

## MONTANE AVIFAUNAS OF SOUTHERN NEVADA: HISTORICAL CHANGE IN SPECIES COMPOSITION

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### INTRODUCTION

The demonstration of historical faunal change documents the fundamental principle of zoogeography that range adjustments and fluctuations in abundance are routine attributes of species. However, with the increasing appreciation of the global extent of direct or indirect environmental effects of man, changes of distribution resulting from environmental trends independent of human habitat modification are notably difficult to demonstrate. This paper describes and documents changes in the breeding distribution and abundance of several species of birds in the mountains of southern Nevada in a setting that seems relatively independent of human influence.

### GRAPEVINE MOUNTAINS

From 10 to 14 June 1939, and from 31 May to 11 June 1940, field parties from the Museum of Vertebrate Zoology conducted a detailed survey of the breeding avifauna of the Grapevine Mountains, Death Valley National Monument, Nevada (Miller 1946). Three persons participated in the first expedition and six persons in the second, all of them experienced vertebrate zoologists, including Harvey I. Fisher, Alden H. Miller, Frank A. Pitelka, and Ward C. Russell. All major ecologic formations represented were examined: the piñon association, brushland and scrub, rocky canyon walls, and limited riparian thickets near springs. A large collection of specimens was preserved to document the survey. From the depth and care of the undertaking and because of the relatively small extent of the highland area which required exploration, we may assume that virtually all of the species of birds breeding at that time were discovered.

Thirty-one years later, from 17 to 22 May 1971, I visited the same portion of the Grapevine Mountains, camped in Phinney Canyon within one-quarter mile of the site of the earlier camp, and attempted a new survey of the breeding birds. In 6 days of hiking in the same canyons and along the same slopes worked by the earlier parties (determined from field notes on file in the Museum of Vertebrate Zoology), I was able to find all but 15, or 73% of the species of definite or probable summer resident species reported from the earlier survey.

On a return trip to the same area, from 29 to 31 May 1973, I found 7 of the 15 species unrecorded in 1971. Explanation may be offered for my failure to find, in either 1971 or 1973, the eight other species recorded by Miller in 1939 or 1940. Three of these species, Turkey Vulture (*Cathartes aura*), Ferruginous Hawk (*Buteo regalis*), and Golden Eagle (*Aquila chrysaetos*), are wide-ranging predators and/or scavengers that normally occur at very low density and are easily overlooked. There is no assurance that any of these were resident in 1939–40; all could have been merely visitants and their exclusion from Miller's list of breeding birds could be justified on that point alone. The Mountain Quail (*Oreortyx pictus*), Saw-

whet Owl (*Aegolius acadicus*), Plain Titmouse (*Parus inornatus*), and Cañon Wren (*Catherpes mexicanus*) occurred locally and in very small numbers in the Grapevine Mountains in 1939–40. I did not search the exact spots where these species were found by Miller and his co-workers, for example, the lower arid portion of the piñon zone (for the titmouse) or brushy areas near springs (for the quail); the absence of all four is attributable to insufficient field work in the proper places. In my opinion only the Red Crossbill (*Loxia curvirostra*) may have been absent in 1971 and 1973, when persistent hunting over 9 days failed to disclose any in the most promising habitat of luxuriant piñon. However, to conclude local extinction even for the crossbill would be improper. This nomadic species is unpredictable in breeding occurrence anywhere in the forests of the western United States, being dependent upon the irregular production of conifer seeds. It is likely that individual crossbills resident on one mountain range in one year may be the same birds found breeding later in another range when the conifers of the first range are producing insufficient seeds. Therefore, the probability is high that none of the eight species was actually missing during the recent period and that virtually all species resident in 1939–40 were also breeding in 1971 and 1973.

More importantly, on the recent trips I was able to find seven presumed breeding species that were either unrecorded or not reported as resident by Miller (1946) and to note the obvious change in abundance of two species. The documentation of these remarks is offered in the following species accounts.

