BREEDING AVIFAUNAS OF THE NEW YORK MOUNTAINS AND KINGSTON RANGE: ISLANDS OF CONIFERS IN THE MOJAVE DESERT OF CALIFORNIA

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Quantification of species turnover rates on islands in the context of the equilibrium theory of island biogeography (MacArthur and Wilson 1967) depends on accurate inventories of the biota taken at appropriate intervals in time. Inaccurate historical data concerning species composition is a source of error that must be avoided when calculating turnover rates (Lynch and Johnson 1974). Johnson's (1974) analysis of historical changes in species composition and abundance exemplifies the importance of sound avifaunal inventories for later comparison. In this paper, we present data to provide future researchers with a baseline from which to calculate turnover rates for the breeding avifaunas of two conifer "islands" in the Mojave Desert in California.

Island biogeography of isolated mountain ranges forming conifer "islands" in the Great Basin has been studied by Brown (1971, 1978) for mammals and Johnson (1975) for birds. An analysis of breeding bird turnover rates for a conifer island in the Mojave Desert (Clark Mountain, California) is in progress (N.K. Johnson pers. comm.). Detailed and accurate surveys of the breeding avifaunas of the Sheep and Spring ranges of southwestern Nevada (Johnson 1965) and the Providence Mountains, San Bernardino Co., California (Johnson et al. 1948) provide data from other Mojave Desert ranges for comparison with data we present below.

STUDY AREAS

New York Mountains. The New York Mountains extend from about 14 km west of Cima east to the Nevada border in extreme eastern San Bernardino Co., California. The highest point, New York Peak (7532 ft = 2296 m), is 39.5 km southeast of Clark Mountain (7929 ft = 2417 m) and 118 km south of Charleston Peak (11,919 ft = 3633 m) in the Spring Mountains of Nevada. Open pinyon-juniper woodland extends from the base at about 5500 ft (1675 m) to the summit, with tree height varying from an average of about 4 m in drier, exposed locations to about 8 m in more sheltered spots. Utah Junipers *(Juniperus osteosperma)* become scarce above about 6500 ft, leaving Single-leaf Pinyon *(Pinus monophylla)* virtually the sole tree above this elevation. Nearly pure stands of Canyon Live Oak *(Quercus chrysolepis)* of about 0.3 ha are found in both Live Oak and Caruthers canyons. Some trees reach 9 m in height. Scattered individuals and smaller groves of Canyon Live Oak are also found in Keystone, Sagamore and Fourth of July canyons. Scrub oak *(Q. turbinella)* forms some dense thickets in these same canyons. To our knowledge, neither oak species is found in nearby ranges such as the Kingston Range and Clark Mountain, but a few isolated clumps of Canyon Live Oak can be found in the Providence Mountains and small

groves are present in the Granite Mountains just west of the Providence Mountains. A few small springs and open mine shafts may provide year-round water, at least during wetter-than-average years, but no permanently flowing water is found.

Most interesting from the viewpoint of island biogeography is a stand of about 30 White Firs *(Abies concolor)* occupying an area of about 1 ha in a very steep, north-facing canyon about 0.6 km north of New York Peak between 6400 and 7200 ft (Hendrickson and Prigge 1975). Most trees are within 100 m of one another at 6900-7100 ft. The largest tree measured 71 cm DBH and about 17 m in height; only about 10 trees are taller than 7 m (Hendrickson and Prigge 1975). A few small Canyon Live and scrub oaks intermingle with the firs and pinyons, adding a bit of habitat complexity lacking in the oak-less Kingstons or Clark Mountain White Fir stands. However, thickets of Mountain Maple *(Acer glabrum)* and currant *(Ribes cercum, R. velutinum)* found in the Kingstons and Clarks probably equal or surpass the influence of oaks on habitat complexity in the New Yorks.

The only published information we can find concerning the avifauna of the New York Mountains is that of Hollister (1908) who listed 13 widespread species noted at "New York Mountain" in early June 1905. Johnson et al. (1948) conducted thorough bird surveys in the lower 700 ft or so of the pinyon-juniper zone of the Mid Hills and Providence Mountains (actually contiguous with eastern border of the New Yorks). Connection of the New York pinyon-juniper zone with those of the adjacent Mid Hills and Providence Mountains could possibly influence the stability of the avifauna through area-size effects.

The New York Mountain White Fir stand had not been visited by ornithologists prior to our visits.

