

most part, have appeared previously in publications of the Bureau of Biological Survey, United States Department of Agriculture; the National Park Service, United States Department of the Interior; the National Association of Audubon Societies; Bird-Lore, and the Handbook of Birds of the Western United States, published by the Houghton Mifflin Company.

Twenty-three of the colored plates are by Maj. Allan Brooks and one by the late Louis Agassiz Fuertes.

DISTRIBUTION OF BIRDS IN NEW MEXICO

The birds of New Mexico affect the agricultural situation according to their status, whether they are merely birds of passage stopping on their way between northern breeding grounds and southern wintering grounds, as some of the sandpipers and plovers; whether they are summer residents, coming in to check the ravages of insects and rodents and the spread of noxious weeds during the period of greatest insect, mammal, and plant activity, as the cuckoos, goatsuckers, swifts, flycatchers, blackbirds, orioles, swallows, vireos, warblers, and others, and some of the hawks, finches, and sparrows; or whether they are permanent residents, carrying on the work of destroying insects, rodents, and weeds throughout the year, as quails and grouse, many of the hawks and owls, the road-runners, woodpeckers, ravens, jays, blackbirds, meadowlarks, wrens, thrashers, chickadees, and nuthatches.

The importance of birds to special interests depends not only on the time they spend in the State, but upon their distribution, whether they confine their good work to the timbered regions or work also in the orchard tracts; whether they make their homes on the mountain peaks or in the agricultural valleys. Their economic value, the special protection to be accorded them, and the efforts made to attract them are therefore matters determinable only by a knowledge of the habits and distribution of each species. But, as Professor Cooke pointed out, the problem of the distribution of the birds of New Mexico is a difficult and complex one. As he said, "the Mountain Bluebird nests from 5,800 to 10,300 feet, ranges in fall to the top of Wheeler Peak, 13,600 feet (aneroid), the highest point in the State, and descends in winter to the lowest valleys of southern New Mexico [about 2,800 feet]; the White-tailed Ptarmigan occupies both summer and winter only a few square miles of the tops of the highest peaks of the Sangre de Cristo Range; the Arizona Hooded Oriole, the Arizona Pyrrhuloxia, and the Crissal Thrasher are found throughout the year in the extreme southwestern part of New Mexico, being restricted to an area containing less than one-twentieth of the State; the Chestnut-collared Longspur breeds far north of New Mexico, but enters the State in the fall, is widely dispersed there through the winter and leaves in April for its summer

home; the Painted Bunting nests in the extreme southern part of the State in the valleys of the Rio Grande and the Pecos, and deserts the States, as well as the United States, for the winter; while the White-rumped Sandpiper, the Baird Sandpiper, and several other shorebirds pass across New Mexico when traveling from their summer homes on the far Arctic coast to their winter homes in southern South America" (MS).

ZONAL DISTRIBUTION OF BREEDING BIRDS

Broadly speaking, the birds of New Mexico may be divided into three zonal categories: Those that breed in the hot Lower Sonoran mesquite and creosote valleys of the Pecos and Rio Grande in the southern part of the State; those that breed in the Upper Sonoran and Transition Zones—on the Upper Sonoran grassy plains and the juniper and nut-pine lower slopes of the mountains, and in the Transition yellow pine middle slopes of the mountains—including by far the largest area of the State; and those that breed on the Boreal Zone mountain heights marked by spruce, fir, and aspen in the Canadian Zone, by dwarf Engelmann spruce, cork-barked fir, and fox-tail pine in the Hudsonian Zone, and by hardy alpine plants in the Arctic-Alpine Zone.

But while the birds of the State may be divided broadly into these three zonal categories, the local student will find it convenient to consider those of each zone separately, as listed by Mr. Bailey in his *Life Zones and Crop Zones of New Mexico* (1913, pp. 19-52).¹ For records since 1913, see *State Records* of individual species.

