

# From the Field: Progress in restoring the aplomado falcon to southern Texas



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**Abstract** The northern aplomado falcon (*Falco femoralis septentrionalis*) was once fairly common in the savannas of southern Texas and in other parts of the American Southwest but virtually disappeared by the 1950s north of the Mexican border. It was federally listed as endangered in 1986. The Peregrine Fund established a captive breeding program based on 25 nestlings obtained from eastern Mexico during 1977–1988. Following a pilot release project in 1985–1989, a full-scale release effort in the southern Texas plain began in 1993 employing techniques similar to those we developed for the peregrine falcon (*Falco peregrinus*). We produced 923 fledgling aplomado falcons, of which 812 were released in Texas on both federal wildlife refuges and private property. We observed released falcons breeding in the wild for the first time in 1995, and by 2002, 37 pairs were known and at least 87 wild young had fledged over an 8-year period. Predation by raccoons (*Procyon lotor*) was a frequent cause of nest failure, and the great horned owl (*Bubo virginianus*) was the principal source of death in fledglings at hack sites, a factor that may limit aplomado falcon recovery in some areas of its former range. Enrollment of more than 5,500 km<sup>2</sup> of private land under federally mediated “Safe Harbor” agreements encouraged landowner goodwill and cooperation and provided essential access to private property by affording relief from potential liability associated with the Endangered Species Act.

**Key words** aplomado falcon, captive breeding, endangered species, *Falco femoralis*, hacking, Mexico, reintroduction, Texas

The aplomado falcon (*Falco femoralis*) is a New World species inhabiting grasslands from Argentina to the southwestern United States. The range of the northern subspecies (*F. f. septentrionalis*) once extended from Guatemala and southern Mexico to southern and western Texas, southwestern New Mexico, and southeastern Arizona (Bent 1937, Keddy-Hector 2000). Though regularly observed by early naturalists, it had virtually disappeared within the United States by the 1950s (Keddy-Hector 2000). Except in areas where releases have occurred, the aplomado falcon has become so rare

that only a few are recorded each year despite its being one of the most sought-after species for observation by the birding community. Reasons for extirpation remain unclear, and hypotheses include habitat degradation, climatic change, pesticides, egg and skin collecting, electrocution, drowning in livestock watering tanks, and other causes (Cade et al. 1991, Keddy-Hector 2000, Truitt 2002). The northern subspecies was listed as endangered by the United States Department of the Interior (USDI) in 1986 (USDI 1986). In this paper we update Cade et al. (1991) with regard to the 25-year history of

efforts to restore aplomado falcons to their former range in southern Texas.

## Captive propagation

### Breeding stock

The captive breeding program was based upon 25 nestlings collected from wild nests in San Luis Potosi, Veracruz, Tabasco, and Chiapas, Mexico during 1977–1988 by the Chihuahuan Desert Research Institute ( $n=8$  nestlings) and The Peregrine Fund ( $n=17$ ). The distance along the coastal plain from the northern end of the collection area to the Texas border was about 500 km. We obtained blood samples from 4 individuals from Veracruz, 6 from Tabasco, and 7 from Chiapas for DNA comparison with 14 individuals from Chihuahua, the northernmost extant population. The analysis, which involved both mitochondrial DNA and nuclear microsatellite variation, using 2 different probes, indicated low overall levels of genetic variation in both samples. All alleles present in the coastal samples were also found in those from the interior (Chihuahua), and only minor differences in allele frequency existed at 2 loci (R. Fleischer, Smithsonian National Museum of Natural History, unpublished data; McIntosh et al. 1999). These findings were not surprising, given historical accounts of widespread occurrence and continuity of grasslands that may have connected the now disjunct populations prior to the livestock era (see Powell 2000).

### Captive breeding

Captive aplomado falcons were bred at the Chihuahuan Desert Research Institute (CDRI) in Alpine, Texas in 1982; at the Predatory Bird Research Group, University of California at Santa Cruz (PBRG) during 1983–1990; and at the World Center for Birds of Prey (WCBP) in Boise, Idaho from 1990 to present. A priority at the last-named facility was to maintain at least 30 captive pairs with the capacity to produce at least 50 young per year for

release. All young produced during 1990–1992 were retained for breeding, along with an additional 61 young in subsequent years to maintain genetic diversity. Pairs currently maintained at the Idaho facility produced >100 young per year during 1997–2002 (Figure 1). During the 2002 season, 32 captive pairs produced 120 young, of which 10 were held back to augment the captive population now totaling 44 pairs.

Procedures for captive breeding were modified from those The Peregrine Fund earlier developed for the peregrine falcon (*Falco peregrinus*) (Weaver and Cade 1983, Cade et al. 1991). Breeding chambers for aplomado falcons measured 3.0 m × 6.1 m and were 5.5 m high at the peak, sloping to 4.3 m. Each chamber contained 2 open skylights and an open 0.91-m-high × 3.0-m-wide window 0.91 m above the floor. A bar spacing of 43 mm on skylights and windows accommodated the head but not the shoulders of the falcons. The nest ledge, positioned on the back wall, contained 2 0.61-m-square nest boxes filled with shredded cedar (*Thuja plicata*). Additional flat perches covered with coir (*Cocos nucifera*) fiber doormats (“cocomats”) were affixed on the 3 remaining walls. Falcons often laid eggs on these matted ledges, so each was topped with an additional semi-circular mat to prevent eggs from rolling off. We compensated for suboptimum winter temperatures at the Boise facility by supplying radiant heat panels near perches and thermostatically controlled heat tape on the edges of nest ledges. One-way glass above the nest ledge provided a view of the

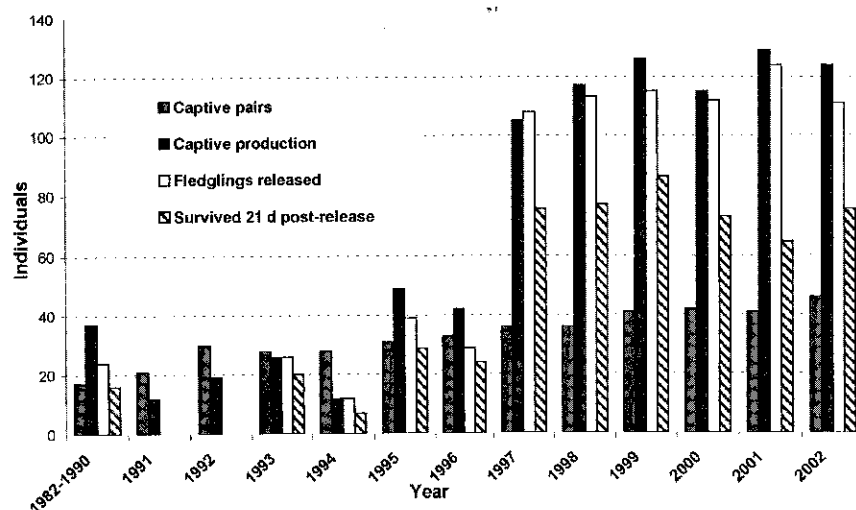


Figure 1. Captive production, release, and survival of hacked aplomado falcons in southern Texas during 1982–2002.