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Frontispiece. Neotropic Cormorant (*Phalacrocorax brasilianus*). Art compliments of Lynn Delvin.

BULLETIN OF THE

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NESTING ECOLOGY AND HATCHLING ONTOGENY OF NEOTROPIC CORMORANTS (*PHALACROCORAX BRASILIANUS*)

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ABSTRACT.—The nests of seven mated pairs of Neotropic Cormorants were observed continuously for 4 hours each day from 9 May 2002 to 17 July 2002, inclusively, at a rookery in High Island, TX. Objectives were to determine parental behavior prior to and during hatching; brooding behavior; parental behavior when adding material to an actively brooded nest; number and duration of feeding sessions and how the age of chicks affects feeding sessions; behavior of chicks during feeding and how hatch order and age affects feeding behavior; interaction among chicks in the parents' absence; and details regarding the development of plumage, pigmentation, and morphology of the chicks from hatching to fledging. Neotropic Cormorants exhibited biparental care of nest, eggs, and chicks. Incubating adults became agitated a few hours prior to the hatching of each egg. Eggs hatched 1-2 days apart, and adults removed eggshells after hatching. Brooding was continuous for several days after hatching. Nest repair occurred frequently during the first 2 weeks after hatching, then ceased. The number of feeding sessions per 4-hour observation period ranged from 0 to 4. The total number of feeding sessions logged during the study was 243, and the maximum number of feeding attempts per observation period for any nest was 22. There was a general trend for feeding sessions to increase in frequency after sunrise until the peak in feeding activity at 3-4 hours after sunrise. The number of feeding attempts during a feeding session ranged from 1 to 13, with a mean of 2.2. The highest number of feeding sessions per day occurred 1 or 2 days after hatching, with the daily frequency of feeding sessions decreasing steadily until fledging. The total number of feeding attempts and mean number of feeding attempts per feeding session also declined as the chicks aged. The latest observed feeding occurred 60 days post-hatch. Most chicks had fledged by 47 days after hatching. The mean number of chicks fledged per nest was 2.7. No chick or adult mortality was observed among the seven nests.

The Neotropic Cormorant, *Phalacrocorax brasilianus* (Gmelin, 1789), has one of the most extensive geographic distributions of the genus, ranging from Tierra del Fuego to Northeast Texas, with the densest breeding range near lakes, reservoirs, and bays along the Gulf Coast of Texas and Louisiana (Telfair and Morrison 2005). Recent records suggest the species' range is expanding in North America with new reports of nesting in Mississippi and Oklahoma (Hanson et al. 2010). Reported habitats are more varied than most members of the family, and include areas near coastal waters, marshes, lakes, and mountain streams, and altitudes from sea level to higher than 4,000 m (Telfair and Morrison 2005).

Adult Neotropic Cormorants are black with a slight olive gloss on the back and wings. The dull yellow throat pouch is relatively small for the

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cormorant family, and develops a white border in the breeding plumage. Irises are emerald green in adults. There is no sexual dimorphism (Morrison 1977; Palmer 1962; Tveten 1993).

Breeding is restricted to coasts, lakes, and reservoirs (Telfair and Morrison 2005). There is an extended breeding season in Texas, with eggs laid from early February to mid-October and peaking in April (Morrison 1977; Morrison et al. 1979; Palmer 1962). These cormorants prefer to nest in small trees, and often share communal rookeries with Roseate Spoonbills [*Platalea ajaja* (Linnaeus, 1758)] and various species of herons, egrets, and ibises. When an intruder disturbs the rookery, the presence of spoonbills in the rookery causes the Neotropic Cormorants to return to the nest more quickly (Morrison et al. 1978; Telfair and Morrison 1995), suggesting that the spoonbills may threaten nest security for the cormorants.

Reported clutch sizes range from one to eight eggs (but clutches exceeding five may be a result of dumping), with mean clutch size usually around three eggs (Telfair and Morrison 2005). Eggs are laid at 2-day intervals with incubation beginning after the second egg is laid; thus, eggs hatch asynchronously, leading to variation in sizes of nest mates. According to previous research, the smallest hatchling usually dies within a few days of hatching as a result of crushing, selective starvation, or eviction from the nest (Morrison et al. 1979).

Adults leave the rookery to forage during the first half hour after dawn and usually satisfy their own caloric needs before returning to the nest to feed hatchlings (Morrison et al. 1979; van Dobben 1952). We could find no reports of the cormorants having been observed feeding at night.

Although one of the most widely distributed of the cormorants, many aspects of the Neotropic Cormorant life history are poorly known, and Morrison's 1977 study was the first to document breeding biology of the species (Telfair and Morrison 1995). Several other studies of Neotropic Cormorant biology have been conducted (e. g. Kalmbach and Becker 2005; Quintana et al. 2002), but we can find no reports of studies based on continuous periods of detailed observations of nests day after day from hatching until fledging. Consequently, detailed understanding of the breeding biology of Neotropic Cormorants has remained sparse and fragmentary until our report. Only fragmentary summary reports of brooding or feeding issues occur in the literature, and we could find no reports on parental behavior prior to and during hatching, nor regarding the timing and sequence of the development of chick behavior and morphology on a fine time scale. For instance, we could find no published information on the developmental sequence of bill morphology, or the developmental sequence of pigmentation in the iris, gular pouch, legs, or feet of hatchlings. Few details have been reported about the developmental sequence of the juvenal plumage. Although some information regarding the stages in development of muscular control in chicks is available for other species of cormorants, we could find none for Neotropic Cormorant chicks.

More information is available for other cormorant species. Other cormorants do not exhibit parental assistance during hatching, and eggshells are tossed over the side of the nest (Telfair and Morrison 1995). Dunn (1975) observed that fewer feeding attempts occurred as the chicks of Double-crested Cormorants [*Phalacrocorax auritus* (Lesson, 1831)] grew older, and were able to accept whole fish offered by the parents. She also observed the behavior of Double-crested Cormorant chicks during feeding. Younger chicks stimulated food offers by peeping and head waving. Older chicks had a hoarser voice and stood and waved their bill back and forth (Dunn 1975).

Our study builds on and extends the research reported by Morrison in 1977. Our research objectives were based on his recommendations for further research, as well as priorities for future research suggested in Telfair and Morrison (2005). We had as our research goals for this study to provide new, or more detailed information regarding: 1) parental behavior prior to and during hatching; 2) parental behavior when adding material to an active nest; 3) incubation and brooding behavior; 4) number and duration of feeding sessions and how the age of chicks affects these numbers; 5) interaction among chicks in the absence of parent(s); 6) behavior of chicks during feeding and how hatch order and age affect this behavior, and 7) the developmental sequence of pigmentation, morphology, and plumage of Neotropic Cormorant chicks on a fine time scale.

METHODS

Study Site

The study site was a mixed-species rookery on Heron Island in Clay Bottom Pond at Smith Oaks

Sanctuary, High Island, TX (Google Earth Pro coordinates: 29° 34' 28.32" N; 94° 23' 23.59" W). The town of High Island is situated atop a salt dome, which elevates the surface into a mound about 4 km in diameter. The mound rises 9 m above the surrounding coastal plain, and can be seen from the Gulf of Mexico for many miles in any direction. Clay Bottom Pond is about 2.5 km NNW of the nearest open water of the Gulf of Mexico, and about 10 km ENE of the East Bay arm of Galveston Bay.

The area of High Island is very popular with recreational birders, especially during spring migration, and at least one group came to observe and photograph the rookery each day of our study. The birds of the rookery were habituated to the frequent presence of observers, and showed no detectable reaction to humans.

The rookery was also used for nesting by Boat-tailed Grackles [*Quiscalus major* (Vieillot, 1819)], Snowy Egrets [*Egretta thula* (Molina, 1782)], Cattle Egrets [*Bulbulcus ibis* (Linnaeus, 1758)], Great Egrets [*Ardea alba* (Linnaeus, 1758)], Little Blue Herons [*Egretta caerulea* (Linnaeus, 1758)], Tricolor Herons [*Egretta tricolor* (Müller, 1776)], Black-crowned Night-Herons [*Nycticorax nycticorax* (Linnaeus, 1758)], Roseate Spoonbills, and White-faced Ibises [*Plegadis chihi* (Vieillot, 1817)]. Although the ranges of Neotropic Cormorants and Double-crested Cormorants overlap, no Double-crested Cormorant nests were observed in the Heron Island rookery. Heron Island is surrounded by Clay Bottom Pond, which supports American alligators (*Alligator mississippiensis*). While the alligators eat any chick that falls into the water, they also inadvertently protect the rookery from land-based predators such as raccoons [*Procyon lotor* (Linnaeus, 1758)]. Indeed, all colonies of Double-crested Cormorants found by Vermeer (1969) were located on islands. Nest structure and location, as well as behavior of adult birds, determine the risks of predation; and predation is the primary cause of nest failure in general (Koskimies 1948). The only avian predators nesting in the rookery at High Island were Boat-tailed Grackles and Black-crowned Night-Herons. The latter were occasionally observed taking a chick from other species in the colony, but not from cormorant nests.

Observations were conducted from a bench about 30 m east of Heron Island situated on a berm slightly higher than Heron Island. Seven study nests (Nests N_1 – N_7) were selected because they could all be easily and simultaneously observed from the same observation point. Study nests were observed from the same viewing location throughout the study. Behaviors, which often happened in rapid sequence on two or more nests simultaneously during busy periods at the rookery, were studied using a pair of 8x, 42 mm binoculars (Bausch and Lomb, Rochester, NY). During quieter periods, fine details of morphology and pigmentation were studied using a 10x-40x, 50 mm telescope (American Optical, Southbridge, MA) mounted on a tripod.

Observation periods were conducted every day for 70 days from 9 May 2002 to 17 July 2002, inclusively, and all seven nests were observed continuously during each 4-hour observation period. The hours of observation were staggered to include approximately equal observation time during morning, mid-day, and evening. This was accomplished by starting the first observation period on 9 May, 2002 at 0600 and ending it at 1000, and then starting the observation period on each subsequent day 1 hour later until an observation period began at 1600 and ended at 2000. The cycle was then reset and observation periods began at 0600 again.

Data were collected on the number of adults and chicks present and the duration of all documented behaviors. Parental behaviors documented included incubation sessions (the time one adult began incubating until the time it left the nest or was relieved by its partner), brooding sessions, feeding sessions (from when an adult returned to the nest with intent to offer food through when the adult was no longer offering food), and nest repair. Any adult observed incubating, brooding, or feeding at a nest was considered to be a parent of that nest. Chick behaviors documented including feeding attempts (each attempt by any chick during a feeding session to elicit food from an adult), begging behavior, and aggression among the chicks. Also recorded were changes in the chicks' behavior and appearance with age. All descriptions of development were based on the most advanced chick in each nest and were based only on nests for which the exact age since hatching was known (Nests N_2, N_3, & N_5, all with three chicks each). High winds, or the movements of parents and chicks, occasionally made it impossible to determine the exact number of feeding attempts, or whether feeding had

occurred. Therefore, feeding sessions and attempts were included in the summary statistics only when viewing conditions allowed the number of feeding attempts to be exactly determined. Chicks were recorded as having fledged upon their first successful flight away from Heron Island. An additional 3 hours was spent observing the early stages of nest construction the subsequent spring on 12 March 2003.

The seven study nests varied substantially regarding the date when incubation was initiated. The clutches in Nests N_2, N_3, and N_5 were in incubation at the start of the study on 9 May 2002. First hatches in Nests N_3 and N_5 occurred on the second day of the study, and nest N_2 hatched 5 days after the study started. Nest N_6 was not located until a few days after eggs had hatched. The other three nests contained chicks about 2 weeks old at the start of the study.

As altricial chicks age they exhibit behaviors requiring an escalating amount of muscular development and control. Although some information is available for other cormorant species in this regard, we could find no literature regarding the details of development in the Neotropic Cormorant, so we kept careful notes on timing and sequence of discernable developmental stages. All descriptions of development were based on the most advanced chick in each nest and were based only on nests for which the age since hatching was known. Nest N_4 was unusual, because an adult or former fledgling sometimes sat among the chicks and was occasionally fed, and so nest N_4 was excluded from analysis of feeding behaviors.

RESULTS

Nest Structure and Placement

Neotropic Cormorant nests in the Heron Island rookery were placed in Chinese tallow [*Triadica sebifera*, (L.) Small] and yaupon (*Ilex vomitoria* Aiton) trees. Nests were mostly in the upper one-third of trees and supported by the forks of tree limbs. Nests were often placed near other cormorant nests of a similar chronology, but never touching another nest.

Nests were constructed of large twigs. All materials used for nest repair were carried in the beak; presumably (though not observed) materials for initial construction of the nests were also carried in this manner. The nest design, a simple platform with raised rims, seemed adequate to prevent eggs and young chicks from falling from the nest. The nests observed under construction in the early spring of 2003 were all lined with pine needles. It was impossible to view inside the nests observed in 2002 to see if this was also the case then, as they were all completed prior to the beginning of the study.

Behavior at Nest

Hatching—The incubating adult became agitated a few hours prior to the hatching of each egg, presumably because of vocalizations from within the egg alerting the adult to the imminence of hatching. Adult behaviors observed during this time included preening, moving around on the nest, pecking at the nest bottom, turning around, looking under itself, and frequent flapping of wings. Near the time of hatching, both parents sometimes stood on the edge and peered into the nest, and often put their heads into the nest. As with other cormorant species (Telfair and Morrison 1995), there was no apparent parental assistance during hatching, and spent eggshells were tossed over the side of the nest by the adults.

Nest Repair—Nest repair occurred frequently in the first 2½ weeks after hatching, then ceased about 6 to 8 days before chicks began to spend much of their time on branches near the nest. Nest repair probably reduced the risk of chicks falling from the nest, and became unnecessary when chicks became mobile and could perch on nearby branches. The observed instances of nest repair (n = 24) occurred either when the non-brooding mate brought twigs to the brooding parent, or at apparently random times when the brooding parent rearranged the placement of twigs in the nest. At no time was a brooding parent observed leaving the nest to find materials for nest repair. When an especially large stick was brought to the nest, both parents attempted to work the stick into the nest at the same time. No obvious greeting ceremony specific to the bringing of nest repair material was observed. Adults were occasionally observed adding green vegetation to their nests, but we were unable to confidently determine the species of vegetation brought to the nest.

The frequency of nest repair varied greatly among nests, with 13 of the observed nest repairs occurring at Nest N_2, 5 at Nest N_5, 4 at Nest N_4, 2 at Nest N_3, and none at Nests N_1, N_6 and N_7. All observed nests had disintegrated by about the time chicks began to fledge, probably from other birds in

the rookery robbing twigs for their own nest from the now vacant nests of their neighbors.

Brooding—A lack of sexual dimorphism in adults of the species made it impossible for us to confidently determine allocation of brooding time by sex of the parent. However, as could be observed by duty sharing, each parent spent some time incubating eggs prior to hatching, and both parents alternated brooding the young chicks. The shortest observed brooding session lasted 19 minutes, and thirteen of the brooding sessions lasted longer than 4 hours, having started at the beginning of an observation period and continuing through the end of the observation period.

Many species, including Brown Pelicans [*Pelicanus occidentalis* (Linnaeus, 1766), terns, herons, and cranes exhibit some form of nest-relief rituals (Van Tets 1965; Welty and Baptista 1988 p340). The Neotropic Cormorants in our study exhibited pair-bond displays, including rituals during relief of incubating or brooding duties similar to what was described by Van Tets (1965). During typical incubation and brooding switches, the incoming adult perched next to the nest. Both birds then stretched their necks towards each other and waved their heads; often bumping their bills together, before switching places. The departing parent then left the nest, and the incoming parent, now perched on the edge of the nest, scooted forward into the nest.

Of 31 observed brooding-relief changes, most took less than a minute from the arrival of the returning parent to the departure of the relieved parent (Fig. 1). In two-parent sessions lasting more than a minute, the additional time was spent by the outgoing adult perched on a branch near the nest for periods ranging from a few minutes to about an hour.

Although we do not know what happened outside the 4-hour observation period each day, based on our records, brooding ceased when chicks were between 4 and 10 days old. We observed Nest N_6 being brooded continuously through the 4-hour observation period for 4 consecutive days; Nest N_3 continuously for 4 consecutive days with a final brooding session on Day 10; Nest N_2 continuously for 10 consecutive days (longest of the seven nests); and Nest N_5 continuously for 4 consecutive days until Day 6, with a final brooding session on Day 16. The mean duration of observed continuous brooding was 6 consecutive days.

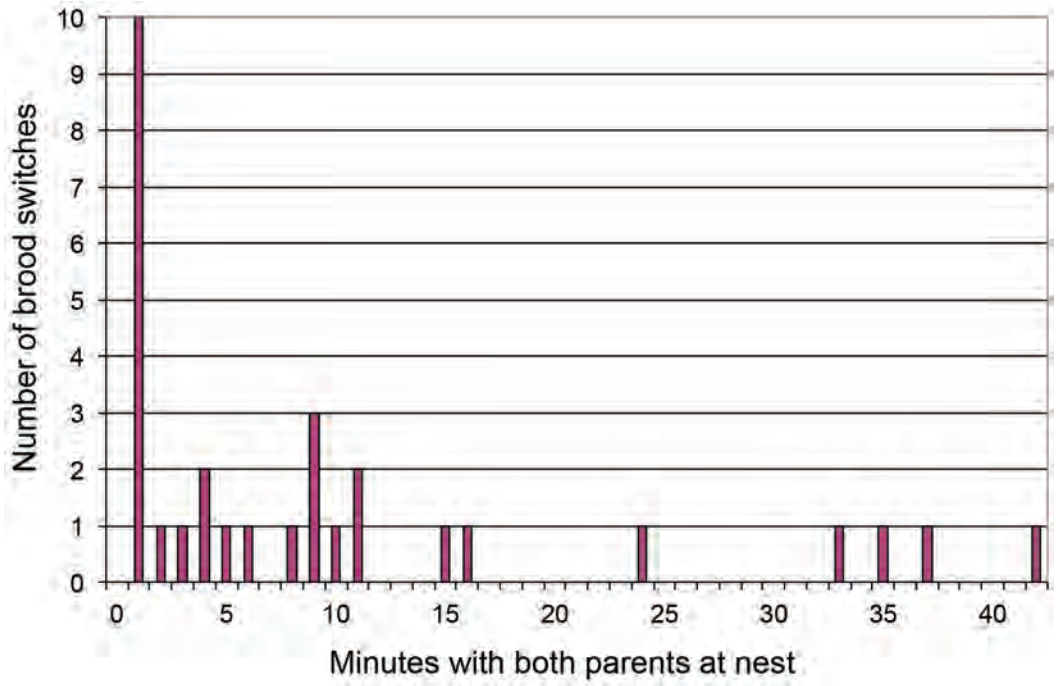

Figure 1. Amount of time during which both Neotropic Cormorant (*Phalacrocorax brasilianus*) parents were present at a study nest during brooding switches at High Island, TX, 2002.

Nests were tended by at least one parent staying near the nest or perched on the rim of the nest for several days after the final brooding session, apparently to discourage avian predators in the rookery from accessing the chicks. Nest attendance lasted for a mean of 12 days after hatching, with parents taking turns in this nest guarding.

During the parents' absence, chicks mostly slept or remained still in the nest, as was reported for young White-breasted Cormorants (du Plessis 1957). Occasionally, younger chicks pecked at each other briefly. Two instances (Nests N_1 and N_3) were observed where one chick appeared to be attempting to swallow a sibling's head.

Play-like Behaviors—Chicks were occasionally seen pulling on twigs in the nest or on nearby branches, and sometimes tossed Chinese tallow leaves into the air and caught them. Play-like behavior was observed in three nests, and was exhibited by chicks as young as 18 days and as old as 49 days (Table 1).

Thermoregulation—Although other species using the rookery shaded their eggs or chicks during the hottest part of the day, and Telfair and Morrison (1995) observed shading of Neotropic Cormorant chicks by the parents, we rarely observed cormorants shading their nests. During hot periods of the day, chicks often exhibited gular fluttering (rapid vibration of the hyoid apparatus in the throat) in an apparent attempt to thermoregulate by increasing evaporative cooling.

Nest N_2 was the only nest in which watering behavior was observed. Watering behavior began when brooding had ceased and the chicks were

Table 1. Incidences of behaviors suggestive of play in Neotropic Cormorant (*Phalacrocorax brasilianus*) chicks at High Island, TX, 2002.

Date (2002	Nest #	Age in days	Days till fledging	Activity
27 May	N_3	18	28	Chicks plucking at twig in nest
1 June	N_3	23	23	Chicks playing with stick in nest
3 June	N_3	25	21	Chicks tossing leaf
3 June	N_3	25	21	Chicks tossing leaf
6 June	N_1	?	6	Chicks tossing piece of Chinese tallow
10 June	N_1	?	2	Chicks pulling on twigs
28 June	N_5	49	7	One chick tugging on Chinese tallow leaves

Table 2. Sessions of chick watering by adult Neotropic Cormorant (*Phalacrocorax brasilianus*) in Nest N_2, with chronology and notes on incidental behaviors (High Island, TX, 2002).

Date (2002)	Time of day	Age in days	Days till fledging	# of Adults	Notes
25 May	1231	10	44	2	Non-brooding parent returned; spit water on nest and chicks.
6 June	1434–1438	22	32	2	Both parents, one watered
7 June	1327–1330	23	31	1	Parent w/ beak in chick's mouth three times for 12 seconds
8 June	12471249	24	30	1	Parent placed its beak in the chick's mouth, and also dripped water all over nest
10 June	0856–0858	26	28	1	Parent placed its beak in the chick's mouth, and also dripped water all over nest
10 June	0900–0902	26	28	1	Parent back and spitting water on nest, nest very wet
14 June	1207–1207	30	24	1	Water spitting, chicks returned to the nest

about 10 days old and continued until they were 30 days old. The parents of Nest N_2 brought water to the nest on eight occasions from 25 May to 14 June. In the last observation of watering, the chicks returned to the nest from nearby branches to receive the water (Table 2).

Most observed episodes of watering occurred during the hottest part of the day from 1200 until around 1430, when many cormorant chicks in the colony were engaging in gular fluttering, although one episode was observed at 0900. Watering sometimes occurred in response to begging by the chicks, and may have helped to replace water lost to evaporative cooling during gular fluttering. Although adults sometimes simply spit a stream of water onto the nest and chicks, at other times water was directly transferred into the chick's mouth. During episodes of direct transfer, the adult gently placed its beak inside the chick's open beak and dripped water into its mouth. This differs from the behavior of feeding attempts, during which the adult opened its gape and the chick often had its entire head down the adult's throat.

Feeding of Chicks—Adults began leaving the rookery in groups or singly within the first hour after sunrise, and began returning to the rookery for the night within 1 hour before sunset. Despite the presence of fish in the fresh waters of Clay Bottom Pond that surrounds Heron Island on which the rookery was located, no adults were observed foraging in the pond.

Adults returned to their nests to feed chicks at varying times throughout the day. Adults often fed chicks almost immediately after returning to the nest to take a turn at brooding or guarding the nest. Of the 31 observed changes of this kind, 21 were followed by a feeding from the returning adult within 10 minutes of its arrival at the nest.

The first feedings of the day sometimes occurred as early as 1 hour after sunrise. The frequency of nest-duty switches (including feeding sessions) tended to increase dramatically after sunrise until a peak at 3 hours after sunrise, and then declined more or less steadily until about 14 hours after sunrise, at which time adults began returning to the rookery for the evening (Fig. 2).

Feeding of chicks on the day of hatching involved dripping a regurgitated liquid from the parent's beak into a chick's open gape. By the second day, chicks inserted their heads into the parent's open gape to feed. Very young chicks stimulated the parent to offer food by uncoordinated head waving. Older chicks begged by standing and swaying their heads and bodies to and fro and extending the pharyngeal pouch. They also pecked at the adult's gular pouch and sometimes they flapped their wings. Older chicks often shoved their heads far into a parent's throat to feed.

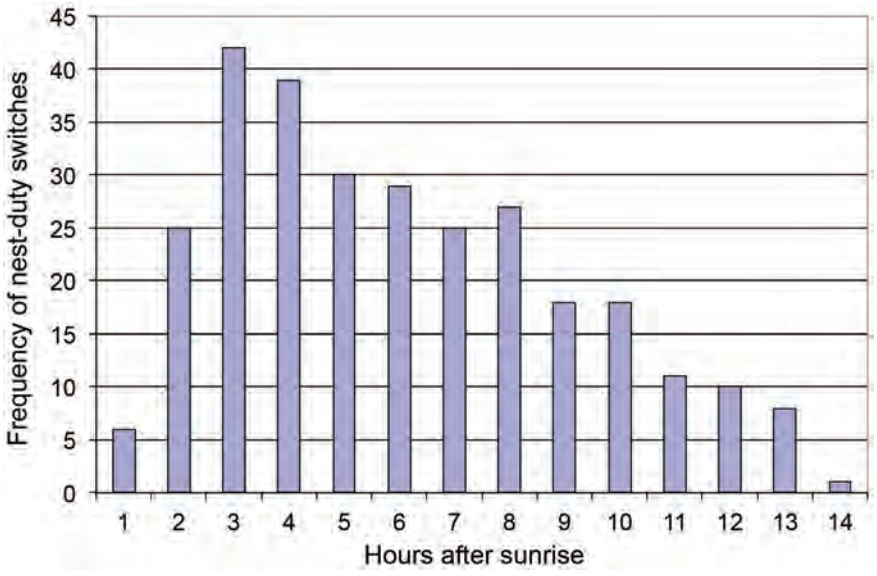

Figure 2. Change in frequency of nest-duty switches by adult Neotropic Cormorants (*Phalacrocorax brasilianus*) by hours after sunrise at High Island, TX, 2002.