Kingston Range. The Kingston Range is located about 30 km southeast of Tecopa and about 30 km west of the California-Nevada border in extreme northeastern San Bernardino Co., California. The highest point, Kingston Peak (7323 ft = 2232 m), is 37 km northwest of Clark Mountain and 63 km west of Charleston Peak. The general vegetation of the Kingston Range is very similar to that of the New York Mountains except that 1) junipers seem to be less common; 2) oaks are apparently absent; and 3) Joshua Trees *(Yucca brevifolia)*, although common at the lower limits of the pinyon-juniper belt in the New York Mountains, are very scarce at the base of the Kingstons. The absence of Joshua Trees may be partially offset by the presence of large yucca-like *Nolina wolfii*, which extend to considerable elevations on drier slopes. Pinyon-juniper habitat, primarily restricted to north-facing slopes and the uppermost portions of drier slopes, is less extensive in the Kingston Range than in the New York Mountains. In addition, fires have eliminated much of the pinyon-juniper habitat on the NE slopes of the range. The White Fir stand in the Kingstons is much larger than that in the New Yorks. Approximately 150 trees, with the largest 86 cm DBH and the tallest about 20 m, are scattered over 12 ha in two steep canyons between 6400 and 7200 ft, just north of Kingston Peak; most trees are found between 6800 and 7100 ft (Hendrickson and Prigge 1975).

The avifauna of the Kingston Range is virtually unknown. Alden H. Miller (field notes in the Museum of Vertebrate Zoology) visited the lower edge of

the pinyon-juniper zone on 17 June 1939, but recorded few birds; the Kingston Range is included as a locality for a few species in Grinnell and Miller (1944) as a result of this visit. We can find no other data from the Kingstons.

Both the Kingstons and the New Yorks are surrounded by Mojave Desert characterized by Joshua Tree woodland from 4000 to 5500 ft and Creosote Bush *(Larrea tridentata)*-Mohave Yucca *(Yucca schidigera)* scrub below 4000 ft, habitats generally unsuitable to bird species characteristic of the pinyon-juniper zone.

BIRD SURVEYS

We spent approximately 280 party-hours (observation time only; more than one observer was considered to be a "party" unless separated sufficiently to be encountering different birds) in the New York Mountains between 1970 and 1979 (with most effort concentrated in 1976-1977), primarily from March to July but with visits in every month of the year. Most time was spent in the lower elevation canyon areas (Live Oak, Keystone, Caruthers, Fourth of July and Sagamore canyons) along the southern and eastern perimeters. We have not visited the sparsely vegetated northern portion of the range, nearly inaccessible by road and appearing very uninteresting from a distance. It is unlikely that we have overlooked any breeding bird species in the pinyon-juniper zone, although our knowledge of the bird community above 6800 ft is scanty. We were able to census the White Fir stand only three times: Remsen, with Andrew Sanders, spent 2 hours there on 28 April 1976; Remsen and Cardiff were there for 4 hours on 20 June 1977; and Cardiff, Cheryl Cardiff and Lawrence LaPré made an overnight visit on 4-5 July 1979. Also, Don Roberson (pers. comm.) and Donna Dittmann spent 3 hours in the White Firs on 29 June 1977.

In contrast to the New Yorks, our knowledge of the Kingston Range is based on only 29 party-hours on 21-22 June 1977. Cardiff camped in the White Fir stand and spent 6 hours censusing it. Remsen and Linda Hale concentrated on the areas of pure pinyon above 6600 ft. While we feel confident we did not miss any common species, we certainly could have missed some rare species. Thus our surveys of the Kingstons can be used mainly to establish *presence* of species, not absence, although we will argue below that some species are absent from the Kingstons.

BREEDING AVIFAUNAS

Below we present lightly annotated lists of the breeding birds of both the pinyon-juniper zone and the White Fir stands of each mountain range. We present our evidence for breeding using the format proposed by Binford (1973), using the following abbreviations for Binford's categories: NY = nest with young, NE = nest with eggs, NC = nest under construction, NU = active nest, stage unknown, PJ = prejuvenal, C = courtship observed, T = territoriality observed, and RHD = combination of a) range within known breeding distribution, b) observed in appropriate breeding habitat, c) dates of observation outside migration period. For all species (except Turkey Vulture, Black-throated Gray Warbler and Rufous-crowned Sparrow) in the pinyon-

juniper zone for which we give "RHD" as our evidence for breeding, we have direct evidence (nest or "prejuvenals") of breeding from adjacent mountain ranges (Mid Hills, Providence or Granite mountains). For the pinyon-juniper zone, we use the following terminology to indicate relative abundance: common (10+ per ½ day); fairly common (3-10 per ½ day); uncommon (1-2 per ½ day); rare (average less than 1 per ½ day). For the White Fir stands, we give an estimate of the number of breeding pairs. An asterisk (*) indicates that the species breeds in non-coniferous habitat below the pinyon-juniper zone; thus for these species, coniferous habitat does not function as an island.

I. NEW YORK MOUNTAINS—Pinyon-Juniper Zone (38 species)

*Turkey Vulture *(Cathartes aura)*. (RHD). Uncommon to rare; all elevations.

Cooper's Hawk *(Accipiter cooperii)*. (NE). Rare; found primarily around Canyon Live Oak groves, especially in Caruthers Canyon, where an abandoned nest with one egg was found on 13 June 1979.

*Red-tailed Hawk *(Buteo jamaicensis)*. (RHD). Uncommon; all elevations.

*Golden Eagle *(Aquila chrysaetos)*. (C, RHD). Rare; all elevations.

