

## A PRELIMINARY ASSESSMENT OF DISTRIBUTIONS AND CONSERVATION NEEDS OF GRASSLAND BIRDS IN MEXICO

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**Abstract.** We examined distributional patterns of grassland birds in three major grassland biomes in Mexico: the grasslands of northern Mexico, the pine (*Pinus*) grasslands of central Mexico, and the tropical savannas of southern Mexico. Although results are preliminary, we identified the grasslands of northern Mexico and the pine grasslands of central Mexico as important areas of endemism for grassland birds. We also found that a sizeable component of North American grassland birds depends heavily on grasslands in northern Mexico. The tropical savannas of southern Mexico, although lacking endemic species, support the only Mexican populations of several species.

### UNA EVALUACIÓN PRELIMINAR DE LAS DISTRIBUCIONES Y DE LAS NECESIDADES DE CONSERVACIÓN DE LAS AVES DE PASTIZAL EN MÉXICO

**Sinopsis.** Examinamos los modelos de distribución de las aves de pastizal en tres biomas principales de pastizal en México: los prados del norte de México, los prados de pino (*Pinus*) del centro de México y las sabanas tropicales del sur de México. Aunque los resultados son preliminares, identificamos los prados del norte de México y los prados de pino del centro de México como áreas importantes para las aves endémicas de pastizal. Descubrimos también que una parte importante de las aves de pastizal norteamericanas depende mucho de los prados en el norte de México. Las sabanas del sur de México, aunque carecen de especies endémicas, mantienen las únicas poblaciones de varias especies.

**Key Words:** endemism; grassland birds; Mexico.

Grassland habitats, although originally extensive across central North America, are now among the continent's most degraded and threatened habitats (Dinerstein et al. 1995, Stotz et al. 1996). A review of the distribution and diversity of grassland birds in Mexico is challenging because at least three distinct types of grasslands can be identified. In northern Mexico, grasslands are continuous with and similar to those of the southern Great Plains of the United States; in the Transverse Volcanic Belt of central Mexico, open pine (*Pinus*) woodlands are interspersed with extensive grasslands; and in lowland portions of southern Mexico, tropical savannas extend south and east into Guatemala and Belize (Fig. 1). We examined distributional patterns of grassland birds in each of these three major grassland biomes.

We defined grasslands as large expanses of open areas dominated by grass and without a closed tree canopy cover. Bird distributions were determined in part from specimens in scientific collections (American Museum of Natural History, New York, New York; Field Museum, Chicago, Illinois; Museo de Zoología, Universidad Nacional Autónoma de México, México, D.F.; University of Kansas Natural History Museum, Lawrence, Kansas; and U.S. National Museum of Natural History, Washington, D.C.) but principally from summaries of Mexican bird distributions. The latter included Friedmann et al. 1950, Miller et al. 1957, Mengel 1970, Binford

1989, Howell and Webb 1995, Stotz et al. 1996, and American Ornithologists' Union (AOU) 1998. We excluded from consideration species found only in trees or in shrub edges.

### SPECIES DISTRIBUTIONS

We identified 71 species of birds that make significant use of grassland habitats in Mexico (Table 1; note that there is some overlap between sections). Compared with avifaunas in other habitats in Mexico, the grassland avifauna is not especially diverse (Escalante et al. 1993). Still, several interesting and distinctive forms are represented, and it is clear that Mexican grasslands are important to a broad spectrum of North American grassland birds, especially during the winter months (Stotz et al. 1996).

Of the 71 grassland species we identified, 3 are endemic and 2 are nearly endemic to the country (Table 1, sec. I). Among the 23 major habitat types represented in Mexico, this level of endemism ranks thirteenth (Escalante et al. 1993). Botteri's Sparrow (*Aimophila botterii*) and Rufous-winged Sparrow (*A. carpalis*) range from just north of the U.S. border south into central Mexico and thus are almost endemic to Mexico. Striped Sparrow (*Oriturus superciliosus*) and Sierra Madre Sparrow (*Xenospiza baileyi*), both representing monotypic genera, are endemic to the highlands of the Transvolcanic Belt. Masked Bobwhite (*Colinus [virginianus] ridgwayi*) is a distinctive form that is restricted to northwestern Mexico and is probably recog-



FIGURE 1. Major grassland biomes of Mexico.

nizable as a species (Phillips et al. 1964). All five of these species appear to be ecologically restricted to grassland habitat.