LOWER SONORAN ZONE

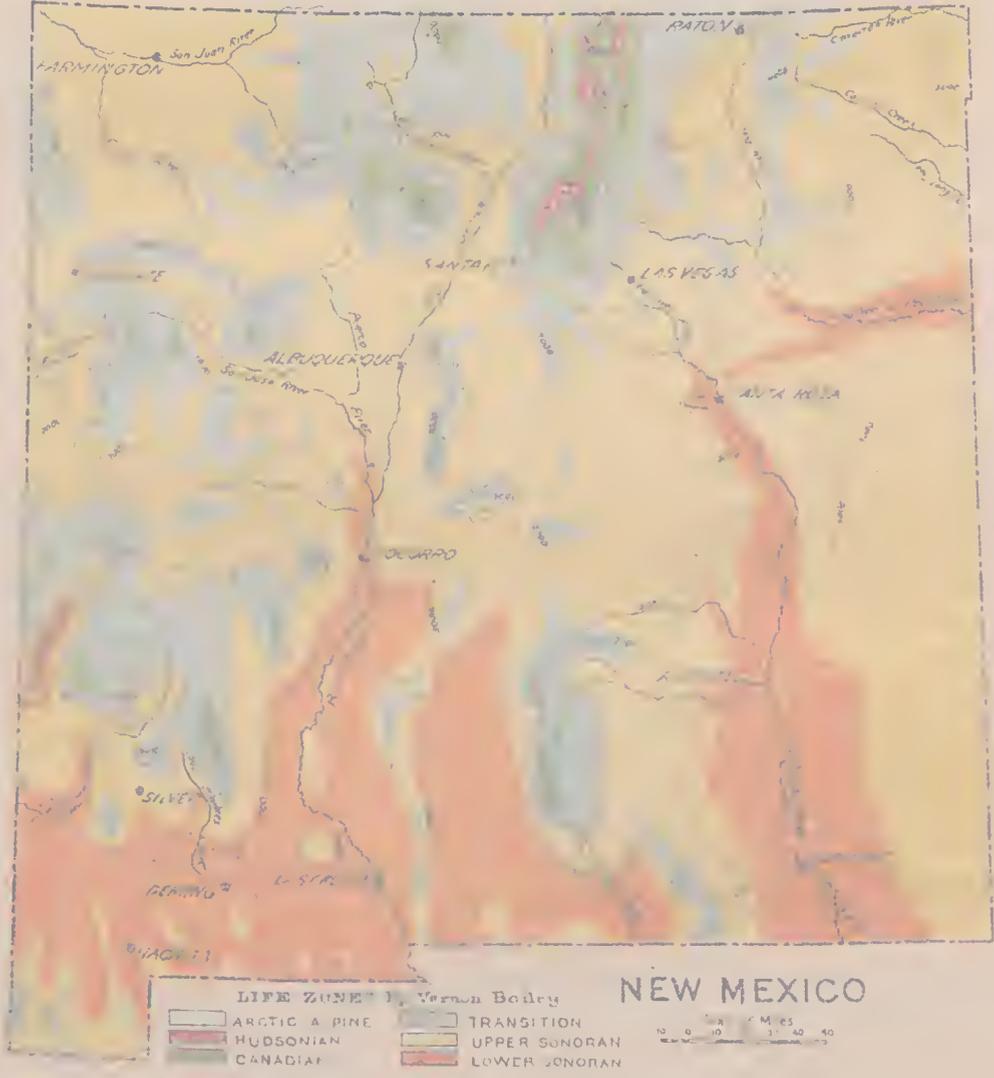
Characterized by mesquite and creosote, armadillo, kangaroo rat, Gila monster, and western diamond rattlesnake.

[Species marked *U.* also occur in the Upper Sonoran Zone.]

Texas Bob-white.	Rio Grande Meadowlark.
Arizona Scaled Quail. <i>U.</i>	Scott Oriole.
Gambel Quail.	Arizona Hooded Oriole.
White-winged Dove.	Desert Sparrow.
Harris Hawk.	Cassin Sparrow.
Aplomado Falcon.	Abert Towhee.
Audubon Caracara. ²	Gray-tailed Cardinal.
Barn Owl.	Arizona Pyrrhuloxia.
Burrowing Owl. <i>U.</i>	Western Blue Grosbeak. <i>U.</i>
Elf Owl. <i>U.</i>	Painted Bunting.
Road-runner.	Phainopepla.
Cactus Woodpecker.	Western Mockingbird. <i>U.</i>
Gila Woodpecker.	Curve-billed Thrasher. <i>U.</i>
Texas Nighthawk.	Bendire Thrasher.
Costa Hummingbird.	Crissal Thrasher.
Cassin Kingbird. <i>U.</i>	Cactus Wren.
Black Phoebe.	Canyon Wren. <i>U.</i>
Vermilion Flycatcher.	Verdin.
Chihuahu Horned Lark.	Plumbeous Gnatcatcher.
White-necked Raven.	