*Gambel's Quail *(Lophortyx gambelii)*. (PJ). Fairly common; below 5800 ft.

*Mourning Dove *(Zenaida macroura)*. (C, RHD). Fluctuating annually from rare to fairly common; mainly below 5800 ft; recorded as high as 6400 ft.

*Greater Roadrunner *(Geococcyx californianus)*. (RHD). Uncommon; below 5800 ft.

*Common Screech-Owl *(Otus asio)*. (RHD). Rare; noted as high as 5880 ft.

*Great Horned Owl *(Bubo virginianus)*. (T, RHD). Rare; noted as high as 5760 ft.

Long-eared Owl *(Asio otus)*. (NY). Rare; recorded between 5680 and 5840 ft; nests found in Keystone and Caruthers canyons.

*Common Poorwill *(Phalaenoptilus nuttallii)*. (T, RHD). Uncommon; noted as high as 6200 ft.

White-throated Swift *(Aeronautes saxatalis)*. (C, RHD). Fairly common. Forages at all elevations, but nesting apparently restricted to cliffs at higher altitudes.

*Costa's Hummingbird *(Calypte costae)*. (T, RHD). Uncommon; below 6000 ft; birds recorded as high as 6400 ft probably post-breeding, upslope wanderers.

*Ladder-backed Woodpecker *(Picoides scalaris.)* (RHD). Uncommon; below 6200 ft. Not restricted to desert vegetation; occurs in pinyon-juniper above upper limits of Joshua Trees.

*Cassin's Kingbird *(Tyrannus vociferans)*. (NY). Uncommon; below 5700 ft.

*Ash-throated Flycatcher *(Myiarchus cinerascens.)*. (PJ). Uncommon; below 5900 ft.

Violet-green Swallow *(Tachycineta thalassina)*. (RHD). Fairly common. Forages at all elevations, but nesting restricted to cliffs at higher altitudes.

Scrub Jay *(Aphelocoma coerulescens)*. (PJ). Fairly common; below 6000 ft; rare above 6000 ft.

*Common Raven *(Corvus corax)*. (C, RHD). Uncommon; all elevations. Apparently forages mainly in desert areas below pinyon zone.

Pinyon Jay *(Gymnorhinus cyanocephalus)*. (PJ). Fairly common to common below 6400 ft; rare at higher elevations.

Mountain Chickadee *(Parus gambeli)*. (PJ). Uncommon; mainly from New York Peak east to Keystone and Live Oak canyons and south to Caruthers Canyon; all elevations.

Plain Titmouse *(Parus inornatus)*. (T, RHD). Fairly common below 6000 ft; rare to 6400 ft.

Bushtit *(Psaltriparus minimus)*. (PJ). Common below 6000 ft; rare at higher elevations.

Bewick's Wren *(Thryomanes bewickii)*. (T, C, RHD). Common; all elevations.

*Canyon Wren *(Catherpes mexicanus)*. (T, RHD). Uncommon; all elevations.
*Rock Wren *(Salpinctes obsoletus)*. (T, RHD). Uncommon; all elevations.
*Crissal Thrasher *(Toxostoma dorsale)*. (PJ). Uncommon; below 5900 ft, primarily in Caruthers Canyon.
*Blue-gray Gnatcatcher *(Polioptila caerulea)*. (NC). Common; all elevations.
Gray Vireo *(Vireo vicinior)*. (T, RHD). Uncommon; below 6100 ft.
Black-throated Gray Warbler *(Dendroica nigrescens)*. (T, RHD). Uncommon; all elevations.
*Scott's Oriole *(Icterus parisorum)*. (NU). Fairly common below 5600 ft; rare to 6200 ft.
*Brown-headed Cowbird *(Molothrus ater)*. (RHD). Rare; below 6200 ft.
Black-headed Grosbeak *(Pheucticus melanocephalus)*. (PJ). Uncommon; all elevations, but primarily oak thickets and brushy gullies.
*House Finch *(Carpodacus mexicanus)*. (PJ). Uncommon; all elevations. Most birds seen in pinyon-juniper may be there mainly to drink from springs and may not actually breed within the zone.
Rufous-sided Towhee *(Pipilo erythrophthalmus)*. (PJ). Uncommon; all elevations but local, in brushy areas.
Rufous-crowned Sparrow *(Aimophila ruficeps)*. (T, RHD). Uncommon; below 6400 ft; in Keystone and Live Oak canyons only. See Remsen and Cardiff (1979) for details of this range extension for the race *scottii*.
*Black-throated Sparrow *(Amphispiza bilineata)*. (NY). Fairly common; below 6100 ft, probably much higher on some open, exposed slopes.
Black-chinned Sparrow *(Spizella atrogularis)*. (PJ). Uncommon; below 6800 ft.

