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## BREEDING DISTRIBUTION OF NASHVILLE AND VIRGINIA'S WARBLERS

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ACCURATE definition of the breeding ranges of the western race of the Nashville Warbler (*Vermivora ruficapilla ridgwayi*) and of Virginia's Warbler (*Vermivora virginiae*) is of more than ordinary interest for several reasons. Although Phillips et al. (1964: 148) argue for the conspecificity of these two warblers, descriptions of nesting distributions in the current literature (e.g. A.O.U. 1957) imply breeding sympatry in Idaho and Utah. Mayr and Short (1970: 73) also express concern for possible overlap and interaction of *V. ruficapilla* and *V. virginiae* in the same region, in view of their general distribution and close relationship as probable members of the same superspecies (Mengel 1964).

In this paper I review the basis for the published statements on the breeding ranges of the western race of the Nashville and Virginia's Warblers, especially where they occur in proximity, and correct and update these descriptions with records from recent fieldwork.

Many specimens examined for this study are in the Museum of Vertebrate Zoology, University of California, Berkeley (MVZ). Other useful material is in the United States National Museum of Natural History, Washington (USNM); California Academy of Sciences, San Francisco (CAS); San Diego Natural History Museum (SDNHM); Western Foundation of Vertebrate Zoology, Los Angeles (WVZ); Museum of Biology, University of Nevada, Reno (UNMB); University of Utah, Salt Lake City (UU); and Utah State University, Logan (USU). In the text, initials are used to identify the collection containing a specimen that documents occurrence at a particular locality. The initials "NKJ" follow records of breeding birds unsupported by specimens. My field notes (MVZ) fully describe these observations.

## CURRENTLY ACCEPTED DESCRIPTIONS OF BREEDING RANGES

According to the "Check-list of North American birds" (A.O.U. 1957: 484), *V. r. ridgwayi* breeds "from southern interior British Columbia (Pemberton, Revelstoke, Creston) and northwestern Montana (Fortine) south through Washington (west to Tacoma), Oregon, and Idaho to interior northwestern and central California (Mount Sanhedrin, Greenhorn Mountains), central western Nevada (Incline), and northern Utah (Wasatch Mountains)." The closely-related *Vermivora virginiae*, breeds "from central Nevada (Toiyabe Mountains), southeastern Idaho (Cassia County), northeastern Utah (Salt Lake City, Vernal), and central northern Colorado (Estes Park) south to southeastern California (White Mountains, Clark Mountain), southern Nevada (Potosi Mountain), central and southeastern Arizona (Hualpai, Santa Rita, and Chiricahua mountains), and central-northern New Mexico (Sandia Mountains, Glorieta)." These descriptions, that imply nearly contiguous allopatry and local sympatry of the Nashville and Virginia's Warblers, have been followed by all authors of recent important literature concerning the species (Griscom and Sprunt 1957, Mengel 1964, Lowery and Monroe 1968, Stein 1968).

The map (Fig. 1) shows breeding localities for the two species based on a reevaluation of evidence from museum specimens and records from the regional literature. I emphasize localities that define the perimeter of each breeding range.

BREEDING DISTRIBUTION OF *Vermivora ruficapilla ridgwayi*

*British Columbia, Washington, and Oregon.*—The Nashville Warbler breeds across southern British Columbia (Godfrey 1966), through the Cascade Mountains, Okanogan Highlands, and Blue Mountains of Washington (Jewett et al. 1953), and on both slopes of the Cascade Mountains and in the Blue Mountains of Oregon (Gabrielson and Jewett 1940). The species is unrecorded in summer across a broad swath of south central Washington and virtually all of Oregon east of the Cascades except for the mountainous region of the northeast corner of the state. Considerable forested country occurs in north central Oregon, where at least small populations of *V. ruficapilla* may breed, and this region is queried on the map.

