Successful nesting by a Bald Eagle pair in prairie grasslands of the Texas Panhandle

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Through much of the 1900s, Bald Eagle (Haliaeetus leucocephalus) populations experienced dramatic declines across their range due to bounties, habitat loss, persecution, and environmental contaminants (Buehler 2000). Following legal protection (e.g., Bald and Golden Eagle Protection Act, Endangered Species Act) and conservation efforts, eagle numbers have increased across their range, which includes Texas (Campbell 1995, Buehler 2000, Ortego 2003). However, increases of nesting eagles in Texas generally have been limited to areas adjacent to large expanses of permanent surface water (e.g., lakes, reservoirs, rivers; Ortego 2003). Although Bald Eagles will scavenge carrion, pirate prey from other species, and capture mammals and birds (Swenson et al. 1986), the importance of aquatic systems to Bald Eagles is due to their preference for fish as prey (Stalmaster 1987, DeLong 1990, Knight et al. 1990), even in desert regions (Brown et al. 1991, Grubb 1995). This pattern of prey use would explain the strong association of Bald Eagles with aquatic systems and the species’ tendency to select nest sites adjacent to or near (within 2 km) large bodies of water (Buehler 2000).

There is little information on the occurrence of breeding Bald Eagles in the grasslands of the southern Great Plains (Buehler 2000), an arid region with little available permanent surface water. Currently, known nest locations of Bald Eagles in the southern Great Plains are associated with permanent water sources such as the Arkansas River in Colorado and Kansas (B. Bibles, Colorado Division of Wildlife, personal communication). Although Bald Eagles are not currently reported as breeding in the arid panhandle region of Texas (Campbell 1995, Buehler 2000), 2 historical nesting records exist for the species in the Texas Panhandle. McCauley (1877) reported a Bald Eagle nest containing 2 young by a tributary of the Red River near Palo Duro Canyon in Texas. However, Lish and Sherrod (1986) suggest McCauley may have misidentified what was actually a Golden Eagle (Aquila chrysaetos) nest and nestlings. More definitively, E.W. Gates collected 1 Bald Eagle clutch in Potter County in 1916, the last and only confirmed nesting by Bald Eagles in the panhandle of Texas (Oberholser and Kincaid 1974, Seyffert 2001). Both the report from McCauley (1877) and the clutch collected by Gates in 1916 were from the Palo Duro Canyon region.
Duro Canyon complex, which, at the time, had permanent surface water. Here we report on the occurrence, successful nesting, and prey use of a pair of Bald Eagles nesting in arid prairie grasslands with negligible surface water in the Texas Panhandle. To our knowledge this is the first confirmed nesting by the species in the region since 1916.

**STUDY AREA AND METHODS**

These observations were made on privately owned land adjacent to the Rita Blanca National Grasslands in Dallam County, Texas. The county is a mosaic of native short- and mixed-grass prairie, Conservation Reserve Program parcels, and fields in agricultural production (e.g., corn and wheat). The landscape is generally level to gently undulating. Trees are sparse and consist primarily of elm (*Ulmus pumila*), cottonwood (*Populus* spp.), and mesquite (*Prosopis glandulosa*), which usually occur as single trees near stock tanks or in clumps as windbreaks adjacent to occupied or vacant houses. Other than in the rural communities of Dalhart, Texas (population 7243), and Texline, Texas (population 511), most human activity is associated with crop fields and ranch houses, the latter occurring at low density across the county. Surface water, and thus aquatic prey, are lacking in the study area. Lake Rita Blanca was the nearest existing surface water (defined as >2.5 ha) to the nest and is over 50 km south near Dalhart, Texas, in the south central part of the county.

We made periodic observations of the Bald Eagle nest (hereafter the Dallam nest) from the time we first located it on 6 May 2004 until the nestling of that year fledged, and also from 6 February 2005 until both nestlings of that year fledged. Following the 2004 fledging, we measured diameter at breast height (dbh) of the nest tree with a dbh tape and heights of the nest and nest tree with a clinometer. Because the nest was in a snag that was unsafe to climb, we estimated nest dimensions from the ground. We plotted the nest site on a digital map composed of a series of digital orthogonalized quarter quadrants. We generated a 5-km-radius circular plot (78 km²) centered on the eagle nest using ArcView 3.2, digitized 4 landcover types (residence, agriculture field, grassland, prairie dog colony) within the plot, and calculated proportions of each land type.