Seven species are broadly distributed, ranging from the United States south through Mexico into South America (Table 1, sec. II). Only one of these seven species (Burrowing Owl [*Athene cunicularia*]) uses grassland habitats almost exclusively, however.

Another component of Mexico's grassland avifauna breeds from Canada and the United States south into northern Mexico, where geographic distributions frequently end at the southern terminus of the Chihuahuan Desert, in the states of Jalisco, Guanajuato, and Querétaro. Of the 14 species in this category, 8 are ecologically restricted to grasslands (Table 1, sec. III). Interestingly, Horned Lark (*Eremophila alpestris*) ranges from northern North America south to the Isthmus of Tehuantepec, where its range terminates, in spite of the existence of apparently similar habitats to the south; there is a disjunct population in the vicinity of Bogotá, Colombia (AOU 1998).

A very different set of species, 20 in total, resides in the tropical grasslands and savannas of Central America and ranges north into the tropical lowlands of southern Mexico (Table 1, sec. IV). Most of these species (e.g., Spot-tailed Nightjar [*Caprimulgus maculicaudus*], Blue-black Grassquit [*Volatinia jacarina*]) inhabit grassy openings in tropical rain forest, although one (Ocellated Quail [*Cyrtonyx ocellatus*]) is found in grassy montane pine forests and another (Sedge Wren [*Cistothorus (platensis) stellaris*]) in grassy marsh habitats. Seven of the 20 species are restricted to grassland habitats.

A fifth component of Mexico's grassland avifauna consists of species that nest in Canada and the United States and migrate south to winter in

Mexican grasslands (Table 1, sec. V). Most of the 20 species we include in this category spend the winter in northern Mexico. Four of the species (Ferruginous Hawk [*Buteo regalis*], Mountain Plover [*Charadrius montanus*], Sprague's Pipit [*Anthus spragueii*], and Lark Bunting [*Calamospiza melanocorys*]) winter principally in Mexico, and another (Baird's Sparrow [*Ammodramus bairdii*]) is nearly endemic to the country in winter.

The entire populations of another 10 species (Table 1, sec. VI) migrate through Mexico on their way to points farther south, including the savannas of northern South America (e.g., Dickcissel [*Spiza americana*]) and the pampas of southern South America (e.g., Buff-breasted Sandpiper [*Tryngites subruficollis*]; Eskimo Curlew [*Numenius borealis*], spring only; Upland Sandpiper [*Bartramia longicauda*]). Most of the species in this category are ecologically restricted habitat specialists (Stotz et al. 1996; Table 1, sec. VI).

#### CONSERVATION STATUS AND RECOMMENDATIONS

The conservation status and needs of Mexican grasslands and their avifaunas vary. Although conservation of grassland birds and habitats has intensified in the United States, little or no progress has been made in Mexico.

#### NORTHERN GRASSLANDS

The grasslands of northern Mexico were originally extensive, but fragmentation through encroachment of woody vegetation and overgrazing has been nearly ubiquitous; isolated portions of this region, such as the coastal plain of Sonora state, are most seriously threatened (Phillips et al. 1964, Howell and Webb 1995). At least six species of grassland birds depend