*California and Nevada.*—Breeding localities for the Nashville Warbler extend through the higher mountains of northern California, southward along the Inner Coast Range to as far as Mount Sanhedrin, Mendocino County (Grinnell and Miller 1944); St. John Mountain, Glenn County (NKJ); and Crockett Peak, Lake County (NKJ); and from eastern

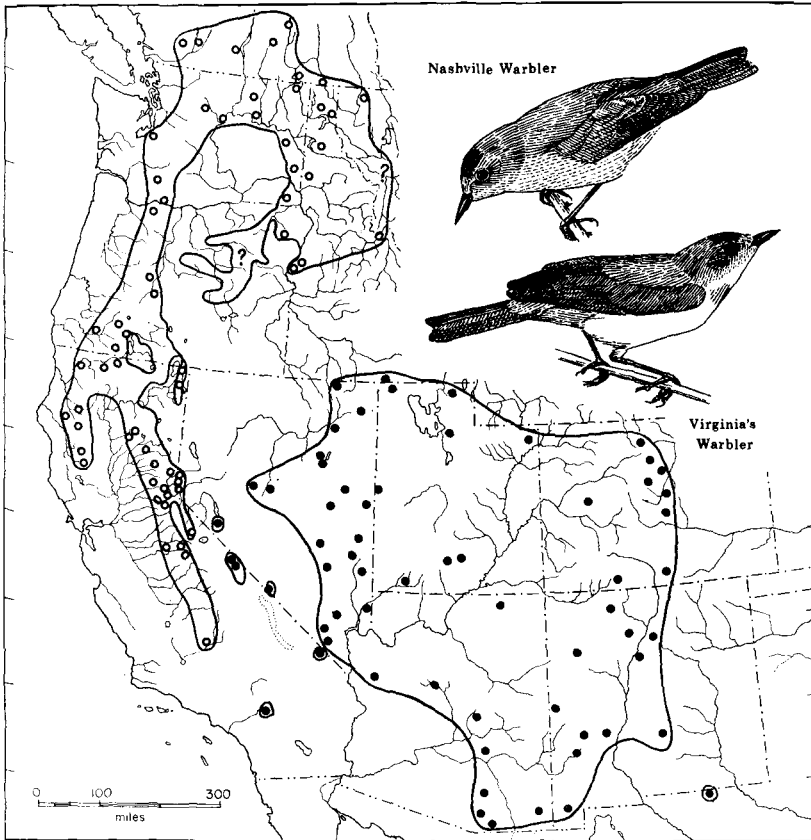


Fig. 1. Breeding distribution of the western race of the Nashville Warbler (*Vermivora ruficapilla ridgwayi*) and Virginia's Warbler (*Vermivora virginiae*) in western North America. Representative localities where the species have been recorded during the nesting period are shown (circles for *V. ruficapilla*, dots for *V. virginiae*). Considerable habitat within the heavy line that marks the perimeter of the main range of each species is unsuitable for nesting and is unoccupied in summer. Six small and peripheral populations of Virginia's Warbler are outlined individually.

Modoc County (Pine Creek, 5200 feet, Warner Mountains; MVZ), southward at numerous localities, especially along the west slope of the Sierra Nevada, to as far as Kern County (8 miles west of Isabella, 5500 feet; MVZ). Although Grinnell and Miller (1944) mention no specific nesting localities for the species on the east side of the Sierra Nevada, it also breeds locally in eastern Nevada County (2 miles east of Hobart Mills; MVZ), in the Lake Tahoe Basin (Ward Creek, Placer County; CAS), and on both slopes of the Carson Range of western Nevada (4

miles south of Verdi, 6000 to 6500 feet; Sand Harbor, Lake Tahoe, 6500 to 6800 feet; UNMB and NKJ). The species has been recorded in summer 25 miles to the southeast of the Lake Tahoe area at Bryant Creek, 6400 feet, Douglas County, Nevada, near the Alpine County, California line (NKJ). Presumably the species also occupies the forested region between Bryant Creek and Lake Tahoe. The Nashville Warbler does not breed elsewhere in Nevada. Farther southeastward, along the east side of the Sierra Nevada, the species is unrecorded except at a single locality, Twin Lakes, Mono County, California, where J. B. Dixon collected a set of eggs 14 June 1940 (WVZ).