¹ In some cases names have been changed to conform with the text.

² Breeding record doubtful.



MAP OF LIFE ZONES IN NEW MEXICO

home; the Painted Bunting nests in the extreme southern part of the State in the valleys of the Rio Grande and the Pecos, and deserts the States, as well as the United States, for the winter; while the White-rumped Sandpiper, the Baird Sandpiper, and several other shorebirds pass across New Mexico when traveling from their summer homes on the far Arctic coast to their winter homes in southern South America" (MS).

ZONAL DISTRIBUTION OF BREEDING BIRDS

Broadly speaking, the birds of New Mexico may be divided into three zonal categories: Those that breed in the hot Lower Sonoran mesquite and creosote valleys of the Pecos and Rio Grande in the southern part of the State; those that breed in the Upper Sonoran and Transition Zones—on the Upper Sonoran grassy plains and the juniper and nut-pine lower slopes of the mountains, and in the Transition yellow pine middle slopes of the mountains—including by far the largest area of the State; and those that breed on the Boreal Zone mountain heights marked by spruce, fir, and aspen in the Canadian Zone, by dwarf Engelmann spruce, cork-barked fir, and fox-tail pine in the Hudsonian Zone, and by hardy alpine plants in the Arctic-Alpine Zone.

But while the birds of the State may be divided broadly into these three zonal categories, the local student will find it convenient to consider those of each zone separately, as listed by Mr. Bailey in his *Life Zones and Crop Zones of New Mexico* (1913, pp. 19-52).¹ For records since 1913, see *State Records* of individual species.

LOWER SONORAN ZONE

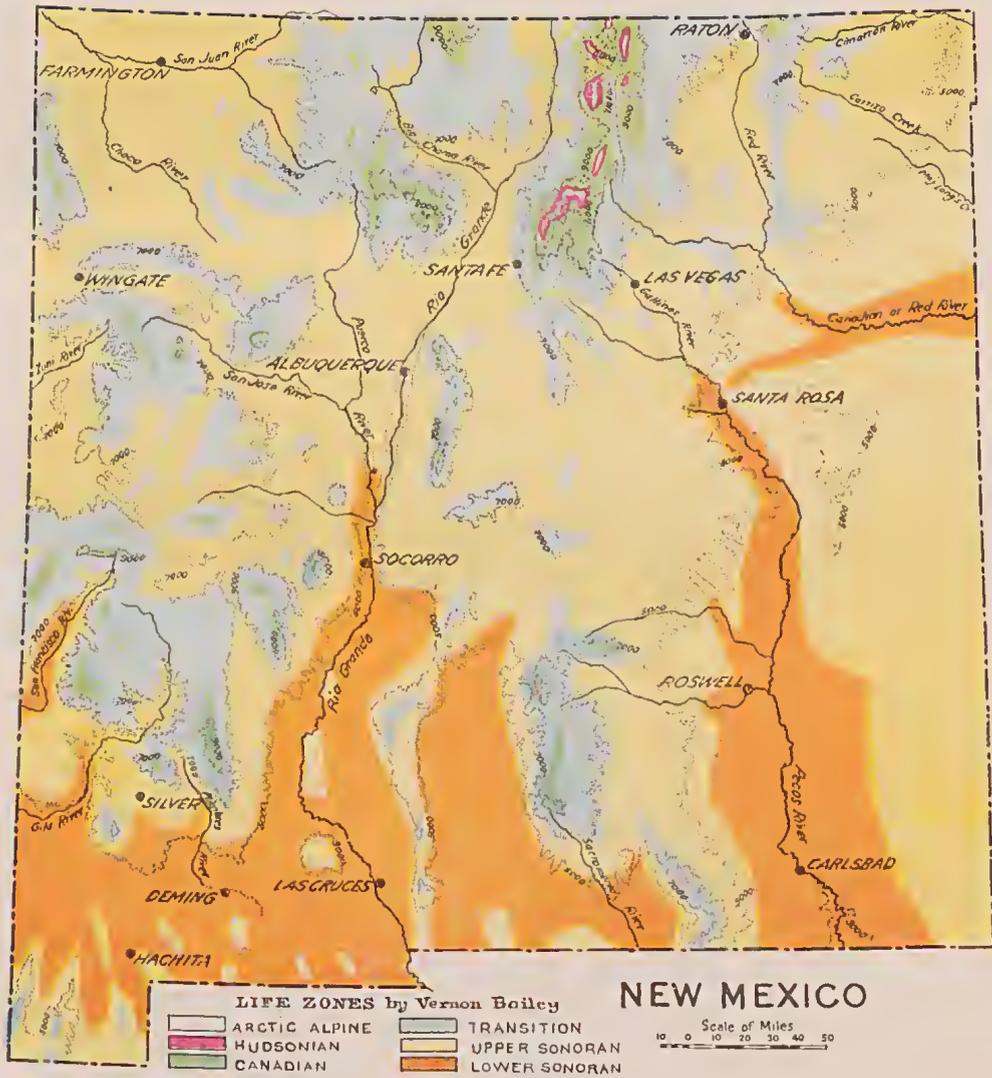
Characterized by mesquite and creosote, armadillo, kangaroo rat, rattlesnake, and western diamond rattlesnake.

