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LETTERS

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NESTING OF THE ENDANGERED CHACO EAGLE (*BUTEOGALLUS CORONATUS*) ON A HUMAN-MADE STRUCTURE

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Availability of nesting sites may be an important environmental constraint for raptors. Several population recovery programs for threatened and endangered raptor species focus on providing artificial nests sites, ranging from small boxes to large platforms (Negro et al. 2007). Artificial nests have been successfully used as a management tool to augment populations or even to reintroduce species of non-globally threatened but locally scarce or extirpated species such as Ospreys (*Pandion haliaetus*; Castellanos and Ortega-Rubio 1995), Bald Eagles (*Haliaeetus leucocephalus*; Hunter et al. 1997) and Aplomado Falcons (*Falco femoralis*; McClure et al. 2016). However, not all raptor species adapt to use of artificial structures, but instead rely only on natural structures such as trees, cliffs, or cavities. Diurnal raptors that breed on artificial nesting structures include several hawks, eagles, and falcon species (see examples in Bird et al. 1996). For most of these species, the first evidence of tolerance of artificial structures for nesting may have been from observations of nesting on human-made structures (e.g., electricity towers and poles, buildings, bridges). However, any summary of raptor species known to use artificial nesting structures would be incomplete due to the lack of understanding of basic biology and behavior of many raptor species.

The Chaco Eagle (also called Crowned Eagle or Crowned Solitary Eagle; *Buteogallus coronatus*) is one of the most threatened raptor species occurring in the Neotropical region, with negative population trends and an entire population estimated at fewer than 1000 reproductive individuals (BirdLife International 2016). This species occurs from southern Brazil through Bolivia and Paraguay to northern Patagonia in Argentina. The

species is considered extirpated in Uruguay, where no records have been obtained since 1930 (Alvarez 1933). The Chaco Eagle occurs in a variety of habitats but particularly within the savanna-like landscapes of arid and semiarid environments, such as the Chaco and the Espinal ecoregions of southern South America (Ferguson-Lees and Christie 2001). Although information on habitat requirements for Chaco Eagles is scarce, it is known that they select the tallest trees available for their nests in breeding territories in La Pampa province in central Argentina (Maceda 2007). Data on global threats are also limited. However, in central Argentina, human-related threats include direct persecution (Sarasola and Maceda 2006, Sarasola et al. 2010, Barbar et al. 2015), electrocution on power lines (Galmes et al. in press), and habitat loss due to deforestation and subsequent shortage of trees for nesting (Bellocoq et al. 1998). Additionally, wildfires are also responsible for the loss of nesting trees (Maceda 2007).

Here I report an observation of a Chaco Eagle nest on a human-made structure in central Argentina. This demonstrates the ability of the species to use artificial structures for breeding and highlights the potential of artificial platforms as a tool in habitat management for this endangered species.

After investigating local reports, on 25 January 2002 I found a Chaco Eagle nest on the top of a steel tower near the town of Santa Isabel in western La Pampa province, Argentina (36°06.68'S, 66°55.87'W). This location is within the Monte Desert biome, a subtropical to warm temperate desert and semi-desert located in western Argentina and constituting the most arid rangeland in this country (Abraham et al. 2009). The nest was located in sandy, treeless grasslands dominated by perennial grasses of *Stipa* spp. and herbaceous plants. Such habitat characteristics are probably associated with edaphic and geomorphological features of this particular site, which are linked to sandy

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Figure 1. (A) Tower used by Chaco Eagle pair for nesting in the semiarid habitat of central Argentina. Note the nesting eagle on the wooden platform near the top of the tower and part of the unoccupied Monk Parakeet nest upon which the eagles built their nest. (B) Chaco Eagle nestling on its nest after banding.

alluvial soils and the proximity of the Atuel and Salado rivers (Bisigato et al. 2009).

The tower where the eagles built their nest consisted of a double structure with a small tower built inside of a larger one (Fig. 1A). The Instituto Geográfico Militar (IGM) of Argentina erected this tower during topographic surveys conducted in the area in the middle of the twentieth century. The structure was 10 m high with a square section of 3.5-m sides on the base and 2-m sides on the top of the tower. One meter below the top of the tower, a wooden platform covered the structure, except for a central hole through which the inner structure rose to reach the same height as the external tower (Fig. 1). The eagles built their nest on the wooden platform and upon an unoccupied and partially destroyed Monk Parakeet (*Myiopsitta monachus*) nest. Use of Monk Parakeet nests by Chaco Eagles to support their own nests is not novel and was previously reported for this same study area (Santillán et al. 2009). The nest contained a single nestling approximately 40 d old that was measured and banded with a color anodized aluminum band before being returned to the nest (Fig. 1B). We did not see adult eagles in the area when approaching the tower or while handling the nestling; this may have been due to the advanced age of the nestling, which did not require continuous adult care. Furthermore, there was an absence of trees for perching in the vicinity of the nest. Other than the tower itself, alternative elevated points in the area included the top of the nearest sand dunes, 50–200 m from the nest. Several shell remains of large hairy armadillos (*Chaetophractus villosus*) and dwarf armadillos (*Zaedyus pichiyi*) were found on the top of the dunes, confirming their use as feeding sites by adult eagles.

Based on interviews with local residents, the use of this platform by Chaco Eagles occurred during several previous breeding seasons. However, after this recorded breeding attempt, the nest was not occupied again during the following breeding seasons. Maceda (2007) mentioned the use of a steel tower by Chaco Eagles for nesting in La Pampa province before 2001, but did not provide an accurate description and location for the nest. Thus, it is unclear if the nest reported by Maceda (2007) was the same as that reported here or was a different nest on another steel tower. Two other IGM towers located on private ranches at 83 and 98 km from the Santa Isabel tower were inspected in the 2004 and 2008. Both towers contained Monk Parakeet nests on the top but did not contain eagle nests.

The observation of Chaco Eagles building their nests on human-made structures reveals the capability of this species to adopt artificial structures for nesting. There is increasing evidence that habitat loss, including loss of suitable nesting sites, is an important threat to Chaco Eagles. In the dry forests of the Chaco and Espinal biomes of northeastern Argentina, for example, the Chaco Eagle range has contracted to 36% of its original area in the last 60 yr (Fandiño and Pautasso 2013). This percentage is similar to the amount of the Espinal biome lost or severely modified by deforestation during the last century (37%; Brown et al.

2006). Thus, evidence of Chaco Eagles adopting artificial structures for nesting could encourage its experimental implementation for habitat improvement and as a management tool, particularly in those areas where Chaco Eagle breeding populations still exist and availability of suitable nesting sites is suspected to be a limiting factor.

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