

NOTES

DISTRIBUTIONAL STATUS OF THE COMMON BLACK HAWK
(*BUTEOGALLUS ANTHRACINUS*) IN CHIHUAHUA, MEXICOJOSÉ MANUEL JURADO-RUIZ¹ AND ISRAEL MORENO-CONTRERAS^{2,3}¹*Agrupación de Guía de Turistas del Estado de Chihuahua (AGTECH), Privada de José Ángel Vizcaino 5137, Chihuahua, Chihuahua, Mexico, Postal Code 31107*²*Posgrado en Ciencias Biológicas, Universidad Nacional Autónoma de México, Coyoacán, Mexico City, Mexico*³*Corresponding author, e-mail: israel.moreno.contreras@gmail.com*

Abstract.—Updating species ranges and documenting range extensions with new municipality records helps monitor the status of populations, provides insight into life-history traits, and informs conservation decisions. Herein we document a new locality record and range extension of the Common Black Hawk (*Buteogallus anthracinus*) in Chihuahua, Mexico, which partially fills a distributional gap in the central part of the state. We also update information on the winter, migration, summer, and year-round distribution ranges of this species in Chihuahua. We compiled several sources of distributional information and produced new range maps based on the aerographic method. We show that the distribution of this species in Chihuahua is not only associated with wet drainages within Sierra Madre Occidental Montane Forests and Sinaloa Dry Forests ecoregions as previously thought, but that the species is also a regular summer resident in riparian habitats along the Chihuahuan Desert, and an accidental migrant in that ecoregion.

Key Words.—aerographic method; tropical hawk; range extension; riparian areas

The Common Black Hawk, *Buteogallus anthracinus*, is a buteonine raptor that depends on riparian areas with a range extending from the southwestern U.S. to northern South America (Schnell, J.H. 2020. Common Black Hawk (*Buteogallus anthracinus*), version 1.0. in *Birds of the World*. Poole, A.F. and F.B. Gill (Eds.). Cornell Lab of Ornithology, Ithaca, New York. Available from <https://doi.org/10.2173/bow.comblh1.01> [Accessed 5 June 2020]). It typically nests in trees but occasionally nests on cliffs (Schnell *op. cit.*). Common Black-Hawks are obligated to wet riparian habitats where they often hunt fish, amphibians, and reptiles from perches just above the water or while walking along shore (Russell and Monson 1998; Flesch 2008a). The species has expanded its summer range in northern Mexico and southwestern U.S. (Schnell *op. cit.*). Its breeding range in the U.S. is limited to the southwestern corner in Utah and northwestern portion in Arizona along streams of Virgin River drainage (Wauer and Russell 1967; Gifford 1985). Small breeding populations exist in Texas, where it is a rare and local summer resident in the Davis Mountains and adjacent localities (Peterson and Zimmer 1998), and a regular nester along the Rio Grande in southern Brewster and Presidio Counties, and in the Concho Valley (Lockwood and Freeman 2014).

In Mexico, the Common Black Hawk has been recorded as a common to fairly common resident of southern Sonora and eastern Nuevo Leon, and southern Tamaulipas to the Yucatan Peninsula (Howell and Webb 1995). Although the summer range of the Common Black Hawk in Chihuahua and Sonora has been mapped to the Sierra Madre Occidental ecoregion (Howell and Webb 1995), there are records wholly within the Sonoran Desert

ecoregion just west of the Sky Islands in southeastern Arizona and northern Mexico (Russell and Monson 1998; Flesch 2008b). To our knowledge, there have been no concerted efforts to determine the distribution of Common Black Hawks across Chihuahua, and very little research of any kind has been published on this species in this part of its northern distributional range. Herein we document a new locality record and range extension in Chihuahua, which partially fills a distributional gap in the central part of the state. We also update the winter, migration, summer, and year-round distribution ranges of Common Black Hawk in Chihuahua, Mexico.

We compiled Chihuahua records of the Common Black Hawk from three major resources: published literature (Stager 1954; Vuilleumier and Williams 1964; Gómez de Silva 2005, 2008; Moreno-Contreras et al. 2015), the Global Biodiversity Information Facility (GBIF; www.gbif.org [Accessed 8 June 2020]), and specimen records in the Atlas of Mexican Bird Distributions (Peterson et al. 2016), a database that has focused on comprehensive capture of distributional data from Mexican bird specimens housed in 70 scientific collections. The GBIF data was downloaded using the `occ_search` function of `rgbif` R-library (Chamberlain et al. 2020). These distributional data include records from Naturalista, an online social network of people sharing biodiversity information to help each other learn about nature; (<https://www.naturalista.mx> [Accessed 8 June 2020]), and eBird, a real-time checklist program and online citizen-based platform for collection of ornithological data (<https://ebird.org> [Accessed 8 June 2020]).