(Species marked U. breed in the Upper Sonoran Zone.)

Texas Bob-white.	Rio Grande Meadowlark.
Arizona Scaled Quail U.	Scott Oriole.
Gambel Quail.	Arizona Hooded Oriole.
White-winged Dove.	Desert Sparrow.
Harris Hawk.	Cassin Sparrow.
Aplomado Falcon.	Abert Towhee.
Audubon Caracara?	Gray-tailed Cardinal.
Barn Owl.	Arizona Pyrrhuloxia.
Burrowing Owl. U.	Western Blue Grosbeak. U.
Elf Owl. U.	Painted Bunting.
Road-runner.	Phainopepla.
Cactus Woodpecker.	Western Mockingbird. U.
Gila Woodpecker.	Curve-billed Thrasher. U.
Texas Nighthawk.	Bandire Thrasher.
Costa Hummingbird.	Critical Thrasher.
Cassin Kingbird. U.	Cactus Wren.
Black Phoebe.	Canyon Wren. U.
Vermilion Flycatcher.	Verdin.
Chihuahua Horned Lark.	Plumbeous Gnatcatcher.
White-necked Raven.	

¹ In some cases names have been changed to conform with the text.

² Breeding record doubtful.



MAP OF LIFE ZONES IN NEW MEXICO

UPPER SONORAN ZONE

Characterized by nut pine and juniper, antelope, mountain sheep, prairie-dog, horned toad, and plains and black-tailed rattlesnakes.

[Species marked *L.* breed also in the Lower Sonoran Zone; those marked *T.* also in the Transition.]

Ruddy Duck. <i>T.</i>	Western Meadowlark. <i>T.</i>
Cinnamon Teal. <i>T.</i>	Bullock Oriole. <i>L.</i>
Long-billed Curlew.	House Finch. <i>L.</i>
Mountain Plover.	Arkansas Goldfinch. <i>L.</i>
Arizona Scaled Quail. <i>L.</i>	Western Lark Sparrow. <i>L.</i>
Mearns Quail.	Worthen Sparrow.
Mourning Dove. <i>L.</i>	Black-chinned Sparrow.
Arizona Spotted Owl. <i>T.</i>	Sage Sparrow (breeding?).
Mexican Screech Owl.	Scott Sparrow.
Burrowing Owl. <i>L.</i>	Canyon Towhee.
California Cuckoo. <i>L.</i>	Lazuli Bunting.
Arizona Woodpecker.	Lark Bunting. <i>T.</i>
Poor-will.	Cooper Sumner Tanager.
Western Nighthawk. <i>T.</i>	White-rumped Shrike.
White-throated Swift. <i>T.</i>	Yellow Warbler. <i>T.</i>
Kingbird. <i>T.</i>	Western Yellow-throat. <i>L.</i> and <i>T.</i>
Arkansas Kingbird. <i>T.</i>	Long-tailed Chat. <i>L.</i>
Ash-throated Flycatcher. <i>L.</i>	Catbird. <i>T.</i>
Buff-breasted Flycatcher.	Rock Wren. <i>T.</i>
Montezuma Horned Lark.	Baird Bewick Wren.
Woodhouse Jay.	Western Marsh Wren.
Raven. <i>T.</i>	Gray Titmouse.
Western Crow. <i>T.</i>	Bridled Titmouse.
Pinyon Jay.	Lead-colored Bush-Tit.
Yellow-headed Blackbird. <i>T.</i>	Lloyd Bush-Tit.
Nevada Redwing.	Western Gnatcatcher. <i>L.</i>

TRANSITION ZONE

Characterized by yellow pine, Abert squirrel, chipmunks, and poreupine.