*Montana, Idaho, and Utah.*—The Nashville Warbler apparently breeds locally in northwestern Montana at Fortine, Lincoln County (Wedemeyer 1934). The species also may nest irregularly near Missoula (Hoffmann et al. 1959), according to recent observations (R. L. Hand, R. E. Johnson, and P. D. Skaar, in litt.).

In his account of the Nashville Warbler in Idaho, Burleigh (1972) described the species as a "rather local summer resident over most of the state." He repeated that "It undoubtedly breeds throughout the state, but there are only a few published records for its occurrence, a further indication of its peculiarly spotted distribution." But careful study of his published records shows no breeding localities for the species in the southern two-fifths of Idaho, the southernmost definite nesting localities being in Washington County (East Brownlee Creek, 30 miles northwest of Cambridge (Burleigh 1972: 330) and southwest slope Cuddy Mountain, 4000 feet (MVZ)) and in Lemhi County (vicinity of Shoup (Burleigh 1972: 330)). In response to my query concerning the distribution of *V. ruficapilla* in Idaho, the late Thomas Burleigh kindly sent a letter (dated 16 February 1970 and written while his book on Idaho birds was in press) that contained a map delimiting the southernmost nesting localities in the state. His plotting is identical to that of Fig. 1. Further, he wrote that the map "would appear to confirm your opinion that *ruficapilla* does not breed in southern Idaho, but as suitable habitat exists future field work might reveal an occasional pair." Although the Nashville Warbler may breed somewhat farther south in central Idaho than present records indicate, I question whether any significant area of suitable nesting habitat exists in the state south of the Snake River. The southwestern part of the state is unsuitable, being arid and essentially unforested. And in the forested highlands of southeastern Idaho, the favored habitat of this warbler—warm, dry, and open forests of ponderosa pines or woodlands of oaks, with a brushy understory necessary for nesting (Grinnell and Miller 1944, Kilgore 1971)—is lacking (Critchfield and Little 1966: 80). The descriptions of Davis (1939) indicate that

much of the coniferous habitat in the mountains of southeastern Idaho is unsuitable for the Nashville Warbler. Furthermore Rust (1917) did not find this species in Fremont County, nor is it known from adjacent southwestern Montana or Wyoming. Therefore, until evidence to the contrary emerges, acceptance of the breeding distribution in Idaho as plotted in Fig. 1 is the only justifiable choice.

Breeding of the Nashville Warbler in northern Utah is also unlikely and the putative records in the literature that support this supposition will now be evaluated. At least three old records are relevant, any one or all of which could have provided the basis for the inclusion of northern Utah in the breeding range of the species in the A.O.U. Check-list (1957):

(1) Allen (1872: 175), without specifying details, listed *Helminthophaga* (= *Vermivora*) *ruficapilla* as a summer resident of the "Wahsatch [sic] Mtns." of Utah. But because Allen, in keeping with common practice of his day, failed to publish supporting evidence for his report of breeding status for *V. ruficapilla* in the Wasatch Mountains, the record is without proper documentation and should be disregarded.

(2) Woodbury et al. (1949) listed *V. ruficapilla* as a "Casual breeder of the Wasatch Mountains." They cite Allen's paper (1872) in their bibliography and thus it could have been at least partial grounds for their assumption of breeding status.

However W. H. Behle (in litt., 18 February 1971) examined the manuscript for Woodbury's check-list and found the entry: "Nesting record: Salt Lake County near Brighton, 8800 feet, a bird, nest and four fresh eggs taken June 26, 1931. The nest was placed at the base of a large clump of willows in wet marshy ground. It was of loose construction, composed mostly of bark, a few grasses and hairs (Mullen)." Behle further wrote (in litt.) that he had never met Mullen, a local egg collector, and therefore was unable to judge his competence as an ornithologist. Behle continued that "there is need for substantiating evidence, but neither the bird, the nest nor eggs are in our collection. Indeed all our specimens are migrants and all Woodbury's other records pertain to migrants. Thus, the evidence of this warbler breeding in northern Utah is weak and the record should be discounted." Finally, the description of the nest site seems inappropriate for a Nashville Warbler; instead it seems to pertain to MacGillivray's Warbler (*Oporornis tolmiei*).