*Empidonax oberholseri*. Dusky Flycatcher. This species was unreported by Miller (1946). However, in the Museum of Vertebrate Zoology is a male (testis, 7 mm) taken at 6700 ft on 5 June 1940, with the tag marked "intergrade with *wrightii* [= Dusky Flycatcher at that time] ? [or] atypical *griseus* [= Gray Flycatcher at that time] ? AHM" which is a positive example of *E. oberholseri*. Although cool woodland and scrub appropriate for this species is more prevalent on the higher ridges of the Grapevines than at 6700 ft elevation where this specimen was taken in the piñon zone, the bird nonetheless could have been established for breeding in view of the date and the testis size. I assume, therefore, that this individual indicates that the Dusky Flycatcher was a rare summer resident in the mountains at the time of the earlier survey. Further evidence that the species was scarce then is provided by the fact that of 12 specimens of *Empidonax* taken by the earlier expeditions, 10 were Gray Flycatchers (*E. wrightii*). The aforementioned individual of *E. oberholseri* and a migrant of the Willow Flycatcher (*E. traillii*) were the other two.

In 1971, *E. oberholseri* was definitely breeding in the Grapevine Mountains at 8200 ft elevation on the moderately steep north slope of Wahguyhe Peak. A singing male (testis 5 × 3 mm), taken on 20 May, occupied a territory grown to scattered small piñon and limber pines, with low growth of piñon seedlings, currant (*Ribes*), and sagebrush forming an interrupted chaparral element this species seems to require. Another male of *E. oberholseri* was positioned nearby; he sang and also gave *du-hic* vocal sequences (Johnson 1963:173–174), indicating an advanced level of breeding behavior. A Gray Flycatcher was stationed for breeding next to the latter Dusky Flycatcher. Two singing males of *E. oberholseri* were on territories again in the same area on 30 May 1973.

*Nucifraga columbiana*. Clark Nutcracker. Miller (1946) did not mention this species from the field work of 1939 and 1940. In 1971, I saw or heard nutcrackers from 18 through 20 May. On the latter date, a group of 10 perched together in piñons on the cool and windswept ridge just below Wahguyhe Peak. This species nests early and thus it is unlikely that breeding residency could be proved by May or June records unless juveniles were recorded. Their presence at this date, however, strongly suggests an earlier nesting in the Grapevine Mountains and the flock observed is assumed to have been composed of local postbreeding individuals. The species was not seen in 1973, when my visit was later than in 1971.

*Catharus guttatus*. Hermit Thrush. Miller (1946: 59) listed this species as a transient or vagrant in the Grapevine Mountains but noted that it was "possibly summer resident," based on a single sight record on 13 June 1939. On 20 May 1971, I heard males singing at four places in the piñon zone between 7500 and 8000 ft on the north slope of Wahguyhe Peak. A pair of birds in a chase was noted and a female with an early incubation patch and ova 2 mm in diameter was taken. Additional singing birds were found in 1973. These records positively establish breeding status for the Hermit Thrush in the Grapevine Mountains and indicate a recent increase in abundance.

*Sialia currucoides*. Mountain Bluebird. This species was found in one place by the earlier survey (Miller 1946:57). In contrast, I found Mountain Bluebirds in five locations in 1971; at least two of these sites had active nests. In 1973, four territories were found. An increase in population size since the earlier field work is strongly suggested.

*Regulus calendula*. Ruby-crowned Kinglet. This species was not recorded from the Grapevine Mountains during 1939-40, nor was it expected to occur. Surprisingly, at least two singing males were encountered on 20 May 1971, in medium-sized piñon at 7800 ft and at 8000 ft elevation on the cool north slope of Wahguyhe Peak. The individual at the latter elevation was carrying nesting material and approached within 5 ft in response to my imitated owl calls. I know of no other breeding occurrence of the Ruby-crowned Kinglet in the piñon association and these records add another species to Miller's (1946) list of Boreal species present in the Grapevine Mountains, apparently in response to the peculiar upward extension of piñon into the higher and cooler zones of the range. None was noted during my brief visit of 1973.

*Vireo solitarius plumbeus*. Solitary Vireo. Miller (1946) did not report this species from the Grapevine Mountains. In 1971, I found the species common in the piñon association and collected a series of specimens in breeding condition between 6900 and 7500 ft elevation from 18 to 20 May. In 1973, the species again was common and additional specimens were taken. This highly vocal species of vireo would not have been overlooked if present during the earlier study. I conclude that it has colonized in numbers in recent years.

