

COMMENTS ON THE STATUS AND DISTRIBUTION OF WESTERN AND MOUNTAIN BLUEBIRDS IN WASHINGTON

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Concern has been expressed for many years over the decrease in numbers of both Western Bluebirds (*Sialia mexicana*) and Mountain Bluebirds (*S. currucoides*) in Washington. One major problem in attempting to document this reported decline is the lack of comprehensive status and distribution data. Seasonal reports in *American Birds* provide summaries of observations but often these are not quantitative in nature. Recent breeding bird surveys conducted by the U. S. Fish and Wildlife Service (Robbins and Van Velzen 1969, Van Velzen and Robbins 1971) are quantitative but often provide only limited data on bluebirds. The purpose of this study is to supply quantitative information on the status and distribution of both bluebird species in Washington for the summer of 1974, to provide an analysis of Breeding Bird Survey (BBS) data for 1968 through 1976, and to evaluate population trends during the past 80 years.

MATERIALS AND METHODS

I conducted timed censuses throughout the state in areas that seemed to satisfy basic habitat requirements (elevated perches, open spaces, some cover, one or more nest cavities) of bluebirds. Each census, begun at times when bluebird activity was considered to be greatest, consisted of a 1 to 3 hour walk through an area. During the nesting period (see below) bluebirds were active throughout the day, whereas after the young had fledged, maximum activity occurred in early morning and late evening. The walk was usually in a circular pattern covering 1 to 5 km. After the initial census, a 1 to 2 hour search for nests was conducted. Four of the five areas with active nests were censused a second time, approximately 3 weeks later, to check the accuracy of the census method and to obtain data concerning reproductive success.

To gain perspective on the historical status and distribution of Western and Mountain bluebirds, species lists, surveys, and museum collections made between 1894 and 1966 were examined.

For purposes of comparison, Washington was divided into western and eastern sections with the crest of the Cascade Range serving as the dividing line. The breeding season, based on Jewett et al. (1953) and

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personal observations, was defined as follows: Western Bluebird, 5 April to 12 August and Mountain Bluebird, 28 April to 25 July.

Forty-nine questionnaires, requesting current information on numbers, species, and habitat of bluebirds, were mailed in 1974 to persons actively engaged in field work or with access to areas which may have been suitable for bluebirds. Those contacted included U. S. Forest Service district rangers, National Park Service biologists, Fish and Wildlife Service refuge personnel, Indian Agency superintendents, and managers of state wildlife recreation areas. Thirty individuals (13 west and 17 east of the Cascade Range) completed the questionnaires.

An analysis, based on the method of Neu et al. (1974), of life zone and habitat utilization was made. Confidence intervals were placed on the proportion of each bluebird species observed in a life zone or habitat type, then compared with expected values. The expected number of bluebirds was taken to be the proportion of the total census time that was spent in each area multiplied by the total number of bluebirds observed on all areas. The 0.05 level of significance was used. For this analysis, both bluebird species were assumed to have equal accessibility to all areas.

From 10 June to 28 August 1974, 48 full-time days were spent in the field. Seventeen part-time days were spent in the field from 14 February to 23 May 1974.

RESULTS AND DISCUSSION

Former Status and Distribution

Early published reports by Dawson (1909), Taylor and Shaw (1927), Burleigh (1930), Kitchin (1930) and Miller et al. (1935) indicated that Western Bluebirds were most often observed west of the Cascade Range. Later reports listed this species as rare (Pearse 1946) or as a migrant and winter visitor only (Wick 1958) in extreme northwestern Washington. In eastern Washington, Edson (1932), Wing (1944), and others noted isolated sightings. King (1953) and Hudson and Yocom (1954) classed Western Bluebirds as rare summer residents in southeastern Washington. Jewett et al. (1953:523) stated that this species "while not abundant anywhere, enjoys a wide distribution in the state."

For the Mountain Bluebird in western Washington, the only published observations during the breeding season are from Whatcom County (Edson 1926) and from Mount Rainier National Park (Dawson 1909, Schaffer 1934, Kitchin 1939). All other reports from this part of the state come from migratory periods (Jewett et al. 1953). Records from eastern Washington are more abundant and many observers reported the bird as common (Dice 1918, Hurley 1921, Larrison 1943, Burdick 1944, Yocom 1945, Jewett et al. 1953, King 1953, Hudson and Yocom 1954).