[Species marked *U.* breed also in the Upper Sonoran Zone; those marked *C.* also in the Canadian.]

Ruddy Duck. <i>U.</i>	Brewer Sparrow. <i>U.</i>
Cinnamon Teal. <i>U.</i>	Red-backed Junco. <i>C.</i>
Shoveller. [<i>U.</i> and <i>L.</i>]	Mountain Song Sparrow.
Dusky Grouse. <i>C.</i>	Spurred Towhee. <i>U.</i>
Merriam Turkey.	Green-tailed Towhee.
Band-tailed Pigeon.	Black-headed Grosbeak. <i>U.</i>
Sharp-shinned Hawk. <i>C.</i>	Western Tanager.
Cooper Hawk.	Hepatic Tanager. <i>U.</i>
Flammulated Screech Owl.	Plumbeous Vireo.
Saw-whet Owl. ¹	Virginia Warbler.
Pygmy Owl.	Orange-crowned Warbler.
Rocky Mountain Hairy Woodpecker. <i>C.</i>	Olive Warbler.
White-breasted Woodpecker.	Audubon Warbler. <i>C.</i>
Mearns Woodpecker. <i>U.</i>	Grace Warbler.
Lewis Woodpecker.	Black-throated Gray Warbler.
Red-shafted Flicker. <i>C.</i>	Maegillivray Warbler. <i>C.</i>
Stephens Whip-poor-will.	Painted Redstart.
Western Nighthawk. <i>U.</i>	Red-faced Warbler.
White-throated Swift. <i>U.</i>	Sage Thrasher.
Blue-throated Hummingbird.	Western House Wren. <i>U.</i>
Black-chinned Hummingbird. <i>U.</i>	Rocky Mountain Nuthatch.
Western Wood Pewee.	Pygmy Nuthatch.
Wright Flycatcher.	Mexican Chickadee.
Desert Horned Lark. <i>U.</i>	Mountain Chickadee.
American Magpie.	Willow Thrush.
Rocky Mountain Evening Grosbeak.	Western Robin. <i>C.</i>
Western Vesper Sparrow. <i>U.</i>	Chestnut-backed Bluebird.
Western Chipping Sparrow. <i>U.</i>	

¹ No definite breeding record.

CANADIAN ZONE

Characterized by spruce, fir, and aspen, woodchuck, spruce squirrel, elk, and deer.

[Species marked *T.* breed also in the Transition Zone; those marked *H.* also in the Hudsonian Zone.]

Merganser. <i>T.</i>	Red-breasted Nuthatch.
Dusky Grouse. <i>T.</i>	Olive-sided Flycatcher.
Western Goshawk. ¹	Western Flycatcher. <i>T.</i>
Alpine Three-toed Woodpecker. <i>H.</i>	Long-crested Jay. <i>T.</i>
Red-naped Sapsucker. <i>T.</i>	Rocky Mountain Canada Jay. <i>H.</i>
Rocky Mountain Sapsucker. <i>T.</i>	Cassin Purple Finch.
Broad-tailed Hummingbird. <i>T.</i>	Mexican Crossbill. <i>T.</i>
Calliope Hummingbird. ² <i>T.</i>	Pine Siskin.
White-crowned Sparrow. <i>H.</i>	Long-tailed Chickadee. <i>T.</i>
Gray-headed Junco. <i>H.</i>	Golden-crowned Kinglet. <i>H.</i>
Lincoln Sparrow.	Ruby-crowned Kinglet.
Northern Violet-green Swallow. <i>T.</i>	Townsend Solitaire.
Pileolated Warbler.	Audubon Hermit Thrush.
Water-ouzel. <i>T.</i>	Mountain Bluebird. <i>T.</i>
Rocky Mountain Creeper.	

HUDSONIAN ZONE

Characterized by foxtail pine, dwarf cork-barked fir, and Engelmann spruce.