*Vermivora virginiae*. Virginia's Warbler. The Virginia's Warbler was not recorded during the earlier surveys. On 19 May 1971, a singing male (testis, 6 × 4 mm; no fat) was taken at 6900 ft in *Purshia* and small piñons in Phinney Canyon. No others were detected either in 1971 or 1973.

*Passerina amoena*. Lazuli Bunting. This species was not recorded in 1939 or 1940 (Miller 1946),

although Fisher (1893) earlier had reported it from the Grapevine Mountains. On 29 and 30 May 1973, singing males were noted in mixed shrubs and piñons in Phinney Canyon at 5600 and 6700 ft elevation.

*Carpodacus cassinii*. Cassin's Finch. This finch "occurred sparingly in the Grapevine Range" in 1940 (Miller 1946:57). He reported two specific breeding records from the piñon belt, at 6700 ft and at "about 8000 ft" elevation. In 1971, the species was numerous and conspicuous on 18 and 20 May between 6900 and 8000 ft elevation in the piñon association. On the latter date, at least 15 were seen; many males were in full song and flight song display was noted, indicating active breeding. In late May 1973, Cassin's Finches were numerous between 6700 and 8200 ft. An increase in numbers from low population levels in the 1940s is indicated.

#### POTOSI MOUNTAIN

From 11 to 15 June 1940, a party of four persons from the Museum of Vertebrate Zoology surveyed the avifauna on the north slope of Potosi Mountain, in the southern part of the Spring Mountains, Clark County, Nevada (Miller 1945). The piñon-Gambel oak woodland and the ponderosa pine-white fir association were examined in detail and a large collection was obtained. Because the extent of forest habitat is rather limited and because the survey was conducted by experienced ornithologists, we may assume that all or nearly all of the breeding species present were found.

I visited the same section of Potosi Mountain, on 24 and 25 May 1971, and checked on the presence of breeding birds between 6300 and 7500 ft elevation, well into the ponderosa pine and white fir zone. Surprisingly, six forms were recorded which were not found by the survey of 1940, and another species seemed to have increased in abundance, as the following accounts will document. Miller (1945) listed the species found in 1940. In certain instances where details on abundance were needed I consulted his field notes on file in the Museum of Vertebrate Zoology.

*Empidonax oberholseri*. Dusky Flycatcher. Miller (1945) commented on the absence of this species on Potosi Mountain in 1940. In contrast, in 1971, at least five singing males were found in pine-fir between 6800 and 7500 ft elevation, definitely pointing to the colonization of this flycatcher since the earlier survey.

*Certhia familiaris*. Brown Creeper. Miller (1945) did not report the creeper and commented that the forested areas on Potosi were probably too small and too scattered and heavily insolated for this species. However, I found a single singing male in a dense clump of white fir at 7300 ft elevation, suggesting probable residence.

*Catharus guttatus*. Hermit Thrush. The Hermit Thrush was not found during the 1940 survey, and Miller (1945) suggested that the forest on Potosi Mountain was too open for this species. On 25 May 1971, at least three males were singing in white fir clumps at the bases of cliffs at 7500 ft elevation. Colonization of Potosi Mountain by this thrush in recent decades is implied.

*Myadestes townsendi*. Townsend's Scitair. This species was unreported previously from Potosi Mountain. I shot a female at 7100 ft elevation in ponderosa pines and white firs. The ova were not enlarged and the bird was slightly fat. Prior to collection, however, this individual had taken part in a chase with

another solitaire, and subsequent breeding may have ensued.

*Vireo solitarius plumbeus*. Solitary Vireo. In 1940, Miller collected a singing male of this species, but of the form *V. s. cassinii*, at 8000 ft elevation on the northeast side of Potosi Mountain. Although the bird was moderately fat, it showed testes in breeding condition and Miller concluded that the individual was established for breeding. No other Solitary Vireos were seen. I have commented previously on the significance of this record (Johnson 1965:112). In 1971, I collected a male (testis,  $7 \times 5$  mm) of *V. s. plumbeus* at 7000 ft elevation in open yellow pines. The bird was with an apparent mate. A second male Solitary Vireo sang from the opposite canyon side but was never seen. Significantly, these records suggest the possibility of the temporal replacement of one form (*V. s. cassinii*) by another form (*V. s. plumbeus*) of the same species. The fact that *V. s. cassinii* usually prefers warm forests or woodlands along the Pacific Coast and that *V. s. plumbeus* typically inhabits the cooler forests of the Great Basin and Rocky Mountains assumes special interest when other trends of change in the avifaunas under discussion are examined (see beyond).