As an additional automated step, we employed the `clean_coordinates` function of the `CoordinateCleaner`

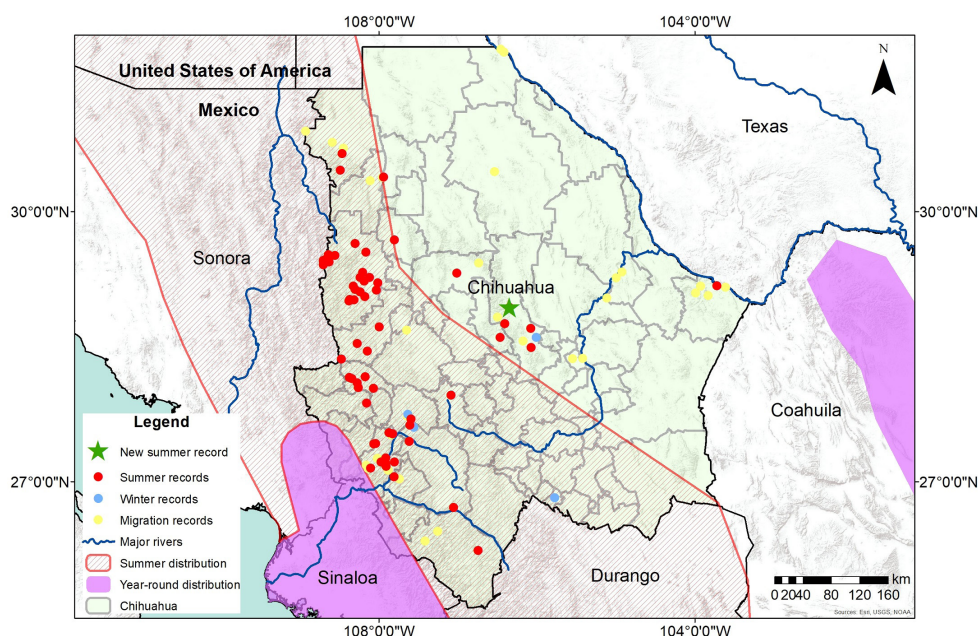


FIGURE 1. Digitized representations of published range maps of the Common Black Hawk (*Buteogallus anthracinus*) in Chihuahua of Howell and Webb (1995) supplemented by BirdLife International and Handbook of the Birds of the World (<http://datazone.birdlife.org>). All records separated by seasonal status (including a new record at Cueva de las Monas, Chihuahua Municipality) and were overlaid on the published distribution maps.

R-package (Zizka et al. 2019) as a bioinformatic pipeline filter of the GBIF occurrence data to avoid sampling bias in georeferenced data (i.e., doubtful records based on known distributional ranges). As a manual step, we individually checked the Common Black Hawk observations in the state of Chihuahua and changed the geographical coordinates of an occurrence record of eBird indicating Chihuahua City, but which actually referred to Mil Castillos. We only included records submitted to Naturalista if they were classified as research-grade, which requires a photograph and corroborated identification by at least one other user. We did not exclude potentially erroneous observations from the other data sources, largely because necessary details regarding the observations were rarely available to us. We conducted the cleaning process for Common Black Hawk observations using R 3.6.1 (R Development Core Team 2019).

Once we gathered all the available distributional information and after removing duplicates (records submitted to multiple databases), we plotted the locations of all records of Common Black Hawk occurrence by seasonal status to map their spatiotemporal distribution. We used the contemporary distribution range maps of Howell and Webb (1995) to determine what are considered out-of-range records. These maps were modified and supplemented by records from BirdLife International and the Handbook of the Birds of the World (<http://datazone.birdlife.org> [Accessed 4 June 2020]).