Each year we collected regurgitated castings from below the nest and below adjacent perch trees to assess prey use by the Bald Eagles. We stored each casting at 0°C prior to dissection and analysis. We used a dissecting scope and a microscope to identify hair, skeletal materials, and feathers in the castings (Marti 1987) to the lowest possible taxonomic level based on information provided in guides (Moore et al. 1974, Jones and Manning 1992) and comparison with voucher specimens at the Museum of Texas Tech University. Identifying prey species from skeletal and keratinous tissues in castings is a common method for raptor food habit assessment (Marti 1987). However, the method is imprecise because more than 1 individual prey animal may be represented in a single casting, 1 prey animal may be represented in multiple castings, casting contents do not provide information on ages or size classes of some prey, and the manner of prey acquisition (i.e., captured or scavenged) is unknown (e.g., Marti 1987). Therefore, we take a conservative approach and present food habits based on frequency of occurrence only.

**RESULTS**

As part of a study of sympatric grassland raptors, at 0920 hours (CDT) on 6 May 2004 we checked a large nest that had been unoccupied during the summers of 2001–2003. The nest was on private land, and the closest accessible observation point was 0.8 km away. We observed the nest with binoculars and a spotting scope and identified an adult Bald Eagle (definitive plumage as described in Wheeler 2003) in an apparent brooding position. We obtained landowner permission to access the property and visited the nest site on 14 May 2004 to confirm the presence of a nestling and to collect regurgitated castings. Two adult Bald Eagles were perched in the nest tree and a large nestling was visible on the nest. We visited on 2 June 2004 to estimate the nestling’s age and to determine if either adult was banded. Based on a Bald Eagle nestling age guide (D. Meinke and G. Meinke unpublished data), we estimated the single nestling to be 50–55 days old on 2 June 2004. Although we observed both adult eagles closely, we were unable to see any leg band.

We monitored the nest by making periodic visits throughout the summer. The nestling was first observed perching on branches away from
the nest on 21 June. On 14 July we observed
the fledgling leave the nest in level, controlled
flight. On 17 July we observed, presumably,
the same fledgling eagle perched on a tele-
phone pole approximately 3 km from the nest.
During our last visit to the nest on 13 August
2004, the fledgling was perched on the nest
but took flight upon our approach, gained alti-
tude to a soar, and then flew beyond view. Pre-
sumably the same eagle pair nested in the same
nest in 2005 and produced 2 young. Similar to
2004, in 2005 we made periodic observations
from 6 February until both nestlings fledged
in July.

The eagle nest was in a dead cottonwood or
elm tree (identification not possible) that mea-
sured 14.6 m tall and 86.4 cm dbh. The nest
was 13.1 m above ground and was approxi-
ately 1.5 m from bottom to top. Our assess-
ment of landcover types within the 7811-ha
area around the nest indicated that grasslands
accounted for the majority of the area (7020
ha, 90%), followed by agriculture (592 ha, 8%).
Black-tailed prairie dog (Cynomys ludovic-
ianus) colonies occupied 196 ha (2%) of the area,
and single human residences and associated
structures (i.e., barns) occupied 2 ha (<1%).

We collected a total of 112 regurgitated cast-
ings in 2004 ($n = 63$) and 2005 ($n = 49$). Each
casting contained an average of 1.45 ± 0.05 (s,
range 1–3) prey species. Analysis of casting
contents revealed that the diet of these eagles
was relatively narrow with 6 mammalian species.
Black-tailed prairie dog remains occurred in
81.2% of the castings, indicating that the spe-
cies was the primary prey used by the eagles.
Cottontails (Sylvilagus spp.) were the 2nd most
frequently occurring mammalian prey (15.2%),
followed by black-tailed jackrabbit (Lepus cal-
ifornia, 4.5%), plains pocket gopher (Geomys
bursarius, 3.6%), and pronghorn (Antilocapra
americana, 1.8%). Black-crowned Night-Herons
(Nycticorax nycticorax) were present in 4.5%
of castings, while other bird remains (32.1%) could
not be identified. Grasshoppers were
incidental in occurrence (0.9%). No reptilian,
amphibian, or fish remains were present in the
castings, suggesting that if such prey were used
by the eagles, it was infrequent during the
nesting period.