[Species marked *C.* also breed in the Canadian Zone.]

Alpine Three-toed Woodpecker. <i>C.</i>	White-crowned Sparrow. <i>C.</i>
Rocky Mountain Canada Jay. <i>C.</i>	Gray-headed Junco. <i>C.</i>
Rocky Mountain Pine Grosbeak.	Golden-crowned Kinglet. <i>C.</i>

ARCTIC-ALPINE ZONE

Characterized by dwarf alpine flowers.

White-tailed Ptarmigan.	Hepburn Rosy Finch. ³
Pipit.	Black Rosy Finch. ³
Gray-crowned Rosy Finch. ³	Brown-capped Rosy Finch.

VALUE OF BIRDS TO THE STATE

The value of birds, from the educational, recreational, esthetic, humanitarian, and economic points of view, is coming to be almost a commonplace; but in New Mexico, where natural climatic advantages afford rare opportunities both for nature study, out-of-door life, and for agricultural and horticultural development, the birds of the State become a peculiarly important asset.

From the economic point of view they are directly instrumental in the conservation of man's agricultural output. As has been pointed out by Mr. Henshaw, "in satisfying their own hunger, birds perform an important service to man," for "the destruction of farm and orchard crops by insects and rodents amounts to many millions each year." Moreover, insects are carriers of both plant and animal diseases. As to the economic problem Herbert Hoover wrote, during the war, "I hope the people of the United States realize how closely related to this whole question of food saving is the question of the protection and encouragement of insectivorous and migratory birds."

¹ Not positively known to breed. So little work has been done in this zone during the early breeding season that the list is very incomplete.

² No definite breeding record.

³ Recorded since the publication of Life Zones and Crop Zones of New Mexico.

That such realization has been reached to no small degree is evidenced by the fact that in 1916 a treaty was signed by the United States and Great Britain for the protection of insectivorous, game, and non-game birds migrating between the United States and Canada, probably the most important single measure ever taken for the preservation of bird life. In further evidence, the United States, recognizing the evils resulting from the wholesale destruction of birds for millinery purposes, by a tariff act of 1913, prohibited the entry of plumage of wild birds, either raw or manufactured, not for scientific or educational purposes; and the Canadian Government in furtherance of the same purpose by an act in 1915 rendered all importations of wild birds' plumage illegal, except the feathers of the ostrich, pheasant, and peacock, of birds used for food, and of specimens for scientific purposes.

Recognition of the importance of educational propaganda regarding the value of birds to the State has been shown not only by the Federal Government in its Biological Survey publications on the food of birds and the best means of attracting them to various parts of the country, but by State Audubon societies, State boards of agriculture, and by the publication of important treatises on the birds of the respective States.

Recognition of the value of birds is strikingly demonstrated by the large number of Federal and State refuges established and associations for the conservation of wild life organized throughout the country.

NATIONAL AND STATE REFUGES AND STATE ORGANIZATIONS FOR THE CONSERVATION OF WILD LIFE ¹

NATIONAL AND STATE REFUGES

Refuges for the protection of birds and game are Federal, State, or Municipal.

In New Mexico there are two Federal bird refuges, fifty-eight big game refuges, and twenty-one State bird refuges, making in all, eighty-one tracts of land where birds are afforded protection.

The two Federal bird refuges are both on reclamation projects—that of Carlsbad on the Pecos, which has two reservoirs, Lake Avalon and Lake MacMillan; and that on the Rio Grande, which is some thirty miles long, extending up the Rio Grande from Elephant Butte dam.

The fifty-eight State big game refuges, mainly in the mountainous sections of the State, aggregating 1,606,900 acres, have been established for the purpose of providing safe sanctuaries in which game may breed and from which it may spread to adjacent hunting ranges. But while they are intended to protect deer, bear, and mountain sheep, they also

¹ Ligon, J. S. Wild Life of New Mexico: Its Conservation and Management, pp. 171-184, 1927.

afford protected breeding grounds for Wild Turkey, Band-tailed Pigeons, Dusky Grouse, various quails including the Mearns' or Fool Quail, and the rare White-tailed Ptarmigan of arctic-alpine mountain tops—all birds of great economic or zoologic interest whose preservation is greatly to be desired.

The twenty-one State bird refuges afford protection for both land and water birds.