We considered three seasonal categories based on published research of the life history of Common Black Hawks (Russell and Monson 1998; Flesch 2008a; Schnell *op. cit.*): winter (November to early February),

migration (spring: mid-February to July; fall: late August to October), and summer (April to late September in breeding habitat). We determined the habitat type of Common Black Hawk observations by overlaying them with the land use and vegetation cartography (Scale 1:50,000) of the state of Chihuahua provided by CONAFOR (https://www.cnf.gob.mx:8443/snif/seif_chihuahua/). We constructed the new distributional maps for three periods (winter, migration, and summer) employing the aerographic method (Rapoport 1982). This method uses geo-referenced locality data. Occurrence points are interconnected to form an open, minimum spanning tree (MST), where all points are connected by their shortest distance. The minimum distances between pairs of points are measured and the standard deviation distance (SD propinquity index) is calculated (Rapoport 1982). We created the MST in PASSaGE 2 (Rosenberg and Anderson 2011), where we considered the minimum distance (SD propinquity index) as the radius of each locality point. The cumulative area of the circles (deducting overlapping fragments) is taken as the species distribution area. To assess potential changes in distribution within Chihuahuan protected areas, we compared through a gap analysis (Moreno-Contreras et al. 2017) the breeding distribution across two time periods: historical (1934–2000) and current (1934–2019) based on the timing of records. We performed all geospatial work using ArcMap 10.3.1 (Esri, Redlands, California, USA).

We found 156 records of Common Black Hawks for Chihuahua in the compiled database from 1934 to 2020 (Fig. 1); of these, four records are based on specimens from Chihuahua from three localities along the Sinaloan

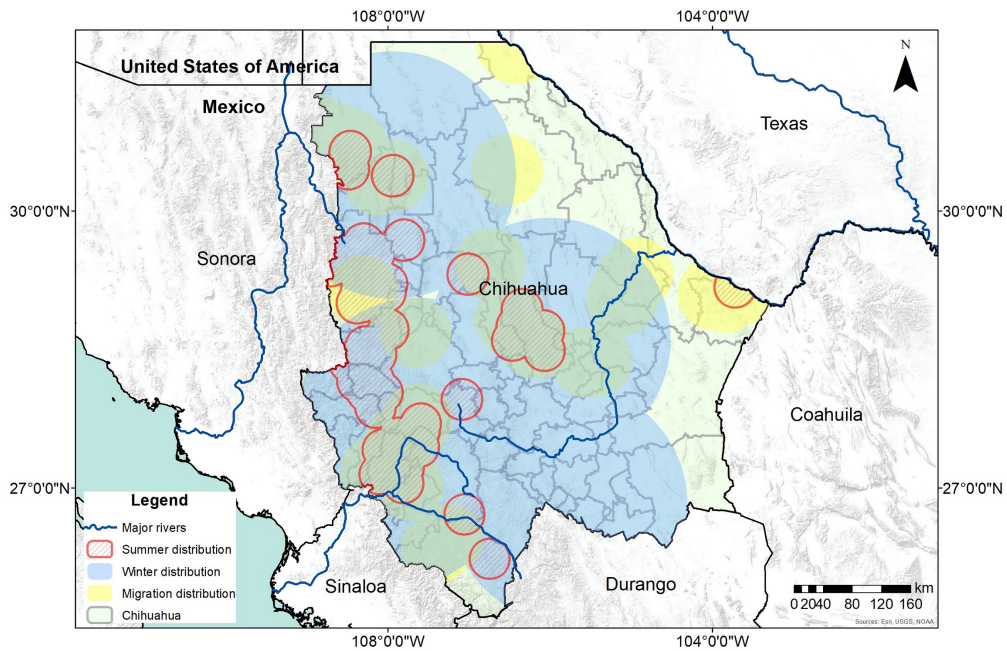


FIGURE 2. New distribution maps based on the aerographic method representing the occurrence of the Common Black Hawk (*Buteogallus anthracinus*) in Chihuahua, Mexico.

Dry Forest ecoregion from 1934 to 1950. All specimens are from the Barrancas del Cobre region (also named as Cooper Canyon), where historically the species has been mapped as a year-round resident in the Sinaloan Dry Forest ecoregion (Howell and Webb 1995). In that region, R. T. Moore collected one male at camp # 1 near La Mesita on 28 May 1934 (ID 491; Moore Laboratory of Zoology [MLZ], Los Angeles, California, USA). Stager (1954) mentioned that the Common Black Hawk appeared to be a rather abundant species in southwestern portions of this ecoregion and he collected at several elevations and in varying vegetation associations: Arroyo

Hondo (adult male on 10 May 1950; ID 612, Natural History Museum of Los Angeles County [LACM], Los Angeles, California, USA) and along the Urique River in the bottom of the Barranca del Cobre (on 18 May 1950; ID 619, Louisiana State University Museum of Natural Science [LSUMZ], Baton Rouge, Louisiana, USA).