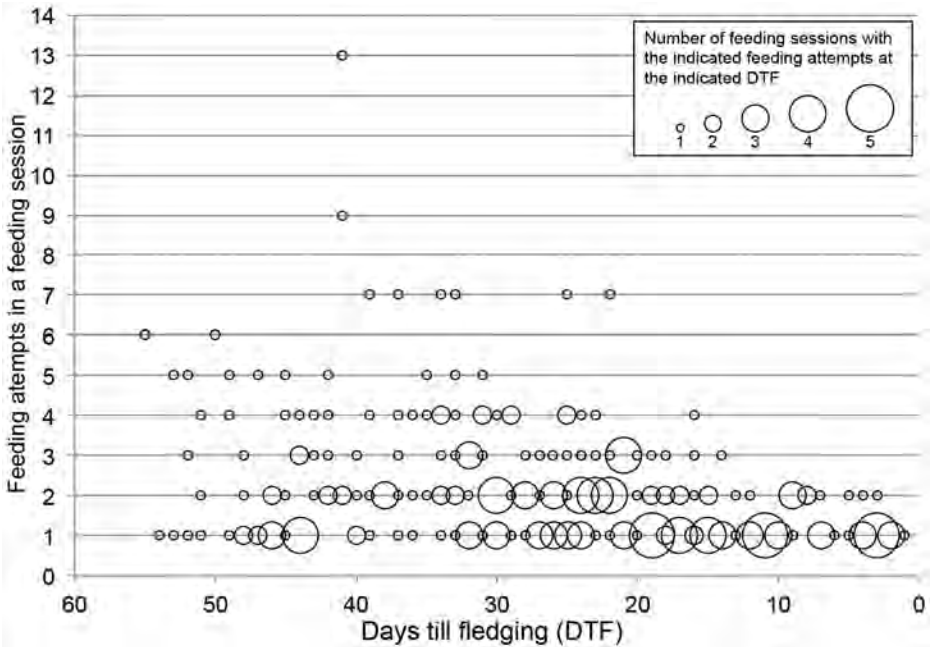

Figure 3. Distribution of 542 feeding attempts among 243 feeding sessions as time of fledging approached; seven Neotropic Cormorant (*Phalacrocorax brasilianus*) nests at High Island, TX, 2002.

The number of feeding sessions per nest (prior to fledging) during a 4-hour observation period ranged from 0 to 4. During each feeding session, the adults fed chicks one or more times. A total of 542 feeding attempts were observed during 243 feeding sessions during which conditions permitted counting of feeding attempts. The number of feeding attempts during a feeding session ranged from 1 to 13 with a mean of 2.22 ($s_{\bar{X}} = 0.1$). Fig. 3 is a bubble chart displaying changes in the distribution of feeding attempts among feeding sessions as time of fledging approached (DTF = Days Till Fledging). Fig. 4 displays the change in frequency of feeding sessions as time of fledging approaches. There was a significant quadratic coefficient in this relationship [$p(t_{\alpha(1),52} \leq -2.9) < 0.005$], indicating that the frequency of sessions started low after hatching, then increased slightly toward a peak at about 41 DTF, and then decreased to near zero just before 0 DTF (fledging). Fig. 5 displays the significant linear decline in the total number of feeding attempts (adjusted by number of nests under study at each DTF) as time of fledging approached, indicating that chicks were fed more frequently when young. When number of feeding attempts at each DTF was divided by number of feeding sessions at that DTF, a significant linear decline was also noted (Fig. 6). As chicks age, they can accept larger fish from their parents, which would provide more food per feeding attempt, thus emptying the parent's stores more quickly, resulting in fewer feeding attempts per feeding session.

Chicks often went several days without an observed feeding just prior to leaving the rookery for the first time. The parents may instinctively have been giving the chicks a hunger incentive to encourage them to follow their parents away from the familiarity of the rookery for the first time and learn how to forage. Once the chicks could fly, they often followed the adults after feedings.

It is common for the largest sibling to prevent younger siblings from receiving food (Ricklefs 1968). Although chicks were observed engaging in agonistic behavior on several occasions, sibling rivalry did not seem extreme. Most incidents of agonistic behavior among nest mates occurred during feedings, when the chicks competed for the adult's attention. Chicks fought by pecking at each other's heads and necks.

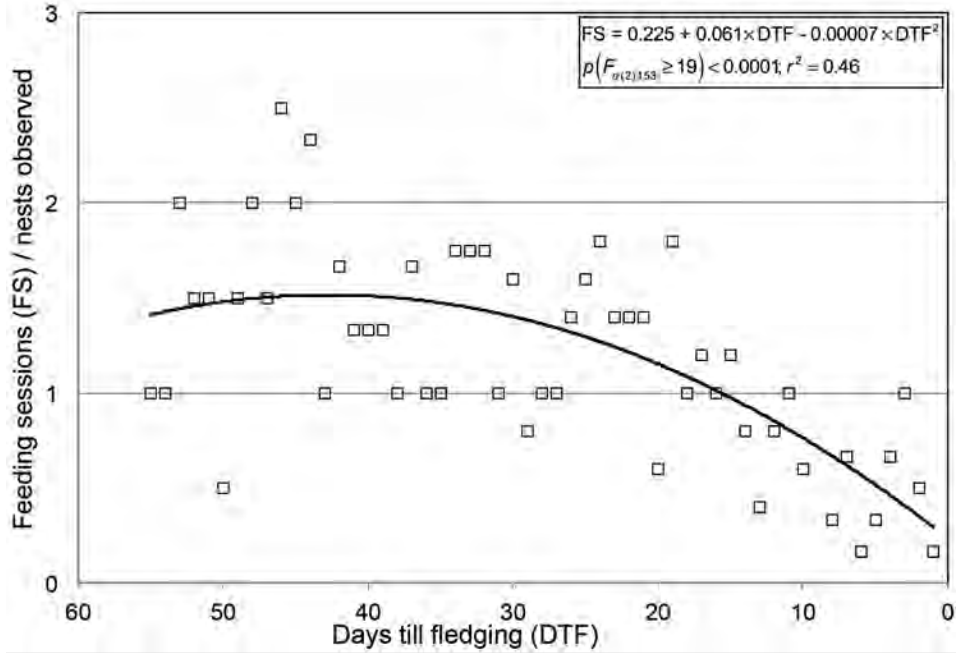

Figure 4. Total number of observed feeding sessions (FS) at various days till fledging (DTF), corrected by number of nests under study at each DTF; seven Neotropic Cormorant (*Phalacrocorax brasilianus*) nests at High Island, TX, 2002.

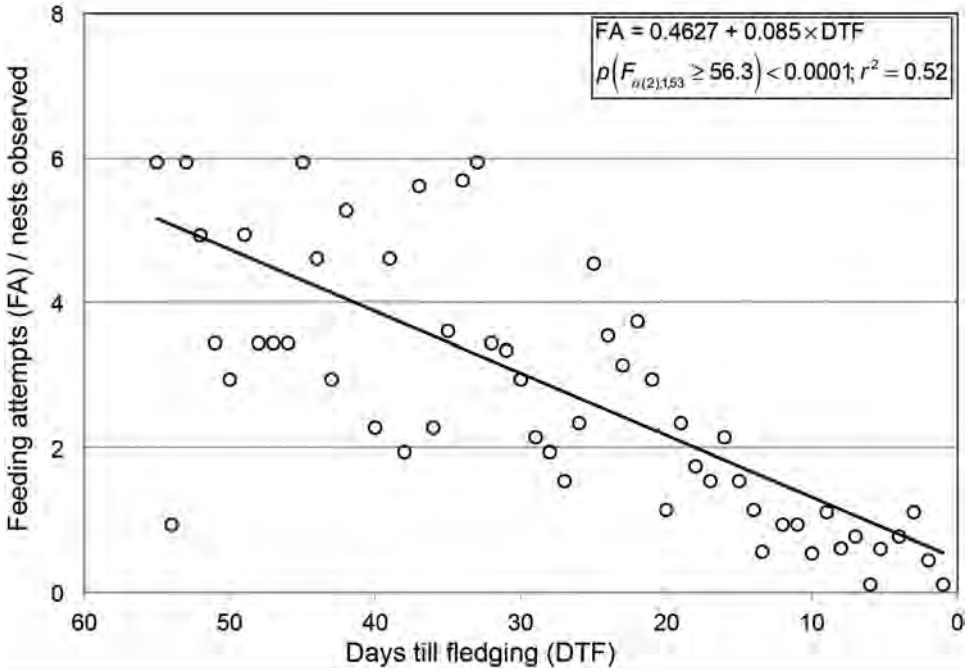

Figure 5. Total number of observed feeding attempts (FA) at various days till fledging (DTF), corrected by number of nests under study at each DTF; seven Neotropic Cormorant (*Phalacrocorax brasilianus*) nests at High Island, TX, 2002.

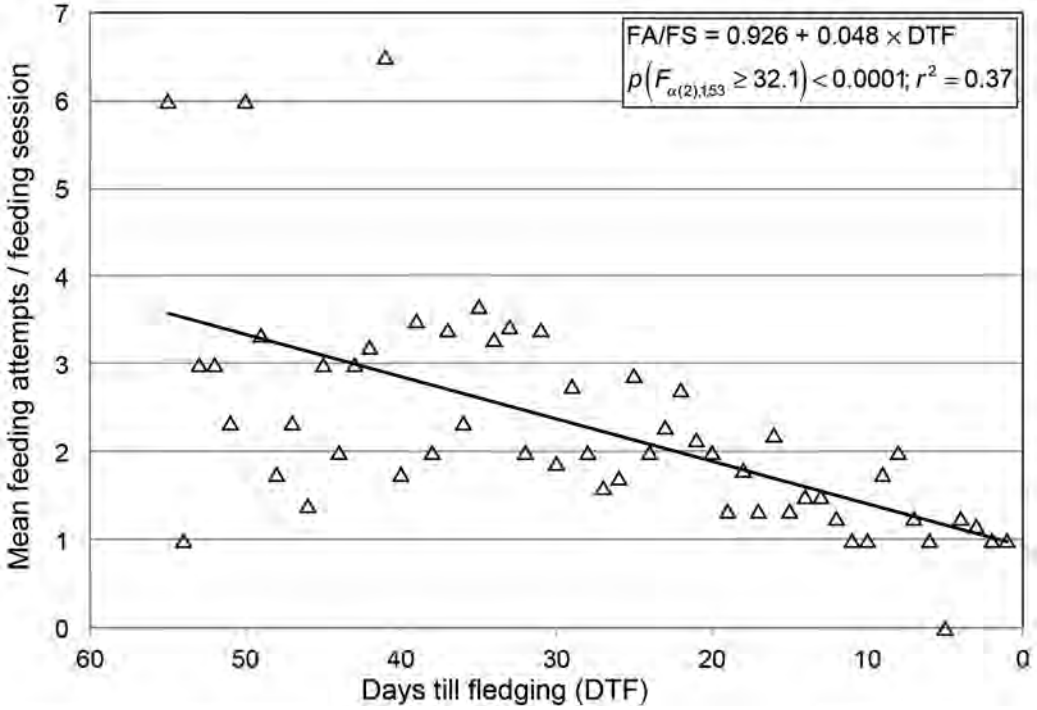

Figure 6. Mean number of feeding attempts per feeding session (FAS) at various days till fledging (DTF); seven Neotropic Cormorant (*Phalacrocorax brasilianus*) nests at High Island, TX, 2002.

Up until about three days after all the eggs of a clutch had hatched, older chicks approached the feeding parent more quickly and begged more energetically than their younger siblings; thus they received more feedings. However, shortly after that, and surprisingly, there was no noticeable difference in the sizes of the chicks.

After chicks could walk, they often crawled over each other to reach the feeding parent. Because of the adults' habit of landing some distance away from the nest before feeding, the first chick to leave the nest often reached the parent and begged from it before the parent reached the nest, and therefore was fed first. However, it appeared that once a chick had received a few feedings, it stopped begging as energetically, and the other chicks were able to obtain food. This could be an evolutionarily stable strategy that fledges larger broods during times of plenty, but also improves the odds that at least one chick from the brood would survive to fledge when food is scarce.

The last observed feeding of a chick by an adult in the rookery occurred at 60 days, at least 8 days after it had fledged.

Reproductive Success

Eggs within a clutch hatched 1-2 days apart, as reported by Morrison et al. (1977). Although the oldest chick in each nest was noticeably larger in size for a brief period after hatching, nest mates in our study soon became indistinguishable by size.

The mean number of chicks fledged per nest during the study was 2.71 ($s_{\bar{x}}$ = 0.184, range 2-3) (Table 3). No nest eviction was observed for the Neotropic Cormorants in our study, or for any other species in the rookery. There were no major storms in the study area until the Neotropic Cormorant chicks were already capable of short flights. No chick or adult mortality was observed.

Developmental Sequence and Timing (summary provided in Table 4)

Day 1—Chicks hatched naked, with grayish-pink skin. The first natal down was gray and became apparent during the first day after hatching. Chicks hatched with a triangular bill, which was yellow with a black smudge on the tip. The gular pouch was straw yellow with a pinkish tinge. The eyes

Table 3. Numbers of Neotropic Cormorant (*Phalacrocorax brasilianus*) chicks fledged from each nest observed in the High Island rookery, with notes on the number of chicks in each nest at beginning of study (High Island, TX, 2002).

Nest	# of Chicks Fledged	Notes
N_1	2	Found with 2 older chicks
N_2	3	Three chicks hatched
N_3	3	Three chicks hatched
N_4	2	Found with 2 older chicks
N_5	3	Three chicks hatched
N_6	3	Found with 3 very young chicks
N_7	3	Found with 3 older chicks

of chicks were closed at hatching, but opened the second day after hatching and had dark irises.

During the day of hatching, chicks were unable to orient to their parents, only waved their heads feebly, and could not raise their heads very far above their bodies. Similarly, newly hatched Shag (*Phalacrocorax aristotelis*) chicks are only capable of raising and waving their heads (Snow 1960). At this point, begging consisted solely of the chick waving its head back and forth. Chicks were fed a liquid dripped down from the parent's beak during the day they hatched.

Day 2—By the second day after hatching, wooly, dark-gray natal down covered the entire body except for the gular pouch and the capital pterylae. The natal down developed sooner than for Double-crested Cormorants, which develop a full covering of down after 2 weeks (Palmer 1962). The exposed skin of the capital pterylae remained bare and pinkish, gradually diminishing in size until it nearly disappeared around the eighth day after hatching, leaving a gray patch of bare skin on the forehead. The pharyngeal pouch was straw yellow as in other ages, but appeared pinkish in bright light. By the second or third day after hatching, head waving was more energetic, and chicks could orient on their parents, inflate the pharyngeal pouch, and insert their heads into the parent's mouth.

Day 3—Chicks pecked at each other occasionally and had developed a longer hooked bill, similar to the adult shape.

Day 5—The gular pouch was still bare and the culmen had become black. Chicks could stretch their necks to full length and hold their heads high above the nest for considerable lengths of time when begging.

Days 6—The chicks could move their wings and walk in the nest, although they appeared clumsy. The down on the head was gray; the down on the body was nearly black.

Day 7—The chicks perched on the side of the nest and moved around the nest more easily, even climbing over siblings.

Day 8—The bald crown was covered by down, leaving a gray area of bare skin above the beak. This skin remained bare until about the fortieth day after hatching, although the bare area shrank steadily. The upper mandible was entirely black, while the lower mandible was yellow.

Day 9—Chicks backed to the rim of the nest to defecate over the rim. The down was completely black, and the bare area on the forehead was still large and gray.

Days 10–11—The primaries began showing and stubby rectrices had appeared. Chicks began sitting on the rim, and spent considerable time on the rim of the nest from this point, returning to the interior of the nest only to sleep and feed. The chicks could flap their wings feebly, but could not hold them out straight.

Day 13—The remiges were longer and more visible. The lower mandible was yellow with a black tip; legs and feet were gray. By this time, the chicks had grown considerably, although they were still much smaller than adults.

Day 16—Bare patches began to appear on the chick's ventral apterium, although they were still mostly downy. The ventral apterium became

progressively more bare, and the skin on the belly was pink. The upper mandible was black; the lower was yellow with a black tip.

Day 17—Chicks could move their tails and hold their wings straight; a row of scapulars was barely showing. Chicks were about 2/3 adult size.

Day 18—The secondaries had developed further; rectrices were approximately 1/5 of the adult length.

Day 19—The bare area under the throat was white, and the feet were chalky gray. The ventral apterium was almost totally bare.

Day 20—Chicks began flapping their wings vigorously. The first of these exercises in Nests N_2 and N_7 occurred during a strong gust of wind, which seemed to cause other chicks in the rookery to do the same.

Day 21—The primaries and secondaries were well defined, with a row of coverts just starting to show.

Day 23— The bare area on the forehead was still large. Chicks began spending time on branches near the nest by day 23-33.

Day 27—The belly was partially covered by teleoptiles from ventral pterylae.

Day 28—Although the chick's spinal pterylae were still downy, their wings were fully feathered, the ventral pterylae were fully but sparsely feathered, and the tails were approximately 1/3 – 1/2 adult length. The chicks still appeared clumsy as they moved about on the branches. Their feet were light gray.

Day 31—The tail had nearly reached adult length, down on the spinal pterylae had been replaced by teleoptiles; chicks still had a gray bare area on the foreheads. Chicks began making practice flights around the rookery by day 31-33.

Day 32—Chicks had attained adult characteristics except for a small bare area on the forehead and gray feet and legs.

Day 33—The skin began peeling on the bare area on the forehead, beak, and feet. At the end of this period, the bare area on the foreheads had vanished and the feet were dark gray, although not as dark as those of adults. The iris remained dark brown or black through fledging, as in other cormorants (Telfair and Morrison 1995).

Day 42-43—Chicks began flying away from the nest, although still fed by the parents at the nest site. Similar ages at fledging have been reported for many other cormorant species.

Most chicks fledged around 47 days after hatching; however, chicks at Nest N_3 began fledging earlier at 42 days. Within a brood, there tended to be 1 to 2 days difference between the dates at which chicks began to fly from the rookery. This was probably due to the 1 to 2 days delay between hatching. However, some nests still had unfledged chicks for up to 6 days after the first chick had fledged.

Day 58—All study nests had either been reduced in size or destroyed.

DISCUSSION

The nesting height we observed (about 4 m) is typical, as the range of heights reported for tree nests of Neotropic Cormorants is 0.0 – 25 m above the surface (Kalmbach and Becker 2005; Palmer 1962). Morrison (1977) observed Neotropic Cormorants nesting in Chinese tallow, and Telfair and Morrison (2005) list no less than 12 species of trees reported to have been used by Neotropic Cormorants, but we are unaware of any previous reports of them nesting in yaupon. However, the use of yaupon in the Heron Island rookery may simply be the result of crowding in the rookery rather than preferential selection. The use of tree forks for nest foundation is typical, although in the absence of suitable tree forks, these resourceful birds have been known to nest on duck blinds, rocks, and even bare ground (Telfair and Morrison 2005).

Nests of Double-crested Cormorants have been reported to actually be in contact with each other (Vermeer 1969), but we saw no examples of this at the Heron Island rookery.

Behavior at Nest

Hatching—Asynchronous hatching may be an adaptation to breeding under uncertain feeding conditions. In asynchronously hatching species, the normal clutch size is likely to be larger than that which the adults can raise in an average year, with the extra eggs only resulting in fledglings when feeding conditions are exceptionally good (Lack 1954). Morrison (1977) reported that nests in his study that had more than two eggs produced two chicks of similar size, while in nests with three eggs, the third chicks were noticeably smaller. This difference in size is important, as the smallest chick in the brood often dies within a few days of hatching due to starvation or being crushed by nest mates (Morrison et al. 1977).

Amundsen and Stokland (1988) found that the

size difference in asynchronously hatched Shags decreased as the chicks aged, and concluded that their study had taken place during a year when feeding conditions were good. Differences in food availability during Morrison's (1977) study and ours likely account for the discrepancies in the size differences of nest-mates and chick mortality between the two studies.

Nest Repair—Many species of birds exhibit specific exchange-of-guard ceremonies as a part of nest-duty relief. In Herring Gulls (*Larus argentatus*) the relieving parent may bring nesting materials, especially when the partner is not willing to leave (Tinbergen 1952). In our study the relieving parent sometimes brought a twig or stick to offer the sitting parent, but there was no evidence that this was done out of failure to coax the sitting parent into yielding to the offer of relief. It seems doubtful that the relieving bird is bringing a stick for repair of a known nest defect, but more likely for a ritualized behavior, even though the token stick is often stuck into the nest during the change of guard.

Since males usually forage for nesting material and bring it to the nest site during nest construction for the female to insert into the nest (Telfair and Morrison 2005), it would be interesting to consider using this behavior as a possible means of sexing the parents at the time of nest-duty exchange. If it is consistently the male who brings sticks when relieving the female and rarely vice versa, this would be one way of comparing the duration of nest attendance between the male vs. the female parent for the times when sticks are brought in by the relieving male. In any study using continuous observations of a nest like in our study, once the sex of the sitting and relieving birds have been established by this behavior, the sex of both sitting and relieving parent could be established for all previous and all subsequent changes of guard for that observation period until the chain is broken by both parents leaving the nest and disappearing from the sight of the observer.

The use of green vegetation occasionally used for nest repair at the rookery is intriguing. Several proposed functions for adding greenery to an active nest have been proposed. These include concealment of eggs and nestlings (Collias and Collias 1984); protecting eggs and especially chicks from remaining in contact with feces, pellets, vomit, uneaten food, and other unwanted materials in the nest (Orians and Kuhlman 1956); advertisement that the nest has not been abandoned (Newton 1979); insulation of nest occupants from environmental extremes (Mertens 1977); and to repel and/or kill nest-parasitic arthropods by choosing plants with monoterpenes and isoprene (Wimberger 1984). However, these theories are mostly based on speculation, and the results of a rather thorough series of experiments performed by Rodgers et al. (1988) indicate that various greenery species most frequently used in stork nests did not repel dermestids (serious nest parasites of storks), and indeed, may even attract the beetles in the case of some greenery species frequently employed by the birds. In another part of the experimentation, they demonstrated statistically significant protection from environmental elements due to the greenery, and they conclude that this is probably the evolutionarily stable strategy for the adding greenery to actively brooded nests. In the case of Neotropic Cormorants, which are seldom seen wandering around on vegetated ground or foraging in green trees, there must be an evolutionary stable strategy that causes the parent to look specifically for greenery, and then work to detach it from the plant; this behavior warrants further investigation.

Play-like Behavior—Some Neotropic Cormorant chicks in our study engaged in play-like behaviors that may have functioned to prepare the chicks for adult duties like nest-building and pursuit of prey (Table 1). While the tugging at sticks may have been incidental responses to urges to exercise musculoskeletal coordination, the tossing of leaves into the air and then catching them almost surely has some function related to training for prey pursuit. Southern Cormorant nestlings have been reported to make catching movements and later to 'mock-hunt' objects found in the nest such as twigs and small stones. These behaviors were observed in Southern Cormorant chicks as young as 18 days old, and continued until less than a week before fledging (Madsen and Spärck 1950).

Thermoregulation—Gular fluttering observed for our Neotropic Cormorant chicks presumably increased the rate of evaporative heat loss from the lining of the mouth and throat. This form of temperature regulation may have been especially important to Neotropic Cormorant chicks because of the near absence of parental shading.

Our study is the first account of watering behavior (the transfer of water from the adult to the chick) for the Neotropic Cormorant. Watering has been reported for Double-crested Cormorants and

Southern Cormorants (*Phalacrocorax carbo sinensis*) (Kuiken 2001; Madsen and Spärck 1950), and similar behavior has been reported in White-breasted Cormorants (du Plessis 1957). Other workers have reported that watering is rather uncommon when it does occur, and that was our conclusion for the Neotropic Cormorant as well, since the adults of only one of the seven study nests (Nest N_2) were observed engaging in watering behavior.

Kuiken (2001) observed Double-crested Cormorants watering their chicks from 14 to 28 days of age, and in our study, chicks in Nest N_2 were watered from 10 days of age until brooding ceased at 30 days of age. It is not clear why watering began and ceased at these ages. It is also not clear why Nest N_2 was the only nest of the seven that was watered, since several of our nests were equally exposed to the sun as was Nest N_2.

Double-crested Cormorant chicks have been reported to beg for water by waving their heads with the bill open and tilted upwards, and this behavior differed from begging for food where the bill was closed (Kuiken 2001). Southern Cormorants spray water over the nest until the chicks open their mouths to receive the water directly while Double-crested Cormorants insert their heads into the chick's mouths in response to water begging (Kuiken 2001; Madsen and Spärck 1950). We observed Neotropic Cormorant chicks accepting water in a different way from that of food acceptance (adult drips water into open mouth of chick vs. chick reaching into mouth of adult to feed), but we did not note a difference in begging behaviors that led specifically to watering. It is perhaps important to note that watering in our study always occurred during the heat of the day when most chicks in the rookery were engaging in vigorous gular fluttering. Thus, vigorous gular fluttering may be the stimulus, rather than a begging behavior specific to a chick's thirst, that precipitated the watering behavior of the adults.

As can be seen in Table 2, the parents of Nest N_2 were accomplished waterers, and exhibited a surprising variety of behaviors associated with watering, from gently dripping water into an open beak to spraying down the entire nest until it was soaking wet.