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Figures 1 and 2 show locations for museum specimens collected during the breeding season for Western Bluebirds between 1894 and 1960 and for Mountain Bluebirds between 1897 and 1966. Before 1947, Western Bluebirds were taken primarily in western Washington (65%), whereas after 1948, 62% of the birds were collected east of the Cascades. For the entire period, 75% of the Mountain Bluebirds were from eastern Washington.

Although the number of birds taken in a given area is a reflection of collecting effort, an important trend in the number of Western Bluebirds in western Washington is suggested by a decrease in specimens. Coupled with a decrease of published observations, fewer museum specimens seem to point to a decline in the breeding population of Western Bluebirds west of the Cascades. No important changes have been noted for Western Bluebirds east of the mountains, or for Mountain Bluebirds throughout the state.

The distribution of both bluebird species, based on life zone or habitat use, has been described by many authors. Jewett et al. (1953) reported that Western Bluebirds were found most commonly in the Upper Sonoran and Transition zones, whereas Mountain Bluebirds were found from the Transition to Hudsonian Zone. Dice (1918) recorded Western Bluebirds as migrants in bunchgrass and in cottonwood-willow habitat and as summer residents in yellow pine habitat, in southeastern Washington. He recorded Mountain Bluebirds as summer residents in bunchgrass, cottonwood-willow, yellow pine and alpine-fir habitats. Observations by Dumas (1950) closely paralleled those of Dice for both species.

Present Status and Distribution

Seventy-nine Western Bluebirds were seen during timed censuses. Seven censuses conducted between 0600 and 1200 resulted in 49 bird observations. Six censuses conducted between 1200 and 2000 resulted in 30 sightings. Thirty-nine and 40 Western Bluebirds were counted in June and July, respectively. None were seen during timed censuses in August. Seven sightings made while traveling between census areas were recorded but not included in field census counts. Flocks, numbering between 6 and 20, were observed on three occasions during censuses, but in no instance were more than 5 adults seen at any location. Although nearly 16% of my field time was spent west of the Cascade Range, no Western Bluebirds were seen there (Appendix A).

Thirty-one Mountain Bluebirds were seen during timed censuses (Appendix A). Two censuses, conducted between 0600 and 1200, resulted in 6 sightings. Four censuses between 1200 and 2000 had a total count of 25. Nineteen, 10, and 2 Mountain Bluebirds were counted in June, July and August, respectively. Three additional sightings were made

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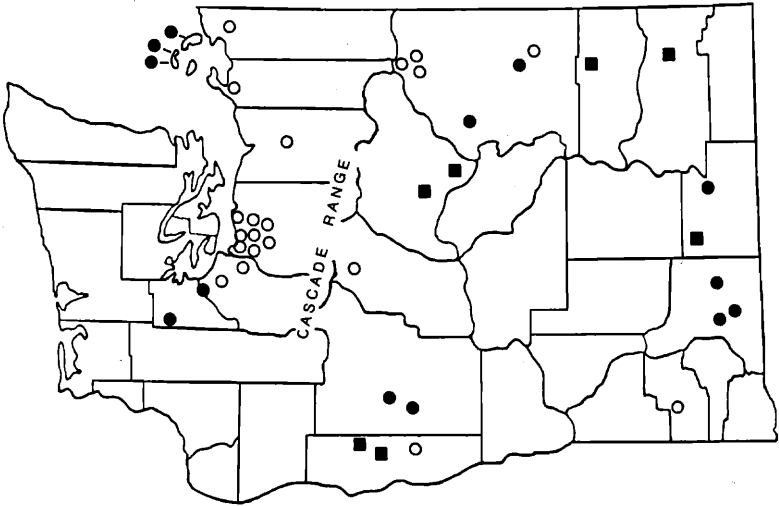


Figure 1. Breeding season locations in Washington for Western Bluebird museum specimens 1894 to 1947 (○), 1948 to 1960 (●), and personal observations and questionnaire reports, summer 1974 (■).