Our geospatial analyses revealed that in Chihuahua, the Common Black Hawk has a summer distribution range of 45,345 km² (Fig. 2), whereas the historical summer range of the species covered 52,958 km² (Fig. 3). The extension of Chihuahuan winter distribution of the Common Black Hawk was 189,351 km² and its

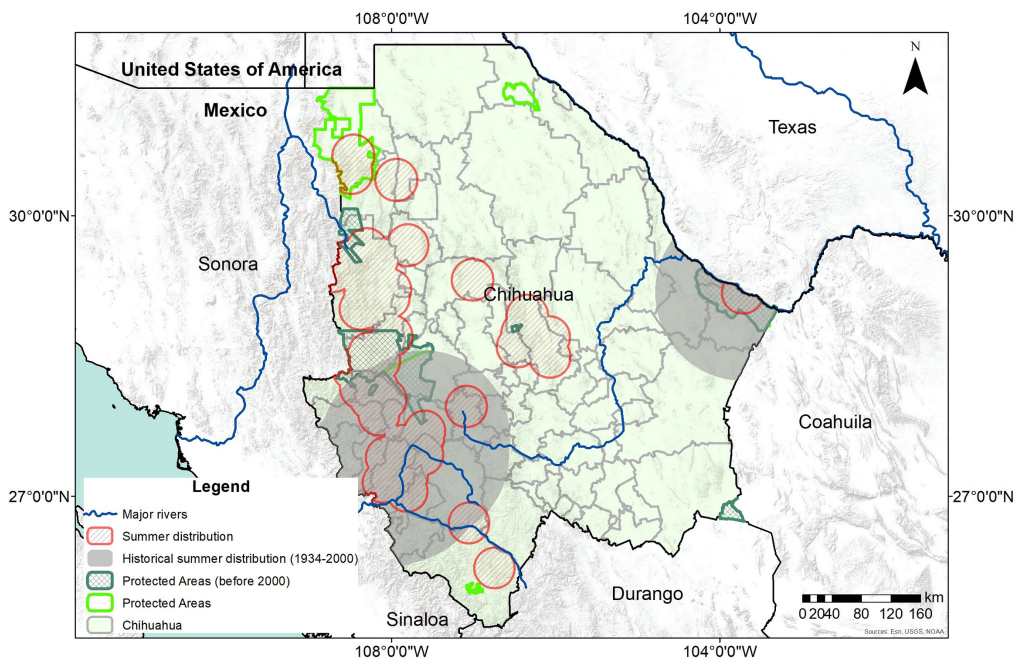


FIGURE 3. Historic and current summer ranges of Common Black Hawk (*Buteogallus anthracinus*) within Chihuahuan protected areas.

migration distribution covered 86,902 km² (Fig. 2). The summer range has remained underrepresented within the network of protected areas (Fig. 3) both historically (11% of protected range) and currently (16% of protected range). The summer distribution (both historical and current ones) includes protected areas such as Bassaseachic Falls, Santa Elena Canyon, Tutuaca, and Papigochic (Fig. 3). The species is considered to have a strong affinity to the wet riparian systems within Sierra Madre Occidental ecoregion in the western portion of Chihuahua (Howell and Webb 1995) during summer. There are at least five so called out-of-range localities, however, in the central part of Chihuahua and one locality in the eastern portion of the state (i.e., Santa Elena Canyon protected area) suggesting a regular local summer occurrence (Fig. 1 and 2).

On 28 May and 11 June 2020, the lead author, accompanied by other bird watchers during ornithological surveys in the Punta de Agua area, Ejido Cuauhtémoc, Chihuahua Municipality, observed a presumably breeding pair of Common Black Hawks at the Cueva de las Monas archaeological site. This area is a recharge area for a phreatic zone that supplies water to nearby Chihuahua City, which is quite close to two small populated areas, Punta de Agua and Ejido Cuauhtémoc (28°56'28.3"N, 106°20'36.2"W). The vegetation communities from the Punta de Agua area to the nest observation site consisted of a mix of typical desert scrub plants, such as Creosote Bush (*Larrea tridentata*), with a riparian zone and oak forest (*Quercus* spp.) of medium height. We noted that one Common Black Hawk vocalized while chasing away five Turkey Vultures (*Cathartes aura*) that were in the area. The first author found and photographed the pair of Common Black Hawks and their nest in a dead oak tree (*Quercus* spp.), always at a suitable distance to prevent the pair from leaving the nest. On 22 June 2020, a birdwatcher (Bonifacio López) recorded a Common Black Hawk on the nest previously observed by the first author (Fig. 4). This nesting record is about 52 km away from the known summer distribution of the Common Black Hawk in Chihuahua (Fig. 1).