Developmental Sequence and Timing

Our study contributed substantial new information on the growth stages of Neotropic Cormorants. Prior to our study there was virtually no information on the development of color and morphology of bill, iris, gular pouch, legs, and feet of Neotropic Cormorant chicks at differing ages (Telfair and Morrison 2005), and little was known about the details of the prejuvenal molt, which replaces natal down with juvenal plumage.

The mean fledging age of 47 days we observed for our study nests was much faster mean time than the 77 days reported by Morrison et al. (1977) for the Neotropic Cormorant, but similar to the report of approximately 40 days in a rookery of 10,000 pairs in Chile (Kalmbach and Becker 2005). Individuals within a species can exhibit markedly different growth rates as a result of variations in quality and quantity of food, temporal pattern of feeding, and temperature (Koskimies 1948). Indeed, even in our study in which conditions seemed uniformly optimal for the birds, there was a surprising amount of variation in timing of developmental stages, both within and between broods (Table 4). Morrison (1977) conducted his study near High Island and at a similar time of year, so seasonality and location cannot account for the observed differences in rate development between his study and ours. However, turbid water conditions during Morrison's study may have decreased the cormorant's foraging efficacy. The maturation rate of some species can be greatly influenced by the availability of food. For example, the maturation of Common Swifts (*Apus apus*) varies from 35 to 56 days based on feeding conditions the adults experience (Koskimies 1948). Therefore, the proposed difference in food availability between our study and Morrison's may have delayed the fledging of chicks from Morrison's (1977) study nests.

Neotropic Cormorants developed full juvenal plumage in as little as 42 days. This is faster than Double-crested Cormorants, which require 58 days (Palmer 1962). The observed faster development in our study may have been due in part to the Neotropic Cormorant's smaller size, but may also have been an acceleration of development caused by the near-ideal conditions at the Heron Island rookery during the spring of 2002.

Reproductive Success

Kalmbach and Becker (2005) reported a mean of 2.76 chicks fledged, while Kalmbach et al. (2001) reported means of 3.1 and 3.0 chicks fledged for Neotropic Cormorant nests at the same site in Chile for 1996 and 1997, respectively. All three of

Table 4. Ages (in days) at which documented developmental milestones occurred in Neotropic Cormorant (*Phalacrocorax brasilianus*) chicks at High Island, TX, 2002.

Developmental Milestone					
Behavioral Milestone				Morphological Milestone	
Notes	Age@Nest #			Notes	Age
	N_2	N_3	N_5		
Wobbly; cannot orient to parents; fed from liquid dripped from adult	1	1	1	Naked, pinkish gray skin; eyes sealed; bill triangular, yellow with black tip; gular pouch straw yellow	1
Insert head into adult's beak	2	2	2	Eyes open; iris dark brown; gray natal down apparent	2
Orient on parents; vigorous head waving; inflate pharyngeal pouch; pecked at sibs	3	3	2	Bill longer and hooked;	3
Stretched necks high to beg	5	5	5	Culmen black	5
Move wings; clumsy walking in nest	8	6	6	Head now covered with gray down except for gray forehead; body down now black; upper mandible black, lower yellow	8
Backed to edge of nest to defecate; perched on edge of nest	9	12	?	Down completely black; forehead bare and gray	9
Last day of continuous brooding by parents	10	4	6	Stubs of remiges and rectrices appear;	11-12
Last nest repair by parent; chicks begin tugging at twigs in or near nest; toss leaves in air and catch them	18	1	14		
On rim of nest except to feed & sleep	11	7	21	Rectrices 2.5 cm; lower mandible yellow w/black tip; legs & feet still gray	13-14
				Venter becomes bare; lower mandible yellow with black tip	16-20
Move tail and hold wings straight;	17	17	17	Row of teleoptiles along humeral pteryla; 2/3 adult size	17
				More remiges appear; rectrices 1/5 adult size	18-19
First wing flapping	21	20	26	Two distinct rows of teleoptiles on trailing edge and one row on leading edge of wing with down between; bare under throat white; feet chalky gray	19-20
				Three rows of teleoptiles on trailing edge of wing	22
				Three rows of teleoptiles on underside of wing; mid-dorsal pteryla still downy.	23
Out of nest onto surrounding branches	28	33	23	Forehead still bare but receding; wing feathers ragged; rectrices 1/4 adult length; mid-dorsal pteryla still downy	25-26
				Belly partially covered with teleoptiles; remiges 2/3 adult length	27

Table 4. (*continued*).

Developmental Milestone					
Behavioral Milestone				Morphological Milestone	
Notes	Age@Nest #			Notes	Age
	N_2	N_3	N_5		
				Wings and belly sparsely covered with teleoptiles; mid-dorsal pteryla still downy; rectrices 1/3 adult length; feet light gray	28
First practice flight	33	32	31	Rectrices nearly full length; dorsal pteryla fully covered with teleoptiles; adult features except bare gray forehead and gray feet and legs; skin peeling on forehead, bill, and feet; feet become darker gray; bare forehead disappears	31-32
First chick fledged, delay between fledging of sibs as long as 6 days	50	42-43	49	Full juvenal plumage; adult appearance except for lighter feet and legs, and dark iris.	42
Second chick fledged	52	44	53		
Third chick fledged	53	45	55		

these reports were very close to our report of 2.71 chicks fledged at Heron Island. However, Morrison (1977) reported a mean of only 1.65 chicks fledged for Neotropic Cormorant nests on Sydney Island, Texas. It is possible that the reduced brood size in Morrison's study was due to a difference in food availability. Storm-induced turbidity may have contributed to poor foraging success during Morrison's study, and deterioration of the food supply can be compensated for by a decrease in clutch size, or by reduction of the brood size by selective starvation (Morrison et al. 1979; Ricklefs 1968). However, Kalmbach et al. (2001) found that clutch and brood size were not reduced in Neotropic Cormorants because of poor feeding conditions during a strong El Niño-Southern Oscillation event when compared to relatively good conditions (Kalmbach and Becker 2005). If the difference in brood size between Morrison's study on the one hand, and our study and Kalmbach's on the other hand was not due to differences in food availability, then it may have been due to storm-related chick mortalities, since Morrison reported that storms had occurred during his study (Morrison 1977). But it's worth noting that both Morrison (1977) and Kalmbach et al. (2001; 2005) repeatedly disturbed the nesting birds by climbing the nest trees, and this surely must have adversely affected the nestlings and parenting efficacy.

Future Research

There are several questions still awaiting answers in regards to the breeding habits and development of the Neotropic Cormorant. The early breeding behavior of these birds needs further study, including pair formation and nest building. Additional work remains to be done on determining how seasonal differences affect clutch size and the development of chicks. Similar questions remain about the effects of food availability, weather, and inland versus coastal colonies on clutch size and development. It would also be useful to study a rookery of cormorants by banding male and female with different colors, and sexing the birds' behaviors to judge relative investment of the parents into the nesting duties. Marked birds would also provide an opportunity to determine if the bird bringing nest repair materials is always the male, in which case this behavior would be an economical and nonintrusive way of assessing relative investment of the parents. In future studies using a continuous observation period of several hours each day, we recommend randomizing the time of day at which each period starts to reduce the likelihood of interaction artifacts.

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JOUTEL'S BIRDS: 17TH CENTURY FIELD OBSERVATIONS ON THE TEXAS COAST

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ABSTRACT.—The 17th century French colonist Henri Joutel kept a journal of the failed Texas colony, which included several descriptions of birds. This provides a unique set of field observations from the 1680s on the Texas coast. I collated these observations and examined them for clues as to the modern names of the species described. Several species were identified, including the Turkey Vulture, Black Vulture, Crested Caracara, and Roseate Spoonbill. Many birds can be approximated to family or order.

During the late 17th century, the French Empire attempted to colonize Texas. Part of that effort was the ill-fated La Salle colony, which was thoroughly recorded by one of the colonists, Henri Joutel. Joutel kept a diary through the colony's short life, describing both the colony and the natural world around him. The colony, located first on Matagorda Island in 1685, and later in today's Victoria County along Garcitas Creek (1685-1688), has been extensively studied by historians. The colony and one of the colonial ships were excavated by the Texas Historical Commission, producing a wealth of knowledge.

Joutel mentions wild birds in his journal several times. These have been examined in Foster's footnotes to the Joutel journal (1998). They have also been examined in context as food items for colonists (de France in press). However, a *complete* tabulation of Joutel's descriptions of Texas' avifauna is useful, as his observations are some of the earliest descriptions of birds in Texas.

I examined both the French edition of the Joutel journal (1879) as well as the English translation (1998). Each time a wild bird was referenced in any more detail than the word "bird" itself, I transcribed the journal quotation as well as the approximate location and date. For some of the birds Foster (1998) has made suppositions about bird species in some explanatory footnotes. This information is presented in Table 1. When attempting to match 17th century French descriptions of birds to modern species, the original French was always used to avoid translation bias. Early dictionaries were used to get the contemporary sense of the word.

There are 16 passages in which Joutel mentions wild birds in Texas using more descriptive language than "bird". Eleven of these contain references to waterfowl like ducks or geese, reflecting the colony's decided interest in hunting. Though I did not include them in this study, it is worth noting that the colony bred domestic chickens—possibly the first such birds in Texas (Joutel 1879:191).

WATERFOWL

Ducks, geese, and other waterfowl are by far the most prevalent birds mentioned by Joutel. Divining exactly what sort of waterfowl he saw is difficult, as he does not describe these birds in great detail. For instance, at no point does he describe a duck with any further language beyond *canard* (duck). Frequently, he refers to *outardes*. It is plain that he is struggling with his language. On 18 January 1685, Joutel says that "Il rapporta quelques outardes qu'il avoit tuées, et… des animaux faits comme des oies, mais qui sont meilleurs" (Joutel 1879:132). The ellipses are original, and Joutel is speaking here of killing an *outarde* which is like a goose, but better. Using the literal meaning, *outardes* are members of the family Otididae—bustards. French-speaking Canadians sometimes use the word to refer to the

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Canada Goose (*Branta canadensis*) (Péronnet 440). It is reasonable to assume that Joutel is using *outard* in this latter sense. Plainly, he believes *outard* to be different from *oye* (goose), as they are differentiated in both the above quotation and again later in the journal (Joutel 1879:214).

Twice in the journal, Joutel refers to *sarcelles* and *cercelles*, which are French common names for *Anas crecca*, the Green-winged Teal (Saint-Vincent 1823:138). Given the colony's location, he likely also saw Blue-winged Teal (*Anas discors*), though he does not distinguish between the species.

Foster (1998:126) identifies Joutel's *poules d'eau* as American Coots (*Fulica americana*) based on a dictionary of Mississippi Valley French. However, Joutel was not a native speaker of any Mississippi Valley French dialect, and so there is no reason to favor the American Coot over Common Gallinules (*Gallinula chloropus*), which were also described as *poules d'eau* by early natural historians (Gagnon, Senior, and Ouelette 2011:366).

As part of a large list of birds seen at the colony, written in January 1686, Joutel mentions swans (Joutel 1879:214). This is most likely the Trumpeter Swan (*Cygnus buccinator*), formerly a common winter resident on the Texas coast in the 19th century (Eubanks, Behrstock, and Weeks 2006:42). Joutel's observations suggest that it was also a common winter resident in the 17th century.

OTHER GAME BIRDS

Joutel writes about turkeys four times. Each time is in the winter, though they are also mentioned in the general description of birds at the colony. Three mentions are at or near the Victoria County colony, and one is at the Colorado River near the present site of La Grange, TX (Joutel 1998:170).

In the general description of the colony's avifauna, Joutel writes that there are "two kinds of grouse, one large, and one small—which is better. The large grouse are like pheasants; they spread their tails like turkeys and have two 'bells' by the collar of the throat, like pendants." Clearly, the larger bird is the prairie chicken (likely Attwater's Prairie Chicken, *Tympanuchus cupido attwateri*) (Lehmann 1941). The smaller grouse is not described in any more detail.

Also receiving brief mention as game birds are *grues* and *bécassines* (Joutel 1879:214). The former is a crane, though as Joutel does not describe what he saw we cannot differentiate between the two species of cranes on the Texas coast. The latter (*bécassines*) refers to a snipe (Cotgrave 1673:41) (*Gallinago* sp.), still a common Texas game bird.

NON-GAME BIRDS

While most of Joutel's interest in avifauna seems to be culinary, he spends some time discussing birds that are not eaten. He clearly describes pelicans (*Pelecanus sp.*), which the French colonists called "large gullets" (Joutel 1879:214), as well as Roseate Spoonbills (*Platalea ajaja*), which the colonists called "spatulas" (Joutel 1879:215). Hummingbirds, which they called "bees", are described as gray-green and changing in color, as well as very pretty (Joutel 1879:215). A small red-and-black bird (Joutel 1879:215) could be any number of Texas birds, including a Red-winged Blackbird (*Agelaius phoeniceus*), Vermilion Flycatcher (*Pyrocephalus rubinus*) Scarlet Tanager (*Piranga olivacea*), or Rose-breasted Grosbeak (*Pheucticus ludovicianus*). The "small crows" at the colony (Joutel 1879:215) are possibly grackles (*Quiscalus* sp.), though these could also be his "starlings".

Joutel saves the bulk of his descriptive talent for vultures, which he called eagles. The most numerous, he writes, are black, and have "heads like turkeys". These birds, clearly Turkey Vultures (*Cathartes aura*) are vexing to the French colonists, as the vultures frequently eat bison before the French can retrieve the meat. Joutel also mentions a type of vulture which is gray (Black Vulture, *Coragyps atratus*), and a third kind of "eagle"—the "nun eagle" with a white collar and white on part of the head. This bird is quite probably the Crested Caracara (*Caracara cheriway*) (Joutel 1879:215).

Though Joutel rarely describes any bird well enough to identify it to the species level, he is clearly interested in the local avifauna. His journal records a set of bird sightings—some with seasons—in 17th century Texas, a period distinctly lacking in bird observations. For this reason, even the relatively scant descriptions given by Joutel are worth studying as a sketch of avian populations during the period of the first European residents in Texas.

Table 1: French colonist Henri Joutel references to birds seen in Texas during the 1680s, along with date if known and place.

Pages[1]	Joutel quote	English Translation[2]	Date	Place
131/76	L'on tua quelques canards	We killed some ducks	17 Jan 1685	Matagorda Is.
131/76	nous ne vismes point de gibier, à la réserve de quelques grues et des outardes qui ne nous attendoient pas	We saw hardly any wild fowl except some cranes and outardes [Canada geese] which were not expecting us.	17 Jan 1685	Matagorda Is.
132/77	Il rapporta quelques outardes qu'il avoit tuées, et… des animaux faits comme des oies, mais qui sont meilleurs.	He fetched some birds which he had killed which are similar to Canada geese but better.	18 Jan 1685	Matagorda Is.
136/79	les chasseurs tuèrent plusieurs canards, outardes et cercelles et autres sortes de gibier de rivière	The hunters killed several ducks, Canada geese, teals, and other wild fowl.	20 Jan 1685	Matagorda Is.
137/79	beaucoup de canards et autres sortes de gibier de rivière	many ducks and other waterfowl	21 Jan 1685	Matagorda Is.
197/116	Au retour de la chasse, où il avoit tué deux ou trois outards […] Or, le vent estant nord et par conséquent fort piquant	In returning from a hunt in which he had killed two or three geese […] at that time, the wind was from the north and consequently it was quite sharp.	Nov 1685	Garcitas Colony (Victoria County)
207/121	ayant veu un gros dindon à portée	so he killed a large turkey when he saw it within range.	Jan 1686	Garcitas Colony (Victoria County)
214/126	Il y a vers le haut de la rivière plusieurs lacs garnis de joncs, dans le milieu desquels se trouvent quantité de canards, sarcelles, poules d'eau et autres sembables.	Near the upper part of the river, there are several lakes trimmed with rushes in the middle of which are found a great many ducks, teals, coots, and the like.	Jan 1686	Garcitas Colony (Victoria County)
214/126	Il faut commencer par les boeufs, qui y sont très-nombreux et que l'on peut dire estre le pain quotidien; après quoy sont les chevreuils, les coqs d'Inde, outardes, oyes, cygnes, grues, canards, sarcelles, poules d'eau, pluviers, bécassines, perdrix de deux sortes, les unes grosses et les autres petites, qui sont les meilleures. Les grosses sont comme des faisans; elles font la roue comme des coqs d'Inde et ont deux espèces de cloches au collet de la gorge, lesquelles sont pendantes. Il y a encore quantité de certains gros oiseaux, que nous appelions grands gosiers à cause d'une grande gorge qu'ils ont et	[A listing of the local game] must begin with the bison which are very numerous, and it could be said that they were our daily bread. After bison, there are the deer, the turkey, Canada geese, other geese, swans, cranes, ducks, teals, coots, plovers, jack-snipes [bécassines], sandpipers, white and brown curlews[3], and grouse of two kinds, one large and one small (which is the better). The large grouse are like pheasants, and they spread their tails like turkeys and have two cups hanging at the collar of their neck. There also are many large birds that we called large gullets because of their big	Jan 1686	Garcitas Colony (Victoria County)

Table 1: (*Continued*).

Pages[1]	Joutel quote	English Translation[2]	Date	Place
	qu'ils remplissent quelquefois du poisson qu'ils peschent et qu'ils vont après manger à terre. L'on m'a dit qu'il y en avoit de sembables à Versailles, que l'on nomme pelicans.	throats which they sometimes fill with the fish they have caught and after which they go on land to eat. I have been told that there are some similar birds at Versailles, and they are called pelicans.		
215/127	Il y en a encore d'une autre espèce que nous appelions spatules, à cause de leur bec, qui est fait de mesme. Ils sont gros comme des poules, tout charnus et de très beau plumage, d'un rouge pâle, lequel est assez beau.	There is another species which we called spatulas, because their beak resembles the same. They are large and fleshy and have a very beautiful plumage of a pale red which is quite lovely.	Jan 1686	Garcitas Colony (Victoria County)
215/127	Il y a une espèce de petits oiseaux de nature et couleurs différentes, entre autres un très beau, qui a une partie de son plumage rouge et l'autre noir.	There is a species of small bird of a different kind and color that, among others, is very beautiful with plumage that is part red and part black.	Jan 1686	Garcitas Colony (Victoria County)
215/127	Il y en a encore que l'on a appelée mouches, qui ont leur plumage d'un gris vert et changeant. Ils sont fort jolis. Ils sont ordinairement à l'entour des fleurs.	There also were some birds which we called mouches whose plumage is gray-green but the color varies. They are very pretty, and ordinarily they are circling around flowers.	Jan 1686	Garcitas Colony (Victoria County)
215/127	Il y a aigles de deux ou trois espèces. Ceux qui sont en plus grand nombre sont ceux que nous appelons aigles corbins. Ils sont noirs et approchent fort du corbeau, tant à cause du carnage, auquel ils sont adonnez, que de leur figure; ils ont la test comme des poules d'Inde. J'ay remarqué plusieurs fois que, lorsque nous estions à la chasse et que nous avoins veu quelque bestes, quoyque nous fussions extremement esloignez, ils s'alloient ordinairement percher. Nous estions surpris qu'en peu de temps il y en avoit des bandes autour de nous, lesquels attendoient que nous nous en allassions pour manger ce qui restoit. Il m'est arrivé souvent, lorsque je tuois quelque boeuf autour de l'habitation, que je le laissois pour venir advertir du mond pour l'habiller; mais, lorsque nous y allions, nous	There are two or three species of eagles [vultures]. The most numerous are what we call aigles corbins. They are black and are very much like crows, in appearance as well as for their penchant to kill. They have heads like turkeys. I noticed several times when we were hunting and spotted some animals, the vultures would usually go and roost even though we were far distant. We were surprised that in so little time there would be flocks around us. They would wait until we were gone and then eat what was left. It often happened to me, when I would kill some bison around the settlement, that I would leave the kill to come and instruct the men to go dress it. But, when we went back, we found the vultures had eaten the tongue, or had begun to eat it at the base, and the eyes had been plucked out. There	Jan 1686	Victoria

Table 1: (*Continued*).

Pages[1]	Joutel quote	English Translation[2]	Date	Place
	trouvions que les aigles en avoient mangé la langue, ou l'avoient entamé par le fondement, on luy avoient tiré les yeux. Il y en a qui sont gris et d'autres que nous appelions aigles nonnes, à cause de certains colliers blancs et d'une partie de la teste.	had been plucked out. There are some vultures which are gray and others which we called aigles nonnes because they have a white collar and white on a part of the head.		
215/127	Il y a encore plusieurs sortes d'oiseaux dont je ne sçais pas le noms, et d'autres qui sont communs, comme des estourneaux, de petites corneilles, des pies de mer, des cormorans, hérons et autres sembables.	There are also several kinds of birds whose names I did not know and others that are common like the starlings, small crows, oyster catchers, cormorants, herons, and the like.	Jan 1686	Victoria
261/153	Nous relaschasmes près du lieu où nous avions campé à cause de la quantité de boeufs qu'il y a dans ce canton, où l'on en avoit boucané un grand nombre.	we crossed open country, about one and a half to two leagues across, in which we saw several herds of bison and many deer, turkeys, Canada geese, and other kinds of game.	Jan 1687	Victoria
287/170	On tua plusiers boeufs et coqs d'Inde et quelques chevreuils, canards, tourtres, au autres espèces de gibier.	We killed several bison, turkeys, and some deer, ducks, doves, and other kinds of game.	Feb 1687	Near La Grange, TX[4]

[1]Page numbers are given for both the French (Joutel 1879) and English (Joutel 1998) versions, in that order.
[2]English translations are taken from the 1998 version, and are presented for convenience. The original French was used for this project.
[3]Curlews do not appear in the French text here.
[4]This location is based on Foster's excellent work tracing the expedition, in Joutel 1998.

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JAMES DOUGLAS OGILBY AND THE BIRDS OF NAVARRO COUNTY, TEXAS

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ABSTRACT.—James Douglas Ogilby (1853-1925) was born in Belfast, Ireland, on 16 February 1853. He arrived in Texas in 1879, and from June of that year through December 1880 collected birds in Navarro County between the towns of Rice and Chatfield and along the Trinity River. In early 1881 Ogilby returned to Ireland where he completed work on his "Catalogue of the Birds Obtained in Navarro County, Texas" which was read by the Royal Dublin Society in 1882 and published in its Scientific Proceedings the following year. Ogilby did no further work in ornithology. In 1885 he moved to Australia where he worked in museums in Sydney and Brisbane and established a reputation as an expert in fish taxonomy.

James Douglas Ogilby (1853-1925, Fig. 1) was well known during his lifetime for his work as an ichthyologist. Less known to his fish-loving colleagues was the fact that early in his career Ogilby had published an important paper on the birds of Navarro County, Texas. The memory of the man and his work in Texas was lost to most American ornithologists following his return to Ireland and his later tenure as a museum worker in Australia. This paper traces Ogilby's early life and education, the events leading to his arrival in Texas, his ornithological work in Navarro County and briefly his later activities as a fish taxonomist in Australia.

Figure 1. James Douglas Ogilby (1853-1925). Photograph taken during 1919 in a shack on Stradbroke Island while Ogilby was on a fishing holiday with a friend. ©Australian Museum.

EARLY LIFE AND EDUCATION

James Douglas Ogilby was the second son of William Ogilby and his wife, Adelaide Douglas. His father practiced law in London from 1832 to 1846 before returning to his estate, known as Altnachree, in County Tyrone, Ireland. Douglas, as he called himself, was born on 16 February 1853 in Belfast and spent his childhood on the estate (Walsh 1988). Around 1860 a large stone home was completed on the Ogilby estate, which would later become known as Altnachree Castle or Ogilby's Castle (Anon. 2015).

Douglas became interested in nature at an early age, perhaps through the influence of his father who published articles on mammals in the *Proceedings of the Zoological Society of London* and was the honorary secretary of the Society from 1839 to 1846 (Blanford 1889). As a child he collected birds' eggs and kept notes on the location and construction of nests, as well as observations on the habits of birds (Ware 2010). From 1866-1869, Douglas attended Winchester College in England, and during 1871-1872 he was enrolled at Trinity College in Dublin.

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Most of his time following the death of his father in 1873 was spent in Portrush, Belfast and Dublin with only short visits to Altnachree.

Ogilby's first effort at publication was an 1874 note on the occurrence of the hairy-armed bat in County Dublin (Ogilby 1874). In 1876 he published nine papers dealing with natural history. Six of these articles contained observations of fish taken at the seaport city of Portrush (Ogilby 1876a,b,c,g,h,i) whereas one article consisted of observations of both fish and birds (Ogilby 1876d). Two reports dealt exclusively with birds – a second record for the Golden Oriole in County Dublin (Ogilby 1876e) and the arrival of summer migrants in County Dublin (Ogilby 1876f). During the following year a commentary on James Mahony's paper "The Natural History of Donegal" was published which contained, among other things, a brief mention of birds (Ogilby 1877).

LOVE AND FAMILY EXPECTATIONS

Sometime in early 1879 Ogilby left Ireland for Texas. The reason for his departure is believed to have been the result of a conflict between youthful infatuation and the expectations of his mother. Douglas reportedly became enamored with Mary Jane Jameson, a young seamstress who attended ladies for dress fittings and then worked at home. Family lore holds that the couple met at the castle when Mary Jane came to fit Douglas's sister-in-law for a dress (Binnington 2010). Although the Jamesons owned property and were a respected and deeply religious family, Douglas's mother did not approve the love match.

