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DISPERSAL OF BALD EAGLES FLEDGED IN TEXAS

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ABSTRACT.—One hundred and thirty-eight bald eagle (*Haliaeetus leucocephalus*) nestlings were banded and color-marked in Texas, 1985–91. Survival of marked eaglets to fledging was 97%. Three recoveries and 61 sightings were verified from 1985–93. Recoveries were from Texas and southeast Louisiana. Beginning in April, most marked eagles showed a gradual spring-summer northward migration that was centered between the Rocky Mountains and the Mississippi River Valley, extending north into Canada. However, two sightings occurred on the Atlantic Coast, and two sightings occurred west of the Rocky Mountains. Forty-six of the 138 marked eaglets have attained breeding age. Nine of these eagles are known to be nesting in Texas and two others have been reported as nesting in Arizona and Mexico. Based on sight records we feel that bald eagles fledged in Texas may enter breeding populations throughout the southern United States.

KEY WORDS: *bald eagle; banding; color-marking;* Haliaeetus leucocephalus; *migration; survival; Texas.*

Dispersión de individuos volantones de *Haliaeetus leucocephalus* en Texas

RESUMEN.—Entre 1985 y 1991 se marcaron 138 polluelos de la especie *Haliaeetus leucocephalus* en el Estado de Texas. El 97% de los polluelos alcanzó el estado de volantón. Tres recuperaciones y 61 avistamientos se registraron entre 1985 y 1993. Las recuperaciones se hicieron en Texas y al sudeste de Louisiana. Comenzando en abril (primavera–verano), la mayoría de las águilas marcadas mostraron una migración gradual hacia el norte, centrada entre las Montañas Rocosas y el Valle del Río Mississippi, extendiendose por el norte hasta el interior de Canadá. Sin embargo, dos avistamientos ocurrieron en la Costa Atlántica y otros dos al oeste de las Montañas Rocosas. Cuarenta y seis de los 138 individuos han alcanzado la edad reproductiva. Nueve de estas águilas han nidificado en Texas y otras dos han sido reportadas nidificando en Arizona y México. Basados en los registros de avistamiento, creemos que los volantones de *Haliaeetus leucocephalus* pueden ingresar a la población reproductiva desde el sur de los Estados Unidos.

[Traducción de Ivan Lazo]

Most migration studies of bald eagles (*Haliaeetus leucocephalus*) have documented southward post-breeding movement from northern nesting territories to southern wintering grounds (Dunstan 1973, Reese 1973, Dunstan et al. 1975, Postupalsky 1976, Gerrard et al. 1978, Griffin et al. 1980); however, eagles nesting at southern latitudes of the United States exhibit northward migration during summer (Broley 1947, Hunt et al. 1992). Bald eagles are reported as nonmigratory in some areas (Stalmaster 1987).

From 1975–91, the number of active bald eagle nests increased from seven to 39 in Texas. Information on eaglet survival to fledging, fledging dispersal, and recruitment into the breeding population was necessary to properly manage this increasing bald eagle population. Such data were also needed to document status (threatened/endangered) for the bald eagle recovery plan. This study presents migratory movements, survival of eaglets to fledging, and recruitment of eagles banded and color-marked as nestlings in the southeastern area of Texas.

METHODS

Fixed-wing aerial surveys have been conducted to monitor nesting activities of bald eagles in Texas since 1971. These surveys determined number of nests, number of active nests, and number of fledged young. From 1985–91, we located and climbed 85 eagle nest trees, representing 26 nesting territories in 16 counties. One hundred and

thirty-eight eaglets, age 6–11 wk, were banded and color-marked (Fig. 1). All eaglets were leg banded with a U.S. Fish and Wildlife Service pop-rivet band and a pop-rivet plastic color band on the opposite leg. Red, black, green, and white bands, with each color representing a specific year, were used from 1985–89. Anodized aluminum bands were used in 1990 and 1991 due to reported high loss rates (94%) of plastic leg bands (C. Todd unpubl. data). Vinyl patagial wing markers (Herculite 20) were attached to both wings of all eaglets (Kochert 1973, Gerrard et al. 1974, 1992). Yellow patagial markers, which designated an eagle as being from the southeastern region, were used on the right wing (D. Bystrak pers. comm.). Alpha numeric codes were painted with black NAZDAR vinyl ink on yellow patagial markers to individually mark each eaglet. Blue patagial markers with a large yellow dot were used on the left wing to designate a bird as being fledged in Texas. Kochert et al. (1983) indicated that patagial markers did not affect breeding success of golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*) and common raven (*Corvus corax*).