The following species may eventually be found nesting in this area:

Anna's Hummingbird *(Calypte anna)*. At least one adult male and two immature males were singing and displaying on territory in oak thickets in Keystone Canyon from at least 26 May to at least 20 June 1977 and a few females were seen in the vicinity. An immature male was on territory in oak thickets in Fourth of July Canyon on 26 May 1977. None was seen in these areas in 1976 or 1978 and this species is not known to breed any great distance east of the Sierra Nevada-Transition Range-Peninsular Range axis in California (Grinnell and Miller 1944) except for a few recent records along the Lower Colorado River (McCaskie 1979a, b; Witzeman 1977). But because this species has greatly expanded its range in the last decade (Zimmerman 1973), with nests discovered as far east as the Davis Mountains of west Texas (Williams 1976), nesting in the oak canyons of the New York Mountains should be watched for. Several birds were present continuously in the nearby Granite Mountains from 24 March to 28 May 1978 (K. Johnson in litt.).
Broad-tailed Hummingbird *(Selasphorus platycercus)*. Recorded from 28 April to 30 May, but no June records. Breeds on nearby Clark Mountain (Johnson et al. 1948, pers. obs.).
Dusky Flycatcher *(Empidonax oberholseri)*. Territorial singing individuals noted at 6800 and 6900 ft on 20 June 1977 within 1 km of the White Fir stand. We strongly suspect nesting at these higher elevations of the pinyon-juniper zone. Johnson (1974) speculates that this species may nest in the pinyon zone of the Grapevine Mountains in Death Valley National Monument.
Western Wood Pewee *(Contopus sordidulus)*. Territorial, singing individuals noted at 6600, 6800 and 7000 ft on 20 June 1977. Although these could have been late migrants or unmated birds, breeding is suspected in light of the nests found in the Kingston Range (see below) and probable nesting on Clark Mountain (N.K. Johnson in litt.).

Mountain Bluebird *(Sialia currucoides)*. Eleven adults and two birds in juvenal plumage noted in Caruthers Canyon at 5700 ft on 21 and 30 July 1976. It is unlikely that these birds were migrants, since this species normally does not migrate until October. It also seems unlikely that birds in spotted juvenal plumage would be migrants. Perhaps local breeding is more likely, especially since pairs have been noted on three occasions in Joshua Tree woodland on Cima Dome (24.5 km west of Caruthers Canyon) in May and June and once in late June in Lanfair Valley (13 km east of Caruthers Canyon), long after migrants have departed (March). The nearest known breeding localities are in the San Bernardino and Panamint mountains (Grinnell and Miller 1944). There are no records for the Sheep or Spring ranges in southern Nevada (Johnson 1965).

Warbling Vireo *(Vireo gilvus)*. Two persistently singing males were found in Keystone Canyon at 5600 and 6600 ft on 20 June 1977. This species has been noted in the breeding season in the Kingston Range (see below) and is definitely known to nest on Clark Mountain (pers. obs.). Although breeding can take place in pure coniferous habitat (Johnson 1965), the singing individuals in the New York Mountains were associated with pinyon-juniper interspersed with thickets of oak, and the oak component of the habitat may account for the presence of this species.

II. NEW YORK MOUNTAINS—White Fir Grove

A. Species not breeding for certain outside White Fir grove:

Dusky Flycatcher. (NE). A nest with four eggs was found about 1 m above ground in a White Fir sapling on 20 June 1977; one member of the pair incubated while the other sang within the grove. A pair was again present in 1979. This is the southeasternmost known breeding locality for this species in the interior of California. May also breed in the pinyon-juniper zone (see above).

Painted Redstart *(Myioborus pictus)*. (T, HD). One closely associating pair (one bird singing), on 20 June 1977. None were found during 1979. The only nest known from California was found in the Laguna Mountains, San Diego Co. (Unitt 1974).

Hepatic Tanager *(Piranga flava)*. (NY). One very closely associating pair, 20 June 1977, and one singing male, 29 June 1977. A nest with recently hatched young was observed in a pinyon, 4-5 July 1979. This is a breeding range extension; the only other definite breeding records for California are from the San Bernardino Mountains (McCaskie 1972, Johnson and Garrett 1974) and the Kingston Range (see below).

B. Species also breeding in pinyon-juniper zone:

Mountain Chickadee. (T, RHD). One pair.
Bushtit. (RHD). One pair.
Bewick's Wren. (T, RHD). One pair.
*Blue-gray Gnatcatcher. (T, RHD). One pair.
Black-throated Gray Warbler. (T, RHD). One pair.
Black-headed Grosbeak. (T, RHD). One pair.
Rufous-sided Towhee. (T, RHD). One pair.

C. Species not nesting in the grove itself but seen foraging overhead and probably nesting in vicinity:

White-throated Swift. Almost certainly nesting in surrounding cliffs; 5-10 overhead on all visits.

Violet-green Swallow. On all four visits, 6-35 foraged overhead; undoubtedly nests in adjacent cliffs.

