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A ROAD SURVEY OF RAPTORS THROUGH WESTERN MEXICO

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Surveys of raptors have been used extensively to determine relative abundances, diversities, and to compare between, or among different regions and habitats (e.g., Ellis *et al.* 1983, 1990). Ellis *et al.* (1990) showed that road counts can be used as a practical method to estimate raptor distribution and relative abundance. Here we present the results obtained in a road survey of raptors through western Mexico. Our intention is to set up a baseline for future one-day raptor surveys in the area.

AREA AND METHODS

The road count was conducted during clear weather conditions from 19 to 25 February 1986. Approximately 3,557 km of road in western Mexico were covered. We conducted seven surveys between Nogales, on the U.S.A. — Mexico border to Tapachula, on the Mexico — Guatemala border (Fig. 1). The first transect was from Nogales to Hermosillo (282 km); the second was from Guaymas to Mazatlan (775 km); the third was from Mazatlan to Puerto Vallarta (458 km); the fourth from Puerto Vallarta to Lazaro Cardenas (589 km); the fifth was from Lazaro Cardenas to Pinoteca Nacional (627 km); the sixth from Pinoteca Nacional to Ciudad Arriaga (557 km); and the seventh was from Arriaga to Tapachula (269 km).

Although we did not made specific notations on habitat, a good overview of habitat for Mexico is given by Rzedowski (1978) and a general sketchy view can be found in Howell & Webb (1995). The first survey was through the Sonoran desert. The next two surveys were in the northwestern lowlands south of Hermosillo. Surveys four through six were a mix between mountainous areas and the narrow strip of lowlands running along southwestern Mexico. The last survey was along a dry area between Arriaga and the Guatemalan border.

The roadside counts were made by both of us, from the front seats of a small truck while taking turns as driver or record-keeper. The observations were made from 7:00 h to near sunset. We identified most birds while in transit, but sometimes we stopped to confirm identification of an individual or group. We did not attempt to identify individuals farther than 300–500 m from the road; such individuals or groups were recorded as unidentified. Taxonomy and sequence of species follows AOU (1983).

RESULTS AND DISCUSSION

We observed a total of 3408 diurnal raptors comprising 20 species, with an overall raptor frequency of 0.96 individuals/km (Table 1). The most frequently encountered species was the Turkey Vulture (*Cathartes aura*) with a frequency of 0.4 individuals/ km, followed by the Black Vulture (*Coragyps atratus*) with a frequency of 0.25 individuals/km. The seventh section was the only one where Black Vultures were more abundant than Turkey Vultures (1.13 and 1.03/km, respectively). Both species of vultures made up the bulk of total individuals and accounted for 70 % of the total individuals observed. Both species were usually patchy in distri-

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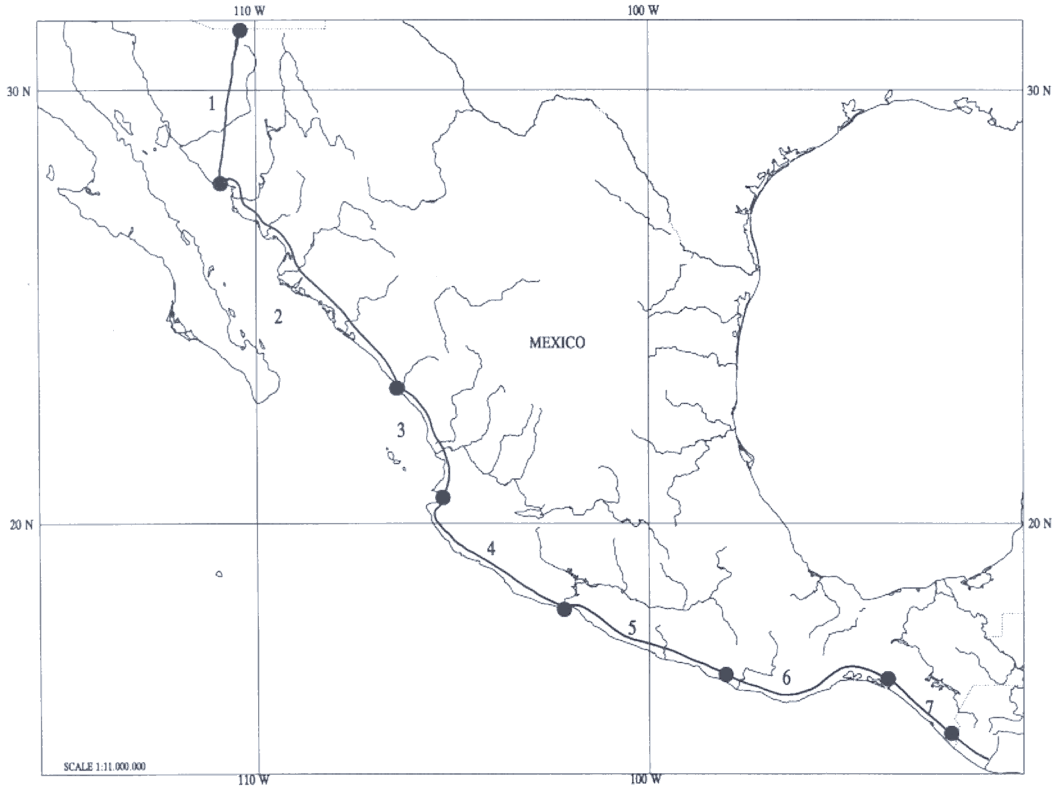