Letters and requests for information on observed or recovered marked eagles were sent to all U.S. state and Canadian province nongame/endangered species divisions following each banding season. Reports or sightings of wing-marked eagles were evaluated on the basis of correspondence or telephone conversations with the observer. Consecutive sightings of a single marked bird within one general area and in the same year were recorded as one sighting. Marked nesting birds observed in consecutive years at nest sites were recorded each year as one sighting.

Survival to fledging of color-marked eaglets was determined through fixed-wing aircraft surveys (Nesbitt et al. 1988) and ground checks of all nest sites. Fledging success was determined when marked birds were observed in flight or away from the nest tree. Recruitment of marked eaglets into the breeding population was determined when marked eagles were observed incubating or brooding during aerial and ground surveys.

RESULTS AND DISCUSSION

Eaglet Survival to Fledging. Survival of color-marked eaglets to fledging was 97%, with productivity from those nests calculated at 1.6 eaglets per nest, 1985–91. Productivity values were similar to those reported in Florida (Broley 1947, McEwan and Hirth 1979), and are as high as any recorded values (Sprunt et al. 1973). The increasing bald eagle population in Texas is likely tied to the high fledging success and high fledgling survival of this population.

Four marked eaglets died during this study. Of these, two were killed by bobcats (*Felis rufus*), and two were found <100 m from the nest tree (cause of death was unknown). There was no indication that our banding operation caused this mortality. Similarly, other studies (Broley 1947, Grier 1969, Fraser et al. 1985) report little mortality due to banding activities.

Band Recoveries. Three band recoveries were reported from 1985–93 (Fig. 2). A juvenile female found dead on 1 June 1987 in Red River County, Texas, was banded and color-marked on 2 April 1987, 525 km to the south, in Brazoria County, Texas; the bird had fledged on 29 April 1987. Only bones and feathers were found and the cause of death was unknown. A 2-yr-old male banded on 31 March 1988 in Matagorda County, Texas, was hit and injured by a vehicle on 17 March 1990 in LaFourche Parish, Louisiana, approximately 600 km from the nest site. The third recovery was of a 3-yr-old banded on 16 April 1990 in Colorado County that was shot and killed on 9 March 1993 in Liberty County, Texas, approximately 177 km northeast of the nest site.

Sightings. Sixty-one sightings (29 adult, 32 immature) of color-marked eagles were verified from 1985–93. Forty-one sightings were reported from within state (Fig. 3), with 70% occurring from November to March. A marked eagle observed in Cameron County is the most southerly documentation of bald eagles in Texas. Twenty sightings were outside of Texas (Fig. 2), with 74% occurring from May to August. Observations of color-marked eagles indicated that a gradual spring-summer northward migration begins in April. Marked birds moved across a broad region from the Rocky Mountains to the Mississippi River and north into Canada (Fig. 2). Two sightings occurred on the Atlantic Coast (South Carolina, New York), one in Mexico (Sonora), and one in Arizona (Fig. 2). In 1989, a nesting eagle with a yellow wing tag and black lettering was reported in Sonora, Mexico. The alpha-numeric code was not fully legible, but the first two numbers indicated that the bird had been banded as an eaglet in Texas in 1985. The eagle sighted in Arizona has recently been confirmed as nesting there. We suspect that bald eagles fledged in Texas may enter breeding populations throughout the bald eagles' southern breeding range.

Most color-marked eagles were observed only on one day. However, some eagles were observed on consecutive days. For example, a color-marked bird was observed for 10 consecutive days in Nebraska, another bird was observed for 19 consecutive days at a catfish farm in Arkansas, and another bird was observed for 30 consecutive days in Cameron County, Texas.

