CAPTURE RATES OF SHOREBIRDS AT MANAGED AND RIVERINE FRESHWATER WETLANDS NEAR THE CENTRAL TEXAS COAST

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Abstract – Shorebirds were mist-netted at 500-ha of moist soil units (MSU) and at a 400-ha riverine overflow basin (NW) near the central Texas Coast from 1996-2001. A total of 3745 shorebirds of 24 species were captured at the MSU at a rate of 76 birds per trip. A total of 1543 shorebirds from 18 species were captured at the NW at a rate of 106 birds per trip. Least Sandpiper (*Calidris minutilla*), Semipalmated Sandpiper (*Calidris pusilla*), Western Sandpiper (*Calidris mauri*), Dunlin (*Calidris alpina*), and Stilt Sandpiper (*Calidris himantopus*) were the most abundant species banded at the MSU and they were recaptured at the rate of 2.6, 0.8, 0.5, 3.3, and 0.8 percent, respectively, during years following banding. Least Sandpiper, Semipalmated Sandpiper, Western Sandpiper and Stilt Sandpiper were captured most frequently at the NW and only two individuals were recaptured during years following banding. Banded birds from this study site were also captured in Nebraska for Least Sandpiper, Ecuador for Semipalmated Sandpiper, and Alaska, British Columbia and Washington for Western Sandpiper. More shorebirds were banded at the MSU site during spring and at the NW during late summer/early fall.

INTRODUCTION

Most species of shorebirds undertake phenomenal migrations from their wintering grounds as far south as Tierra del Fuego, en route to their breeding grounds as far north as the Arctic Circle each year. To complete these extraordinary flights, shorebirds must lay on enormous fuel reserves. For many of the species common to North America, this is done at migration stopover areas, principally wetlands and associated habitats, which have high densities of food available at the critical times (Brown et al. 2000). Skagen et al. (1999) indicated the central coast of Texas was a significant area for migration stopovers. Despite ongoing conservation efforts, many shorebird populations face significant threats from habitat loss, human disturbance, pollution and predation throughout their range. This has led to many populations declining (Brown et al. 2000). As a result of this, Texas Parks and Wildlife Department identified 22 of the 38 regular occurring shorebird species in Texas as of conservation concern (Benson et al. 2005).

Wetland conservation managers along the Coast regularly create <1 m deep freshwater impoundments (MSU) for waterfowl management that are used extensively by waterfowl and to some extent shorebirds, and there is a large diversity of wetlands that are seasonally available to shorebirds (Moulton et al. 1997). The Gulf Coast Joint Venture which is a partnership of several conservation agencies/organizations is starting to direct management to shorebirds and much information is needed on use of manmade and natural wetlands to better plan for their conservation (Bill Vermillion pers. commun.).

This study was conducted to determine relative capture rates of shorebirds using riverine and managed freshwater wetlands near the central Texas Coast from 1996 thru 2001.

METHODS

Shorebirds were mist-netted and banded at riverine wetlands (Guadalupe River overflow basin) in Victoria County (Site A) and at managed MSU at the Whitmire Unit of the Aransas National Wildlife Refuge in Calhoun County (Site B) from 1996 thru 2001 (Figure 1). Shorebirds were captured with 5 4-net sets of standard 12 m X 2 m 36 mm mesh, 4-shelf black mist-nets. Nets were oriented in a straight line in high shorebird concentrations perpendicular to the wind. Nets were oriented in an L-shaped formation during calm conditions. Shorebirds typically flew into winds over wetlands thus net orientation was important to enhance capture rates. Nets were set up 1 hour before sunset and run until 2 hours after or were set 2 hours before sunrise and run for 1 hour after each day. Nets were only set during trapping periods when winds were less than 16 km/h and no precipitation. Shorebirds were netted at weekly intervals whenever high concentrations occurred at either of the study areas.

Study Sites. The two sites were 38 km apart. The 400-ha NW was about 15 km from San Antonio Bay and received flood waters from the Guadalupe River periodically depending on area rainfall and drainage patterns. The wetlands flooded to depths of 1.5 m during rainy seasons, and dried completely and became heavily vegetated during dry seasons. The NW was part of the Jess Womack Family Ranch and was entered into the USDA Wetland Reserve Program. Periods most suitable for shorebirds were typically during

late summer when dry seasons caused waterlevels to dwindle from deep to very shallow and forming abundant mudflats.