D. Species noted in the grove but which should be considered as non-breeding wanderers without direct evidence for breeding:

Cooper's Hawk. One immature, 20 June 1977.
*Red-tailed Hawk. Single adults 28 April 1976 and 20 June 1977, and two apparently paired birds, 5 July 1979.
*Golden Eagle. Two apparently paired birds, 20 June 1977 and 5 July 1979.
Anna's Hummingbird. One female, 20 and 29 June 1977.
Western Wood Pewee. One, 5 July 1979, sang occasionally but did not appear to be strongly territorial.
Scrub Jay. Two, 5 July 1979; probably upslope wanderers.
House Wren *(Troglodytes aedon)*. Two, 5 July 1979. Breeds on nearby Clark Mountain (pers. obs.).
Orange-crowned Warbler *(Vermivora celata)*. One very yellow (probably *V. c. lutescens*) non-singing bird seen on 20 June 1977, and a similar immature-plumaged bird was seen on 5 July 1979. Ned K. Johnson (pers. comm.) has found that the Orange-crowned Warblers on Clark Mountain at this time of year are juvenile *V. c. lutescens*.
Yellow-rumped Warbler *(Dendroica coronata)*. A singing male "Audubon's" type, apparently unmated, was present on 20 June 1977.
Cassin's Finch *(Carpodacus cassinii)*. A solitary male was present on 29 June 1977.
Lesser Goldfinch *(Carduelis psaltria)*. One found on 5 July 1979.

III. KINGSTON RANGE—Pinyon-Juniper Zone (24 species; all observations on 21-22 June 1977)

*Red-tailed Hawk. (RHD). One adult at 6800 ft.
*Great Horned Owl. (T, RHD). One seen at 5800 ft and another heard at 6800 ft.
*Common Poorwill. (T, RHD). Several heard on rocky slopes at lower edges of pinyon-juniper zone.
White-throated Swift. (C, RHD). Fairly common; all elevations. Actual nesting probably takes place in rock cliffs at upper elevations.
*Ash-throated Flycatcher. (RHD). Fairly common; up to 6400 ft.
Western Wood Pewee. (NC). Fairly common; 6080-6720 ft. One bird was building a nest in a pinyon at 6720 ft.
Violet-green Swallow. (C, RHD). Fairly common; all elevations but most common above 6500 ft.
Scrub Jay. (RHD). Uncommon; up to 6400 ft. Seemed much less common than in New York Mountains.
*Common Raven. (RHD). Uncommon; up to 6800 ft.
Plain Titmouse. (RHD). Uncommon; up to 6720 ft. Decidedly less common than in New York Mountains.
Bushtit. (RHD). Common; all elevations.
Bewick's Wren. (T, RHD). Common; all elevations.
*Canyon Wren. (T, RHD). Fairly common; all elevations.
*Rock Wren. (T, RHD). Fairly common; all elevations.
*Blue-gray Gnatcatcher. (T, RHD). Common; all elevations.
Solitary Vireo. (T, RHD). One member of a territorial pair was collected at 6720 ft and another individual was heard singing at 6520 ft. The specimen is very worn but appears to be *V. s. cassinii* (E.A. Cardiff pers. comm.).

Black-throated Gray Warbler. (T, RHD). Fairly common; above 6000 ft.
*Scott's Oriole. (RHD). Fairly common; below 6000 ft, but up to 6800 ft on some sunny, south-facing slopes.
Hepatic Tanager. (D). Fairly common; 6800-6900 ft. The four individuals noted were over 1.5 km from the White Fir stand.
Black-headed Grosbeak. (T, RHD). Fairly common; 6700-6900 ft (true elevational distribution undoubtedly much broader).
*House Finch. (RHD). Fairly common; all elevations.
Rufous-sided Towhee. (T, RHD). Fairly common; up to 6800 ft, especially in *Larrea* thickets.
*Black-throated Sparrow. (T, RHD). Fairly common; up to 6000 ft, and on some sunny, exposed slopes to 6720 ft.
Black-chinned Sparrow. (T, RHD). Fairly common; 6000 to 6800 ft.

Other species noted on our survey are listed below. Many of these may have actually been breeding, but direct evidence is needed to list them with the breeding avifauna:

*Costa's Hummingbird. One female-plumaged bird was at 6580 ft and another at 6660 ft (identified by their high-pitched, Bushtit-like chip notes). These were more likely upslope, post-breeding wanderers rather than breeders, although some may breed along the lower edge of the pinyon-juniper zone, as in the New York Mountains.
Broad-tailed Hummingbird. A female-plumaged bird in a brushy gully may have been nesting. This species nests in similar habitat on Clark Mountain (N.K. Johnson pers. comm.) and a nest was found in the White Firs in the Kingstons (see below).
Hairy Woodpecker *(Picoides villosus)*. One and possibly two birds were seen at 6000 ft. The time of year indicates that this species breeds in the Kingstons, even though none was seen in the White Firs. This species formerly bred in the White Firs on Clark Mountain (Miller 1940) and Cardiff saw a territorial male there on 29 May 1979 (McCaskie 1979a).
Dusky Flycatcher. (T, RHD). Four singing, territorial birds noted at 6580-6800 ft. Very likely breeding, although all were more than 1.5 km from the White Fir grove.
Gray Vireo. One was heard singing by Alden H. Miller at the lower edge of the pinyon-juniper zone on 17 June 1939, at the locality cited as "Horse Spring" (=Horse Thief Spring) by Grinnell and Miller (1944) but was actually some distance from the spring itself (Miller field notes at M.V.Z.). We did not detect any on our survey.
Warbling Vireo. One was singing persistently at 6880 ft and another at 6720 ft.
Orange-crowned Warbler. A very bright (probably *V. c. lutescens*), non-singing bird was seen at 6880 ft (see comments under New York Mountains for this species).
MacGillivray's Warbler *(Oporornis tolmiei)*. A persistently singing male in a brushy gully at 6720 ft may have been breeding. If so, this would be a considerable range extension, since the nearest known breeding localities are in the southern Sierra Nevada and White Mountains of California (Grinnell and Miller 1944) and Quinn Canyon-Grant Range of southern Nevada (Johnson 1973). However, this species has been extending its range and now appears to breed in the San Bernardino and San Gabriel mountains (McCaskie 1978, 1980).
Rose-breasted Grosbeak (*Pheucticus ludovicianus*). One female at about 6000 ft.
Cassin's Finch. One female-plumaged bird at 6000 ft.
Lesser Goldfinch. One flying overhead at 6600 ft.
Chipping Sparrow *(Spizella pusilla)*. Up to four pairs (one bird singing) at 6800 ft.

IV. KINGSTON RANGE—White Fir Grove (all observations on 21-22 June 1977)

A. Species not recorded outside White Fir grove:

Broad-tailed Hummingbird. (NU). A female was sitting on a nest; no males noted. If breeding is confirmed in pinyon-juniper zone (see above), this species would fall in category B below.

Red-breasted Nuthatch *(Sitta canadensis)*. (T, RHD). One or two pairs.

Hermit Thrush *(Catharus guttatus)*. (T, RHD). One pair.

Warbling Vireo. (T, RHD). Two pairs; may breed in pinyon-juniper zone (see above).

Virginia's Warbler *(Vermivora virginiae)*. (T, RHD). One pair.

Dark-eyed Junco *(Junco hyemalis)*. (T, RHD). Three pairs; mainly "Oregon" types, but at least one male appeared to be intermediate between "Oregon" and Gray-headed *(J. caniceps)* types.

Chipping Sparrow. (T, RHD). Four pairs; if found to breed in pinyon-juniper zone (see above), should be transferred to category B.

B. Species also thought to breed in pinyon-juniper zone:

*Common Poorwill. (T, RHD). One heard.

Dusky Flycatcher. (T, RHD). Eight singing.

Violet-green Swallow. (RHD). Ten feeding overhead.

Scrub Jay. (RHD). One pair.

Bushtit. (RHD). About six pairs.

*Blue-gray Gnatcatcher. (NE). About eight pairs.

Solitary Vireo. (T, RHD). Two pairs.

Black-throated Gray Warbler. (T, RHD). About 10 pairs.

Black-headed Grosbeak. (RHD). One pair.

*House Finch. (RHD). Two pairs.

C. Species also seen in the White Fir grove but judged either not to be breeding within the White Firs or to require more positive evidence to be listed as part of the breeding avifauna:

*Red-tailed Hawk. One adult.

*American Kestrel *(Falco sparverius)*. One pair. This is an unusually high elevation record. Our highest record for this species in the New York Mountains is 5600 ft.

Flammulated Screech-Owl *(Otus flammeolus)*. One heard. Miller (1940) took a female with enlarged ova on Clark Mountain and individuals have been heard there several times in recent years (McCaskie 1977b). Huey's (1932) report of a juvenal specimen from pinyon-juniper habitat in the Argus Range further supports the possibility that this species breeds in higher elevation coniferous habitats in the Mojave Desert. Since this species calls only on the breeding grounds (N.K. Johnson in litt.), breeding is strongly suspected, but the possibility that this bird was unmated cannot be ruled out.

*Common Raven. Seven seen overhead.

Ruby-crowned Kinglet *(Regulus calendula)*. One individual.

Yellow-rumped Warbler. One female "Audubon's" type, apparently unmated. An unidentified singing warbler may have been a male of this species.

*Scott's Oriole. Three birds. Almost certainly unslope wanderers.

*Rose-breasted Grosbeak *(Pheucticus ludovicianus)*. One female. This vagrant was exceptionally common in the California deserts in May and June 1977 (McCaskie 1977a).

DISCUSSION

The breeding avifaunas of the pinyon-juniper zone of the New York Mountains and Kingston Range are extremely similar in species composition and relative abundance. This is to be expected from their overall strong vegetational similarities. It is somewhat surprising that the presence of oaks in the New York Mountains did not add species to its breeding avifauna (although see below). The only species entirely "missing" from the Kingston Range pinyon-juniper is Mountain Chickadee. It is unlikely that we overlooked this conspicuous species in the Kingstons. We have no ready explanation for its apparent absence, other than the stochastic factors involved in colonization and extinction in island situations.