DISCUSSION

The Dallam nest is unique in comparison to
typical Bald Eagle nest sites, including the 2
historical records of nest sites in the panhandle
of Texas, both of which were associated with
rivers (McCaulay 1877, Gates 1916 in Ober-
holser and Kincaid 1974). The Dallam nest was
in open, gently undulating short-grass prairie.
Other than stock tanks, the nearest surface
water was Lake Rita Blanca, a 61-ha lake located
over 50 km away. This suggests that eagles on
the Dallam nest subsisted on species other than
fish and were able to acquire sufficient prey to
attain a reproductive state and successfully
raise young. Our data indicated that the eagles
subsisted primarily on mammalian prey, most
of which were black-tailed prairie dogs and
rabbits. Although Bald Eagles normally use prey
associated with aquatic systems (see Buehler
2000) and wetlands (Mabie et al. 1995), they
are capable of capturing a wide variety of prey
(Edwards 1969, Todd et al. 1982, Kozie and
Anderson 1991, Folk 1992, Mabie et al. 1995,
Ricca et al. 2004). They also will scavenge
aquatic and terrestrial animal carrion (Retfalvi
1970, Lish 1975, Swenson et al. 1986) and usurp
prey from other raptors (Sabine and Gardner
to constitute only a small proportion of Bald
Eagle diets. In a review of 10 diet studies and
their own data, Mabie et al. (1995) found that
the highest proportion of mammals in diets of
Bald Eagles was 17%, reported by Swenson et
al. (1986). However, mammalian prey occurred
in 60% of the pellets collected from a Bald Eagle
winter roost in Oklahoma, with cottontails
(Sylvilagus spp.) accounting for 30% of the
mammalian prey (Lish 1975). Furthermore, Lish
(1975) observed Bald Eagles wintering “far from
any rivers or impoundments” and scavenging
cattle and lamb carcasses. Although wintering
Bald Eagles in the Great Plains region are fre-
cently associated with prairie dog colonies
(Kotliar et al. 1999), our data are the first indi-
cating that prairie dogs are the primary prey
used by nesting Bald Eagles. Watkins et al.
(1994) reported a Bald Eagle nest in Hodgem-
an County, west Kansas, occupied for at least
6 years, that was adjacent to a 0.6-ha pond but
in a landscape otherwise dominated by crop-
land and rangeland (Watkins et al. 1994) and
similar to the Dallam nest. Prey remains col-
lected from the Hodgeman nest included com-
mon carp (Cyprinus carpio), bullhead (Ictalurus
spp.), unidentified catfish, several bird species,
black-tailed prairie dogs, yellow-faced pocket
gophers (Pappogeomys castanops), and rabbits

bursarius, 3.6%), and pronghorn (Antilocapra
americana, 4.5%) were present in 4.5%
of castings, while other bird remains (32.1%) could
not be identified. Grasshoppers were
incidental in occurrence (0.9%). No reptilian,
amphibian, or fish remains were present in the
castings, suggesting that if such prey were used
by the eagles, it was infrequent during the
nesting period.
(Watkins et al. 1994). Watkins et al. (1994) did not provide frequency-of-occurrence data, so we are unable to compare the diet with that at our Dallam nest. However, even in the range-land setting, fish were still among the prey used by the Hodgeman eagle pair, unlike the eagles at the Dallam nest site, whose diet consisted of only mammals and birds.

Known Bald Eagle breeding pairs in Texas have increased from 7 pairs in 1971 to over 150 pairs in 2003, primarily in the eastern part of the state and along the central coastal region (Ortego 2003). Though the increased number of nest locations could, in part, be a consequence of increased survey effort, it is more likely due to real increases in the Bald Eagle population in Texas. For example, survey efforts have not increased over the last 5 years during which time the known eagle population has doubled (B. Ortego, Texas Parks and Wildlife Department, personal communication). However, while the Dallam nest is in step with the distribution-wide increase in Bald Eagles, we do not know if that is a result of population growth in the eastern and southern areas of Texas or growth elsewhere (e.g., Colorado, Kansas).

A remaining question is whether this nest is an anomalous occurrence, e.g., an expansion of Bald Eagles into an environment previously unused for breeding or an expansion of eagles back into areas used historically prior to European settlement. We suspect this is not an anomalous occurrence. First, a Bald Eagle nest occupied for 6 years in western Kansas (Watkins et al. 1994) was in a similar setting to the nest we report. Second, the Dallam nest was used, and successfully fledged young, in both 2004 and 2005. Also, the Dallam nest was present, though unoccupied by breeding eagles, for at least 5 years prior to these observations (Boal unpublished data). Discussions with the landowner and existence of the nest prior to 2001 lead us to believe Bald Eagles had used the nest previously. Finally, circumstantial evidence indicates that Bald Eagles may have historically nested in the area: Tate (1923) suggested Bald Eagles were once year-round residents and likely nested in Cimarron County, Oklahoma, which is adjacent and immediately north of Dallam County, Texas. More recently, Bald Eagles have been reported nest-building, but not nesting, at Buffalo Lake National Wildlife Refuge, 172 km south of the Dallam nest. However, the Buffalo Lake nest is adjacent to a large lake and is quite different in setting from the Dallam nest.

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