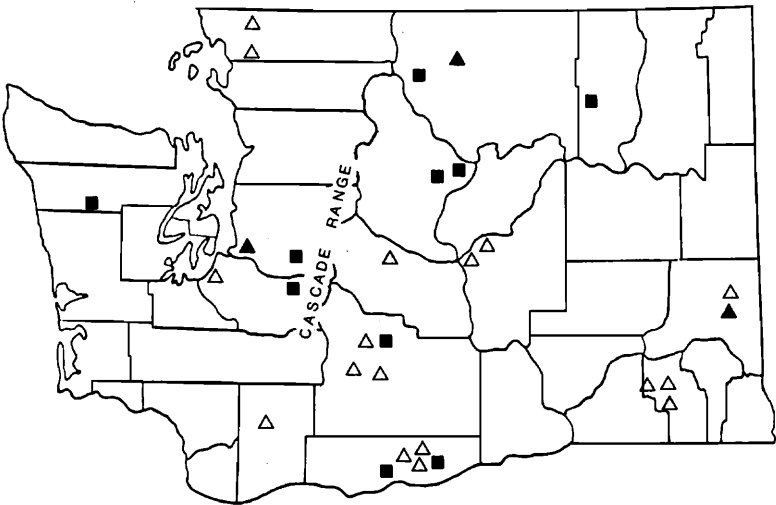


Figure 2. Breeding season locations in Washington for Mountain Bluebird museum specimens 1897 to 1947 (△), 1948 to 1966 (▲), and personal observations and questionnaire reports, summer 1974 (■).

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while traveling between census areas. The only birds seen on the west side of the Cascade Range during timed censuses were 2 at Sunrise in Mount Rainier National Park.

All sightings of Western Bluebirds reported on questionnaires were from eastern Washington, except one record from the Olympic Peninsula listing this species as migratory only. Mountain Bluebirds were reported in 6 areas west and in 16 areas east of the Cascade Range. Five of these (Mitchell Creek, Chelan County; Gold Ridge, Chelan County; Lake Quinalt, Jefferson County; White River, Pierce County; Rimrock Lake, Yakima County) were sightings, ranging from 1 to 12 birds, made during the breeding season. Additionally, T. Wahl (pers. comm.) reported Mountain Bluebirds in June on Hurricane Ridge in Olympic National Park, Clallam County, and in western Whatcom County. The remaining 17 observations were made during periods when juvenile bluebirds form large flocks and move widely prior to migration (Power 1966).

Table 1 summarizes results of timed censuses I conducted in areas corresponding to the four life zones, and presents an analysis of life zone use by bluebirds. Western Bluebirds seemed to use Transition preferentially to all other zones, whereas Mountain Bluebirds used Transition, Canadian and Hudsonian as expected. Neither species was seen in Upper Sonoran areas during the breeding season, probably because of the absence of suitable nesting sites. Although bluebirds will use nest boxes placed in Upper Sonoran, they generally leave the area and move to Transition when the nestlings fledge (Power 1966).

Six habitat types were censused during 1974 (Table 2). Western Bluebirds were seen in edge and burn areas; Mountain Bluebirds were seen in burn, farmland and subalpine. All sightings of Western Bluebirds in edge habitat were from Klickitat County (in the south-central part of the state) where the vegetation consists primarily of Cheatgrass Brome (*Bromus tectorum*), Oregon White Oak (*Quercus garryana*) and Ponderosa Pine (*Pinus ponderosa*). Western Bluebirds were counted in burns at Turnbull National Wildlife Refuge, Sherman Pass, Mitchell Creek and Gold Ridge. In these areas, nest cavities were seen in larger (20 cm or greater diameter breast height [dbh]) fire-killed trees or stubs. The burn at Gold Ridge consisted of two distinct habitats. Only small (less than 20 cm dbh) trees remained throughout much of the area, probably because of post-fire tree salvage. All bluebirds were observed near the edges of the burn or on steeper slopes where larger stubs containing cavities were located.

Mountain Bluebirds were seen in burns at Sherman Pass and at Mitchell Creek, as well as in subalpine meadow-forest mosaic (Franklin and Dyness 1973) at Sunrise and at Cutthroat Pass. The observations in farmland were of a late breeding pair using a nest box near Bickleton, Klickitat County.

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26 Table 1. Life zone utilization by Western and Mountain bluebirds in Washington, summer 1974. Proportion observed is the proportion of the species total. Proportion expected is based on census hours in the life zone relative to total census hours.