The 500-ha of managed MSU at Whitmire Unit of Aransas National Wildlife Refuge in Calhoun County contained 7 moist soil units. They were about 1 km from Matagorda Bay and were actively managed for waterfowl. Units were typically flooded to depths of 0.5 m in late August to early September with irrigation water from the Guadalupe Blanco River Authority and draining begun in late March. MSU were typically most suitable for shorebirds during the spring because this was when large areas of mud flats desired by shorebirds were most likely to occur with draining of impoundments that were grazed heavily by waterfowl. The MSU were heavily vegetated when re-flooded during the fall and were not used by many shorebirds until mudflats developed. At least one MSU was normally not drained during spring to provide brood habitat for waterfowl during summer. As natural drying within these brood areas occurred there typically was a narrow zone of mudflats on the edge of the wetlands which developed and were used by migrating shorebirds during late summer.

RESULTS

From 1996 thru 2001 (Tables 1-3), 49 mist-net sessions at the Whitmire MSU banded 3745 shorebirds from 24 species (76 per trip), and 1593 shorebirds from 18 species were banded during 15 sessions at the Guadalupe River NW (106 per trip). Recaptures at least 1 year following original banding were made of 55 individuals from 7 species at Whitmire MSU and 2 individuals of 2 species from the Guadalupe River NW. Two birds were also recaptured using both study sites during different seasons.

Least Sandpiper, Semipalmated Sandpiper, Western Sandpiper, Dunlin, and Stilt Sandpiper were the most abundant species captured at the MSU. Percent recaptures of these species were 2.6, 0.8, 0.5, 3.3, and 0.8, respectively, during years following banding. Least Sandpiper and Dunlin had higher recapture rates for the site and were species that wintered there as well as migrated through the area. Western Sandpiper also wintered locally but individuals exhibited relatively low site fidelity as compared to the other species. Semipalmated and Stilt Sandpipers only migrated through the MSU.

Least Sandpiper, Semipalmated Sandpiper, Western Sandpiper, and Stilt Sandpiper were captured most frequently at the NW. Since the primary time for suitable habitat at this site was late summer species with later migration were only caught in small numbers. Only two shorebirds were recaptured at this site; one each from Least and Western Sandpipers.

A few of the birds netted were either originally banded or later were recaptured elsewhere. A Least Sandpiper banded in Nebraska in 1994 was recaptured at the MSU in 1999 and one banded at MSU in 1999 was recaptured at the NW in 2001. A Semipalmated Sandpiper banded in Ecuador in 1999 was recaptured at MSU in 2000. Western Sandpipers were involved with the most foreign recaptures. One banded in British Columbia in 1996 was recaptured at MSU in 1998. One banded at MSU in 1999 was recaptured in Alaska during 1999 and another one banded at MSU in 1999 was recaptured in Washington in 2001. One more banded at MSU in 2001 was recaptured at the NW in 2001.

DISCUSSION

Statistical analyses comparing the sites were not conducted because of the high variability between the study areas and the different timings of major shorebird concentrations. Furthermore, recapture rates (recapturing a live banded bird) and recovery rates (recovering a dead banded bird) while frequently used to determine mortality and site fidelity of populations, return rates for shorebirds are widely variable and can be difficult to interpret because each recapture is affected by true survival, site fidelity, site availability and ability to recapture the bird. (Sandercock 2003).

Nebel and Cooper (2008) reported low fidelity of Least Sandpipers to wintering and migratory staging areas. Page (1974) showed 26% of adults and 22% of juveniles returned the next year in California. Thomas (1987) recaptured 4 of 75 banded birds on the same 5-ha site 1 or 2 yr later in Venezuela. Martinez (1979) using a much larger sample in the Cheyenne Bottoms of Kansas recaptured 1.7% of 9,034 banded birds in later years. We recaptured 2.6% at the MSU and <1% at the NW study sites.

Smith and Stiles (1979) reported 3% band return rates for wintering Western Sandpiper and 1% for Semipalmated Sandpiper in Costa Rica. Pfister et al. (1998) on the other hand reported 25 to 49% band return rates for Semipalmated Sandpiper in Massachusetts at a high energy tidal zone. Gratto (1988) reported return rates of Semipalmated Sandpiper chicks (most banded 1–2 d after hatching) to their natal area vary from 4%–12%, averaging 7% (La Pérouse Bay, Man.). No further information is available on site fidelity of Semipalmated Sandpipers to wintering areas, but there is some evidence of high fidelity to tidal migratory staging areas (R. Morrison pers. comm., L. White unpubl. data). Our data showed <1% band return rates for these two species at both study sites.