Although the species is mostly considered a summer resident in the northern Sierra Madre Occidental and a year-round resident in the most southern Oak-Pine Forests (Fig. 5), there are also several winter records (Fig. 5). Single individuals have been reported at the town of Casas Grandes on 23 February 1984 (eBird), in an irrigation pond on the east edge of Casas Grandes Municipality on 5 January 2008 (Gómez de Silva 2008), in Chihuahua Municipality on 25 January 2019 (Naturalista), and in Hidalgo del Parral Municipality on 30 December 2018 (Naturalista). In Sonora, there are recent records of wintering birds within about 15 km of Chihuahua in the Aros River canyon. Because these records in Sonora are along the Aros River, which extends into western Chihuahua, it is probable that Common Black Hawks winter in this part of Chihuahua (Flesch et al. 2015).

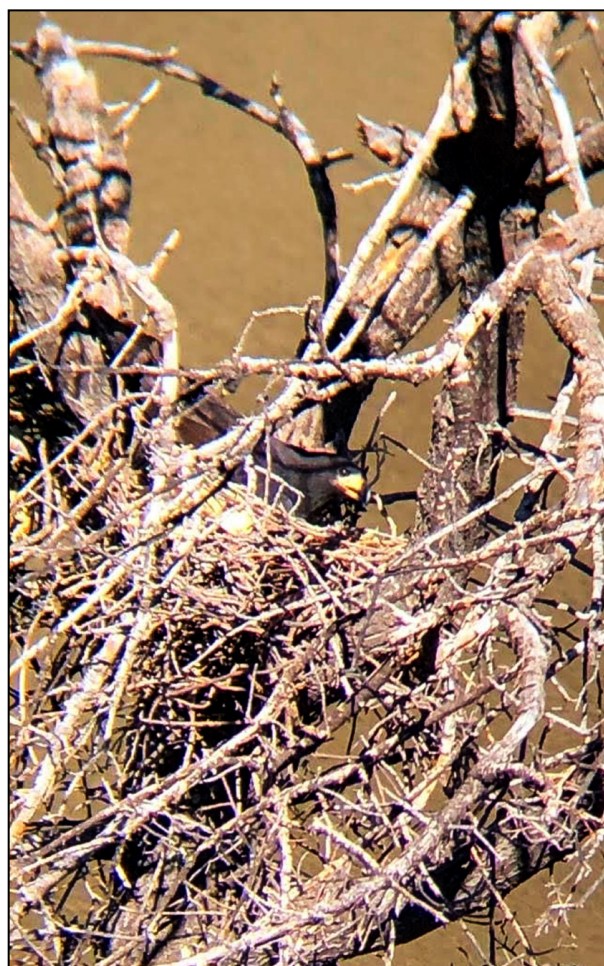


FIGURE 4. Female Common Black Hawk (*Buteogallus anthracinus*) nesting at Cueva de las Monas, Chihuahua, Mexico, 22 June 2020. (Photographed by Bonifacio López).

Outside of its mapped distribution in montane forests and adjacent habitats in northern Mexico, Common Black Hawks likely are accidental transient in the Chihuahuan Desert ecoregion during the migration period. Records during this period include one at San Rafael, Ahumada Municipality 19 April 2008 (eBird) and in urban green spaces at Club Campestre 30 March 2015 (Moreno-Contreras et al. 2015) and at El Chamizal 18 March 2016 (observation by Bruno Lima and Karina Avila, <http://www.wikiaves.com/2057166> [Accessed 15 June 2020]), both in Juarez Municipality. Most of the eastern records in Coyame del Sotol Municipality are migrant individuals associated with agricultural fields and microphyllous desert scrub (see Fig. 5) within the Chihuahuan Desert ecoregion (Vuilleumier and Williams 1964).