STATE ORGANIZATIONS

Forty-four States now have State associations for the protection of game, many of which have done important work by helping to procure proper laws for the protection of birds, and helping to establish bird refuges; by advocating the establishment of game farms; introducing pheasants, Hungarian partridges, and bob-whites; by restocking bird refuges and game farms; and by carrying on educational campaigns by means of illustrated lectures and the publication and distribution of pamphlets and State bird reports.

In New Mexico the first game law was enacted in 1880 but the only birds to which it applied were turkeys, grouse, and quail. From 1898 to 1903, game protection work was done mainly by the League of American Sportsmen in cooperation with the local organizations, but in 1903, the office of State Fish and Game Warden was created, and in 1912 the game protection work was organized as a department of the State. Previous to 1914, game protection in New Mexico followed closely the ideas and activities then prevalent in most States. Any efforts at constructive work were handicapped by unstable tenure of office, limited authority, insufficient funds, and lack of any concrete program or cooperation on the part of the sportsmen and conservationists of the State.

But in 1914, under the leadership of Miles W. Burford, a strong sportsmen's association was formed at Silver City; soon after a similar one was formed at Albuquerque, and in 1916 a State-wide organization was established under the name of the New Mexico Game Protective Association. By the cooperation of the State warden and local shooting clubs a program was agreed upon for improved game and license regulations, including non-partisan warden service and the support of the warden's office by receipts from hunting licenses instead of by appropriations from the State.

In 1921 an act was passed providing for an unpaid commission of three members to constitute a Board of Directors in full charge of the game resources of the State. It conferred on this Board full authority to hire their own executive officers, to declare suitable open or closed seasons in any locality at any time, to establish a system of game and bird refuges by proclamation, to establish and operate fish hatcheries, to manage the funds of the Game Department, and, in

general, to make such rules and regulations and establish such service as might be necessary for the management of the game and fish resources of the State. The Act provided for a graduated change of personnel, each incoming Governor appointing one Commissioner, to insure continuity of policy. In 1925 the appointment of the State Game Warden was also placed in the hands of the State Game Commission.

Shortly after their appointment in 1921 the game commissioners, with the assistance of fourteen local associations, having a total of 1,000 members, proceeded to establish the present system of refuges, receiving valuable cooperation from the U. S. Forest Service in the selection and operation of the big game refuges within the National Forests. Since then, law enforcement, with the backing of the local associations, has improved to the extent of trebling the revenues of the Game Department. In the Silver City region there has been in successful operation for three years a special form of cooperative patrol in which the State, the local associations, and the Forest Service all pool their resources in a common plan for handling the big-game season. It has worked so successfully that it is being extended to the other big-game regions of the State. Predatory-animal control conducted by the Biological Survey in cooperation with the State and live-stock interests has contributed greatly to the actual improvement of game conditions.

In general, New Mexico has built solid foundations for a system of wild-life management. While a few of the rare or badly depleted species like antelope, mountain sheep, and ptarmigan have continued to decrease, the principal game species have probably held their own during the last decade. With an active, intelligent body of organized sportsmen, in spite of many handicaps, it is safe to hope that by the continued cooperation of Federal, State, and private agencies the State's wild life may still be fairly well conserved.

BIRDS FIRST DESCRIBED FROM NEW MEXICO

It is interesting to know that a number of birds new to North America have been discovered and described from New Mexico, mainly by the early explorers of the State.

1. Birds described from New Mexico which are recognized in the Third Edition of the A. O. U. Check-List of North American Birds, or in other publications since 1910.

<i>Species of Bird</i>	<i>Type Locality</i>	<i>Present Location of Type Specimen¹</i>
<i>Anas diazi novimexicana</i> Huber.	Near Las Cruces.....	Coll. Wharton Huber, Philadelphia, No. 1928.
<i>Buteo borealis calurus</i> Cassin..	Near Fort Webster, Mimbres River.	Originally U. S. N. M., Washington, No. 8527. Withdrawn by Henry in 1859, and now A. N. S. Philadelphia, No. 1516.
<i>Numenius americanus occidentalis</i> Woodhouse.	Near Albuquerque.....	U. S. N. M., Washington, No. 12644. Type destroyed in 1888.

¹ A. N. S., Collection Academy Natural Sciences; U. S. N. M., U. S. National Museum.