The story of Douglas and Mary Jane has been greatly romanticized and embellished. Local historians of County Tyrone maintain that the conflict between Douglas and his mother came to a head when he brought Mary Jane to a party at the castle. Here, in the presence of his mother and her socialite guests, Douglas boldly introduced the girl as his future wife. His mother, unable to accept this challenge to her authority, banished him from the family estate with the hope that distance would cool his ardor (Bradshaw 2009). Whether this dramatic confrontation actually occurred is questionable. Family lore does, however, maintain that Douglas was sent to Texas with the hope that he would forget Mary Jane (Binnington 2010).

ARRIVAL IN TEXAS

Why Texas was chosen as Ogilby's place of exile is unknown. Sometime during June 1879 he arrived in the small community of Rice in Navarro County. His roommate while living in Rice was John D. Tracy (1851-1929) an Irishman who had immigrated to the United States in 1872. The Federal Census of 1880 indicates that Ogilby and Tracy were not employed, and their means of financial support is a matter of speculation. Although not known with certainty, it is reasonable to assume that the two men had known each other in Ireland and that Ogilby had come to Texas as a result of this acquaintance.

Ogilby arrived at the small community of Rice in Navarro County in June 1879. In January 1880, he wrote to Robert Ridgway, curator of birds at the Smithsonian, telling him that he had collected a few species in the vicinity that had not been previously recorded from that part of Texas. An offer was also made to provide Ridgway with a list of the birds of the area (Ogilby 1880a). Enclosed with this missive was a letter of introduction from the Irish ornithologist Percy Evans Freke who from 1872 to 1879 had operated a tobacco plantation in Amelia County, Virginia, and was personally known to Ridgway and other American ornithologists (Palmer 1934).

Ridgway responded that he would look forward to receiving a list of the birds in Navarro County and, more specifically, he would like Ogilby to be on the lookout for stragglers from Mexico. Ogilby replied that he might soon move to Uvalde County near the Rio Grande where there was a greater chance of obtaining Mexican species (Ogilby 1880b). In a letter to Ridgway near the end of March, Ogilby noted that he planned to leave Navarro County in "about two months" (Ogilby 1880c). This anticipated move, however, did not occur although John Tracy did later move to Uvalde where by the mid-1880s he was established as a stock raiser.

Believing that he was dealing with an experienced collector, Ridgway asked Ogilby if he would send voucher specimens of some of the birds he had collected. This request brought forth a startling admission – Ogilby did not know how to skin birds! He was, however, attempting to learn, and he would send skins but would not accept remuneration for his efforts (Ogilby 1880d). During the second week in May he again wrote indicating that he

could collect eggs of species such as the Scissor-tailed Flycatcher, Orchard Oriole, and Bell's Vireo (1880e).

The summer of 1880 was a difficult time for Ogilby. He became ill and was unable to spend much time hunting birds. Even worse, beetles destroyed all of the skins that he had prepared (1880f). This illness, of unknown causation, may also be the reason for abandoning his earlier plan to move to Uvalde.

A Swainson's Warbler taken on 24 August 1880 represented the first record for Texas. The bird, found in dense timber by a small pond on the Trinity River, was taken at short range and "frightfully cut up by the shot." Measurements were taken and a positive identification was made before the remains were thrown away (1880g). The measurements and description were sufficient to convince Ridgway that the identification was correct and, with Ogilby's permission, the record was published the following year (Ridgway 1881).

In early November 1880 Ogilby informed Ridgway that he would probably leave Texas before Christmas. Enclosed with this letter was a list of 181 species and subspecies believed to occur in Navarro County. Some of the birds were not identified with certainty whereas others were believed to occur in the county but had not yet been seen or collected there (1880h). A letter a few days later contained corrections to the list that had been sent earlier. Also mentioned were two specimens of the Black-capped Chickadee, which represented a new record for Texas (Ogilby 1880i, Oberholser 1974).

In a letter in mid-November, Ogilby confirmed that he would leave Texas after 1 December and that all further correspondence should be sent to the Brevoort House in New York City where he would stay before sailing for Ireland (1880j). His departure was, however, delayed, and on 15 December he was still at Rice where he anticipated being for another two weeks. During this time, an attempt would be made to obtain several of the birds that wintered in the area (1880k).

RETURN TO IRELAND

Ogilby left Texas for the eastern United States in early January 1881. Before going to New York, he visited Ridgway at the Smithsonian in Washington, D. C., and was given a tour of the museum (Ogilby 1885). He arrived in Belfast by April and sent Ridgway a specimen of a small owl that he had recently received from John Tracy (Ogilby 1881). The specimens brought from Texas were deposited in the National Museum of Natural History in Dublin (O'Sullivan 1995) whereas those sent to Ridgway for identification were retained by the Smithsonian (Milensky 1996).

Three activities occupied Ogilby following his return to Ireland. The first was preparation of his report on the birds of Navarro County.

This annotated account of the 197 species or subspecies taken or observed was read by the Royal Dublin Society on 20 February 1882 and published in the Scientific Proceedings of the society during the following year (Ogilby 1883).

Ogilby next turned his attention to personal matters. Letters written to the ichthyologist Albert Günther at the British Natural History Museum during 1882-1884 have the return address "Altnachree Castle" indicating that he was spending at least some of his time on the estate. His courtship of Mary Jane was renewed, and he began to search for a job by which to support his bride-to-be. Records of the Donagheady Church of Ireland show that the couple married on 24 November 1884. Douglas had also secured a promise of employment for the church records indicate that he was a "curator" at the Australian Museum in Sydney

Soon after their marriage the young couple left Ireland for Australia where in February 1885 Douglas began work as Assistant in Zoology at the Australian Museum in Sydney. Edward Pierson Ramsay was the curator of the ornithological collection, and Douglas was assigned to work with the fish. In 1886 Ogilby became head of the Department of Ichthyology and later head of the departments of ichthyology and herpetology (Ware 2010). In 1887 he was elected a fellow of the Linnaean Society of London. Although his technical work at the Australian Museum was exemplary, he was dismissed in 1890 for his "extreme and undiscriminating use of alcohol" (McCarthy 1993). During the next several years he worked independently on a contract basis.

Mary Jane Ogilby died in 1894 of tuberculosis. There were no children from the marriage. Douglas continued to work on a contract basis until 1903 when he was hired as an ichthyologist at the Queensland Museum in Brisbane (Geiser 1959, Iredale 1926, Walsh 1988). During his professional career he published numerous papers on fishes, a catalogue of the mammals of Australia, as well as

descriptions of new species of lizards and snakes. *Ogilbia*, a genus of viviparous fishes, Ogilby's Ghost Shark (*Hydrolagus ogilbyi*) and Ogilby's Ghost Flathead (*Hoplichthys ogilbyi*) are named in his honor. Around 1920 Ogilby's health began to fail and he was admitted to Diamantina Hospital for Chronic Diseases in Brisbane. He died on 11 August 1925 and was buried in an unmarked grave in Toowong Cemetery (Binnington 2010, Walsh 1988).

For several years Ogilby was the honorary museum curator for the Amateur Fishermen's Association of Queensland, and in 1915 he was granted lifetime membership in the Association. Following his death the Association set up and still maintains the 'J. Douglas Ogilby Cottage', on Bribie Island for the use of its members (Walsh 1988). A biography describing the ancestry and personal life of James Douglas Ogilby has recently been published by Joy E. Ware (2012), a descendant of the Ogilby family.

THE CATALOGUE OF NAVARRO COUNTY BIRDS

The specimens taken by Ogilby in Navarro County were identified using Baird's 1858 report on the birds taken during the Pacific railroad surveys, the three volume History of North American Birds published in 1874 and other taxonomic works provided by Robert Ridgway. Unknown specimens were sent to the Smithsonian for identification. All of the species in the catalogue were taken or observed in the field by Ogilby with the exception of an Eastern Screech Owl obtained from John Tracy and the Barn Owl, Greater Roadrunner and Black-crowned Night-Heron seen in the collection of "Dr. Thomas" in Dallas. Although not known with certainty, this individual may have been the Dr. William Thomas listed in the Federal Census of 1880 as a dentist in Dallas.

Swainson's Warbler, LeConte's Sparrow and Lapland Longspur were considered by Ogilby to be the prize trophies of his collection. The Swainson's Warbler, taken on 24 August 1880, was a first record for Texas. LeConte's Sparrow was found to be an abundant winter visitor. The pursuit and collection of this secretive bird gave Ogilby "more pleasure" than any other bird on his list. Ogilby believed that LeConte's Sparrow was new to Texas, and only later did he learn it had been collected a few years earlier in Cooke County (Ragsdale 1877).

Lapland Longspurs had previously been taken in New Mexico but not in Texas. Ogilby found them to be an abundant winter visitor frequenting the prairies and cultivated lands, and during severe weather even the towns where they could be seen "picking about the streets with all the fearlessness and familiarity of sparrows." Farmers accused longspurs of doing damage to the wheat but Ogilby believed this charge to be in error. His examinations and field observations revealed that they ate seeds of grasses and weeds, especially those of the noxious broomweed. The seed heads of broomweeds could not be reached while the birds were standing on the ground, and they were seen to "take little leaps, at each effort withdrawing a seed so expertly that not a movement of the plant can be detected." Ogilby claimed to have killed 63 longspurs with one shot, 58 of which were Lapland Longspurs.

Ogilby seemed unaware of the significance of the three Black-capped Chickadees he collected considering them to be "merely a scarce autumn migrant." In reality, these specimens represent a first record for Texas (Oberholser 1974). Whether skins were made of these birds is unknown. If so, they were probably deposited in the National Museum of Ireland in Dublin. However, no record of their presence at this institution can be found (O'Sullivan 1995).

Long hours were spent observing birds in the field, and detailed notes were kept on their habitats, behavior patterns, migration dates, foods eaten, and their interactions with other species, including humans. A few examples illustrate the tameness of some birds, as well as Ogilby's patience and ability to approach them at close range – a Bachman's Sparrow that refused to fly more than a few yards at a time was taken by a blow from the barrel of his gun and a feeding Snowy Egret was approached close enough to be killed with a stick. A Yellow-throated Warbler was observed while "running about and feeding close to [his] feet." The Ruby-crowned Kinglet was considered the "most unsuspicious" of birds and would with "perfect trustfulness, seek for [insects] within arm's length of the observer."

The numbers of some birds were astounding. Flocks of American Golden-Plover, considered today an uncommon to rare transient in north central Texas, were so large that Ogilby could hear the sound of their beating wings even before the birds were sighted. Lapland Longspurs arrived in flocks of "incredible" size. Eskimo Curlews

were plentiful during their spring migration, and Whooping Cranes passed through in "considerable numbers" in both the spring and fall. A flock of Eastern Kingbirds was estimated to consist of at least a thousand birds. A migrating flock of Cliff Swallows consisting of thousands of individuals formed a continuous stream over Ogilby's house that lasted for more than two hours.

The digestive tracts of freshly killed birds were routinely examined, and their contents described as seeds, insects, beetles, grasshoppers, caterpillars, grubs, etc. Unusual feeding behaviors were also noted. Brown-headed Cowbirds picked ticks off the backs of cattle, and Brewer's Blackbirds removed parasites [probably lice] from the backs of hogs. Swallow-tailed Kites used their wings to brush "locusts" [probably cicadas] from the topmost branches of trees and to capture and eat the insects in mid-air. The Mexican variety of the Eastern Meadowlark always plucked the wings off grasshoppers before eating them, and a flock of Eastern Kingbirds was seen picking insects from the surface of a standing body of water. A Marsh Wren captured and swallowed a grasshopper so large that Ogilby considered it to have been a "miracle." Loggerhead Shrikes were observed killing a Song Sparrow and a wounded Northern Mockingbird. In addition to seeds, Lesser Prairie-Chickens ate "leaves of the cotton, various flowers, and where obtainable [were] very partial to melons." Purple Martins were common in the towns and, by close observation Ogilby calculated that each pair and their offspring consumed "at least one thousand insects daily."

Parasites and diseases of birds were occasionally mentioned. Northern Cardinals were more frequently infested with ticks than other species. The claws and even the toes of Lark Sparrows were often found to have dropped off and hard, round lumps formed in their place. Several Northern Shovelers had a condition that caused the intestines to turn almost black. Dead meadowlarks were found more frequently beneath telegraph wires than other species.

Ogilby was even-handed with his evaluation of controversial species. It was admitted that the enormous flocks of Red-winged Blackbirds did considerable damage to newly planted wheat and corn. However, for the remainder of the year they destroyed myriads of noxious insects, especially when they followed the plow to eat the grubs and larvae that were exposed. Common Grackles were accused of doing injury to standing corn but Ogilby found no evidence that this was the case. The grackles were instead found to feed primarily on insects including beetles, grasshoppers, wasps, grubs and various larvae. Crows did much damage to corn but it was pointed out that they ate many other types of food during the year. Ogilby was strongly critical of the "reprehensible practice" of calling up and shooting turkey gobblers during the spring. Although turkeys were common in the "wooded districts", he predicted that this practice, if continued, would lead to their extirpation within a few years. This prediction was soon realized and by the end of the 1880s there were no further reports of the Wild Turkey in Navarro County (Pulich 1988).

Roosting habits were noted for several species. Mountain Bluebirds were common winter visitors, and Ogilby discovered a tree devoid of leaves in which around 200 birds were roosting. The birds arrived toward sunset and began to choose the twig upon which they would spend the night. Their restless flitting from branch to branch in search of a resting spot "formed a sight whose beauty it would be hard to match." Flocks of Water Pipits, generally believed to roost on the ground, were often seen in solitary trees on the prairie at so late an hour that Ogilby believed "they intended to pass the night in that position." Horned Larks were found to "pass the night on the ground, squatting in the wagon-tracks and hoof-marks on roads crossing the higher parts of the prairie." The arrival and aerial maneuvers of Red-winged Blackbirds and Scissor-tailed Flycatchers at their communal roosts were also described with a keen eye for detail.

Close attention was given to the nesting of summer birds. Dates of the breeding season, placement and construction of nests, and numbers of eggs were noted for over twenty species. Nests of Blue-gray Gnatcatchers appeared to stand without support on horizontal branches but were "most firmly and ingeniously fastened by threads of wool or spider's web." Grasshopper Sparrows usually placed their nests "on the side of a steep slope, beneath an overhanging tuft of herbage, and often so tilted up that the eggs [were] lying on the side of the nest, the other side forming a half canopy over them." Cotton fields were the nesting sites most frequently used by Lark Sparrows. Nests of the Swallow-tailed Kites were placed on upper branches of the tall cottonwoods bordering Richland Creek. Northern Bobwhite nested in tall

grass in low-lying localities, but numbers of eggs were "lost by being laid promiscuously, chiefly about the edges of prairie paths."

Nests were often dismantled and the materials used in their construction itemized. The presence of wool and cotton in the nests of Blue-gray Gnatcatcher, Bell's Vireo, Blue Grosbeak and Great Crested Flycatcher indicate the proximity of sheep and cotton fields to nest sites. Although eggs are often mentioned, there is no indication that collections were made.

Some numerical data are presented in the catalogue. Average measurements and weights are given for 20 specimens each of the American Pipit and Sprague's Pipit. The weight of old male Lesser Prairie-Chickens was found to be as much as 38 ounces whereas the average weight of 50 chickens taken during November and December was about 30 ounces. The average weight of Northern Bobwhite was 6-l/4 ounces with an occasional male weighing as much as 7-l/2 ounces.

A LOOK BACK

The catalogue presents a view of bird life in the bottomlands of the Trinity River and surrounding prairies during 1879-1880. Ogilby had only limited experience in ornithology and none in the United States or Texas. Nonetheless, his work is of high quality and on a par with that of other recognized naturalists of the era. His catalogue has, however, been largely ignored and seldom cited. The reasons for this neglect are perhaps twofold – the catalogue was published in a foreign journal that was not readily accessible to American ornithologists and, secondly, Ogilby did no further work on birds and thus became a forgotten entity within the ornithological community. Those wishing to acquaint themselves firsthand with Ogilby's catalogue can now find the entire text online by doing a search of Google Books for "*Scientific Proceedings of the Royal Dublin Society*, 1883."

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OBSERVATIONS OF LEAST GREBE FORAGING AND PARENTAL CARE BEHAVIORS

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ABSTRACT.—I observed Least Grebes (*Tachybaptus dominicus*) at the western edge of the Coastal Sand Plain in South Texas. I witnessed both a foraging behavior and a parental care behavior, neither of which are reported in the scientific literature. The foraging behavior appears to be a cooperative feeding technique, employed to increase predator vigilance in open water areas, where one pair member remains vigilant while the other member dives for prey. The parental care behavior involved a formation whereby adults flanked each side of the clustered young to protect them while in particularly vulnerable areas (e.g., open water). An additional aspect of parental foraging behavior was exhibited in which one adult would stay with the young as the other foraged for food, with adults regularly switching roles. I also provide a brief assessment of the management or enhancement of the proper habitat targeted for South Texas land stewardship of Least Grebes.

Opportunities to conduct research in Texas are often difficult to come by, as the vast majority of the land is privately owned. This difficulty is exacerbated when species have restricted distributions in the state. For example, there are numerous species that are restricted to the southern portion of the state (often the northern range limit of broadly distributed Central American species) that have minimal life history documentation, or simply go unnoticed. The Least Grebe (*Tachybaptus dominicus*) is one of these species. It is the smallest of the North American grebes and has wide distribution throughout much of South and Central America, with small populations in south Texas (Storer 1976). These small waterbirds can inhabit many freshwater systems, ranging from ephemeral to permanent bodies; these freshwater bodies may contain little or no emergent vegetation (Storer 1992). In recent years, work from Patrikeev (2009) and Konter (2014) have expanded our knowledge about the behavior this bird. Other studies have specifically documented diet and foraging behaviors of this species, but little is known of a possible cooperative aspect of foraging. Here, I recorded behaviors that indicate that Least Grebe pairs collaborate to feed both themselves and their offspring. Together, these behaviors function to maintain higher levels of predator vigilance than would be possible via individual foraging methods.

Least Grebe (*Tachybaptus dominicus*). Photo: Marvin Delong /USFWS

METHODS

During large-scale biodiversity assessments conducted on East Foundation lands, I had the opportunity to observe Least Grebe behavior during 2014 on the San Antonio Viejo Ranch-a 60,298 hectare property located approximately 25 miles southwest of Hebbronville, Texas in Jim Hogg County. Grebes were present at six man-made cattle stock tanks during 2014. These tanks are common amongst ranchers to provide an artificial water source for wildlife in the area. I recorded whether Least Grebes were breeding on each tank, as indicated by the presence of young (Table 1). I calculated the size of each tank by walking the

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perimeter while using the calculate area function on a GPS device. Vegetation (both emergent and surrounding) was noted to provide an indication of habitat structure. Overall, the tanks varied in size, and in vegetation composition (Table 1).

I recorded grebe behaviors on the following tanks:

Tank 2: This is one of the smaller tanks on the ranch measuring ~0.1 hectares. Dense mesquite trees (*Prosopis* spp.) and spiny hackberry (*Celtis pallida*) composed the main vegetation and provided overhang cover around the water's edge. Emergent vegetation was absent (Table1).

Tank 5: Measuring ~0.49 hectares, this is the second largest tank where I recorded behaviors. There is dense mesquite surrounding the tank that created sheltered coves. Thick patches of rushes (*Juncus* spp.) covered half the tank in the shallowest areas.

Tank 6: This was the largest of all the water sources with grebes present on the ranch. This tank measured ~0.75 hectares, and was surrounded by Texas ebony (*Ebenopsis ebano*) and mesquite trees. There was no emergent vegetation present; however, there were several large broken tree limbs which provided shelter at one end of the tank.

OBSERVATIONS

Asynchronous dive feeding: I observed a pair of adult grebes (1 male and 1 female, based on body size) on tank 2 from 0800-1200, on both the 24th and 25th of October 2014. Normal foraging behaviors occurred throughout the time of observation. These normal behaviors included diving, grebes lowering their heads near water level to capture invertebrates active along the surface (Fjeldsa 2004), and attempting to collect flying insects (Storer 1992). From 1000-1200, diving was the preferred method of foraging, and it was during this time that I observed a previously undocumented foraging behavior.

Throughout this period the grebe pair remained in close proximity of each other, and began foraging using an "asynchronous diving" technique. This technique was observed 15 times, and involved one grebe diving for approximately 10 seconds, while the other grebe stayed on the surface. As the diving grebe resurfaced, and after a slight pause of a few seconds, the pair would reverse roles, with the second grebe diving while the other stayed on the surface.

Parental care and Parental foraging: On 17 May 2014, I observed two separate groups of grebes, both of which exhibited a type of parental foraging behavior that appears to be undescribed. On tank 5, from 1200-1400 I observed and adult grebe pair with four offspring. While observing the group I noticed that the adults were flanking (bracketing) their offspring. The adults ushered the young grebes around the open water as they dove for food. The adults themselves were never observed to dive during this time. Eventually, the parents steered the young to the dense emergent vegetation and then returned to forage themselves.

I observed similar behavior at tank 6, by a group of grebes consisting of 2 adults and 3 juveniles. During the late afternoon from 1500-1700 on 17 May 2014, the grebes moved across the open water in the same formation as observed on tank 5, one adult on each side of their young, with only the young diving for food. Once the young were finished feeding, the adults ushered them to the portion of the tank where numerous fallen tree limbs provide shelter. In this case, one parent stayed with the young, while the other moved to open water to forage. This lasted for approximately 5 minutes, after which the adults switched roles. This process happened twice during the observation period.

DISCUSSION

Predation plays a significant role in shaping grebe behavior (Fjeldsa 2004). The behaviors that I report here support this idea. An "asynchronous diving" technique is an excellent strategy that allows for increased predator vigilance during foraging in open water. Grebes have been recorded to have aerial, land, and aquatic predators (Fjeldsa 2014). There is a documented account of young being taken by water turtles (*Psuedemys*) in South Texas (Palmer 1962). Large raptors such as Great Horned Owls (*Bubo virginianus*), Peregrine Falcons (*Falco peregrinus*), Red-Shouldered Hawks (*Buteo lineatus*), and Accipter hawks have been recorded to capture and kill Pied-billed Grebes (*Podilymbus podiceps*) (Riehl 2002, Fjeldsa 2004). A Cooper's Hawk (*Accipiter cooperii*) was hunting in the same location prior to observing this cooperative feeding technique, and Great Horned Owls and large hawks are common on the San Antonio Viejo Ranch. These observations combined with previous reports in the literature yield plausible scenarios for the

raptors found in south Texas to regularly prey upon the smaller Least Grebe.

The observed behavior where paired adults ushered and flanked their young as they foraged, along with "parental foraging" behavior, are likely additional predation defense strategies. The flanking formation observed creates a more vigilant situation that can lead to quicker warning vocalizations to protect offspring from potential predators. After securing their young, the parental foraging observed describes an efficient strategy of predator avoidance. This allows the young to be in a sheltered area with an adult grebe, while allowing the other adult to forage. This seems to be an effective strategy to protect young from predators and still maintain adequate resource.

The habitat preferences for these birds have been well documented and highlights that they can live on a tank or water source of any size. The data in Table 1 provides information about available vegetation in and around the tanks where I observed Least Grebes. It appears that even minimal emergent vegetation or overhanging shelter from surrounding plants provides suitable habitat in tanks with stable food resources, the size of these tanks can be exceptionally small (Table 1). This idea is supported by Howell and Webb (1995), in which they documented that areas with vegetation along the edges and cover were preferred by grebes. Noting South Texas land stewardship, it would be relatively easy to manage for this species. To establish or enhance a habitat for these birds all that is required is to have semi-permanent or permanent ponds, or stock cattle tanks. This is in line with observations by Ortega-Álvarez (2013), who documented artificial water sources (such as stock tanks) as being able to provide suitable habitat for waterbirds. Vegetation, both emergent and surrounding (Table 1) these artificial water sources can provide a sustainable food source, sufficient vegetation to provide protection from predators, and assist in the success of the Least Grebe in south Texas

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Table 1. List of grebe tanks on the ranch, size, available vegetation, and if breeding occurred.

Tank	Size (hectares)	Emergent Vegetation	Overhang Cover	Breeding
Tank 1	0.03	Present	Absent	Yes
Tank 2	0.1	Absent	Present	Yes
Tank 3	0.386	Absent	Absent	No
Tank 4	0.41	Present	Absent	Yes
Tank 5	0.488	Present	Present	Yes
Tank 6	0.747	Absent	Present	Yes

SHORT COMMUNICATIONS

FIRST RECORD OF BAR-TAILED GODWIT (*LIMOSA LAPPONICA*) FOR TEXAS AND THE WESTERN GULF OF MEXICO

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DISCOVERY AND SUBSEQUENT FIELD OBSERVATIONS

On August 9, 2014 around 7:20 PM, while scouting for an upcoming shorebird workshop, I spotted an odd-looking godwit in the Blind Oso section of the Cayo del Oso Bay, in Corpus Christi, Nueces County, Texas. The bird was at a distance that ranged from 100 to 150 yards, and was feeding actively with several Marbled Godwits (*Limosa fedoa*). Viewing conditions were not optimal at the time, but I was able to take a few mediocre digiscoped photos. Features that could be noted at the time of sighting indicated the bird was likely a rare, stray Bar-tailed Godwit (*Limosa lapponica*). After observing the bird until light conditions subsided, and after dictating field notes into a hand-held recorder, I returned home to study photos and text.