(3) A set of eggs (WVZ) labelled "*Vermivora rubricapilla* [sic] *ridgwayi*" were collected on 6 June, 1912, in "Utah County, Utah" by Mrs. A. O. Treganza. The nest, collected with the set, was "placed on the ground under a boulder on the dry mountain side. Altitude 6500 feet." The identification was based upon "Birds, nest and eggs." L. Kiff (pers.

comm., 8 May 1973, stated that although the set is definitely of *Vermivora*, the eggs of *V. ruficapilla* cannot be distinguished from those of the Virginia's Warbler or of the Orange-crowned Warbler (*V. celata*), both of which breed in the general area. No skins taken at the nest are available to corroborate the record.

None of the foregoing three records constitutes scientific evidence for nesting of the Nashville Warbler in northern Utah and, therefore, Behle's (1944) description of the species as an "uncommon transient" in that state is accepted. Thus, as Fig. 1 shows, the vast region of southeastern Oregon, northern Nevada, northern Utah, and southern Idaho is not part of the known breeding range of *V. ruficapilla*, as is implied or stated in the A.O.U. check-list (1957); and the maps published subsequently by Griscom and Sprunt (1957), Mengel (1964), and Udvardy (1963, 1969), which apparently were based on the check-list, are faulty.

#### BREEDING DISTRIBUTION OF *Vermivora virginiae*

*California and Nevada.*—Small and isolated breeding populations of Virginia's Warbler are scattered along the Nevada-California border, in the Wassuk Range, Mineral County, Nevada (MVZ); Grapevine Mountains (MVZ, Johnson 1974) and White Mountains, Mono and Inyo Counties, California (MVZ, Miller and Russell 1956); and on Clark Mountain (Miller 1940) and in the San Bernardino Mountains (Johnson and Garrett 1974) of southern California. The principal breeding range of *V. virginiae* begins in central and eastern Nevada, where suitable habitat is extensive and populations are more continuous. Recent fieldwork in this state has added greatly to the meager distributional data previously available, and for this reason all the localities now known for the species in Nevada are listed (Appendix 1). Although much of northwestern Nevada has not been thoroughly explored ornithologically, from what is known (Taylor 1912, Linsdale 1936, Johnson MS) it is unlikely that the actual nesting distribution will be found to extend much beyond the limits as presently understood.

*Idaho and Utah.*—At the northern limits of its known breeding distribution Virginia's Warbler has been recorded as a summer resident in extreme southern Idaho at a single locality, Silent City of Rocks, Cassia County (Burleigh 1972, USNM). Two August records for the southeastern part of the state (Brodkorb 1938, Arvey 1949) from localities somewhat north of the known breeding range, however, suggest that the species also breeds in that part of the state. The species nests across most of Utah. Representative breeding localities for the state (Fig. 1) are George Creek, Raft River Mountains, Box Elder County (UU; Behle 1958); Logan Canyon, Cache County (USU); Ashley Canyon at 12 miles north of

Vernal, Uintah County (Twomey 1942); near Salt Lake City, Salt Lake County (Ridgway 1877); south end of Deep Creek Mountains, Juab County (UU; Behle 1955); Mount Carmel Road, Zion National Park (UU; Behle 1943); and 5 miles north of Boulder and Posy Lake, Garfield County (UU; Behle et al. 1958).

*Arizona, New Mexico, Texas, and Colorado.*—Modern accounts of the nesting distribution of Virginia's Warbler are available for Arizona (Phillips et al. 1964), New Mexico (Hubbard 1970), Texas (Oberholser 1974), and Colorado (Bailey and Niedrach 1965). These sources have been followed in mapping the ranges (Fig. 1). The only point needing clarification is the statement of Bailey and Niedrach (1965: 675-676), for Colorado, that the species breeds "throughout the state." Instead, the data of these authors show that Virginia's Warbler is absent in summer in the eastern one-third of Colorado, where no suitable nesting habitat exists.