Other species known from the New York Mountain pinyon-juniper but not found in the Kingstons are Cooper's Hawk, Gambel's Quail, Mourning Dove, Greater Roadrunner, Common Screech-Owl, Long-eared Owl, Ladder-backed Woodpecker, Pinyon Jay, Crissal Thrasher and Rufous-crowned Sparrow. Six of these species (Gambel's Quail, Mourning Dove, Common Screech-Owl, Greater Roadrunner, Ladder-backed Woodpecker and Crissal Thrasher) are not found above the lower edge of the pinyon-juniper zone; we spent little time at this lower edge in the Kingstons. Also, all six are found in desert habitats below the pinyon-juniper zone and so are irrelevant to island biogeography. Three species (Cooper's Hawk, Long-eared Owl and Rufous-crowned Sparrow) are rare and local species not expected to be detected in a brief survey. Also, all three are primarily found in oak canyons in the New Yorks and may be species added to these mountains by presence of this additional habitat. This leaves Pinyon Jay as the only species that might be added to the "missing" category with Mountain Chickadee. But this species forms very mobile flocks that may have been in other parts of the Kingstons during our survey; further visits would be necessary to add this species to the "missing" list. Solitary Vireo is the only species breeding in the Kingston Range pinyon-juniper zone that we feel definitely does not nest in the New York Mountains. We have not listed Dusky Flycatcher, Western Wood Pewee and Hepatic Tanager in the main list for the New York Mountains, although they likely will be found to breed there. Broad-tailed Hummingbird, Hairy Woodpecker, MacGillivray's Warbler and Chipping Sparrow are other species absent from the New Yorks that may eventually be shown to breed in the pinyon-juniper zone of the Kingstons. As in the case of Mountain Chickadee, we can offer no convincing explanation for the absence of Solitary Vireo in the New York Mountains (see below).

The composition of the breeding avifauna of the White Fir stands differs greatly between the two mountain ranges, primarily due to the huge differences in sizes of the stands. The much larger Kingston Range stand contains every species present in the New York Mountains stand except two: Mountain Chickadee and Painted Redstart (and this latter species was not present in the New Yorks in 1979). The presence of shaded, rocky cliffs immediately adjacent to the New York grove, plus canyon oaks, makes this stand superficially resemble typical Arizona breeding habitat of Painted Redstart much more so than the Kingston stand.

The following species found in the Kingston Range White Fir stand are not known from the New York Mountains White Fir stand: Common Poorwill, Broad-tailed Hummingbird, Red-breasted Nuthatch, Hermit Thrush, Solitary Vireo, Warbling Vireo, Virginia's Warbler, Dark-eyed Junco and Chipping Sparrow. The "absence" of Common Poorwill from the New York stand is probably due to lack of nocturnal observations there during times of the year when this species is very vocal. The remaining species are all characteristic of higher elevations of Great Basin ranges or the Sierra Nevada. Their absence from the New Yorks is probably due to the very small extent of suitable habitat there. However, Solitary Vireo, Warbling Vireo and Chipping Sparrow apparently do not require White Firs *per se* since they are found elsewhere in the Kingstons in pure pinyon above 6700 ft. Absence of Solitary Vireo and Chipping Sparrow from the New York pinyon-juniper zone may be due to stochastic factors involved in colonization-extinction or subtle differences between the ranges in habitat suitability. Thorough vegetation sampling would certainly help quantify the comparability of the sites.

We compared the avifauna of the pinyon-juniper zone of the New York Mountains and Kingston Range with that of a larger, nearby mountain mass, the Spring Mountains, using the accounts of Johnson (1965) and van Rossem (1936). Only one species breeding in the pinyon-juniper zone of the latter is lacking from the New Yorks and Kingstons: Gray Flycatcher. Yet this species apparently inhabits only the upper elevations of the zone in the Spring Mountains (7600-8000 ft) and so its absence from the California ranges, with maximum elevations 7300-7500 ft, is not surprising. However, Gray Flycatcher is known to breed in pinyon-juniper habitat at 6700-6900 ft in the eastern San Bernardino Mountains (Johnson and Garrett 1974). It is also possible that we may have overlooked this species because it is very difficult to detect when breeding in low densities (N.K. Johnson pers. comm.).

Only three species recorded from the New Yorks or Kingstons are not reported from the Springs: Greater Roadrunner, Cassin's Kingbird and Rufous-crowned Sparrow. Only one of these, Rufous-crowned Sparrow, does not also occur in non-coniferous habitats. Distribution of pinyon-juniper zone birds may be best explained by vicariance (Croziat 1958) rather than island biogeography, since this habitat was apparently more or less contiguous in the relatively recent past (van Devender 1977). The present islands of pinyon-juniper habitat apparently are sufficiently large that no extinctions have occurred or any extinctions have been counterbalanced by successful recolonizations.