*Dendroica graciae*. Grace's Warbler. This species has not been reported previously from Potosi Mountain. On 25 May 1971, I collected a singing male (testis,  $7 \times 5$  mm) at 7100 ft elevation in open yellow pines, indicating colonization of the mountain at some time in recent decades.

*Carpodacus cassinii*. Cassin's Finch. Miller (1945) found one individual of this species on Potosi Mountain, at 8000 ft elevation on the north slope. Records obtained in 1971, when seven singing males were found in pine-fir in two canyons between 7000 and 7500 ft elevation, suggest a pronounced increase in the population level of this species since the work of 1940.

## DISCUSSION

I assume that the differences between the surveys of 1940 and of 1971 in the Grapevine Mountains and on Potosi Mountain are real and have resulted from colonization and/or from increase in abundance of at least 12 species of birds in the 31-year period. The thoroughness and extent of the field work in 1940 provide a very satisfactory base level with which subsequent surveys can be compared. Furthermore, except as noted, the recent studies are directly comparable to those of 1940 in terms of the areas and habitats visited, as determined from field notes preserved from the earlier exploration.

The woodland zones of the Grapevine Mountains within Death Valley National Monument are protected and remain well preserved. Habitat modification through wood cutting, grazing, and agriculture is nonexistent and human traffic is minimal. The piñon woodland seems to be original growth. Similarly, Miller's descriptions (1945 and field notes) of the woodland and forest zones on Potosi Mountain agree closely with my observations 31 years later. I saw nothing to suggest disruption in recent decades of the habitats by lumbering, fire, or livestock. Therefore, the differences noted in avifaunal composition between 1940 and 1971 for both areas are probably not related to the availability of different successional stages of vegetation for occupancy by birds.

In a previous paper I discussed the striking change in the breeding avifauna of the Spring Range (= Charleston Mountains), Clark County, Nevada, dem-

onstrated by comparison of relatively complete surveys conducted in the early 1930s (van Rossem 1936) and in 1963 (Johnson 1965). Eight species found breeding in numbers in 1963 were not noted by van Rossem 31 years earlier; another 10 species had increased in abundance, some markedly. It is pertinent to the present discussion to note that three of the species which changed in status in the Spring Range, the Dusky Flycatcher, Solitary Vireo, and Cassin's Finch, also either colonized for the first time in recorded ornithological history or definitely increased in number in both the Grapevine Mountains and on Potosi Mountain. Another species, the Ruby-crowned Kinglet, which increased in population size in the Spring Range, is a recent colonist to the Grapevine Mountains. Furthermore, the Hermit Thrush is now a common resident in both the Grapevine and Potosi areas where previously it was rare or absent. Perhaps colonization to both Potosi Mountain and the Grapevine Mountains occurs from centers of Boreal populations in the Spring Range, where highland forests are more extensive than elsewhere in southern Nevada. Colonists might disperse from these centers especially during periods of abundance of particular species.

From the nature of these records for the three highland areas, the conclusion is inescapable that avifaunal change in a common direction has occurred in montane habitats of southern Nevada. The trend has been toward the enrichment of avifaunas with previously existing Boreal elements, whether they be weak (as in the Grapevine Mountains; Miller 1946), fair (as on Potosi Mountain; Miller 1945), or moderate (as in the Spring Range; Johnson 1965), through the addition of further species of Boreal derivation and by expansion of populations of Boreal species already present. Evidently, this trend has operated in recent decades since the avifaunal surveys of the 1930s and 1940s in southern Nevada.

I must emphasize that the addition of species to the mountaintop faunas has not been accompanied by the concomitant subtraction of other species, resulting in a stable or equilibrium species number (MacArthur and Wilson 1963, 1967). Instead, an historical pattern of fluctuation is indicated in which a substantial increase in total species number has occurred in several montane avifaunas over a period of three decades. I suspect that we are witnessing the recovery in recent years of Boreal faunas which were reduced in diversity sometime prior to the census of 1940, perhaps by the deleterious environmental effects of the relatively warm-dry period of the 1930s.

