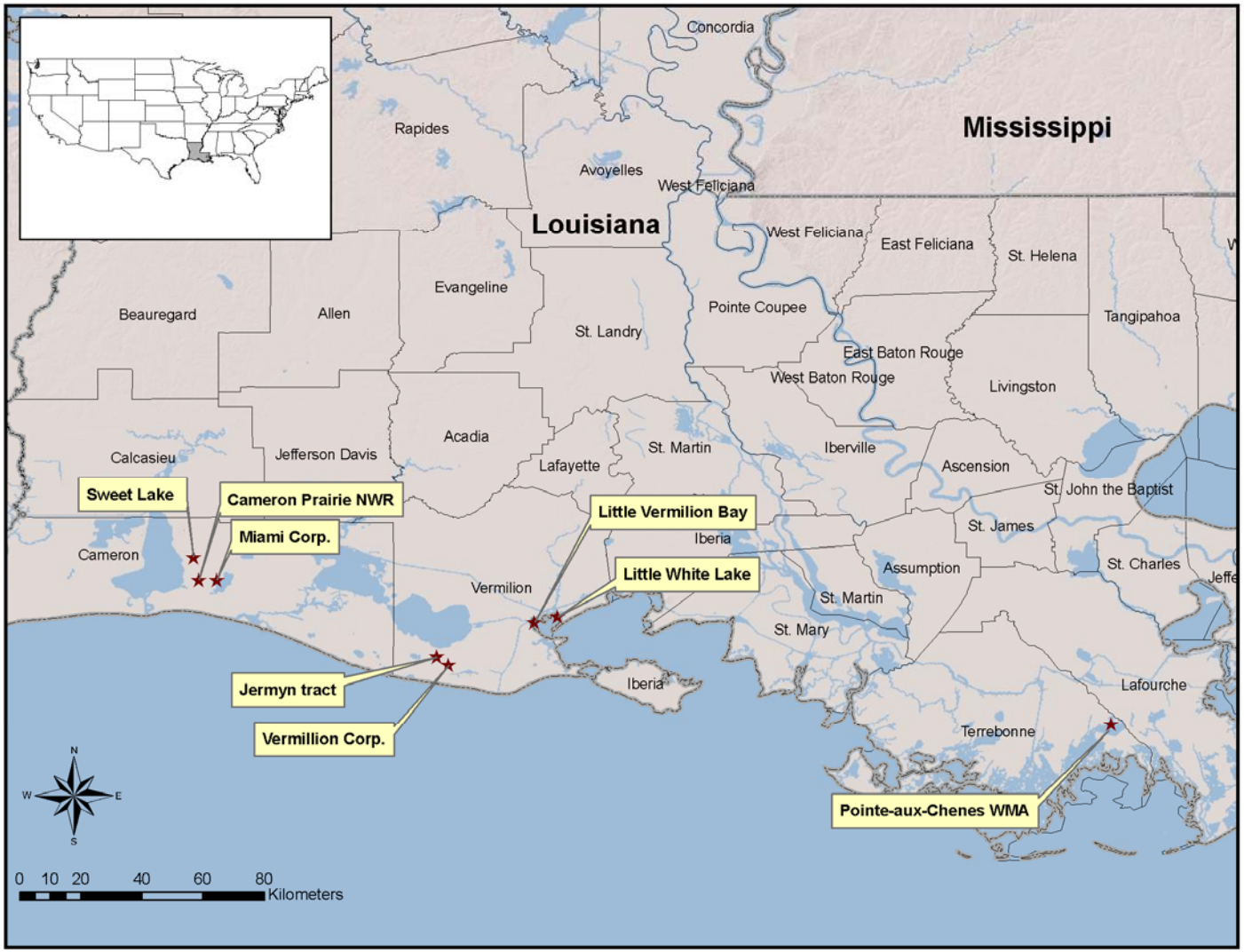

Figure 1. Study areas in coastal Louisiana where searches were conducted to document the occurrence of mottled duck nests on constructed marsh terraces, 28 March – 9 May 2007.

Figure 2. Methods used to search for mottled duck nests on constructed marsh terraces in coastal Louisiana, 28 March – 8 May 2007.

Results

We observed mottled duck nests on terraces at 4 of 5 study areas in southwest Louisiana and the lone study area in southeast Louisiana, but did not detect any nests at the 2 locations in southcentral Louisiana. Specifically, we discovered 16 active, 9 inactive (i.e., destroyed or abandoned), and 3 hatched nests during our searches (Table 1). Average clutch size of active nests that were in the incubation stage was 9.8 (n = 8). We also located 1 Forster's tern colony with >10 nests, 1 lest bittern nest, and 1 red-winged blackbird nest.

Table 1. Number of active, inactive, and hatched mottled duck nests located on constructed marsh terraces in coastal Louisiana, 28 March - 8 May 2007.

			No. nests located		
Study area	Location	Date searched	Active	Inactive	Hatched
Miami Corp.	Cameron Parish, LA	28 March 2007	1	0	0
Cameron Prairie NWR	Cameron Parish, LA	28 March 2007	3	0	0
Sweet Lake Land and Oil Co.	Cameron Parish, LA	9 April 2007	3	3	0
Little White Lake	Vermilion Parish, LA	16 April 2007	0	0	0
Little Vermillion Bay	Vermilion Parish, LA	16 April 2007	0	0	0
Vermillion Corp.	Vermilion Parish, LA	17 April 2007	0	0	0
Jermyn tract - Miller Estate	Vermilion Parish, LA	24 April 2007	7	5	3
Pointe-Aux-Chenes WMA	Terrebonne Parish, LA	8 May 2007	2	1	0

Our limited observations revealed no obvious structural differences between terraces containing mottled duck nests and those that did not, except that we failed to detect nests on terraces covered with extremely dense vegetation. However, at the level of individual terraces we did observe a general tendency for nests to be located in clumps of *Spartina patens* or otherwise at the base of small to intermediate sized (3-5' in height) shrubs (e.g., *Iva frutescens*). We frequently observed a narrow band of *Spartina alterniflora* at the water-terrace interface, but we did not detect any nests in this band of vegetation. Most, if not all, nests were located on the crown of the terrace.

Discussion and future implications

This pilot study was not designed to enable estimation of nest densities, nest survival, or any measure of productivity from mottled duck nests on constructed marsh terraces. Rather, we merely intended to document the occurrence, or lack thereof, of mottled ducks nesting on terraces. Despite our non-random selection of study areas, we believe the number of nests located during this pilot study provides justification for a more rigorous investigation. We therefore advocate a more intensive and extensive study employing a sampling design (e.g., multi-stage sampling with individual terraces as sampling unit) capable of generating unbiased

and precise estimates of nest densities, nest survival, and other measures of productivity (e.g., clutch size) for mottled duck nests on constructed marsh terraces in coastal Louisiana and Texas. This study should also seek to describe relationships between nest-related parameters (e.g., nest density, nest survival) and vegetative and structural characteristics of terraces or terrace fields, specifically as they may have implications for the design and location of future terrace construction projects. Lastly, we believe the geographic scope of this future study should span the coastal regions of Texas and Louisiana possessing the highest densities of terrace projects and/or where future terraces are most likely to be constructed.

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