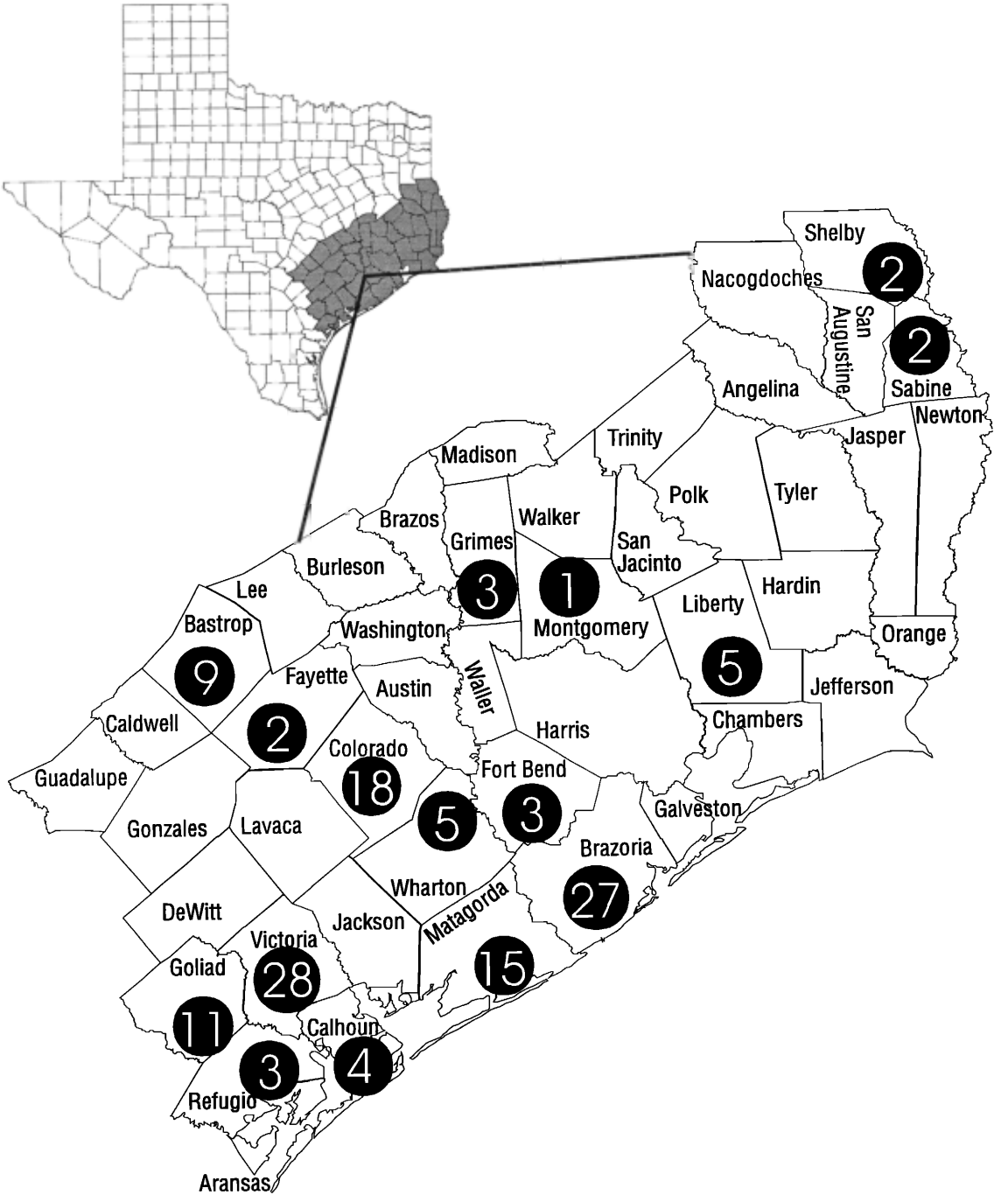

Figure 1. Locations of 138 bald eagles banded and color-marked as nestlings in Texas, 1985–91.

Figure 2. Location of out-of-state sightings and recoveries of bald eagles banded and color-marked as nestlings in Texas, 1985–93.