It is tempting to hypothesize that the recent period of global cooling, which reversed the warm trend of the 1940s (Kukla and Matthews 1972), has gradually improved montane environments in the Southwest for the occupancy of additional Boreal species. Birds, among the most mobile of all animals, could colonize newly appropriate habitats very rapidly, and in so doing might be exceptionally sensitive indicators of short-term environmental change. Information on current range expansion of species in other groups of vagile Boreal animals and/or of the highland floras (Clokey 1951) in the Southwest could greatly clarify the proposed hypothesis. From the spectacular data of Wells and Berger (1967), who convincingly demonstrate the past presence of piñon-juniper woodlands on the slopes of several ranges in the Mohave Desert at elevations 600 m or more below present levels of occurrence, we can envision clearly the expanded distributions of montane floras in late

Pleistocene times in response to wetter and cooler climates. This paper offers evidence to suggest that data from modern bird distribution may reflect the operation of short-term climatic trends, occurring within the range of a few decades or less and in the absence of any obvious habitat change or other human influence.

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## FIRST NESTING OF BLACK SKIMMER IN CALIFORNIA

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In 1971, McCaskie and Suffel (California Birds 2: 69, 1971) summarized the records of Black Skimmers (*Rynchops niger*) from the Salton Sea area of California, citing a record of five present at the mouth of the Whitewater River at the north end of the sea between 3 and 5 July 1968; two at Salton City along the west shore on 12 July 1969; and one collected at the mouth of the Whitewater River on 17 May 1970. In addition, a bird was reported seen at the mouth of the Santa Ana River along the coast of Orange County on 8 September 1962.

Black Skimmers again appeared on the Salton Sea in 1971; one was seen flying along the southeast shore on 3 July (E. A. Cardiff, pers. comm.), and two were present at the mouth of the Whitewater River between 31 July and 28 August (McCaskie, pers. observ.). Individuals also were reported along the coast, with one seen at Bodega Bay, Sonoma County, on 24 July (Amer. Birds 25:902, 1971); two off Point Pinos, Monterey County, on 26 September (Amer. Birds 26:115, 1972); one in Newport Bay, Orange County, on 6 September (Amer. Birds 26:121, 1972); and another on San Diego Bay near Imperial Beach, San Diego County, on 18 and 19 September (McCaskie, pers. observ.). The first two sightings were made by single observers, so cannot

be verified; however, the latter two were seen by numerous observers and the one on San Diego Bay was photographed.

In 1972 unprecedented numbers appeared on the Salton Sea. On 28 April, a lone adult was seen along the south shore of the sea, and two more were present at the mouth of the Whitewater River on 30 April. Along the south shore, a maximum of 19 were seen in August; most were present at the mouth of the New River, but individuals were also noted at Rock Hill and opposite Mullet Island. At the mouth of the Whitewater River, the number varied between two and four from May through August. No skimmers could be found on 24 September.

During the summer of 1972, five separate Black Skimmer nests were discovered at the south end of the Salton Sea. On 17 June we located a single nest with four eggs at the mouth of the New River. This nest was a deep depression in a line of dead twigs and other vegetation left on a mudbar by high water. In addition, there were about 20 pairs each of Gull-billed Terns (*Gelochelidon nilotica*) and Forster's Terns (*Sterna forsteri*) nesting in the immediate vicinity along with numerous Black-necked Stilts (*Himantopus mexicanus*). On 7 July this nest could not be found; the area containing the nest had been washed away by a violent storm. However, two additional nests were located.

One of these nests was on a small mud island at the southeastern corner of the sea opposite Mullet Island, and contained three eggs. The pair of adults at this nest had been defending a territory since 17 June, and we know nesting had not started on 25 June. We checked this pair weekly, and each time we saw one bird sitting on the nest and the other standing nearby. Upon our approach, the "guard" bird would fly at us and proceed to mob us. On 29 July no birds were at the nest site, and the eggs were gone.

The other nest found on 7 July was at the mouth of the New River about 150 ft from the site of the first nest. Like the first nest, it was a deep depression