TABLE 1. PRELIMINARY CLASSIFICATION OF BIRDS THAT COMMONLY OCCUR ON GRASSLANDS IN MEXICO

Species		Habitat restricted	Endemism <sup>a</sup>
<b>I. Endemic or nearly endemic to Mexico</b>			
Masked Bobwhite	<i>Colinus [virginianus] ridgwayi</i>	✓	E
Botteri's Sparrow	<i>Aimophila botterii</i>	✓	N
Rufous-winged Sparrow	<i>A. carpalis</i>	✓	N
Striped Sparrow	<i>Oriturus superciliosus</i>	✓	E
Sierra Madre Sparrow	<i>Xenospiza baileyi</i>	✓	E
<b>II. Occur north and south of Mexico</b>			
Harris's Hawk	<i>Parabuteo unicinctus</i>		
Crested Caracara	<i>Polyborus plancus</i>		
American Kestrel	<i>Falco sparverius</i>		
Common Ground-Dove	<i>Columbina passerina</i>		
Burrowing Owl	<i>Athene cucularia</i>		
Lesser Nighthawk	<i>Chordeiles acutipennis</i>		
Cassin's Kingbird	<i>Tyrannus vociferans</i>		
<b>III. Breed from Canada and U.S. south into northern Mexico</b>			
Swainson's Hawk	<i>Buteo swainsoni</i>	✓	
Golden Eagle	<i>Aquila chrysaetos</i>	✓	
Prairie Falcon	<i>Falco mexicanus</i>		
Scaled Quail	<i>Callipepla squamata</i>	✓	
Sandhill Crane	<i>Grus canadensis</i>		
Common Poor-will	<i>Phalaenoptilus nuttallii</i>		
Western Kingbird	<i>Tyrannus verticalis</i>		
Horned Lark	<i>Eremophila alpestris</i>		
Chihuahuan Raven	<i>Corvus cryptoleucus</i>		
Cassin's Sparrow	<i>Aimophila cassinii</i>	✓	
Savannah Sparrow	<i>Passerculus [sandwichensis] sandwichensis</i>	✓	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	✓	
Baird's Sparrow	<i>A. bairdii</i>	✓	
"Lilian's" Meadowlark	<i>Sturnella [neglecta] lilianae</i>	✓	
<b>IV. Breed north into tropical lowlands of southern Mexico from Central America</b>			
Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i>	✓	
Roadside Hawk	<i>Buteo magnirostris</i>		
White-tailed Hawk	<i>B. albicaudatus</i>	✓	
Aplomado Falcon	<i>Falco femoralis</i>	✓	
Ocellated Quail	<i>Cyrtonyx ocellatus</i>		
Black-throated Bobwhite	<i>Colinus nigrogularis</i>		
Double-striped Thick-knee	<i>Burhinus bistriatus</i>		
Striped Owl	<i>Asio clamator</i>		
Spot-tailed Nightjar	<i>Caprimulgus maculicaudus</i>	✓	
Tropical Kingbird	<i>Tyrannus melancholicus</i>		
Fork-tailed Flycatcher	<i>T. savana</i>		
Sedge Wren	<i>Cistothorus [platensis] stellaris</i>		
Gray-crowned Yellowthroat	<i>Geothlypis poliocephala</i>		
Blue-black Grassquit	<i>Volatinia jacarina</i>	✓	
Variable Seedeater	<i>Sporophila aurita</i>		
White-collared Seedeater	<i>S. torqueola</i>		
Ruddy-breasted Seedeater	<i>S. minuta</i>		
Grassland Yellow-Finch	<i>Sicalis luteola</i>	✓	
Stripe-headed Sparrow	<i>Aimophila ruficauda</i>		
Peten Sparrow	<i>A. [botterii] petenica</i>	✓	
<b>V. Migrate south into Mexico (winter residents)</b>			
Northern Harrier	<i>Circus cyaneus</i>		
Ferruginous Hawk	<i>Buteo regalis</i>	✓	
Prairie Falcon	<i>Falco mexicanus</i>		
Merlin	<i>F. columbarius (F. c. richardsonii only)</i>		
Sandhill Crane	<i>Grus canadensis</i>		
Mountain Plover	<i>Charadrius montanus</i>	✓	

TABLE 1. CONTINUED

Species		Habitat	
		restricted	Endemism <sup>a</sup>
Long-billed Curlew	<i>Numenius americanus</i>	✓	
Short-eared Owl	<i>Asio flammeus</i>	✓	
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	✓	
Sedge Wren	<i>Cistothorus [platensis] platensis</i>		
Sprague's Pipit	<i>Anthus spragueii</i>	✓	
Vesper Sparrow	<i>Pooecetes gramineus</i>	✓	
Lark Sparrow	<i>Chondestes grammacus</i>	✓	
Sage Sparrow	<i>Amphispiza belli</i>	✓	
Lark Bunting	<i>Calamospiza melanocorys</i>	✓	
Baird's Sparrow	<i>Ammodramus bairdii</i>	✓	
McCown's Longspur	<i>Calcarius mccownii</i>	✓	
Chestnut-collared Longspur	<i>C. ornatus</i>	✓	
Eastern Meadowlark	<i>Sturnella magna</i>	✓	
Western Meadowlark	<i>S. [neglecta] neglecta</i>	✓	
VI. Passage migrants			
Swainson's Hawk <sup>b</sup>	<i>Buteo swainsoni</i>	✓	
Mississippi Kite	<i>Ictinia mississippiensis</i>		
American Golden-Plover	<i>Pluvialis dominica</i>		
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	✓	
Upland Sandpiper	<i>Bartramia longicauda</i>	✓	
Eskimo Curlew	<i>Numenius borealis</i>	✓	
Franklin's Gull	<i>Larus pipixcan</i>		
Common Nighthawk <sup>b</sup>	<i>Chordeiles minor</i>	✓	
Dickcissel	<i>Spiza americana</i>	✓	
Bobolink	<i>Dolichonyx oryzivorus</i>	✓	