Very little data are also available for Dunlin. Warnock (1994) reported adults were shown to have high fidelity to Bolinas Lagoon; resighting probabilities as high as 97% in some years on the wintering grounds in California. I had 3.3% recapture rates of all ages at NW, but did not have color marked birds as in Warnock's study.

Klima and Jehl (1998) speculated there was some fidelity of Stilt Sandpipers to migration stopovers and winter range, but there were no data. I had <1% recapture rates with a sample of about 400 birds.

Data from this study was comparable to some of the previous studies and adds more information on the variability of site use by wintering and migrating shorebirds. There appears to be stronger site fidelity of shorebirds to the MSU likely resulting from the consistent availability of mudflats during winter and spring. The NW on the other hand appeared to have much lower site fidelity and I only recaptured 2 out of 1500 banded shorebirds. The lower rate of site fidelity at this site was predictable because of the high variability of flooding and drying which occurred naturally at the site.

The MSU as managed during the study reliably provided habitat for large numbers of shorebirds each spring. A combination of high winter waterfowl use which ate much of the vegetation providing abundant mudflats in combination of prolonged water drawdowns in the spring. The site was not very good for attracting shorebirds in late summer and early fall because of lack of mudflats. Retaining water for waterfowl brood habitat did provide some mudflats on the edges as the impoundments dried and a fair number of shorebirds used this setting. However, very few shorebirds used the MSU when they were reflooded in the fall primarily because of dense vegetation present.

The NW provided high use of shorebirds typically in late summer/early fall when the area received little summer rains. This large overflow basin dried over many weeks and provided 10s of thousands of shorebird use days annually when conditions were good. However, the occurrence of suitable conditions were sporadic and not dependable. Their good days did occur during periods when MSU were not suitable. Using my mist-netting trips as a rough scale of available habitat and large shorebird concentrations, suitable habitat was available >3 X at the MSU than the NW.

Availability of both of these habitat types are very important for conservation of migrating shorebirds near the Texas Coast because of the seasons at which they occur.

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Table 1. Banding dates at Guadalupe River Overflow Basin in Victoria County, TX.

	FEB	MAR	APR	MAY	JUL	AUG
1996	0	0	0	0	2	2
1998	0	0	0	1	0	0
1999	0	0	0	0	0	3
2000	0	0	0	0	1	2
2001	0	0	0	0	0	4
TOTAL	0	0	0	1	3	11

Table 2. Banding dates at Moist Soil Units of the Whitmire Unit of Aransas National Widllife Refuge, Calhoun County, TX.

	FEB	MAR	APR	MAY	JUL	AUG
1996	0	1	0	1	0	0
1997	0	0	0	0	5	0
1998	0	2	1	0	1	0
1999	2	5	5	5	0	0
2000	0	3	7	1	1	2
2001	0	2	5	0	0	0
TOTAL	2	13	18	7	7	2

Table 3. Total banded and recaptured shorebirds at Moist Soil Units in Calhoun County and a River Overflow Basin in Victoria County, TX, from 1996 thru 2001.

	Moist Soil Units		Natural Wetlands	
	TOTAL BANDED	RECAPTURES	TOTAL BANDED	RECAPTURES
American Golden Plover *Pluvialis dominica*	1	0	0	0
Wilson's Plover *Charadrius wilsonia*	4	0	0	0
Semipalmated Plover *Charadrius semipalmatus*	27	0	9	0
Killdeer *Charadrius vociferus*	35	1	3	0
Black-necked Stilt *Himantopus mexicanus*	36	0	1	0
American Avocet *Recurvirostra americanus*	1	0	0	0
Greater Yellowlegs *Tringa melanoleuca*	2	0	3	0
Lesser Yellowlegs	109	0	53	0

Tringa flavipes Solitary Sandpiper				
Tringa solitaria Willet	5	0	14	0
Catoptrophorus semipalmatus Spotted Sandpiper	2	0	0	0
Actitis macularia Semipalmated Sandpiper	17	0	64	0
Western Sandpiper	907	7	274	0
Least Sandpiper	601	3	204	1
White-rumped Sandpiper	932	24	689	1
Calidris fuscicollis Baird's Sandpiper	26	0	52	0
Calidris bairdii Pectoral Sandpiper	1	0	1	0
Calidris melanotos Dunlin	47	0	62	0
Stilt Sandpiper	510	17	0	0
Buff-breasted Sandpiper	254	2	139	0
Tryngites subruficollis Short-billed Dowitcher	2	0	1	0
Limnodromus griseus	5	0	1	0