Later in the evening, I shared photos and details of the observation with Martin Reid, who has extensive experience with Bar-tailed Godwit, as well as with Willie Sekula. Both agreed on the identification, and confirmed the identity as Bar-tailed Godwit. The sighting was then posted to the Texbirds listserv and other birding forums.

Over the next several days, the bird remained in the immediate area, and was seen by an estimated 200-plus birders. Many photos and descriptive details were obtained. Observations were made in and around the Blind Oso portion of the Cayo del Oso until about Sept. 4. Then, on Oct. 11, 2014, the bird was rediscovered in nearby Swantner Park, a small city park along the Corpus Christi Bay, about 1 mile from the Blind Oso location. It remained at this location until at least October 18. The last known sighting was Oct. 26, at the original location; the Blind Oso.

DESCRIPTION

The main challenge in searching for and spotting the Bar-tailed Godwit was to separate it from Marbled Godwit, with which it typically remained in close proximity. Compared to the Marbled Godwits, the Bar-tailed was smaller, approximately 75% of Marbled Godwit's size. It was noticeably lighter, an ashy gray tone, generally lacking the warm brown tones of the Marbled Godwit.

In general, the upperparts of the Bar-tailed Godwit were a medium-gray brown, with pale gray edges, contrasting with the bold internal dark brown/buff upperparts of Marbled Godwit. Underparts were a pale gray, in contrast to Marbled Godwit's buff underparts, with fine dark brown streaking on the breast and flanks.

In flight, the under wing showed light speckling on the axillaries, and the center of the underwing coverts was unmarked white, indicating the bird was the European race: *L. l. lapponica*, as opposed to the darker under wing of the Russian/Alaskan *L. l. baueri* race. The upper tail showed thin, blackish barring on the white upper tail surface. The upper tail coverts and the lower back were completely white, except for a few black chevrons. This bold white wedge up the back presented a stark contrast to the brownish back feathering, again indicating *L. l. lapponica*.

The bird was in a constant, gradual state of pre-basic molt during the August-early September observations. The upperparts were largely worn and frayed, with a combination of new and old feathers. There remained a few dark back and scapular feathers among new, paler basic feathers. The flight feathers and tertials were worn and frayed, as shown in Reid's photograph of 10 August (Fig.1). During the earliest days of observation, the underparts were

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Figure 1. When first observed, the Bar-tailed Godwit was in an early state of pre-basic molt, with worn back and scapular feathers and retained reddish blotches on the underparts. Photo: Martin Reid, Aug. 10, 2014.

pale with remaining splotches of reddish remnants from the alternate plumage. Small areas of reddish remained in the underparts even until the last observation, Oct. 26. The head was a pale gray, with a rather obscure pale supercilium.

The legs appeared black or blackish, and were noticeably shorter than the legs of the Marbled Godwit. The bird seemed to be in constant motion, feeding continuously in probing motions, similar to the Marbled Godwit. The bill was bright pink at the basal half, and blackish on the distal portion, and was slightly upturned. It appeared to be broader at the base than Marbled Godwit's bill. The iris appeared quite dark.

During the October sightings, the godwit had advanced well into its pre-basic molt, and had attained a clean gray-brown appearance (Fig. 2 and Fig. 3.) with whitish edges to gray-brown upperparts and wing coverts.

HABITAT

The area in which the Bar-tailed Godwit was discovered and spent much of its time is Oso Bay, or Cayo del Oso, which is a broad, shallow estuary of Oso Creek in eastern Corpus Christi. Oso Creek is a principal drainage for much of southern and western Nueces County, and it forms a broad estuary for about 3 miles in increasing width before it empties into Corpus Christi Bay, a large primary bay off the Gulf of Mexico. The "Blind Oso" is a neck of the Cayo del Oso, which does not connect to Corpus Christi Bay, and is only influenced by tides and limited fresh ground water drainage. The Blind Oso portion, which adjoins the Texas A&M–Corpus Christi campus on Ward Island, is hypersaline in certain areas, but is less saline than the main portion of the Cayo del Oso, because of constant, but limited, fresh water inflow. The estuary is quite shallow and is rich in aquatic food

Figure 2. By mid-October, the Bar-tailed Godwit was advancing into basic plumage: pale brown back and scapular feathers with gray fringes, whitish underparts with few retained light reddish smudges. Photo: Arman Moreno, Oct. 18, 2014.

sources. It is a primary stopover feeding area for waders and shorebirds, and supports large numbers of Western Sandpipers, Marbled Godwits, Short-billed Dowitchers, and other species in migration and winter.

Swantner Park is a neighborhood park with a rather small, open grassy area, used mainly for lawn sports, kite flying, fishing, etc. It fronts the Corpus Christi Bay. During the Bar-tailed Godwit's occurrence, there were areas of shallow freshwater pools within the grassy area, which supported shorebird feeding.

DISTRIBUTION, MIGRATION

This record represents the first occurrence for Texas, and was accepted by the Texas Bird Records Committee in August 2015 by a 9-0 vote. It also represents the first documented record for the western Gulf of Mexico. The species has never been positively detected in the central United States. The Bar-tailed Godwit is a rare spring and fall migrant on the Atlantic Coast (*lapponica race*), as well as on the Pacific Coast (*baueri* race). The species is an extremely long-distance migrant, with migration routes thought to be in excess of 20,000 miles.

Bar-tailed Godwits of the lapponica race breed in northern portions of Sweden, Finland, Norway and eastward to the Taimyr Peninsular, in central Arctic Russia . Migration routes take them to wintering grounds in Europe, West Africa and India. Records on the east coast of the United States are mostly fall records, August to September, although the majority of records on the upper Eastern seaboard are spring records.

NOTABLE INTERIOR AND GULF COAST RECORDS

5-11 Aug 2013, Box Elder County, Utah. One within an enormous staging flock of Marbled Godwits at Willard Bay Reservoir. lapponica race. Accepted by Utah Bird Records Committee.

9 June 2010, Luck Lake, Saskatchewan, Canada. A pre-alternate bird with Marbled Godwit flock.

Figure 3. By mid-October, the Bar-tailed Godwit was advancing into basic plumage: pale brown back and scapular feathers with gray fringes, whitish underparts with few retained light reddish smudges. Photo: Arman Moreno, Oct. 18, 2014.

10 July 1984, one at Turkey Point, Franklin County, Florida. No photos. FOSRC #1984-67.

18-22 Sept 1985 and 1 Jan 1986, one at Honeymoon Island State Park, Pinellas County, Florida. Photographed. FOSRC #1986-99.

2008 (no date), one lapponica at Little Estero Lagoon, Lee County, Florida (Greenlaw et al. 2014; no FOSRC review).

18 Sept 2013- 18 April 2014, one bird overwintered at various locations along Gulf Coast in Pinellas and Pasco Counties, Florida. lapponica race.

28 Mar-2 April 2010 Everglades National Park, Monroe County, Florida. First spring female of the baueri race. FOSRC 2010-83

3-11 Feb 2012 Everglades National Park, Monroe County, Florida. Possibly same bird as 2010 record. baueri race. FOSRC 2012-890.

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DOCUMENTATION OF A PLAIN CHACHALACA IN NUECES BAY, NUECES COUNTY, TEXAS

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The range of the Plain Chachalaca (*Ortalis vetula*), Family Cracidae, extends only as far north as the Lower Rio Grande Valley (LRGV), in extreme south Texas (Howell and Webb 1995). Plain Chachalacas are endemic to the Tamaulipan brushlands of the LRGV and are secretive arboreal birds that are found in brushy woodlands, second growth, and forest edges (Howell and Webb 1995, Peterson 2000).

Photographs of a Plain Chachalaca were captured by game cameras deployed on shell islands and beaches in upper Nueces Bay. These cameras were deployed to monitor diamondback terrapin nesting activity by researchers in the Center for Coastal Studies at Texas A&M University-Corpus Christi. In the course of routine cataloging and examination of archived photos, we discovered that a Plain Chachalaca was photographed 4 times on 10 June 2015 at ~17:00 h moving along a shell beach on the south side of Nueces Bay (Figs. 1, 2). Based on one of the photographs, the bird also tried to enter one of the mangroves located at the site.

Considered a game bird, the Plain Chachalaca is hunted between the end of October and the end of February in 4 counties in the LRGV: Cameron, Hidalgo, Starr, and Willacy (TPWD 2015). The daily bag limit is currently set at 5; however there is very little hunting of the species (Robert M. Perez, Texas Parks and Wildlife Department, pers. comm.).

Between 1959 and 1987, Plain Chachalacas were released on private ranches and state lands (such as wildlife management areas) by Texas Parks and Wildlife in an attempt to expand their range and establish huntable populations in the following South Texas counties (Balda 1989): Brooks, Dimmit, Duval, Hidalgo, Jim Wells, Kenedy, Kleberg, LaSalle, Live Oak, McMullen, Nueces, San Patricio, Starr, Webb, Willacy, and Zapata (Balda 1989). Birds were captured from Bentson State Park (Hidalgo County), Santa Ana National Wildlife Refuge (Hidalgo County), and Longoria Wildlife Management Area (Cameron County) where native populations existed. Numbers released at a site ranged from 7 to 220, with a total of ~2550 released at 42 sites between 1959 and 1987. The majority of releases occurred from 1980–1987. In counties north of TX 285 (a line from Riviera, Texas to Laredo Texas), ~1000 birds were released between 1970 and 1987 (Table 1). An evaluation of the success of releases at 29 sites found that ultimately about 60% failed and that failure could be attributed to predation and/or unsuitable habitat, specifically the density of vegetation near the ground and at 1.5-2 m above the ground (Balda 1989). Success was greater in areas where there was less vegetation near the ground and a denser canopy. Mammalian predation, most likely bobcat (*Lynx rufus*) accounted for 43% of mortalities of radio-tagged Plain Chachalacas studied in the Santa Ana National Wildlife Refuge in 2004 (Gandaria 2009).

Not surprisingly, Plain Chachalacas have been recorded on many checklists submitted to e-bird (www.ebird.org) from throughout the LRGV and particularly in areas along the Rio Grande. What is somewhat surprising is that, in addition to the observation we report here, there are 16 other e-bird records of Plain Chachalacas north

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Figure 1. Photograph of a Plain Chachalaca (*Ortalis vetula*) captured on a game camera deployed on a shell beach on the south shoreline of Nueces Bay, Nueces County, Texas on 10 June 2015.

Figure 2. Cropped and zoomed photograph of Plain Chachalaca (*Ortalis vetula*) in Figure 1.

Table 1. Release sites, dates, and numbers of Plain Chachalacas released north of TX 285, 1970-1987 (Balda 1989).

County	Site	Year	Number of Birds
Dimmit	River Ranch	1981	123
	San Pedro Ranch	1987	31
	Stumberg Ranch	1987	39
Dimmit/LaSalle	Chaparral WMA	1975	53
Duval/Live Oak	Kasper Ranch	1984	40
Jim Wells	Gafford Ranch	1980	80
Kleberg	Los Machos Ranch	1983	60
Kleberg/Kenedy	King Ranch	1984	139
LaSalle	Hillje Ranch	1982	68
	Martin Ranch	1980	68
McMullen	Horton Ranch	1985	64
	Venado Grande Ranch	1985	60
Nueces	Wardner Ranch	1985	60
San Patricio	Mason Ranch	1970	25
	Welder Wildlife Foundation	1982-1987	92
Webb (north of Laredo)	Killam Ranch	1985	61

Table 2. Inclusion of Plain Chachalaca (*Ortalis vetula*) in checklists submitted to e-bird (www.ebird.org) from the area north of a line from Riviera to Laredo (TX 285) in Duval, Jim Wells, Kleberg, and San Patricio counties, 1989-2015. If multiple checklists were submitted for the same day, only the maximum number seen is reported.

County	Location	Date	Number
Duval	Chachalaca Valley (near Freer)	11 July 2009	27
Jim Wells	Lake Findley (Lake Alice)	05 March 2014	1
	US-281/CR 448, Alice	29 November 2014	1
Kleberg	Kingsville (unspecified)	20 July 1989	N/A
		20 February 2002	N/A
	Dick Kleberg Park (CTC 088)	08 April 2011	2
	Arroyo Colorado Unit	15 June 2015	N/A
	Padre Island National Seashore (CTC 063)	09 April 1997	N/A
		16 April 2006	N/A
	Padre Island National Seashore Malaquite Beach	05 June 2011	12
San Patricio	Welder Park, Sinton (CTC 045)	18 April 2005	1
		29 March 2008	2
	Welder Wildlife Foundation	28 April 2009	4
		04 May 2012	3
		05 May 2012	N/A
		28 November 2012	1

of TX 285 in Duval, Jim Wells, Kleberg, and San Patricio counties over the last 26 years (Table 2). The Plain Chachalacas that were transplanted on the Welder Wildlife Foundation in San Patricio County have persisted and are regularly seen and heard (Terry Blankenship, Director, pers. comm.). Their population size is currently unknown, but was estimated at 86-126 individuals during the breeding seasons of 1987 and 1988 (Balda 1989). In e-bird checklists the largest number of birds was reported in July 2009 at "Chachalaca Valley" in Duval County (near Freer), but the majority of sightings have been recorded in Kleberg and San Patricio counties. No birds have been reported from Nueces County or the Nueces River watershed, which includes western San Patricio County. Birds were transplanted on the Wardner Ranch in Nueces County near the Nueces-Kleberg-Jim Wells county lines (Kingsville area) over 48 km from the shell beach where the bird was photographed. Birds were also transplanted on the Mason Ranch in far western San Patricio County along or near the Nueces River near the Live Oak and Jim Wells county lines (Mathis area), also nearly 48 km from the area where we photographed the bird. The Welder Wildlife Foundation is closest at ~32 km away. Maximum dispersal distances measured by Gandaria (2009) were ~1.5 km during the nesting season and 0.7 km during the breeding season. Birds crossed both the Rio Grande and unvegetated tracts of land in his study and neither seemed to inhibit their movements. Expansion of the range of Plain Chachalaca, north of Falcon Dam was reported by Eitniear and Rueckle (1996) and Eitniear (2012).

This is the first confirmed record of Plain Chachalaca in Nueces County since the introduction of the birds into counties north of TX 285. However, the presence of this bird is hard to explain. Its location along a shell beach in an estuarine habitat with shrubby mangroves is noteworthy in and of itself. Equally interesting is the fact that the only known release sites are 32–48 km from the area where this bird was photographed. While it seems likely that the releases near the Nueces River in western San Patricio County in 1970 are the source of this bird, it is remarkable that they have persisted so far north of their natural range for more than 40 years, but even more, that they appear to have dispersed as far as they have.

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THE STATUS OF THE PURPLE MARTIN IN TEXAS

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The Purple Martin (*Progne subis*) is an obligate areal insectivore found across much of North America (Tarof and Brown 2013). In Texas it is found in much of the state except for extreme western areas of the Panhandle and South Plains and most of the Trans Pecos (Ray 1995, 2001; Seyffert 2001; Figure 1, Sauer et al. 2014). All Purple Martins in Texas belong to the subspecies, P. s. subis, which in the United States and Canada occurs west of the Rocky Mountains and is now dependent on man for provisioned nesting cavities (Bent 1942; Hill 1988, Tarof and Brown 2013) that are managed to exclude the House Sparrow (Passer domesticus) and European Starling (*Sturnus vulgaris*; Tarof and Brown 2013; JDR unpubl. data). Management includes the use of starling-resistant entrance holes (Chambers 1994, Kostka 2001), nest tear-outs, and trapping and lethal control of the two exotic species (Ray 2012a, JDR unpubl. data).

Aerial insectivore populations have declined since the mid-1980s at a rate significantly higher than other passerine birds (Nebel et al. 2010). The taxonomic breadth of declining species suggests that downward trends involve changes to insect populations, and long-distance migrants such as the Purple Martin seem particularly affected (Nebel et al. 2010). The northeastern region of the Eastern race's range receives relatively high levels of acid rain and other airborne pollutants, which have negative effects on insect abundance and in turn the productivity of aerial insectivores (Nebel et al. 2010). There may also be a developing mismatch

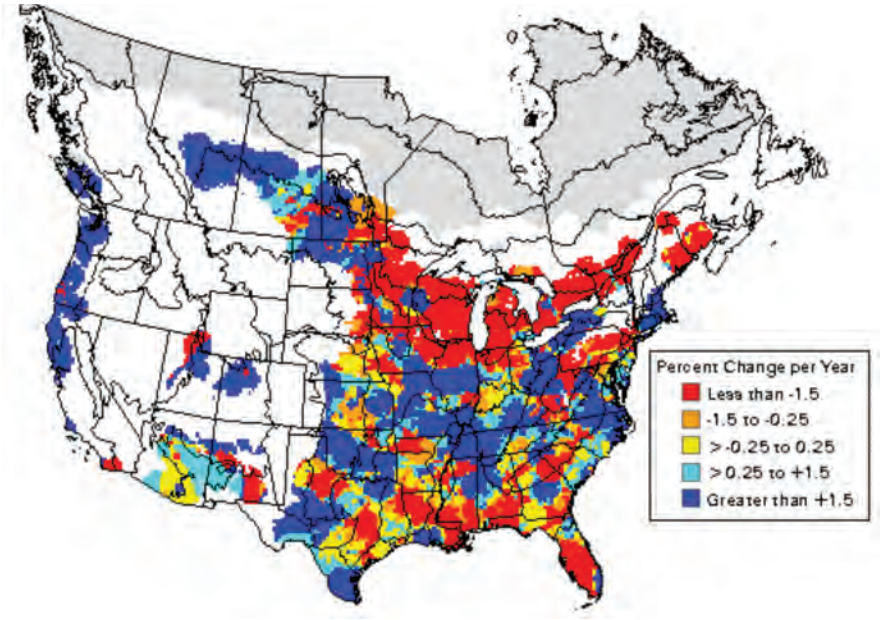

Figure 1. Mean percent change per year for Purple Martin, 1966-2014 (from Sauer pers. comm.).

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between spring arrival dates and insect availability due to climate change (Fraser et al. 2013). Effects of neonicotinoids insecticides are of concern, having been linked to declines of insectivorous birds in Europe (Hallmann et al. 2014).

Purple Martin populations are declining across their range (1966-2014; −1.1% yr^{-1} [−4.3, −0.6]; Sauer pers. comm.) and states along the Gulf Coast of the United States are among those of particular concern (Tautin et al 2009). Purple Martins may be particularly affected by changing human age and ethnic demographics. Artificial housing, including provision and management, is mainly provided by older generations (Ray 2012b). Similarly, the more recent generations and ethnic composition (Lopez 2005) may have a decreasing interest in natural resources management. Thus, regular monitoring of Purple Martins is warranted. Status of Purple Martin populations in Texas was last assessed by Ray (2001) as part of the Texas Breeding Bird Atlas Project (Benson and Arnold 2001). Herein, my objective was to summarize the current distribution and status of the Purple Martin in Texas.

METHODS

I used analyses and maps of the U. S. Geological Survey's Breeding Bird Survey (BBS) to describe the current distribution (Sauer pers. comm. [for 2014 results not posted on the website as of yet]) and population status (Sauer et al. 2014) of the Purple Martin in Texas. For comparative purposes I used the BBS search feature and obtained trend estimates for the Purple Martin on the range-wide level, from surrounding states, and in states and regions where I found that declines are occurring. I also accessed range-wide maps of percent population change (1966-2014; Sauer pers. comm.) and relative abundance (2007-2013; Sauer et al. 2014) from the latest analyses of BBS data. The BBS uses a hierarchical model for trend analyses (Sauer and Link 2011; Sauer et al. 2014), where significance is possible when the credible interval (2.5% and 97.5% percentiles of the posterior distribution of trend estimates) does not contain zero (0).

Because the BBS may not detect Purple Martins in areas with low densities, I augmented BBS data with distribution information from Ray (1995, 2012a) and Seyffert (2001) for the Panhandle, and searched the Internet for evidence of nesting of Purple Martins in the Trans Pecos and adjacent eastern New Mexico (searched for 'Trans Pecos Purple Martins', 'West Texas Purple Martins', 'Guadalupe Mountains Purple Martins,' 'Purple Martins southeast New Mexico,' 'e-bird Purple Martins.')

RESULTS AND DISCUSION

The highest relative abundances of Purple Martins indicated by BBS were in North Texas, the mid- and upper Coastal Plain, and the western and central portions of East Texas (10-30 birds observed per route; Figure 2, Sauer et al. 2014). The densities of Purple Martins east of the 100th Meridian (1-100/ BBS route) are similar to those observed over much of the southern U. S. and northeasterly from Texas through the eastern portions of the Midwest.

BBS data indicate that the Purple Martin nests across all of Texas except for west of a line from the northeast corner of the Panhandle, southwesterly to approximately Lubbock (Lubbock County), Monahans (Ward County), and to west of Fort Stockton (Pecos and Brewster Counties; Figure 1, Sauer et al. 2014). Ray (1995) and Seyffert (2001) confirm Purple Martins nesting further west in the Panhandle to Spearman (Hansford County), Amarillo (Potter and Randall Counties), and Canyon (Randall County). The lack of BBS lines within communities (Ray 1995) and low densities contribute to the lack of detection of Purple Martins upon the High Plains of the Panhandle. The only change from Ray (2001) is that BBS data indicates that Purple Martins inhabit Brewster County in the Trans Pecos (BBS; Sauer et al. 2014).

Colonies in artificial housing in southeastern New Mexico (Lord and Lord 2010) are testimony that Purple Martins could eventually be encountered even in western portions of the South Plains. Additionally, the proximity of the Purple Martins in the mountains of New Mexico adjacent to El Paso, Hudspeth and Culberson counties of the Trans Pecos is intriguing (Figure 1 and 2). Any natural cavity-nesting Purple Martins in western mountains would likely be of the subspecies P. s. arboricola (Behle 1968; Baker et al. 2008; Tarof and Brown 2013). Any finding of Purple Martins breeding in natural cavities (cliff faces, snags, live cottonwoods and oaks; [Tarof and Brown 2013; Ray 1999]) there, or anywhere in Texas would be noteworthy. While Strecker (1912) stated that the

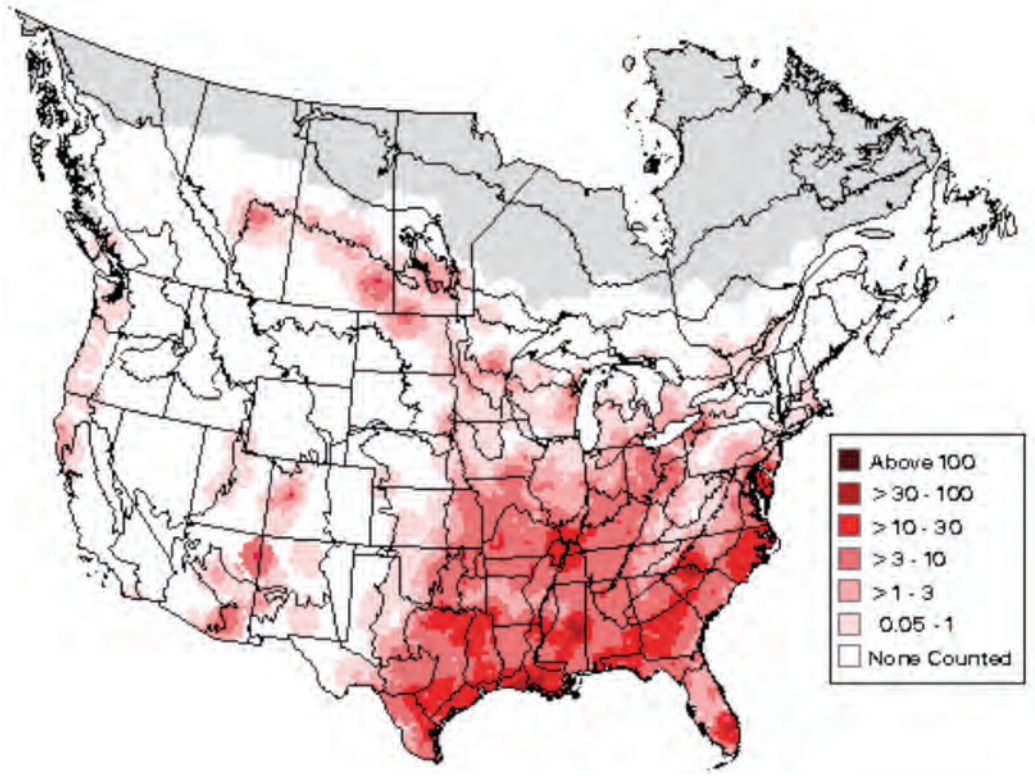

Figure 2. Relative abundance for Purple Martin, 2007-2013 (from Sauer et al. 2014).

Purple Martin occurred statewide, it is unclear if his definition of "inhabitants" included migrants. Peterson and Zimmer (1998) refer to the Purple Martin as a casual migrant in the El Paso area and that specimens exist for Big Bend National Park and the Davis Mountains. A bird list for Guadalupe Mountains National Park lists the Purple Martin as accidental in occurrence (Carlsbad Caverns Guadalupe Mountains Association 1997).

Concern is rising over the significant and long-term population trend of the Purple Martin in North America (Tautin et al. 2009, Fraser 2012). The species is in a range-wide decline (1966-2014) across 20 states and Canadian provinces (Sauer pers. comm.). Of particular concern are populations in the Great Lakes states and provinces, New England states, Maritime provinces, and in states along the Gulf of Mexico. A dozen states and provinces concentrated in the Northeast and along the Pacific Coast have applied such designations as "threatened" or "special concern" to Purple Martins (Tautin et al. 2009).