<sup>a</sup> E = endemic, N = near endemic.

<sup>b</sup> Small numbers breed in northern Mexico.

heavily on the grasslands in this region; two are effectively endemic to Mexico, two are near-endemics (Escalante et al. 1993), and two are near-endemics as far as wintering populations. Hence, a sizeable component of North American grassland birds depends heavily on grasslands of northern Mexico.

#### TRANSVOLCANIC BELT

The open, grassy pine woodlands that are concentrated in the Transvolcanc Belt of central Mexico comprise the most unusual Mexican grassland habitat. This habitat extends north in the Sierra Madre Occidental and Sierra Madre Oriental (Escalante et al. 1993) and south in the mountains, such as Cerro San Felipe (Binford 1989), of interior Oaxaca state. Two endemic species (Striped and Sierra Madre sparrows) and two near-endemic species (Botteri's and Rufous-winged sparrows) are found only in the grassland habitats of this region; included are the two monotypic genera (*Oriturus* and *Xenospiza*) representing distinctive phylogenetic lineages. Several species of small mammals, including the unusual volcano rabbit (*Romerolagus diazi*), are also endemic to this habitat. Hence, this grassland habitat clearly supports many distinctive animals (Escalante et al. 1993).

The Transvolcanc Belt grasslands are becoming critically endangered. There are several large cities, including Cuernavaca, Guadalajara, Morelia, and Mexico City, in the region. People seeking to fulfill subsistence needs (e.g., collecting firewood, planting corn fields) have destroyed large expanses of this habitat. Additional areas, especially between Cuernavaca and Mexico City, are being consumed by urban sprawl, and still more habitat is being affected by air pollution from large population centers (Flores-Villela and Pérez 1988). The once-extensive high-elevation grasslands in the mountains around Mexico City are especially critical; they include the volcanoes El Ajusco, Popocatepetl, and Nevado de Toluca as well as other nearby volcanoes. Some of these peaks have been the focus of conservation efforts, yet little concrete progress has been achieved. Continued rapid reduction and fragmentation of this high-elevation habitat could lead to several avian extinctions in a short period of time.

#### TROPICAL SAVANNAS

The tropical savannas and grassy openings of southern Mexico are being converted to agricultural uses; indeed, almost all lowland tropical habitats in the country are degraded. Although

no endemic species are found in these habitats, further perturbation of this ecosystem could well eliminate species from Mexico that are dependent on it, such as the Grassland Yellow-Finch (*Sicalis luteola*). Identifying sizeable patches of remaining undisturbed lowland habitat will be a major challenge.

#### RECOMMENDATIONS

Developing an action plan for effective conservation of grassland habitats and their birds is critical. First steps should include identifying the largest remaining patches of grasslands in the Chihuahuan Desert, Sonoran Coastal Plain, and Transvolcanic Belt (preferably in the states of México, Michoacán, and Morelos). Basic inventories need to be conducted throughout the year to ensure that species of special concern are included in the area, and effective steps for conservation must be implemented. It is critical that active grassland preservation efforts in the United States be coordinated with such efforts in Mexico, providing expertise and enthusiasm to preserve habitats that in Mexico have received little attention.

In conclusion, Mexican grasslands are a heterogeneous assemblage of habitats that overlap little in the composition of bird species they support. Habitat restriction is high among the northern migrants that winter in or pass through Mexico. Year-round endemism is focused in the grassy pine woodlands of the Transvolcanic Belt, but many species that move into Mexican grasslands on migration are nearly endemic to the country. Hence, even though grasslands were not emphasized in a previous evaluation of avian diversity and endemism in Mexico (Escalante et al. 1993), a more careful inspection reveals considerable numbers of interesting forms in these distinctive habitats in Mexico.

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