Long-billed Dowitcher *Limnodromus scolopaceus*	199	1	14	0
Wilson's Snipe *Gallinago delicata*	9	0	0	0
Wilson's Phalarope *Phalaropus tricolor*	13	0	9	0
TOTAL	3745	55	1593	2

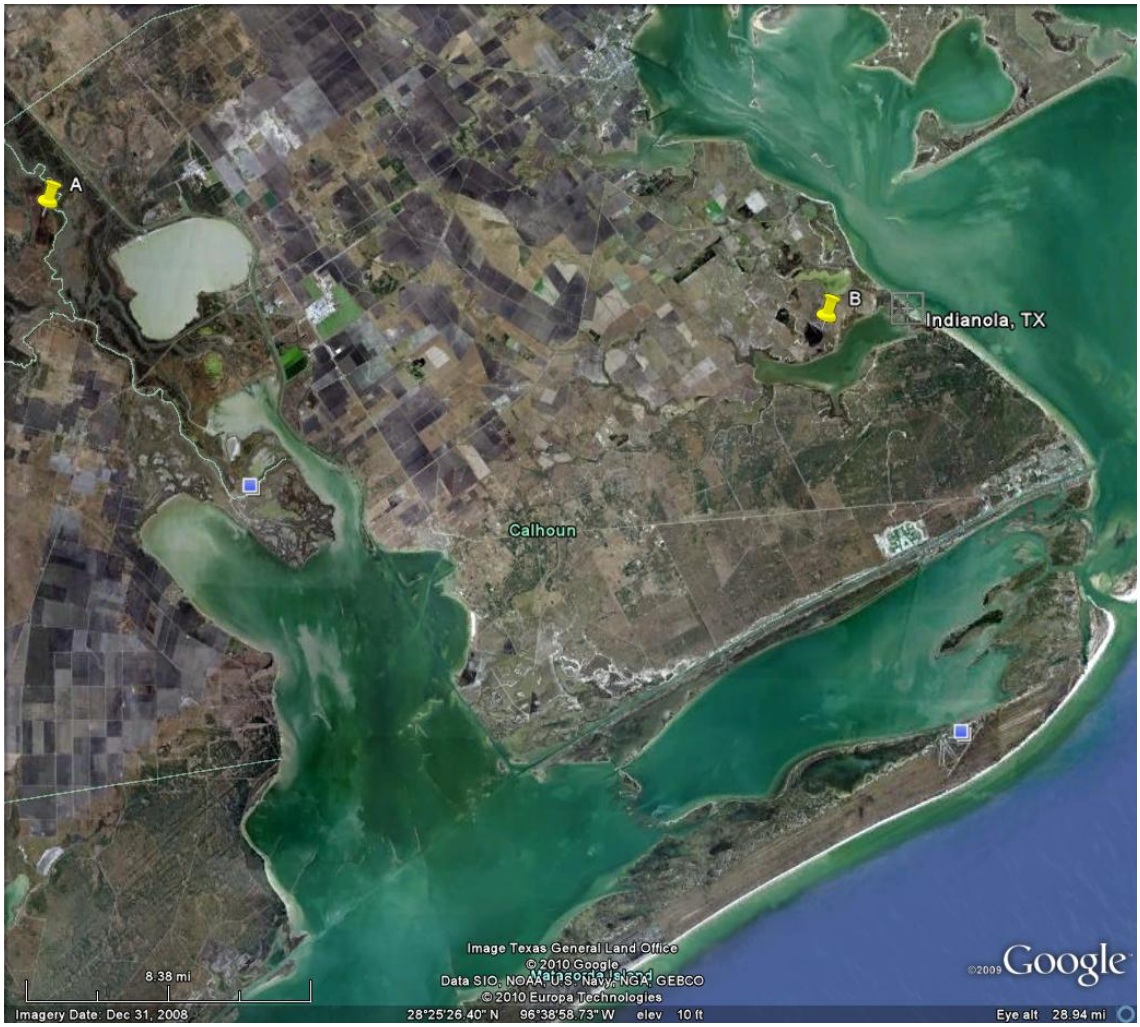

Fig. 1. Riverine Overflow Basin (A) and Managed Moist Soil Units (B) in Victoria and Calhoun Counties, Texas.