Louisiana (-2.0 yr^{-1} [-2.9, -1.0], Alabama (-2.7 yr^{-1} [-3.6, -2.0]), and Florida (-2.4 yr^{-1} [-3.6, -1.2]) are experiencing significant long-term population declines. Georgia (-0.3 yr^{-1} [-1.2, 0.5]) and Mississippi (-0.7 yr^{-1} [-1.8, 0.5]) are declining, but not at levels of significance (Sauer pers. comm.). In Texas, populations of the Purple Martin remain stable (1966-2014; 0.4% yr^{-1} [-0.4, 1.1]), if they are not increasing (non-significant). However, Purple Martins in much of East, Central and North Texas appear to be declining similarly to populations in the other Gulf Coast states (red and orange colors in Figure 1; -0.25 to -1.5% yr^{-1}). When compared to a map covering a period prior to the Texas Breeding Bird Survey project (1966-1996; U. S. G. S. Breeding Bird Survey 1996.), it is clear that these areas of concern have expanded (Figure 1 and Figure 3).

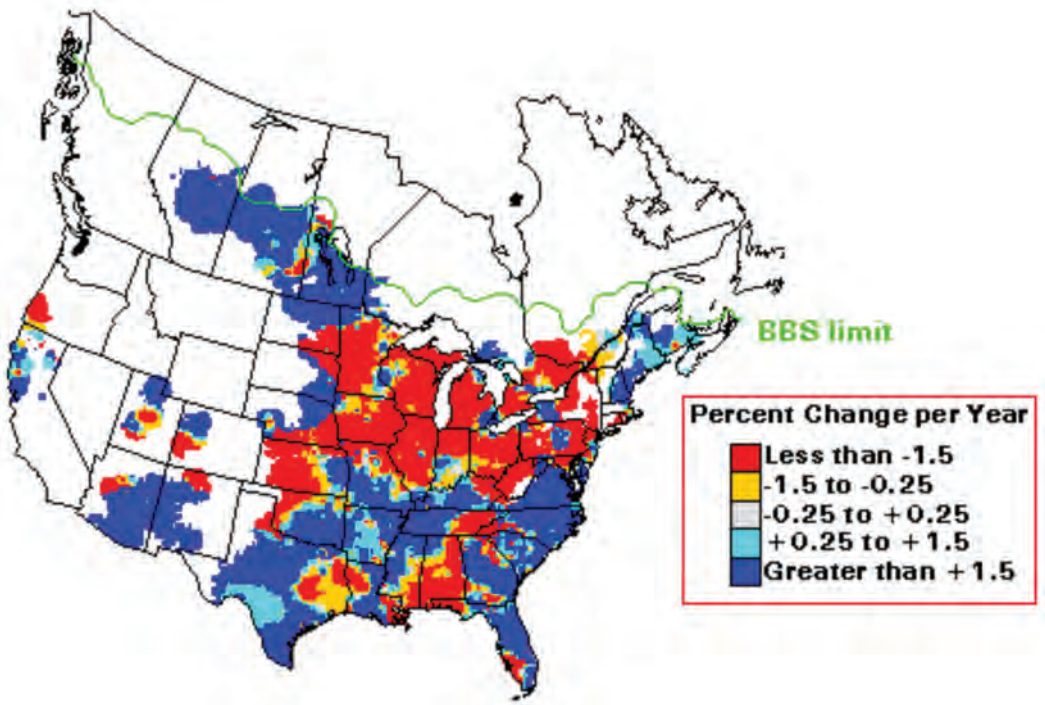

Figure 3. Mean percent change per year for Purple Martin, 1966-1996 (archived map, U. S. G. S. Breeding Bird Survey)

A reversal in trend is apparent in the southern Rolling Plains in northwest Texas.

Reasons for declines are not yet fully explained and may vary across the range. Weather has always played a role in short-term declines, especially in the northern states (Brown 1997). Prolonged cold and wet spells reduce insect activity for long enough periods that die-offs occur (Allan and Nice 1952; Brown 1997; Ray 1997, 2012a) and the frequency of these events can make it difficult for northern populations to recover (Brown 1997). Potential mismatches of migrations and resources due to climate change compound the problem in the north, and may have effects across the range (Fraser 2013). Changing demographics may also affect the availability of housing for the Purple Martin, and whether or not housing is managed to exclude the European Starling and House Sparrow. A colony of ~20 pairs of Purple Martins in the Texas Panhandle plummeted to zero in just three years after the human residents moved away, leaving the housing with the new homeowners who did not take interest in the martins, nor the House Sparrows and European Starlings that proliferated at the site (Ray 2012c).

To date it has been difficult to focus concern on the Purple Martin in the eastern United States; it appears to be common and faring well in artificial housing. The decline in populations across most of the Gulf Coast states should not be over-looked simply because of the relative abundances that are still observed in those states. Monitoring of trends across that region and westerly throughout Texas is warranted. The tradition of erecting and managing housing for Purple Martins should be promoted across all demographics (age groups, ethnic groups, rural, urban) to help ensure the species future (JDR unpubl. data). Ray (2012a) is a source of guidelines for providing the Purple Martin with suitable nesting cavities and management. The booklet details the Purple Martin's life history, and offers suggestions for maximizing ones chances of attracting and maintaining a productive colony.

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DEVELOPMENTAL STAGES OF THE LESSER YELLOW-HEADED VULTURE (*CATHARTES BURROVIANUS)*

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In studies on New World vultures, plumage and soft part coloration have been used to identify individuals (Snyder et al. 1987, Wallace and Temple 1987, Eitniear 1996). Additionally, if such characteristics allow for the determination of age classes, survivorship patterns can be determined (Todd and Gale 1970). Despite being abundant and widespread from Tamaulipas, Mexico (possibly historically in Texas *see* Graber and Graber 1954) south to Uruguay (Eitniear 2014) no detailed criteria are known for age determination in Lesser Yellow-headed Vultures (*Cathartes burrovianus*). Howell and Webb (1995) state the juvenile is undescribed while Hilty and Brown (1986) and Burton (2003) indicate the immature is similar to the adult but browner, with a dusky head. Most accounts focus on visual differences between the species and its closest relative, the Turkey Vulture (*Cathartes aura*) (Ferguson-Lees and Christie 2001, Burton 2003). Here I describe for the first time the pattern of morphological changes in plumage and bare part coloration for defined development classes in the Lesser Yellow-headed Vulture in order to establish developmental criteria for the species in the wild. Known-age individuals in captivity were used as previous studies have shown that captive observations of cathartid vultures accurately mirror the situation in the wild (Todd and Gale 1970, Rea 1983, Snyder and Smith 2002). To augment observations of captive birds the findings were compared to recent photos of cathartid vultures by Manuel Grosselet in Oaxaca, Mexico and information in the published literature. For a detailed description of the definitive plumage coloration in the Lesser Yellow-headed Vulture consult Howell and Webb (1995).

METHODS

Three Lesser Yellow-headed Vultures hatched and raised at the Carolina Raptor Center (Huntersville, NC, USA) were photographed and changes in the coloration of plumage, soft parts, and irides described. Their parents were wild caught and legally imported from an unknown country in northern South American country. The first (hatched on 19 June 2011) was photographed at 7 weeks, 1 year, and 2 years; a second bird (hatched on 25 April 2013) was photographed weekly for the first 11 months, and a third bird (hatched on 20 June 2011), owned by Luke Thurkhill, was photographed at 10 weeks and 1 year of age. Developmental stages were compared to the adults being held at the Carolina Raptor Center and numerous photographs of wild birds at various stages of development.

RESULTS AND DISCUSSION

Considering only plumage, *Cathartes* exhibits a simple basic strategy with a juvenile and adult plumage (Pyle 2008). However, taking soft tissue coloration also into account four developmental

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categories were tentatively assigned. (Fig. 1): Chick (hatching to c. 2 months), Juvenile (> 2 months to 1 year), Immature (1– 2 years), Adult (2–3 years). The chick is covered with long, fluffy white down, which is denser on their head. At 25 days, body down becomes thicker, turning "dingy white" (Fig. 1). Juveniles have brownish plumage, grayish irides, white collar, dark bill, and dark faces with some downy feathers. Yellow on the mandible and face initially become visible between 10 weeks and one year, during which time the downy white collar is replaced with dark feathering. In the immature stage brownish plumage molts into the darker adult plumage. The second year is characterized by varying amounts of facial yellow and blue and the mandible turning from dark to white. During the end of the second year, the adult's mandible is white but the iris may be brown to brownish-orange turning red at the end of the second or beginning of the third year. Development of the Lesser Yellow-headed Vulture is similar to that of its congener, the Turkey Vulture (Howell and Webb 1995). According to Henckel (1981) "hatch year" Turkey Vulture bills are 2/3 dark from the tip to the cere. Additionally, "second year" birds often will not have acquired a totally white beak. Kirk and Mossman (1998) state that *C. aura* has full adult appearance by second fall or winter. Both species are easily aged as juveniles. Juvenile *C. burrovianus* plumage is browner (lighter) than the definitive basic-plumaged adult and contrasts with the Turkey Vulture where the juvenile plumage is darker than that of adults. Second-year birds of both species may have dark coloration on the distal portion of the bill with the iris of the Lesser Yellow-headed often not yet red (*C. aura* iris is brown). Birds by the end of their second year are adults in the definitive plumage. In both species, the legs of juvenile are more creamy, whereas those of adults are flesh to grey-white (Henckel 1981, Burton 2003).

Additional characters that separate the species include *burrovianus* lacking the scaly appearance created by the pale fringes to the upper wing coverts as well as its contrasting wing panel formed by the

Figure 1. Four developmental stages in the Lesser Yellow-headed Vulture (*Cathartes burrovianus*): (A) chick (hatching to c. 2 months), (B) juvenile (> 2 months to 1 year), (C) immature (1 to 2 years), (D) adult (> 2 years). Photos by Richard Schabel and Amber Rosintoski.

Figure 2. Iris coloration changes in the Lesser Yellow-headed Vuture (*Cathartes burrovianus*). (A) captive juvenile, (B) captive immature, (C) wild adult. Photos by Richard Schabel, Amber Rosintoski, and Manuel Grosselet.

white shafts of the outer six primaries. Differences in plumage, head coloration, and habitat preference (Yellow-headed Vultures prefer savannahs) should allow for species determination and ageing of both *Cathartes*. While facial coloration and iris color change (Fig. 2) in a predictable progression the potential influence of diet on the coloration of bare parts makes predicting age using only these characters unreliable.

ACKNOWLEDGMENTS

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2014 ANNUAL REPORT
TEXAS BIRD RECORDS COMMITTEE REPORT FOR 2014

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The Texas Bird Records Committee (hereafter "TBRC" or "committee") of the Texas Ornithological Society requests and reviews documentation on any record of a TBRC Review List species (see TBRC web page at http://texasbirds.org/tbrc/). Annual reports of the committee's activities have appeared in the Bulletin of the Texas Ornithological Society since 1984. For more information about the Texas Ornithological Society or the TBRC, please visit www.texasbirds.org. The committee reached a final decision on 73 records during 2014: 60 records of 33 species were accepted and 13 records of 12 species were not accepted, an acceptance rate of 82.19% for this report. In addition, there was 1 record which was withdrawn by the submitter (Northern Pygmy-Owl, 2013-10). A total of 140 observers submitted documentation (to the TBRC or to other entities) that was reviewed by the committee during 2014.

No new first state records were accepted in 2014. The official Texas State List remains at 639 species in good standing.

In addition to the review of previously undocumented species, any committee member may request that a record of any species be reviewed. The committee requests written descriptions as well as photographs, video, and audio recordings if available. Information concerning a Review List species may be submitted to the committee secretary, Eric Carpenter, 4710 Canyonwood Drive, Austin, Texas 78735 (email: ecarpe@gmail.com). Guidelines for preparing rare bird documentation can be found in Dittmann and Lasley (1992) or at http://www.greglasley.net/document.html.

The records in this report are arranged taxonomically following the AOU Check-list of North American Birds (AOU 1998) through the 55th supplement (Chesser et al. 2012). A number in parentheses after the species name represents the total number of accepted records in Texas for that species at the end of 2014. Species added to the Review List because of population declines or dwindling occurrence in recent years do not have the total number of accepted records denoted as there are many documented records that were not subjected to review (e.g. Brown Jay, Pinyon Jay, Tamaulipas Crow, and Evening Grosbeak). All observers who submitted written documentation or photographs/recordings of accepted records are acknowledged by initials. If known, the initials of those who discovered a particular bird are in boldface but only if the discoverer(s) submitted supporting documentation. The TBRC file number of each accepted record will follow the observers' initials. If photographs or video recordings are on file with the TBRC, the Texas Photo Record File (TPRF) (Texas A&M University) number is also given. If an audio recording of the bird is on file with the TBRC, the Texas Bird Sounds Library (TBSL) (Sam Houston State University) number is also given. Specimen records are denoted with an asterisk (*) followed by the institution where the specimen is housed and the catalog number. The information in each account is usually based on the information provided in the original submitted documentation; however, in some cases this information has been supplemented with a full range of dates the bird was present if that information was made available to the TBRC. All locations in italics are counties. Please note that the county designations of offshore records are used only as a reference to the nearest point of land.

TBRC Membership—Members of the TBRC during 2014 who participated in decisions listed in this report were: Randy Pinkston, Chair; Keith Arnold, Academician; Eric Carpenter, (non-

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voting) Secretary; Greg Cook, Tim Fennell, Mary Gustafson, Petra Hockey, Mark Lockwood, Jim Paton, Martin Reid, and Byron Stone. During 2014, Martin Reid's second-term expired and Petra Hockey was elected to fill that vacancy. The Academician and Secretary were also re-elected.

Contributors–Mark Alvarez, Tony Amos, Scott Atkinson, Mike Austin (**MAu**), Ruben Ayala, Mark Bartosik, Bob Becker, Dan Allen Belcher (**DAB**), Collin Blood, Jeff Bouton, Erik Breden, Kelly Bryan, Frank Bumgardner, Antonio Cantu, Eric Carpenter, Cameron Carver (**CCa**), Nancy Christensen, Sheridan Coffey (**ShC**), Lisa Cole, Scarlet Colley (**ScC**), Steve Collins (**StC**), Greg Cook, Ricky Cosby, Cameron Cox (**CCo**), Chuck Coxe (**ChC**), Rich Damron, Tripp Davenport (**TDa**), Michael David (**MDa**), Mark Dennis (**MDe**), Drew Dickert, Tom Dugan (**TDu**), Mike Dupree, Gil Eckrich, Mark Elliott (**MEl**), Mark Esparza (**MEs**), Ted Eubanks, Paul Fagala, Tim Fennell (**TFe**), Tad Finnell (**TFi**), Joe Fischer, Mark Flippo, Graham Floyd, Harry Forbes, Susan Foster, Tony Frank (**TFr**), Brush Freeman, David Freers, Terry Fuller (***TFu***), Doug Ghrist (**DGh**), Kevin Gin, CJ Goin (**CJG**), Dave Grise (**DGr**), Mary Gustafson, Andrew Haffenden (**AHa**), Jim Hailey (**JHa**), David Hanson, Allen Hardee (**AlH**), Neil Hayward, Sue Heath, Anthony Hewetson (**AHe**), Terry Hibbitts, Emma Hickerson (**EHi**), Ron Hillstrom, Jim Hinson (**JHi**), Ben Hortsmann, Lee Hoy, Erik Huebner (**EHu**), Dan Jones, Joel Jorgensen, John Kaye (**JKa**), Joseph Kennedy (**JKe**), Peter Keyel, David Kidwell, John Kiseda (**JKi**), Rick Knight (**RKn**), Rick Kostecke (**RKo**), Greg Lasley, Larry Layne, Tony Leukering, Michael Lindsey (**MLi**), Mark Lockwood (**MLo**), Scotty Lofland (**ScL**), Sandy Lowry (**SaL**), Mary Anne Marjamaa (**MAM**), David McDonald (**DMc**), Todd McGrath, Craig McIntyre (**CMc**), Jon McIntyre, Mary Mehaffey, Colette Micallef (**CMi**), David Montemayor (**DMo**), Arman Moreno, Martha Norman, Kyle O'Haver, Carolyn Ohl, Sue Orwig, Dory Owen, Jay Packer (**JaP**), Jim Paton (**JiP**), Jeff Patterson (**JeP**), Seth Patterson (**SPa**), Jim Peterson (**JPe**), Sam Petrie (**SPe**), Barrett Pierce, Randy Pinkston, Martin Reid (**MRe**), Holly Reinhard, David Richman (**DRi**), Mike Rickard (**MRi**), Don Roberson (**DRo**), Patricia Rosel, Chris Runk, Kelly Sampeck, David Sarkozi (**DSa**), Mark Scheuerman, Suzanne Schroeder, Bill Scott (**BSc**), Willie Sekula, Paul Sellin (**PSe**), Dennis Shepler (**DSh**), David Sibley (**DSi**), Don Simons (**DSi**), Jana Singletary (**JSi**), Letha Slagle, John Sproul (**JSp**), Jim Stevenson (**JSt**), Byron Stone (**BSt**), Nancy Stotz, Paul Sunby (**PSu**), Romey Swanson, Jannan Swearengin (**JSw**), John Tharp, David Trudeau, John Vanderpoel, Ron Weeks, Shirley Wilkerson, Dale Wolck, Bonnie Wunderlich, Teri Zambon, Phil Ziegler.

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Additional Abbreviations—AOU = American Ornithologists' Union; NP = National Park; NS = National Seashore; NWR = National Wildlife Refuge; SHS = State Historic Site; SNA = State Natural Area; SP = State Park; TBSL = Texas Bird Sounds Library (Sam Houston State University); TCWC = Texas Cooperative Wildlife Collection (Texas A&M University); WMA = Wildlife Management Area.

ACCEPTED RECORDS

Brant (*Branta bernicla*) (32). One se. of Amarillo, Randall, on 8 December 2013 (**BP**; 2014-12).

Trumpeter Swan (*Cygnus buccinator*) (11). Two at Bristol, Ellis, from 14–20 February 2014 (**JSw**, GC; 2014-11; TPRF 3185). One at Lubbock, Lubbock, from 6–14 March 2014 (CCa, StC, MLo, JaP; 2014-14; TPRF 3187).

Masked Duck (*Nomonyx dominicus*) (95). One at Sabal Palm Sanctuary, Cameron, from 29 April–6 May 2013 (SPa, KO; 2013-43; TPRF 3155).

Red-necked Grebe (*Podiceps grisegena*) (28). One at Balmorhea Lake, Reeves, from 10 December 2013–1 January 2014 (**ShC**, GL, MLo, SH, TFi; 2013-78; TPRF 3172). One at White Rock Lake, Dallas, from 24 December 2013–23 January 2014 (**JPe**, KS, CR; 2013-81; TPRF 3174). One at Stillhouse Hollow Reservoir, Bell, from 6–10 March 2014 (**JeP**, RP, GE, SaL; 2014-16; TPRF 3188).

Sooty Shearwater (*Puffinus griseus*) (18). One bird 1 mile offshore from the Port Aransas jetty, Nueces, on 6 September 2013 (**JV**,**TDu**; 2013-53; TPRF 3156). One at Matagorda Jetty Park, Matagorda, on 8 March 2014 (**TM**; 2014-15).

Brown Booby (*Sula leucogaster*) (39). One 12 miles south of Mansfield Cut, South Padre Island, Cameron, on 12 October 2013 (**CB**; 2014-10; TPRF 3184). One at South Padre Island jetty, Cameron, on 8 November 2013 (**DSi**; 2013-77).

Short-tailed Hawk (*Buteo brachyurus*) (43). One in the Chisos Mountains, Big Bend NP, Brewster, from 29 April–14 May 2014 (**MF**, **SPe**, RKn, BSc; 2014-25; TPRF 3195).

(Eurasian) Whimbrel (*Numenius phaeopus phaeopus/variegatus/alboaxillaris*) (1). One at Crystal Beach, Galveston, from 29 April–19 May 2013 (**CCo**, EC, MLi, DH, SW, DMc, KG; 2013-37; TPRF 3154). Thought by most to be N.p. phaeopus; first documented record in Texas for this subspecies group.

Ruff (*Calidris pugnax*) (35). One at Anahuac NWR, Chambers, from 19 April–4 May 2014 (**CCo**, DSa, PF, DK, JSi, ShC, DRo, JT; 2014-22; TPRF 3193).

Red Phalarope (*Phalaropus fulicarius*) (44). One at Lake Wichita, Wichita, on 1 September 2013 (**GC**; 2013-57; TPRF 3158). One at McNary Reservoir, Hudspeth, on 6 October 2013 (**JiP**; 2013-58; TPRF 3159).

Black-legged Kittiwake (*Rissa tridactyla*) (98). One at S. Padre Island/Boca Chica Jetty, Cameron, from 11 December 2012–15 February 2013 (**DJ**, MRe, ChC; 2013-15; TPRF 3149). One at Mustang Island SP and Port Aransas, Nueces, from 31 December 2012–10 March 2013 (**NS**, DT, PSu, TZ, JaP, BSt; 2013-02; TPRF 3147). One at Balmorhea Lake, Reeves, from 17 November–1 December 2013 (**MLo**, BSt, GF; 2013-73; TPRF 3168). One at Ascarate Park, El Paso, El Paso, on 27 November 2013 (**GC**, JiP; 2013-75; TPRF 3170). One at Jonathan Rogers Wastewater Treatment Plant, El Paso, on 3 December 2013 (**CJG**, DRi; 2013-76; TPRF 3171). One at Balmorhea Lake, Reeves, on 7 December 2013 (**GF**, **DSh**; 2014-13; TPRF 3186). One at Port Aransas, Nueces, from 29 December 2013–26 February 2014 (**TDa**, JM, TA; 2014-07; TPRF 3181). One at Souh Padre Island, Cameron, from 31 January–13 February 2014 (**DJ**, ScC; 2014-05; TPRF 3179). One at Lake Palestine, Smith, on 9 February 2014 (**GC**, DGh; 2014-09; TPRF 3183).

Iceland Gull (*Larus glaucoides*) (6). One at San Luis Pass, Galveston, from 16–18 April 2014 (**JSt**, RW, EC, CMi; 2014-20; TPRF 3191).

Slaty-backed Gull (*Larus schistisagus*) (7). One at Lake Casa Blanca, Webb, from 6 February–13 March 2014 (**SF**, HR, MAu, DJ, EHu, RP, BSt, MDe, MS, LH, MDa; 2014-08; TPRF 3182).

Great Black-backed Gull (*Larus marinus*) (53). One at Surfside/Quintana, Brazoria, from 25 November–24 December 2012 (**JSt**, TE, HF, MB; 2013-18; TPRF 3150). One at Texas City Dike, Galveston & San Luis Pass, Quintana, Brazoria, from 5 December 2012–28 March 2013 (**JKe**, TDa, AlH, TZ, TFr, MB; 2012-75; TPRF 3145). One at East Beach & Texas City Dike, Galveston, from 6–26 January 2014 (**JF**, DMc; 2014-04; TPRF 3178). One at Bolivar Flats, Galveston & Quintana, Brazoria, from 6–25 March 2014 (**JJ**, JF; 2014-17; TPRF 3189).

Black Noddy (*Anous minutus*) (4). One offshore at East or West Flower Garden Banks, Galveston, on 12, 13, 14 or 15 May 2003 (DSi, EHi; 2012-79; TPRF 3146).

Elegant Tern (*Sterna elegans*) (5). One near Bolivar Flats, Galveston, on 14 September 2013 (**MB**; 2013-59; TPRF 3160). One at Ascarate Park, El Paso, El Paso, on 8 May 2014 (JiP; 2014-30; TPRF 3198).

Costa's Hummingbird (*Calypte costae*) (38). One at Terlingua, Brewster, from 22 November–4 December 2013 (**BW**, CO, KB, BSt; 2013-74; TPRF 3169).

Amazon Kingfisher (*Chloroceryle amazona*) (2). One near Los Ebanos Preserve, Cameron, from 9 November–5 December 2013 (**JB**, MEs, AM, TL, NC, MM, DF; 2013-68; TPRF 3166).

Tufted Flycatcher (*Mitrephanes phaeocercus*) (4). One at Padre Island National Seashore Headquarters, Kleberg, on 22 April 2014 (**PZ**; 2014-24; TPRF 3194).

Greater Pewee (*Contopus pertinax*) (25). One at Bear Creek Park, Harris, from 25 December 2013–8 April 2014 (**JHi**, **DD**, DW, LS, MD, DSh, SO; 2014-03; TPRF 3177).

Buff-breasted Flycatcher (*Empidonax fulvifrons*) (28). One at Wolf Den Canyon, Davis Mts Preserve, Jeff Davis, on 26 May 2013 (**MG**; 2013-49).

Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*) (24). One at Paradise Pond, Port Aransas, Nueces, on 29 September 2013 (**ShC**, PSe; 2013-56; TPRF 3157). One at Packery Channel, Nueces, from 1–3 May 2014 (**DGr**, WS, CMc, JM, BH; 2014-26; TPRF 3196).

Gray Kingbird (*Tyrannus dominicensis*) (12). One on w. Galveston Island, Galveston, on 8 April 2014 (**JSt**; 2014-27; TPRF 3197).

Fork-tailed Flycatcher (*Tyrannus savanna*) (25). One near Boca Chica Unit, Las Palomas WMA, Cameron, from 3–5 November 2013 (**MRi**, EB; 2013-65; TPRF 3163).