#### POSSIBLE SYMPATRY OF NASHVILLE AND VIRGINIA'S WARBLERS

In stating that piñon-juniper is used by the Nashville Warbler, Mengel (1964: 22) implied the possibility of considerable sympatry of that species with Virginia's Warbler, a common breeder in this plant association. However I know of no good evidence that Nashville Warblers ever breed in piñon-juniper; more substantial woodland or forest of medium to large oaks and/or conifers seems to be required for singing and foraging, although nesting takes place under a brushy layer on the ground. This disparity in preferred breeding habitats of the two species essentially precludes opportunity for their contact and interaction when nesting. But in places their breeding habitats adjoin and interdigitate and to encourage further fieldwork it is worthwhile to consider possible areas of sympatry in the general region where both species breed in fairly close proximity.

The reanalyzed breeding distributions (Fig. 1) show that the species approach most closely along the Nevada-California border. Possible contact in northwestern Nevada is unlikely in view of the pronounced allopatry in that region because of absence of suitable habitat for either species. Farther south the two warblers approach to within 40 miles (Twin Lakes, 7100 feet elevation, Mono County, California for nesting *V. ruficapilla* and North Canyon, 6800 feet elevation, Wassuk Range, Mineral County, Nevada for breeding *V. virginiae*). Contact in this region seems unlikely, for searches during the breeding season in the woodlands between those two localities have failed to reveal either species. No appropriate breeding habitat for *V. ruficapilla* occurs anywhere in western Nevada east of the Carson Range near Lake Tahoe; the scattered groves

of apparently suitable yellow pines that grow from the Virginia Range near Pyramid Lake southward to the Wassuk Range (Billings 1950, 1954; Griffin and Critchfield 1972) lack the brushy understory required for nesting and Nashville Warblers are absent in summer (Johnson MS). The species likewise avoids the extensive forests of yellow pines (primarily *Pinus jefferyi*; the Nashville Warbler seems to prefer *Pinus ponderosa* among the yellow pines) that occur east of the main Sierra Nevada in both the Sweetwater Mountains and in the vicinity of Glass Mountain, Mono County, California.

Bent (1953: 116), without documentation, reported *V. ruficapilla* as summer resident on both slopes of the Sierra Nevada. Grinnell and Storer (1924) and Grinnell and Miller (1944) mention occurrence only on the west slope and records are lacking for the steep eastern slope of the Sierra Nevada in the vicinity of Owens Valley, anywhere south of Twin Lakes, Mono County. But the Nashville Warbler could follow the scattered pine-oak association around the southern end of the Sierra Nevada, as does the race *Aphelocoma coerulescens superciliosa* of the Scrub Jay (Pitelka 1951: 213), and penetrate northward locally on the east side. The Nashville Warbler certainly does not nest in the White Mountains where Virginia's Warbler breeds, nor in the Inyo Range; neither of these ranges have proper breeding habitat for the former species (Griffin and Critchfield 1972, Lloyd and Mitchell 1973).

*Vermivora virginiae* may occur west of its currently documented distribution on the east-facing slopes of the Sierra Nevada along Owens Valley. Here thickets of mountain mahogany, singleleaf piñon, and scrubby oaks, favored by Virginia's Warbler, occur in places near scattered patches of open yellow pine forest with an understory of manzanita and buckbrush, the habitat preferred by the Nashville Warbler. Pitelka (1951: 266) discusses the interdigitation of plant communities at several localities in this region. Source populations for Virginia's Warbler already exist in the nearby White Mountains, across the narrow barrier provided by the agricultural and pasture lands of Owens Valley. The fact that *V. virginiae* seems to be actively extending its range westward suggests the possibility of present, or eventual, establishment on the east slope of the Sierra Nevada. Interior forms of at least four other species, the Pygmy Owl (*Glaucidium gnoma pinicola*), Solitary Vireo (*Vireo solitarius plumbeus*), Orange-crowned Warbler (*Vermivora celata orestera*), and Black-chinned Sparrow (*Spizella atrogularis evura*) now breed locally on the east slope of the Sierra Nevada (Grinnell and Miller 1944, Johnson and Garrett 1974), although their main distributions are to the east, and these occurrences indicate that environments of the eastern slope may be suitable for Virginia's Warbler as well.