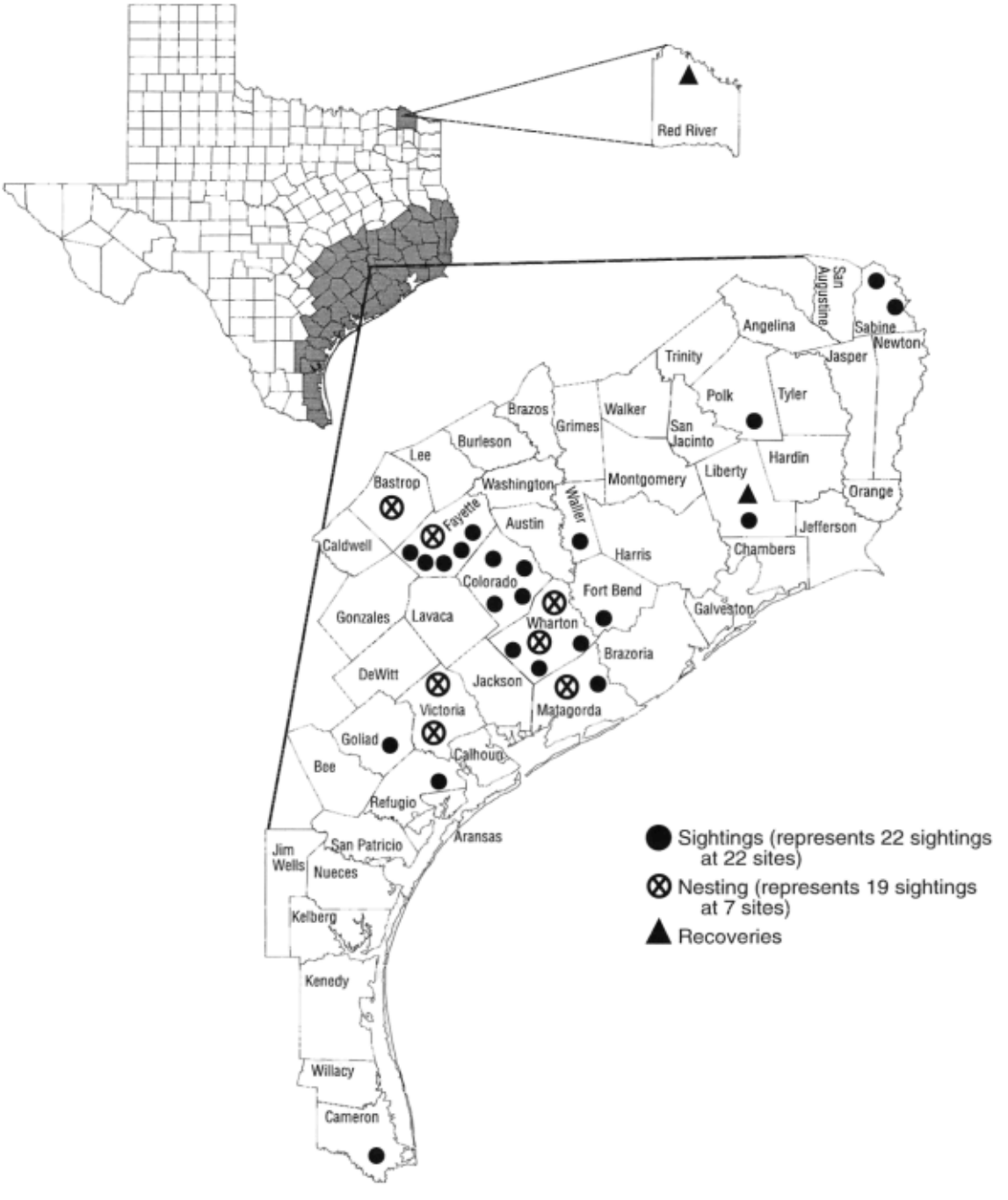

Figure 3. Location of in-state observations, nest site locations, and recoveries of bald eagles banded and color-marked as nestlings in Texas, 1985–93.

Both wing markers were reported for 38 sightings. Other sightings reported only single markers. We rejected several sightings due to inadequate description of wing-markers. Our data, like Gerrard et al. (1978), shows a much higher information return from wing-markers than leg bands.

Recruitment into the Breeding Population. Of 138 bald eagles color-marked as eaglets in Texas from 1985–91, 46 have attained breeding age. Twenty percent (9 of 46 eagles) of those have established nesting territories in Texas. These nine eagles occupied seven nesting territories (Fig. 3). Two of the nine nesting birds were males (a 3-yr-old and a 4-yr-old) that mated with females at established nest sites. The females presumably lost their mates the previous year. One male was observed nesting for three consecutive years and the other male for five consecutive years. We have recorded two instances in which both members of a breeding pair were color-marked as eaglets in Texas. One of these pairs nested for two consecutive years. Three other new nesting territories which contained one individual color-marked as an eaglet in Texas were located in 1989 and 1990. All seven nesting pairs have successfully fledged young in consecutive years. We were unsuccessful in identifying the specific nest site from which these color-marked breeding bald eagles were fledged.

Data on marked eaglets returning to natal breeding areas as breeding adults establishing nesting territories are lacking (Stalmaster 1987). Many studies have banded and/or radio-tagged eaglets (Broley 1947, Gerrard et al. 1978, Buehler et al. 1991, Gerrard et al. 1992, Hunt et al. 1992), but few report eaglets returning as nesting adults (Swenson et al. 1986:26–27, Gerrard et al. 1992). Our data indicate that bald eagles fledged in Texas exhibit strong fidelity to natal nesting areas for breeding.

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