Rose-throated Becard (*Pachyramphus aglaiae*) (51). One at Sabal Palm Sanctuary, Cameron, on 12 November 2013 (**MAM**; 2013-71). One at Sabal Palm Sanctuary, Cameron, from 26 January–25 February 2014 (**TDa**, DMo, MEs, BB, JM, TFe, StC, SS, LL; 2014-06; TPRF 3180).

Pinyon Jay (*Gymnorhinus cyanocephalus*) (2). One at El Paso, El Paso, on 15 August 2013 (**JiP**; 2013-52).

(Russet-backed) Swainson's Thrush (*Catharus u. ustulatus/oedicus*) (2). One at Paradise Pond, Port Aransas, Nueces, on 13 April 2013 (**MRe**, RH; 2013-28; TPRF 3152).

Rufous-backed Robin (*Turdus rufopalliatus*) (20). One at Old Hidalgo Pumphouse, Hidalgo, on 13 October 2013 (**DO**; 2013-62; TPRF 3162). One at Palo Duro Canyon State Park, Randall, on 21 October 2013 (**RC**; 2013-67; TPRF 3165). One 5 miles west of Camp Wood, Edwards, on 8 April 2014 (**TH**; 2014-21; TPRF 3192).

Varied Thrush (*Ixoreus naevius*) (44). One at El Paso, El Paso, from February 2014–19 April 2014 (JKi, DAB, JiP; 2014-19; TPRF 3190).

Golden-crowned Warbler (*Basileuterus culicivorus*) (22). One at Frontera Audubon Thicket, Hidalgo, from 12 October–6 November 2013 (**PR**, HR, AHa; 2013-60; TPRF 3161).

Flame-colored Tanager (*Piranga bidentata*) (11). One at Boot Springs, Big Bend NP, Brewster, from 6 May–1 July 2013 (**MF**, BSt, EC, MLo, RP, NH, ScL; 2013-35; TPRF 3153).

Crimson-collared Grosbeak (*Rhodothraupis celaeno*) (35). One at Sabal Palm Sanctuary, Cameron, from 12 February–19 May 2013 (**SPa**, RA, FB; 2013-19; TPRF 3151). One at Santa Ana NWR, Hidalgo, on 19 January 2014 (**TFu**; 2014-02; TPRF 3176).

Evening Grosbeak (*Coccothraustes vespertinus*) (10). One at Dog Canyon, Guadalupe Mountains NP, Culberson, from 10 January–14 March 2013 (**WS**, **MRe**, MLo, CCa; 2013-05; TPRF 3148). One at Pine Springs, Guad Mountains NP, Culberson, on 26 October 2013 (**RS**; 2013-80; TPRF 3173). One at Clapp Park, Lubbock, Lubbock, from 3 November 2013–1 March 2014 (**AHe**, StC, PK, RD, CCa, DJ; 2013-66; TPRF 3164). One at Fritch, Hutchinson, on 11 November 2013 (**MEl**; 2013-72; TPRF 3167). One at Morton, Cochran, on 29 December 2013 (**RKo**; 2013-82; TPRF 3175).

NOT ACCEPTED

A number of factors may contribute to a record being denied acceptance. It is quite uncommon for a record to not be accepted due to a bird being obviously misidentified. More commonly, a record is not accepted because the material submitted was incomplete, insufficient, superficial, or just too vague to properly document the reported occurrence while eliminating all other similar species. Also, written documentation or descriptions prepared entirely from memory weeks, months, or years after a sighting are seldom voted on favorably. It is important that the simple act of not accepting a particular record should by no means indicate that the TBRC or any of its members feel the record did not occur as reported. The non-acceptance of any record simply reflects the opinion of the TBRC that the documentation, as submitted, did not meet the rigorous standards appropriate for adding data to the formal historical record. The TBRC makes every effort to be as fair and objective as possible regarding each record. If the committee is unsure about any particular record, it prefers to err on the conservative side and not accept a good record rather than validate a bad one. All records, whether accepted or not, remain on file and can be re-submitted to the committee if additional substantive material is presented.

Trumpeter Swan (*Cygnus buccinator*). Two at Georgetown, Williamson, from 16 December 2011–21 January 2012 (2013-22).

Masked Duck (*Nomonyx dominicus*). One at Donna Reservoir, Hidalgo, on 12 January 2013 (2013-12).

Red-necked Grebe (*Podiceps grisegena*). One at Hubbard Creek Reservoir, Stephens, on 12 January 2014 (2014-01).

Northern Goshawk (*Accipiter gentilis*). One at Lewisville Lake Environmental Learning Area, Denton, on 27 December 2012 (2013-25).

Roadside Hawk (*Buteo magnirostri*s). One at Bentsen SP, Hidalgo, on 29 October 2013 (2013-63).

Mew Gull (*Larus canus*). One at Texas City Dike, Galveston, on 1 March 2013 (2013-39).

Vaux's Swift (Chaetura vauxi). One at Austin, Travis, on 15 October 2013 (2013-61).

(Russet-backed) Swainson's Thrush (*Catharus u. ustulatus/oedicus*). One at El Paso, El Paso, on 16 June 2013 (2013-45).

Crescent-chested Warbler (*Oreothlypis superciliosa*). One in the Chisos Mountains, Big Bend NP, Brewster, on 24 September 2013 (2013-54).

(Slate-colored) Fox Sparrow (*Passerella iliaca*). One at Rio Bosque Wetlands Park, El Paso, El Paso, on 29 April 2013 (2013-44).

Black-vented Oriole (*Icterus wagleri*). One at Pine Canyon, Big Bend NP, Brewster, on 10 August 2013 (2013-55).

Evening Grosbeak (*Coccothraustes vespertinus*). Up to two at Devil's River near Dry Devil's River mouth, Val Verde, from 1–2 March 2013 (2013-23). One at the El Paso zoo, El Paso, on 6 November 2013 (2013-70).

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GOLDEN EAGLE PREDATION OF AN ADULT TURKEY VULTURE

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The Golden Eagle (*Aquila chrysaetos*) is a large, apex predator that occurs at low densities, has a long life span, experiences delayed maturity, has low reproductive rates, and has no natural predators (Watson 1997, Kochert et al. 2002). Golden Eagles are sensitive to anthropogenic driven landscape changes in land cover and land use (Hunt 2002, Kochert and Steenhof 2002). Landscape level alterations, such as encroachment of woody vegetation in eagle foraging areas, may result in decreased abundance of suitable prey or interfere with the eagle's ability to see or capture prey. Currently, there is substantial concern for Golden Eagle conservation due to widespread anthropogenic changes to landscapes across much of the species distribution (U.S. Fish and Wildlife Service 2013). In particular, the rapid expansion of wind energy development has led to heightened concerns for Golden Eagle conservation, as the species is susceptible to mortality through collision with turbines (Hunt 2002, U.S. Fish and Wildlife Service 2013). This has resulted in a recent increase in research to develop a better understanding of the species' ecology.

Across their distribution, Golden Eagles forage primarily on small to medium sized mammals such as rabbits and hares (*Leporidae*), ground squirrels (*Spermophilus* spp.), prairie dogs (*Cynomys* spp.), and marmots (*Marmota* spp.) (Mollhagen et al. 1972, Olendorff 1976, Kochert et al. 2002). Golden Eagles are, however, able to capture gallinacious birds, waterfowl and wetland birds, snakes, and they occasionally capture young ungulates (e.g., Goodwin 1978, Deblinger and Alldredge 1996), and predatory mammals such as coyotes (*Canis latrans*), red fox (*Vulpes fulva*), badger (Taxidea taxus), and bobcat (*Lynx rufus*) (see Kochert et al. 2002 for review).

Similar to other birds of prey (Klem et al. 1985, Ellis et al. 1999), Golden Eagles will also occasionally prey on other raptors, including Northern Harriers (*Circus cyaneus*) and American Kestrels (*Falco sparverius*; McGahan 1968), Great Horned Owls (*Bubo virginianus*; Boeker and Ray

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Figure 1. Carcass of an adult Turkey Vulture in a Golden Eagle nest that was occupied by one nestling.

1971), and Osprey (*Pandion haleaetus*; LaFontaine and Fowler 1976, Restani 2015). However, I can find no published records of direct predation on, or of scavenging of, Turkey Vultures (*Cathartes aura*) by Golden Eagles. The two species often occupy the same areas, and Golden Eagles are known to kleptoparasitize Turkey Vultures (Coleman and Fraser 1986, Evens 1991), but with the exception of one report of a Bald Eagle (*Haliaeetus leucocephalus*) killing a Turkey Vulture (Tyler 1937), it appears eagle predation on Turkey Vultures is either very rare or has gone unreported. Indeed, adult Turkey Vultures appear to have few natural predators and on the apparently rare occasions when it occurs, reported predation is by mammals (Kirk and Mossman 1998).

On 8 April 2006, while conducting helicopter based surveys for eagles in the Texas Panhandle, I observed the carcass of an adult Turkey Vulture in a Golden Eagle nest that was occupied by one nestling (Fig. 1). The carcass appeared fresh and had been mostly consumed, but the head and the beak allowed definitive identification as an adult Turkey Vulture.

To my knowledge, this is the first documentation of presumed predation and subsequent consumption of a Turkey Vulture by a Golden Eagle. Information on Golden Eagles in general (Spofford 1964, Rideout et al. 1984, Boal et al. 2008) and their food habits in particular (Mollhagen et al. 1972), is generally lacking for Texas. In the only quantitative food habits study of the species in the region, Mollhagen et al. (1972) reported black-tailed jackrabbits, prairie dogs, cottontails, and rock squirrels accounted for 90% of the prey remains found in 41 Golden Eagle nests in west Texas and New Mexico, and did not mention any evidence of vulture remains. As more focused studies of Golden Eagle food habits are conducted, vultures may be revealed to be a more common prey than currently believed, or this report may represent a truly rare case.

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OBSERVATIONS OF BURROW USE BY BARN OWLS (*TYTO ALBA*) IN WEST TEXAS

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The Barn Owl (*Tyto alba*) is one of the most widely distributed and well-studied owls in North America (Marti et al. 2005). Barn Owls typically roost and nest in tree cavities, cliffs, rock outcrops, and caves, as well as human structures such as farm buildings, abandoned houses, and nest boxes (Marti et al. 1979; Bunn et al. 1982; Marti et al. 2005). On occasion Barn Owls are known to construct and inhabit burrows in the walls of steep-sided riverbanks and arroyos (Marti et al. 2005), although

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this behavior is not well documented and its adaptive significance remains poorly understood. Burrow use has previously been documented among Barn Owls in California (Dawson 1923; Hawbecker 1945), Colorado (Millsap and Millsap 1987), and New Mexico (Martin 1973). We here present observations of Barn Owls using burrows for roosting and nesting in the Trans-Pecos Region of west Texas. To our knowledge, this is the first report of burrow use by Barn Owls in Texas.

We found Barn Owls inhabiting burrows excavated in the vertical wall of an arroyo approximately 15 km E-SE of Alpine (30°21´N; 103°39´W; elevation ca. 1370 m) in Brewster County (Figure 1). The habitat in this area is best described as arid grassland and shrubland (*Prosopis glandulosa* and *Larrea tridentata*) with scattered cottonwoods (*Populus deltoides*) and hackberry (*Celtis reticulata*) along watercourses (Powell 1998; Platt et al. 2014). Barn Owls inhabited three burrows along approximately 100 m of arroyo wall. The arroyo has a maximum depth of about 6.0 m and contains water only in the wake of significant rainfall events (usually during the summer monsoon in June-August; Leithead 1959). The entrance to each burrow was rectangular to oval-shaped and marked by white fecal stains, measured approximately 15-20 cm wide × 25-30 cm high, ranged from 3.6 to 5.4 m above the arroyo floor, and had a west-facing orientation (Figure 2). Burrow architecture in west Texas appears similar to that reported in other states (Dawson 1923; Martin 1973; Millsap and Millsap 1987). West-facing burrows in Texas would presumably be warmer, but also exposed to the desiccating effects of prevailing westerly winds. However, Millsap and Millsap (1987) concluded that directional exposure of Barn Owl burrows is essentially random and probably dictated by the availability of suitable substrates. We noted large accumulations of pellets and disarticulated bones on the arroyo floor beneath the entrance of each burrow; a preliminary analysis of this material suggests woodrats (*Neotoma* sp.) and kangaroo rats (*Dipodomys* sp.) comprise a large portion of the diet (Platt et al., unpubl. data).

We inspected the burrows on 3 March 2007, 12 September 2008, 4 April 2009, 1 September 2009, 18 April 2010, and 23 October 2010. One to five Barn Owls were flushed from burrows

Figure 1. Three burrows used by Barn Owls for roosting and nesting were found in the walls of this steep-sided arroyo.

during each visit, except on 12 September 2008 when no Barn Owls but two adult Great Horned Owls (*Bubo virginianus*) were encountered in the arroyo. Because Great Horned Owls are known to prey on Barn Owls (Millsap and Millsap 1987; Marti et al. 2005) and burrows apparently offer little protection from Great Horned Owls (Millsap and Millsap 1987), we speculate the Barn Owls may have temporarily abandoned the burrow complex to avoid predation. Eggshells found beneath burrow entrances on 12 September 2008 and 1 September 2009 confirm that in addition to serving as roost sites, Barn Owls use the burrows for nesting. Our observation of multi-year burrow occupancy is not unexpected as others (Martin 1973; Millsap and Millsap 1987) found Barn Owls inhabiting the same burrows for two consecutive years. According to Marti (1999), Barn Owls often reuse nest sites for many years, although the turnover of individual owls is generally high.

The underlying factors responsible for burrow use by Barn Owls remain unclear. Martin (1973) suggested that Barn Owls nested in burrows only where human structures and large trees with cavities were absent. However, Millsap and Millsap (1987) found Barn Owls using burrows even where seemingly suitable alternate sites (e.g., cliffs, abandoned buildings, cavity-bearing trees, and nest boxes) were available. We likewise found Barn Owls inhabiting a natural rock crevice (N = 1), abandoned farm buildings (N = 2), empty water storage tanks (N = 2), and a derelict railroad car (N = 1) suggesting that a paucity of suitable alternate sites was probably not responsible for burrow use in our area.

Burrow use among Barn Owls is more likely related to thermal advantages provided by the relatively stable microclimate of the burrow interior where air temperatures are warmer than ambient during cold periods and cooler than ambient during hot periods, and relative humidity greatly

Figure 2. Entrance to a burrow occupied by Barn Owls. Note the white fecal stains below the burrow mouth.

exceeds that of the outside atmosphere owing to the effects of soil moisture (Reichman and Smith 1990; Kinlaw 1999; Doody et al. 2015). This may be critical during the winter when metabolic demands for heat production are elevated (Marti et al. 2005) and mortality can be high (Speirs 1940; Smith and Marti 1976; Marti and Wagner 1985). During the winter, Barn Owls compensate for the high metabolic cost of heat production by roosting in sheltered locations (McCafferty et al. 2001), and Millsap and Millsap (1987) demonstrated that Barn Owls inhabiting burrows are more likely to survive cold conditions when compared to those dwelling in less well insulated shelters.

During the summer months burrows probably function as refuges from high diurnal temperatures and low relative humidity (Millsap and Millsap 1987). Given the relatively mild winter temperatures typical of the Trans-Pecos (temperatures rarely < 0°C; Powell 1998), we speculate that high summer temperatures and extreme aridity rather than low winter temperatures are the primary driver for burrow use by Barn Owls in west Texas. It is worth noting that although Barn Owls occur throughout most of North America (Marti et al. 2005), reports of burrow use (Dawson 1923; Hawbecker 1945; Martin 1973; Millsap and Millsap 1987; our observations) are confined to arid habitats.

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INTERSPECIFIC FEEDING OF CAROLINA WREN NESTLINGS AND FLEDGLINGS BY AN EASTERN PHOEBE

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Carolina Wrens (*Thryothorus ludovicianus*) and Eastern Phoebes (*Sayornis phoebe*) are birds of the Eastern USA and both are documented to nest during the spring months in east Texas (Benson 1992; Tweit 2007). Numerous instances of interspecific bird feeding behavior exist (Beck 1925; Robinson 1962; Bragg 1968). A thorough literature review published in 1982 identified 65 separate species participating in interspecific feeding behavior (Shy 1982). The list included an Eastern Phoebe feeding nestling Tree Swallows (*Tachycineta bicolor*) and two instances of Carolina Wrens feeding nestling Great Crested Flycatchers (Myiarchus crinitus) and Tufted Titmice (*Baeolophus bicolor*). No references were found to document an adult Eastern Phoebe feeding Carolina Wren nestlings and/or fledglings.

The following observations and photographs were made at my residence, 4.82 km E of Edom in Van Zandt County, Texas (32°35'93.91"N, 95°55'88.67"W). Observations were centered around two previously constructed and installed wooden platforms, one 15.2 cm by 22.9 cm by 2.5 cm and the other 19.0 cm by 17.8 cm by 3.8 cm. They were designed and placed in the corners and under the covered porch to encourage nesting Eastern Phoebes (Fig. 1). Both platforms had previously been used in past years as successful nest sites for Eastern Phoebes and Carolina Wrens. The nest platforms are 14 m apart and not directly in view of each other.

A pair of Eastern Phoebes was observed in the yard during early May 2015 and nest building began during the week of 11 May and was completed during the week of 18 May. A phoebe periodically sat in the nest during the week of 25 May and nest sitting became more constant 28 May through 3 June, with the second phoebe in attendance in the adjacent yard. From 4 June through 7 June, no

Figure 1. Nesting platform under porch used by Eastern Phoebes.

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Figure 2. Carolina Wren nest placement and construction on nest platform under covered porch.

Figure 3. Eastern Phoebe perched at active Carolina Wren nest.

phoebes were observed at the nest. A check of the nest on 8 June revealed that no eggs were present.

Two Carolina Wrens had constructed a nest in late April 2015 at the other nest platform using primarily short leaf pine (*Pinus echinata*) and loblolly pine (*Pinus taeda*) needles. The nest was placed between the top of the platform and the porch roof with a side entrance (Fig. 2). Nest placement

and construction conformed to previous accounts (Terres 1991). The wrens were observed feeding young hatchlings during the week of 1 June.

On 9 June, one phoebe was observed perched within 2.4 m of the active wren nest. Several fights occurred between the two birds involving direct contacts in the air and on the ground. The wren also chased the phoebe from the immediate nest vicinity. This was temporary and the phoebe continued to return and perch nearby.

On 10 June, the phoebe was observed perched near the wren nest several times and the wren/phoebe confrontations continued. The phoebe was observed to briefly perch on the edge of the wren nest platform near the nest opening. The wrens continued to feed their young.

On 11 June, the phoebe was observed sitting on the back railing of a metal chair with a food item in its bill. The bird struck the food item several times, back and forth, against the chair railing. It then flew to the wren nest and fed the wren hatchlings (Fig. 3). Additionally, the phoebe completely entered the wren nest, turned around, and settled over the young wrens in a brooding posture (Terres 1991). Fights between the phoebe and wren continued; however, the phoebe continued to feed the wren chicks.

On 12 June, the wren and phoebe fed the wren chicks and both birds were observed removing fecal sacs. No fights were observed between the two adult birds.

On 15 June through 17 June, no adult wrens were seen at the nest site. However, the phoebe remained in the immediate vicinity and fed and removed fecal sacs. During one feeding on 16 June, the phoebe was observed to remove a fecal sac and immediately return to remove another. At approximately 1700 DST on 17 June, four wren chicks fledged and congregated in the corner of the porch. The phoebe appeared very excited and quickly flew to the yard and returned, bringing food items to the chicks. Within 10 minutes, the chicks began to move into the yard and the phoebe continued to locate and feed the fledglings (Fig. 4). No wren adults were observed attending their fledglings. The phoebe continued to feed until nightfall.

The phoebe and wren chicks were not seen again until 1230 on 23 June. A phoebe was observed feeding 2 wren chicks in an American sweetgum tree *(Liquidambar styraciflua*) within 18 m of the old wren nest.

The evidence suggests the adult phoebe took the active wren nest from the parents at least 3 days before fledging and continued to feed some of the wren chicks for at least an additional 6 days after fledging. The phoebe had what appeared to be an active nest for several days, but became inactive, possibly due to the loss of its mate and/or predation of the eggs. In a previous account, it has been noted that interspecific feeding behaviors can be triggered when there is closeness of nests between species, especially when a nest is lost (Shy 1982).

This interaction between the two species of birds would seem to give the evolutionary advantage to the wrens since they are the ones that actually had young that fledged. However, the phoebe may have gained some future advantage. Dawkins (1976) suggested that adopters could benefit by gaining practice in the "art of child rearing". This bird gained experience in offensive and defensive maneuvers with a different species. Additionally, it became very proficient at capturing food to feed young nestlings and fledglings. These attributes could be applied to future phoebe nestings.

Figure 4. Eastern Phoebe feeding newly fledged Carolina Wren chicks.

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BOOK REVIEWS

LCOLIBRÍES DE MÉXICO Y NORTEAMÉRICA
HUMMINGBIRDS OF MEXICO AND NORTH AMERICA

María del Coro Arizmendi y Humberto Berlanga; ilustraciones de Marco Antonio Pineda

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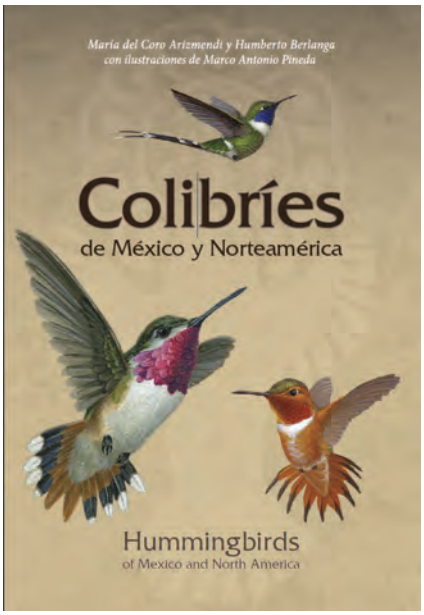

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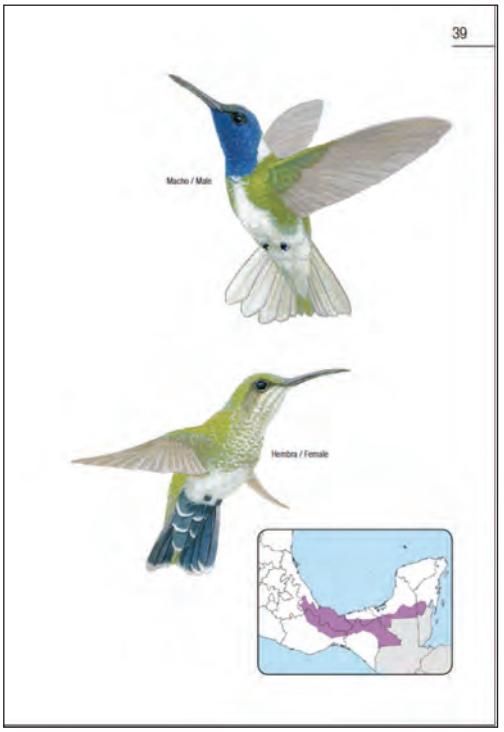

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Article VI. Officers	*Article V. Officers*
Article VII. Executive Board	*Article IV Board of Directors.*
Article VIII. Committees	*Article VI. Committees*
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WHAT'S IN THE NEW BYLAWS?

Article I. Name Purpose and Offices. Self-explanatory.

Article II. Members. Establishes the class of members who are voting members of the Corporation. Defines "good standing". Details of other types of memberships, dues, etc. will be in the membership P&Ps. Includes missing language related to suspension, termination and appeals.

Article III. Meetings of Members. Provides for an annual meeting of the Corporation. Includes required details of notice, waiver of notice voting, electronic attendance, mail ballots for election of the Board; membership lists, and establishment of a record date. Many of these details were missing in the old documents.

Article IV. Board of Directors. Creates the Board of Directors. Sets number at twelve (12): the 8 regions, plus four at-large. Regions remain the same as in old documents. Provides all details of the operation of the Board e.g. terms; vacancies; removal and resignation; meetings (all types); notice; waiver of notice; quorum; actions of the Board; voting; consent; attendance; etc. Many of these required details were missing in the old documents.

Article V. Officers, Agents, Employees. Establishes the four offices (President-elect is eliminated); authority to appoint agents and employees (permissive, not mandatory); terms; duties of the officers; and authority for other duties as needed. These required details were missing in the old documents.

Article VI. Committees of the Board. Establishes only three standing committees in the Bylaws: the Executive Committee, the Nominating Committee and the Texas Bird Records Committee (details are self-explanatory). Provides authority for the Board, or the President, to establish such other committees as are needed.

Article VII. Indemnification of Officers and Directors. Language is similar to that found in the Articles, but here the requirement for indemnification uses the word "shall". Provides exceptions for breach of duties. Note that the language related to breach is the same as the indemnification language in the Articles.

Article VIII. Miscellaneous Provisions. Self-explanatory.

Article IX. Dissolution. Language parallels that in the Articles.

Article X. Amendments. Note that language continues the policy to let the Board handle the routine amendments, but provides that only the voting members can amend Article II Section 1 (authority for voting members); Article III, Sec. 1 (authority to elect the Directors); and Article X, Sec. 1 (these reserved amendment powers). This ensures that no future Board could eliminate the right of the voting members to elect the Board of Directors.

BYLAWS
OF
TEXAS ORNITHOLOGICAL SOCIETY

ARTICLE I
Name, Purpose, and Offices

Section 1. Name. The name of the corporation is Texas Ornithological Society, hereinafter the Corporation.