A second region of possible sympatry of Nashville and Virginia's Warblers is the San Bernardino Mountains, San Bernardino County, California, where Virginia's Warbler recently has nested (Johnson and Garrett 1974). Although it is uncertain that the Nashville Warbler breeds in this area, Garrett found a singing male at Barton Flats on 3-4 July 1971 (McCaskie 1971), approximately 8 airline miles from Arrastre Creek, 6900 feet elevation, where Virginia's Warblers were building a nest, and approximately 1 mile from a site on the South Fork of the Santa Ana River, 6000 feet elevation, where Virginia's Warblers probably nested. This region deserves thorough search for breeding pairs of both species, especially because considerable intermixing of appropriate habitats could apparently permit sympatry.

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#### SUMMARY

Verifiable distributional records of the western subspecies of Nashville Warbler (*Vermivora ruficapilla ridgwayi*) and Virginia's Warbler (*Vermivora virginiae*) indicate, contrary to the current literature, that the species are strongly allopatric during the breeding period. Although probable nesting localities of each species occur as close as 40 miles, the bulk of the breeding populations is separated by gaps between 100 and 200 miles. Old reports that suggest summer residence of the Nashville Warbler in southern Idaho and northern Utah and, thus, occurrence in sympatry with Virginia's Warbler, cannot be corroborated. A corrected breeding range map is presented for the two species. Based on the distribution of environments typically occupied for nesting and on known summer range, the two species could occur in local parapatry and/or in very limited sympatry in two areas of southern California.

#### APPENDIX I

List of localities documenting the nesting distribution of *Vermivora virginiae* in Nevada. Each record, unless noted otherwise, is based on one or more summer specimens in breeding condition in the Museum of Vertebrate Zoology.

*Elko Co.*—Jarbidge, 6100–6700 ft; Thomas Cr., 7600–7800 ft, Ruby Mtns.; W side Ruby Lake, 3 miles N Elko Co. line; 3 miles W Pequop Summit, 6800 ft, Pequop Mtns. (NKJ). *White Pine Co.*—Sawmill Canyon, 8300 ft, E slope Ward Mtn., Egan Range; Lexington Cr., 6700–8400 ft, Snake Range; S Fk. Big Wash, 8400 ft, Snake Range; Willow Cr., 2 miles S White Pine Co. line, Ruby Mtns.; Currant Cr., 7500 ft, White Pine Mtns. *Lander Co.*—Kingston Ranger Sta., 7700 ft, Toiyabe Mtns.; 1 mile S and 2 ½ miles E Carroll Summit, 6600 ft, E slope Desatoya Mtns. (NKJ). *Mineral Co.*—North Canyon, 6800 ft, E slope Wassuk Range. *Nye Co.*—Scofield Canyon, 7800–8100 ft, Quinn Canyon Mtns. (NKJ); 2 ¼ miles E, 1 mile S Grapevine Pk., 6900 ft, Grapevine Mtns. *Lincoln Co.*—E slope Mount Irish, 7700 ft; Water Canyon, 7500 ft, Highland Range (NKJ); E slope Mount Wilson, 7900 ft, Wilson Creek Range (NKJ); 2 miles W Sawmill Peak, 6600 ft, Clover Mtns. (NKJ). *Clark Co.*—Hidden Forest Canyon, 7500–7600 ft, Sheep Range; Macks Canyon, 8100 ft, Spring Mtns.; N side Potosi Mtn., 6000–7000 ft, Spring Mtns.; N slope E Virgin Peak, 5800 ft, Virgin Mtns.

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