FIG. 1. Map of Mexico showing the route of travel. Fill circles correspond to cities between transects and numbers correspond to transect number (see methods for city names).

bution with large numbers usually in a single area. In a comparative study of raptor populations in open tropical habitats between Mexico (estates of Veracruz and Tabasco) and Ivory Coast (Africa), Thiollay (1978) also found that both species of vultures were among the most abundant species in eastern Mexico.

All other raptors had substantially lower frequencies. The American Kestrel (*Falco sparverius)* was found on all transects, but at an overall frequency of 0.13 birds/km, and the Red-tailed Hawk (*Buteo jamaicensis*) had an overall frequency of only 0.04 birds/km. The Red-tailed Hawk declined steadily in frequency toward the south. In the other species, frequency was irregular and without a clear pattern. Some species, such as the Crested Caracara (*Caracara plancus*), were observed in all but one transect and at low frequencies. Three species, Sharp-shinned Hawk (*Accipiter striatus*), Common Black Hawk (*Buteogallus anthracinus*), and Roadside Hawk (*Buteo magnirostris*), were found on five of the seven transects, but in small numbers.

The transect with the highest species richness, 14 species, was the Mazatlan to Puerto Vallarta segment. This transect also had the greatest habitat diversity. The fourth, sixth, and seventh transects were similar in species richness with 10, 10 and 11 respectively. The second and fifth transects contained the fewest number of species, seven and eight, respectively. The transect with the highest number of observed individuals had a diversity of 11 species, and the transect with the highest diversity (14) species had a lower number of individuals than the previous transect. In southeastern Mexico, Thiollay (1978), found the highest species richness in a single habitat type to be 15 species.

TABLE 1. Summary of diurnal raptor survey through Mexico. Frequencies of birds per kilometer are given in parentheses, if not given values are less than 0.00 birds/km.

SPECIES	TRANSECT						
		2	3	4	5	6	
Cathartes aura	60 (0.21)	185 (0.24)	235 (0.51)	258 (0.44)	82 (0.13)	426 (0.76)	279 (1.03)
Coragyps atratus	61 (0.22)	166 (0.21)	30 (0.06)	185 (0.31)	30 (0.05)	103 (0.18)	306 (1.13)
Elanus caeruleus	—	22 (0.02)	6 (0.01)	—	—	4	1
Ictinia sp.	—	—	—	—	—	1	1
Circus cyaneus	—	5	—	—	—	—	—
Accipiter striatus	—	1	1	2	1	2	—
Accipiter cooperii	1	—	2	—	—	—	—
Buteogallus anthracinus	—	—	1	4	3	2	2
Parabuteo unicinctus	4	27 (0.03)	1	—	—	—	—
Buteo magnirostris	—	—	13 (0.02)	6 (0.01)	1	7 (0.01)	3
Buteo brachyurus	—	—	—	—	—	4	2
Buteo albicaudatus	—	—	1	—	—	—	2
Buteo albonotatus	—	—	—	2	—	—	—
Buteo jamaicensis	55 (0.19)	65 (0.08)	18 (0.04)	6 (0.01)	2	—	—
Buteo regalis	1	—	—	—	—	—	—
Caracara plancus	—	15 (0.02)	1	4	3	12 (0.02)	8 (0.03)
Herpethotheres cachinnans	—	—	1	1	—	—	1
Falco sparverius	28 (0.10)	169 (0.22)	94 (0.20)	36 (0.06)	42 (0.06)	63 (0.11)	33 (0.12)
Unidentified	1	4	2	9	1	10	ca.180
Tyto alba	—	—	3	—	—	—	—
Total number of birds observed	211	655	412	513	165	634	818

The greatest number of individuals was not associated with increased species diversity, but was linked with human-made conditions or habitat. For example, most vultures were observed in small to large clumps, around animal carcasses in the road or in garbage dumps.

As some authors, e.g., Millsap & LeFranc (1988) and Ellis *et al.* (1990), have pointed out road raptor surveys can be useful for acquiring a quick idea of relative abundance and species diversity for raptors in open to semiopen habitat. If made in a frequent basis, however, its value would certainly be of great asset.

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