Section 2. Purpose. The Corporation is organized exclusively for religious, charitable, scientific, literary or educational purposes within the meaning of Section 501 (c)(3) of the Internal Revenue Code, or the corresponding sections
of any future federal tax code.

Section 3. Offices. The Corporation shall have a registered office, and may have other offices at such places as the Board of Directors may from time-to-time determine, or as the activities of the Corporation may require.

ARTICLE II
Members

Section 1. Members of the Corporation. There is hereby established a class of members who shall be members of the Corporation, and who shall have voting rights in respect thereof as provided by these Bylaws. All members in this class of membership shall be members in good standing, and shall meet such other criteria as are adopted from time-to-time by the Board. Each member in this class of membership shall be entitled to one (1) vote.

Section 2. Other Classes or Categories of Members. The Board may establish such other classes or categories of members as it from time-to-time deems appropriate. Persons or organizations in such other classes or categories of members shall not be members of the Corporation, and shall not have voting rights in respect thereof.

Section 3. Good standing defined. As used in these Bylaws, or in policies and procedures, "member in good standing" shall mean a person or an organization that has paid the required dues, if any, for the member's class or category of membership, and who has complied with the other requirements of membership as determined by the Board of Directors.

Section 4. Benefits, Dues and Policies. The Board may establish, and from time-to-time amend, membership qualifications, benefits, dues, and policies for each class or category of members established by these Bylaws, or by the Board.

Section 5. Suspension, Termination, and Appeal. The Board, by an affirmative vote of a majority of the Board, may suspend or terminate a member with or without cause at a meeting whose notice shall include such proposed suspension or termination. The Board shall notify the member promptly of his or her suspension or termination. Any member may appeal his or her suspension or termination by filing a written appeal with the Secretary of the Board within thirty (30) days of the date the Board mailed the notice of suspension or termination. Suspension for failure to pay dues may not be appealed, but may be corrected by paying the amount in arrears. The Board shall consider any appeal at the next regularly scheduled meeting. The decision of the Board shall be final.

Section 6. Resignation. Any member may resign by filing a written resignation with the Secretary of the Board, which resignation shall become effective on the date specified in the written resignation, but in no case before the date of receipt. If no date is specified, the effective date of the resignation shall be the date of receipt.

ARTICLE III

MEETINGS OF MEMBERS

Section 1. Annual Meeting. There shall be an annual meeting of the members, which shall take place at such a time and place as is fixed by the Board. At the annual meeting, the voting members of the Corporation shall receive the results of the election for Directors, and transact any and all other business that may come before the membership subject to all provisions for notice, or waiver of notice, as provided in these Bylaws.

Section 2. Special Meetings. Special meetings of the Corporation shall be held upon presentation of a written petition signed by not less than thirty-three per cent (33%) of the voting members of the Corporation who are in good standing. The petition shall also specify the purpose, or purposes, of the special meeting.

Section 3. Notice. Notice of the annual meeting of the Corporation shall be given not less than thirty (30) days nor more than sixty (60) days prior to the date of the annual meeting. Notice of any special meeting of the Corporation shall be given at least fifteen (15) days prior to the date of the special meeting. Notice may be given personally, by mail to the last known address of any member, or by electronic means with or without proof of receipt required as determined by the Board.

Section 4. Waiver of Notice. Whenever any notice is required to be given to any member, director or other person under the provisions of these Bylaws, a waiver of notice in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.

Section 5. Voting. Elections for members of the Board of Directors shall be conducted by mail ballot. The Board shall establish dates for the mailing and return of ballots. Ballots shall be in such a format as is determined from time-to-time by the Board, and shall be opened and tabulated upon receipt. Ballots not postmarked by the deadline for return shall not be counted. The original ballots and tabulations shall be kept under seal until the annual meeting, at which time the results of the election shall be announced.

Section 6. Quorum. Ten percent (10%) of all voting members in good standing shall constitute a quorum at any annual or special meeting of the Corporation, and shall include members attending by electronic means.

Section 7. Membership Lists. In the event that there are other matters to vote on at the annual meeting, the Board shall maintain, or cause to be maintained, accurate lists of members eligible to vote at the annual meeting, or any special meeting called by the members, in accordance with applicable law. The Board shall also determine a reasonable record date prior to each annual meeting in accordance with applicable law, which shall be coordinated with the date for mailing of the ballots.

ARTICLE IV

Board of Directors

Section 1. General Powers. The activities, property, monies, and affairs of the Corporation shall be managed by the Board of Directors (hereinafter the Board) who may exercise all such powers of the Corporation as are permitted by statute, the Articles of Incorporation, and these Bylaws.

Section 2. Number. The Board shall consist of not more than twelve (12) directors, eight (8) of whom shall be from the regions as specified in Section 3 below, and four (4) of whom shall be directors at large. The number of directors may be increased or decreased from time-to-time by amendment of these Bylaws, provided that the number of directors shall not at any time be less than three (3), and provided further that no decrease in the number of directors shall have the effect of shortening the term of any incumbent director.

Section 3. Regions. For purposes of these Bylaws, the State of Texas shall be divided into eight (8) regions as follows: Region 1, Panhandle; Region 2, North Central; Region 3, East Texas Timberlands; Region 4, Trans-Pecos; Region 5, Edwards Plateau; Region 6, Central Prairie; Region 7, Rio Grande Brushland; and Region 8, Coastal Prairie. The boundaries of each region shall be established, and may from time-to-time be amended, by the Board.

Section 4. Qualifications and Election. To be elected to the Board, all nominees shall have been a voting member in good standing on or before the record date for the annual meeting as determined by the Board. Directors shall be elected at the annual meeting of the Corporation in accordance with these Bylaws.

Section 5. Term of Office. The term of office for directors shall be three (3) years. Directors may be reelected to a second term, after which the director shall be ineligible for reelection to the Board for a period of not less than one (1) year. The initial directors under these Bylaws shall be apportioned as follows: one-third shall be selected for a term of one (1) year; one-third shall be selected for a term of two (2) years; and, one-third shall be selected for a term of three (3) years. Thereafter, one-third of the directors shall be elected each year on a rotating basis for terms of three (3) years. Directors shall serve until the expiration of their term, resignation, disqualification, or removal from office as provided in these Bylaws.

Section 6. Filling of Vacancies. Any vacancy in the Board, or a vacancy created as the result of an increase in the number of directors, shall be filled by the affirmative vote of a majority of the Executive Committee at any regular or special meeting of the Board or the Committee, provided that the notice of the meeting shall state that the filling of vacancies is to be considered. Any director appointed to fill a vacancy shall hold office until the end of the term of the vacancy to which he or she was appointed. Vacancies created by an increase in the number of directors shall be apportioned so as to meet the requirements for rotation as provided in Section 5 above.

Section 7. Removal and Resignation. Any director may be removed, either for cause or without cause, at any regular or special meeting of the Board by an affirmative vote of a majority of the number of directors in office, provided that the notice of the meeting shall state that removal of directors is to be considered. Any officer or director may resign at any time by sending written notice by certified mail to the President of the Board. The resignation shall take effect at the time specified, but in no case before notice is received.

Section 8. Regular Meetings. Regular meetings of the Board shall be held at such places and at such times as may be determined by a resolution adopted by the Board and communicated to all directors, subject to all provisions for notice, or waiver of notice, as provided in these Bylaws. There shall be not less than six (6) regular meetings of the Board each year.

Section 9. Special Meetings. Special meetings of the Board shall be held at such places and at such times as may from time-to-time be determined by the Board, subject to all provisions for notice, or waiver of notice, as provided in these Bylaws. Unless otherwise specified in these Bylaws, any and all business may be transacted at any regular or special meeting of the Board. Special meetings may be called by the President, or by the written request of fifty percent (50%) of the directors in office.

Section 10. Annual Meeting. There shall be an annual meeting of the Board, which shall be the first Board meeting after the annual meeting of the Corporation. At the meeting, the Board shall elect officers, and may transact any and all business that may come before the Board, subject to all provisions for notice, or waiver of notice, as provided in these Bylaws.

Section 11. Notice. Notice of the annual meeting shall be given not less than thirty (30) days nor more than sixty (60) days prior to the date of the annual meeting. Notice of any special meeting of the Board shall be given at least seven (7) days prior to the date of the special meeting. Notice may be given personally,

by mail to the last known address of any director, or by electronic means with or without proof of receipt required as determined by the Board. Unless otherwise required by law or these Bylaws, neither the business to be transacted, nor the purpose of the meeting need be specified in the notice of the meeting. In case of an emergency declared by the Board President, the seven day notice may be waived.

Section 12. Waiver of Notice. Whenever any notice is required to be given to any director or other person under the provisions of these Bylaws, a waiver of notice in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.

Section 13. Quorum. At all meetings of the Board, the presence of a majority of the number of directors in office shall be necessary and sufficient to constitute a quorum for the transaction of business, which number shall include any directors attending by electronic means. If at any time a director suggests the absence of a quorum, the roll shall be taken immediately to determine if a quorum is present. In the absence of a quorum the meeting may be adjourned to such a time and place as determined by the Board when a quorum will be present. No notice, other than announcement at the meeting, shall be required to continue the meeting of the Board.

Section 14. Actions of the Board. The act of a majority of the directors present at any meeting where a quorum is present shall constitute an act of the Board, unless a different number is required specifically by these Bylaws.

Section 15. Voting and Proxy. Directors shall be present in person to vote, provided that with reasonable notice to the Board President, a director may attend and vote by electronic means as provided in the Bylaws. Proxy voting shall not be allowed.

Section 16. Consent. Any action permitted or required to be taken at any meeting of the Board may be taken without a meeting if consent in writing setting forth the action to be taken shall be signed by all of the directors. Such consent shall have the same force and effect as a unanimous vote of the Board. Consent may be obtained in writing, by facsimile, or by e-mail.

Section 17. Attendance. With reasonable notice to the President, any director may attend and vote at any meeting by electronic means in which all persons participating in the meeting can hear or communicate with each other simultaneously. If any director fails to attend any three meetings within one (1) year, then the director shall be deemed to have submitted his or her resignation from the Board. The Board, for good cause shown, and upon verification, may refuse to accept the resignation of any director.

Section 18. Compensation. No director shall receive compensation as the result of his or her service on the Board or on any committee of the Board. Nothing contained in this section shall prohibit any director from receiving reimbursement for actual expenses incurred on behalf of the Corporation, provided that the expense was authorized by the Board. Nothing contained in this section shall prohibit any director from being reimbursed for expenses incurred in attending meetings of the Board or any committee of the Board, subject to applicable policies and procedures on reimbursement adopted by the Board.

ARTICLE V

Officers, Agents and Employees

Section 1. Elected Officers. The elected officers of the Corporation shall be a President, a Vice-President, a Secretary, and a Treasurer.

Section 2. Election. All officers shall be elected by the Board from amongst the directors in office at the annual meeting of the Board of Directors.

Section 3. Appointive Officers, Agents, and Employees. The Board may from time-to-time appoint such other officers, agents and employees as it deems necessary, who shall have powers and duties as set forth in these Bylaws, or as determined from time-to-time by the Board.

Section 4. Simultaneous Offices. No person shall hold more than one (1) of the offices designated in Section 1 above at the same time unless the Board shall first declare that such a need exists, and then designate an officer to perform the duties created by the vacancy of another officer. At no time shall the President and the Secretary be the same person.

Section 5. Term of Office, Removal, Filling of Vacancies. Each elected officer shall hold office for a term of one (1) year or until his or her death, resignation, disqualification or removal from office as provided in these Bylaws. Any officer may be reelected to a second or third consecutive term in the same office, provided that no officer shall serve more than three consecutive years in the same office. Any officer may be removed at any time by a majority of the number of directors in office, when in the judgment of the Board, such removal shall be deemed in the best interest of the Corporation, and provided, that the notice of the meeting shall state that removal of officers is to be considered. If the office of any officer becomes vacant for any reason, the vacancy shall be filled by an affirmative vote of a majority of the number of directors in office.

Section 6. President. The President shall have general supervision of the affairs of the Corporation; shall preside at all meetings of the Board; shall have general authority to execute bonds, deeds and contracts in the name of the Corporation; shall sign all official documents on behalf of the Corporation; shall appoint all Committee Chairpersons unless otherwise designated by these Bylaws; shall appoint such other officers and agents as are necessary for the operation of the Corporation; and in general, shall exercise all powers usually pertaining to the president or chairperson of a corporation. All powers and duties of the President shall be subject to the provisions of the Articles of Incorporation and these Bylaws, and to review and confirmation by the Board in such a manner as is from time-to-time determined by the Board.

Section 7. Vice-President. The Vice-President shall, in the absence of the President, perform the duties of President of the Corporation, and shall have such other powers and duties as may from time-to-time be determined by the Executive Committee or the Board.

Section 8. Secretary. The Secretary shall keep and maintain all records of the Corporation unless otherwise specified in these Bylaws; shall see that proper notice is given for all meetings of the Board; shall keep, or cause to be kept, accurate and true records of all proceedings of meetings of the Board; shall ensure that minutes of the previous meeting(s) and all related documents are sent to directors at least five (5) days prior to the next meeting; and in general, shall exercise all powers usually pertaining to the Secretary of a corporation. All powers and duties of the Secretary shall be subject to the provisions of the Articles of Incorporation and these Bylaws, and to review and confirmation by the Board in such a manner as is from time-to-time determined by the Board.

Section 9. Treasurer. The Treasurer shall be the chief financial and accounting officer of the Corporation; shall have active control of and be responsible for all accounts and finances of the Corporation; shall supervise all vouchers and requests for payment by the Corporation including records pertaining thereto; shall prepare or cause to be prepared accurate and understandable monthly financial reports of the finances of the Corporation; shall prepare or cause to be prepared financial statements and related documents; shall have supervision of the books and accounts of the Corporation; shall ensure that regular and accurate reviews or audits are performed according to financial practices and procedures applicable to the Corporation; shall recommend depositories and financial institutions to the Board; shall have care and custody of all monies, funds and securities of the Corporation and shall ensure that all funds are deposited in such depositories as are selected by the Board; shall be responsible for the collection of all accounts payable to the Corporation; shall keep or cause to be kept full and accurate accounts of all expenditures and disbursements by the Corporation; shall have the power to endorse all checks, drafts, notes or other financial instruments payable to the Corporation; shall give or cause to be given proper receipts for all payments to the Corporation; and in general, shall exercise all powers

usually pertaining to the treasurer of a corporation. All powers and duties of the Treasurer shall be subject to the provisions of the Articles of Incorporation and these Bylaws, and to review and confirmation by the Board as determined from time-to-time by the Board.

Section 10. Other Powers and Duties. In addition to the powers and duties enumerated above, the elected and appointed officers, agents, or employees of the Corporation shall perform such other duties, and have such other powers as are provided in the Articles of Incorporation, these Bylaws, and the policies and procedures adopted by the Board, or as are otherwise determined from time-to-time by the Board.

ARTICLE VI

Committees of the Board

Section 1. Executive Committee. There is hereby created an Executive Committee of the Board whose membership shall be the President, Vice-President, Secretary, and Treasurer. The Executive Director of the Corporation, if any, shall serve as an ex-officio, non-voting member of the Executive Committee.

Section 2. Powers and Duties of the Executive Committee. The Executive Committee shall have the authority to act on behalf of the Corporation in the intervals between Board meetings, shall be responsible for recruiting, hiring and evaluating the Executive Director, if any, and shall have such other powers and duties as may from time-to-time be determined by the Board. The Executive Committee shall keep accurate records of its proceedings and report all actions to all directors on the Board. All actions of the Executive Committee shall be subject to review and confirmation by the Board in such a manner as is determined from time-to-time by the Board.

Section 3. Nominating Committee. There is hereby created a Nominating Committee which shall consist of the immediate past-President, one (1) member of the Executive Committee, and two (2) members at large from the voting membership, who shall be members in good standing. The immediate past-President shall serve as chairperson of the Nominating Committee. The President shall appoint the other three members of the Nominating Committee, subject to review and confirmation by the Board in such a manner as is determined from time-to-time by the Board. In the event that there is no immediate past-President, or the past-President is no longer a member of the Board, the President shall name a member of the Board who shall serve as the chairperson of the Nominating Committee.

Section 4. Powers and Duties of the Nominating Committee. The Nominating Committee shall conduct an annual skills and needs assessment of the Board; shall be responsible for identifying, screening and recommending qualified potential Board members to the Board; shall nominate at least two (2) persons from the voting members for each position of Director on the Board that is to be filled at the annual meeting; shall maintain a sufficient pool of qualified potential Board members to allow for normal replacement and unforeseen vacancies; shall develop Nominating Committee policies and procedures subject to the approval of the Executive Committee and the Board; and shall meet at least six (6) time per year to discharge its powers and duties.

Section 5. Texas Bird Records Committee. There is hereby created the Texas Bird Records Committee, which shall be a permanent committee of the Texas Ornithological Society. The Chairperson of the Committee shall be named by the Board President after consultation with the then-current members of the committee, which Chairperson need not be a member of the Board of Directors. The Board shall from time-to-time adopt policies and procedures to govern the duties and responsibilities of the committee.

Section 6. Powers and Duties of the Texas Bird Records Committee. The duties of the committee shall include establishing criteria for the record of birds in Texas; preparing and publishing a Texas state bird list

under the auspices of the Texas Ornithological Society; reviewing reports of birds that are new and/or rare in the State of Texas, and determining the acceptability of such reports; maintaining a permanent record of the birds of Texas; recommending policies and procedures to the Board for consideration; and performing such other duties and responsibilities as may from time-to-time be determined by the Executive Committee or the Board.

Section 7. Other Committees. The President, or the Board, may establish such other committees as are necessary for the operation of the Corporation. All other committees shall have only those powers and duties specifically designated by the Board, and shall perform such tasks and activities as may from time-to-time be determined by the Board. All committees of the Corporation shall keep accurate and true minutes, copies of which shall be filed with the Secretary of the Corporation as directed by the Secretary or the Board. All committees of the Corporation shall give adequate notice of meetings as determined by the committee, but in no case shall the notice be less than seven (7) days. Standing committees of the Corporation shall be chaired by a director, and may include members who are neither officers nor directors of the Corporation.

ARTICLE VII

Indemnification of Officers and Directors

Section 1. Indemnification. The Corporation shall indemnify an officer or director of the Corporation against reasonable expenses incurred by the director in connection with any proceeding in which the director is named as a defendant or respondent because he or she is, or was, a director of the Corporation, subject to the limitations in the Articles of Incorporation and these Bylaws.

Section 2. Conditions. The Corporation shall have no obligation to indemnify an officer or director if the director is found liable for:
a) a breach of the director's duty of loyalty to the Corporation;
b) an act or omission not in good faith that constitutes a breach of duty of the director to the Corporation;
c) an act or omission that involves intentional misconduct or an intentional violation of the law;
d) a transaction from which the director received an improper benefit, whether or not the benefit resulted from an action taken within the scope of the director's office; or,
e) an act or omission for which the liability of a director is expressly provided for by an applicable statute.

Section 3. Limits. The Board may adopt, and from time-to-time amend, reasonable limits on the expenses of any officer or director for whom indemnification is provided.

ARTICLE VIII

Miscellaneous Provisions

Section 1. Dividends Prohibited. No part of the net income of the Corporation shall inure to the benefit of any private shareholder or individual; no dividends shall be paid; and no part of the income of the Corporation shall be distributed to its officers or directors.

Section 2. Loans to Officers and Directors. The Corporation shall make no loans to any officer or director for any reason at any time.

Section 3. Fiscal Year. The fiscal year of the Corporation shall be fixed, and may be changed from time-to-time, by resolution of the Board.

Section 4. Policies and Procedures. The Board shall have the authority to adopt such policies and procedures as the Board may from time-to-time determine, or as the activities of the Corporation may require.

ARTICLE IX

Dissolution

Section 1. Dissolution. The Corporation may be dissolved by resolution approved by a majority of the directors in office, even though less than a quorum, or a sole remaining director. After providing for the payment of all debts, the satisfaction of all liabilities, and the expenses of dissolving the Corporation, any assets remaining upon dissolution of the Corporation shall be disposed of by the remaining directors in accordance with the provisions of the Articles of Formation and applicable law.

Section 2. No benefits. No part of the cash or assets of the Corporation shall inure to the benefit or any current or former director or officer, current or former member, or current or former employee.

ARTICLE X

Amendments to Bylaws

Section 1. The initial Bylaws shall be adopted by the voting members of the Corporation. Thereafter, these Bylaws may be altered, amended, or repealed, or new Bylaws adopted, at any meeting of the Board, by an affirmative vote of a majority of the members of the Board, provided, that amendments to Section 1 and Section 2 of Article II, and to Section 1 of Article X may only be made by the voting membership of the Corporation at the annual meeting of the Corporation. With the exception of the initial adoption of these Bylaws, the notice of any meeting where amendments to the Bylaws are on the agenda shall state that amendments to the Bylaws are to be considered, and shall include a copy of the proposed amendments. Notice shall be given in accordance with the provisions for notice in these Bylaws.

Section 2. Amendments to the Bylaws shall become effective upon approval, unless a different date is specified in the amendment.

These Bylaws were adopted by a majority of members with voting rights in respect thereof, in accordance with the governing documents of the Corporation.

_____ _____

Secretary *Date*

TOS OFFICIAL BYLAW CHANGE BALLOT

MARCH 2016

(Only for TOS members in good standing — membership dues current as of March 18, 2016)

INSTRUCTIONS

Read the new proposed Bylaws then circle your choice below to approve or reject them. ***Print your return address*** on the envelope, attach postage, and mail. Your return address will be used to verify your membership. Ballot must be postmarked by March 25, 2016. Voting ends on March 28, 2016, and ballots will be tallied shortly after that.

I vote to (circle one)

approve

reject

the proposed changes to the TOS Bylaws.

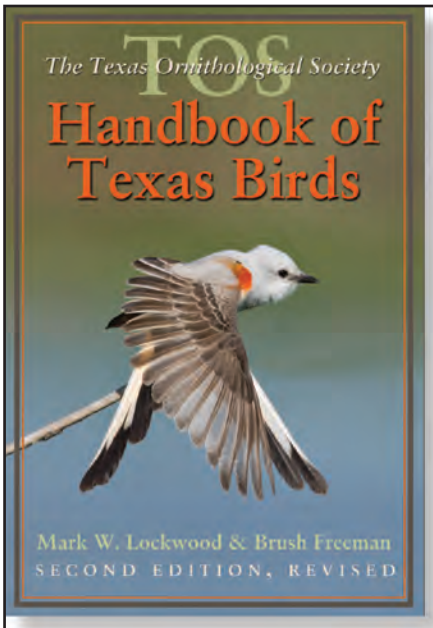
Thank you for taking an active part in the administration of your organization!

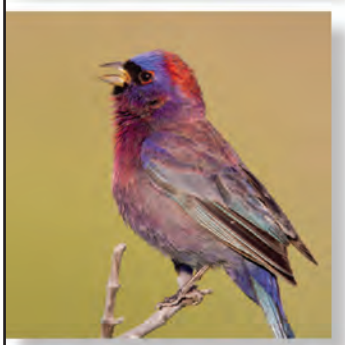
(Fold Here)

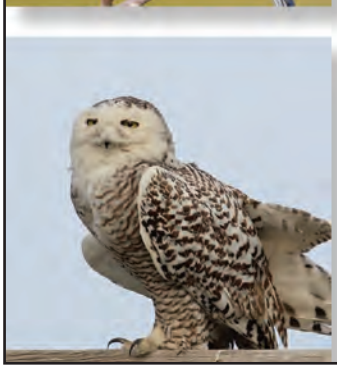
From: _____
_____
_____
_____

Place
Stamp
Here

Texas Ornithological Society
c/o Shelia Hargis
11302 Stormy Ridge Road
Austin, Texas 78739







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Mark W. Lockwood and Brush Freeman

This new edition of the essential Texas birding reference features updated species accounts, all new photographs, and the first complete subspecies listing for Texas birds since 1995.

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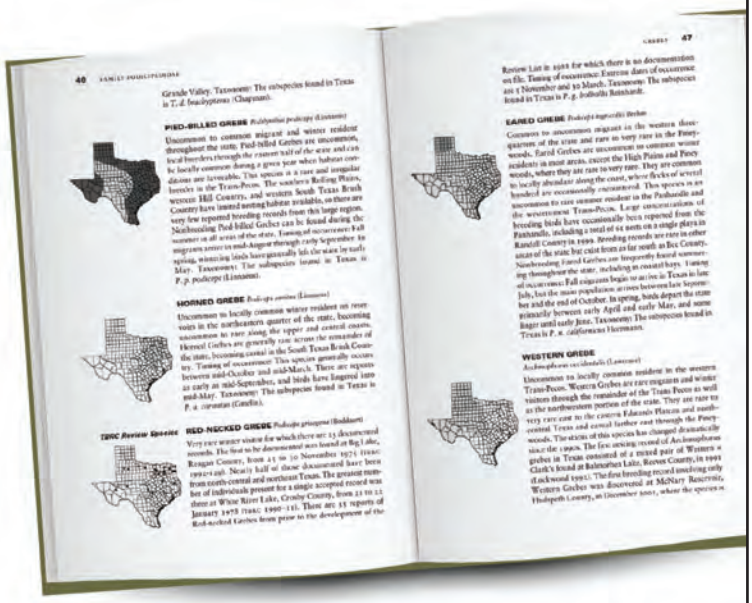

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Bar-tailed Godwit advancing into basic plumage. Photo: Arman Moreno.

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