We have shown that the distribution of this species in Chihuahua is not only associated with wet drainages within Montane Forests of the Sierra Madre Occidental ecoregion and Dry Forests of the Sinaloan ecoregion as previously thought, but that the species is also a regular summer resident in riparian habitats along the Chihuahuan Desert, with scattered out-of-range winter records in northern (one January record), central (one

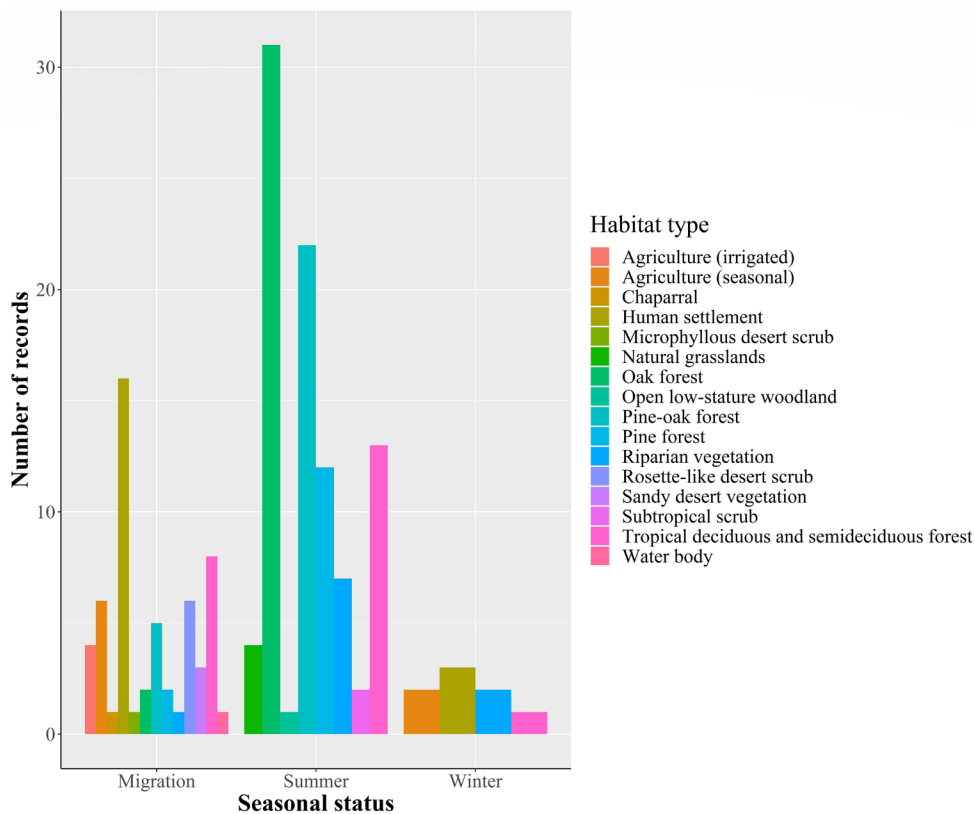


FIGURE 5. The number of records of the Common Black Hawk (*Buteogallus anthracinus*) by seasonal status and habitat type.

January record), and southern (one December record) portions of that state. There are four February records that are thought to be migrants or early arriving breeders, three of which were reported in human settlements along the Sierra Madre Occidental (e.g. Casas Grandes, Batopilas). In addition, Common Black Hawks tend to migrate in human-made habitats (i.e., urban green spaces of Juárez Municipality) in the Chihuahuan Desert ecoregion (Moreno-Contreras et al. 2015). In fact, most of the records during migration come from human settlements (>10 records; Fig. 5). As reported for the state of Sonora, the species is probably attracted to the greater presence and permanence of water that supports breeding in Chihuahuan montane habitats compared to desert landscapes (Flesch et al. 2008b).

The Common Black Hawk is currently listed as Special Protection by Mexican law (NOM-059-SEMARNAT-2010). Although its breeding (e.g., riparian systems, pine-oak forests) and non-breeding habitats (e.g., microphyllous desert scrub) are relatively well represented within the network of protected areas of Chihuahua (Moreno-Contreras et al. 2017), much of its breeding habitat is greatly threatened by the clearing or alteration of riparian habitat (generally for agriculture), water diversion for irrigation and storage, diking and damming for flood control, lowering of the water table by pumping, and by livestock grazing, which eliminates regenerative seedlings (Schnell *op. cit.*). In addition, the historic and current range of this species is poorly

represented in the Chihuahuan protected areas network (< 20% of protected distribution range). As anthropogenic activity continues to alter landscapes and change habitat suitability for this species and other organisms, documenting range shifts and monitoring population trends will be necessary for effective conservation assessment of this tropical hawk species.

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