We also compared the avifauna of the Kingston White Fir stand to montane habitat below 8000 ft in the Spring Mountains (from Johnson 1965 and van Rossem 1936). Of the 34 species breeding in the Spring Mountains in montane habitats 7500-8000 ft (excluding pinyon-juniper), 21 (61.8%) were breeding or probably breeding in the Kingston White Firs. No clear-cut patterns were discerned as to which types (ecological, zoogeographic or taxonomic) of species were more likely to be found in the Kingstons. For example, the species that in our estimation would be the least likely colonist, Hairy Woodpecker, is a species found in the Kingstons and which has possibly recolonized Clark Mountain recently (see above). Also, one might predict that the species in the Spring Mountains most restricted to Ponderosa

Pine woodland (Western Wood Pewee, Pigmy Nuthatch and Western Bluebird) would be the least likely to occur in the ponderosa-less Kingstons. Yet one of these three species is found in the Kingstons.

Three species found in the Kingston Range White Firs are not part of the breeding avifauna of montane forest at similar elevations in the Spring Mountains: Scott's Oriole, Hepatic Tanager and House Finch. Scott's Oriole and House Finch were probably upslope wanderers to the Kingston White Firs rather than part of the breeding avifauna. Hepatic Tanager may be in the process of range expansion (Johnson and Garrett 1974) and may now be part of the breeding avifauna of the Spring Mountains.

Our total of 38 breeding species in the New York Mountains considerably exceeds totals for pinyon-juniper woodland in the Great Basin, which average 23-24 breeding species per mountain range (Johnson 1978). Although Johnson did not present his list of 27 pinyon-juniper birds, we suppose that most of the differences arise from differences in categorizing the birds themselves. If we eliminate 10 species (Gambel's Quail, Mourning Dove, Greater Roadrunner, Costa's Hummingbird, Ladder-backed Woodpecker, Cassin's Kingbird, Ash-throated Flycatcher, Crissal Thrasher, Scott's Oriole and Black-throated Sparrow) found only in the lower portion of the pinyon-juniper zone and more characteristic of lower elevation desert vegetation, and also eliminate 2 species (Cooper's Hawk and Long-eared Owl) possibly added by presence of oaks, the residual 26 species more closely approximate Johnson's figures for Great Basin pinyon-juniper.

SUMMARY

Composition of the breeding bird avifauna is given for two conifer-clad mountain ranges in the California Mojave Desert, the New York Mountains and Kingston Range, neither of which had been previously explored by ornithologists. Both ranges have small, relict patches of White Firs that contain small populations of montane species not found in the pinyon-juniper habitat that dominates both ranges. Data are presented in such a way that future visitors to these ranges can more readily document species turnover events in these insular avifaunas.

ACKNOWLEDGMENTS

Our surveys were sponsored by the Desert Plan Staff, Bureau of Land Management, Riverside, California, through Kristin H. Berry. We thank Kent Johnson for information concerning bird status in the Granite Mountains and Don Roberson for data from his trip to the New York Mountains. Ned K. Johnson, T.S. Schulenberg and Mark B. Robbins provided useful comments on the manuscript.

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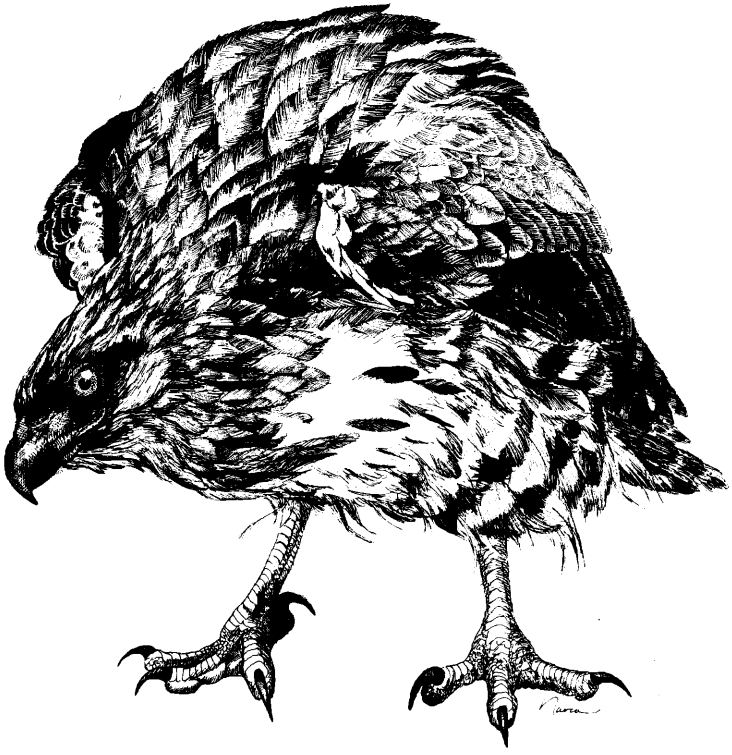
Accepted 22 May 1981



Immature Red-tailed Hawk *Sketch by Narca Moore*