Life Zone	Number of Censuses	Census Hours	Species	Number Seen	Number Per Hour	Proportion Observed	Proportion Expected	Confidence Interval on Proportion Observed	Observed Compared to Expected
Upper Sonoran	2	2.0	Western Mountain	0	0.00	0.00	0.05	...	less
Transition	21	22.5	Western Mountain	71	3.16	0.90	0.59	$0.82 \leq p_1 \leq 0.98$	more
Canadian	4	7.5	Western Mountain	17	0.76	0.55	0.59	$0.33 \leq p_1 \leq 0.77$	no difference
Hudsonian	5	6.0	Western Mountain	8	1.07	0.10	0.20	$0.02 \leq p_1 \leq 0.18$	less
			Western Mountain	10	1.33	0.32	0.20	$0.11 \leq p_1 \leq 0.53$	no difference
			Western Mountain	0	0.00	0.00	0.16	...	less
			Western Mountain	4	0.67	0.13	0.16	$0.00 \leq p_1 \leq 0.28$	no difference
Totals	32	38.0	Western Mountain	79	2.08				
			Western Mountain	31	0.82				

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Table 2. Habitat use by Western and Mountain bluebirds in Washington, summer 1974. Proportion observed is the proportion of the species total. Proportion expected is based on census hours in a habitat type relative to total census hours.

Habitat Type	Number of Censuses	Census Hours	Species	Number Seen	Number Per Hour	Proportion Observed	Proportion Expected	Confidence Interval on Proportion Observed		Observed Compared to Expected
								Observed	Expected	
Edge	8	8.5	Western Mountain	35	4.12	0.44	0.22	$0.29 \leq p_1 \leq 0.59$	more	
								...	less	
Burn	13	15.0	Western Mountain	44	2.93	0.56	0.39	$0.41 \leq p_1 \leq 0.71$	more	
								$0.63 \leq p_1 \leq 0.99$	more	
Farmland	1	1.0	Western Mountain	0	0.00	0.00	0.03	...	less	
								$0.00 \leq p_1 \leq 0.17$	no difference	
Subalpine	7	10.5	Western Mountain	0	0.00	0.00	0.28	...	less	
								$0.00 \leq p_1 \leq 0.29$	no difference	
Grassland	2	2.0	Western Mountain	0	0.00	0.00	0.05	...	less	
								...	less	
Clearcut	1	1.0	Western Mountain	0	0.00	0.00	0.03	...	less	
								...	less	
Totals	32	38.0	Western Mountain	79	2.08	0.00	0.03	...		
								...		

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Bluebird use of clearcuts for foraging has been reported by Hooven (1969) and Nyquist (1973), but no bluebirds were seen in the single clearcut (Gifford Pinchot National Forest, Cowlitz County) I censused during the present study. Ground vegetation was widely spaced within the clearcut, however no cavities were found in the adjacent timbered areas. R. E. Johnson (pers. comm.) found Western and Mountain bluebirds using clearcuts in June near Mount Misery in Garfield County. No bluebirds were seen by me in grassland probably because of the lack of elevated perches and nest cavities.

The analysis of habitat use in Table 2 indicates that both species used burns more than expected. This may have been because, in burns, insects seemed plentiful and understory vegetation was not sufficiently developed (4 to 7 years after the fire) to hinder feeding by bluebirds. The transition area between forest and grassland (edge) probably was used more than expected by Western Bluebirds because of the presence of elevated perches from which the birds scanned adjacent grassland and because of natural cavities located in many of the older Oregon White Oaks. Mountain Bluebirds were seen as expected in both farmland and subalpine.

Bluebirds were seen in a variety of habitat types, all of which are characterized by widely spaced understory vegetation and major tree species usually clustered to form areas of dense cover adjacent to, or within, the more open spaces. Power (1966) observed that open spaces were used by adults for feeding, and that areas of denser cover served as protection for newly fledged young. In the absence of a nest cavity otherwise suitable habitat often remains unused (Hildén 1965). Censuses conducted during 1974 support this observation in that areas meeting all the basic habitat requirements of bluebirds, including seemingly adequate food and cover, were not occupied when nest cavities were absent (e.g., Gold Ridge and Gifford Pinchot National Forest).

The distribution of Western Bluebirds described by Jewett et al. (1953) is probably not entirely accurate today. Museum specimens, published reports and personal observations indicate little use of Upper Sonoran in Washington. All breeding activities seem to be restricted to Transition east of the Cascades where basic habitat requirements of nest cavities, elevated perches and fairly sparse ground cover are met. Mountain Bluebird distribution shows little, if any, change from that reported by Jewett et al. (1953).

Bluebirds vs. Starlings

One possible cause for the decline in bluebird populations is nest site competition with Starlings (*Sturnus vulgaris*) (Rogers 1956). First re-

ports of Starlings in the Northwest were by Mills (1943), Olson (1943) and Wing (1943). Early nesting records were reported by Hudson and King (1951) and by Braden (1953). Starlings were classed as a "common winter visitor and rare breeder" in southeastern Washington by Hudson and Yocom (1954:38). Reports of declining bluebird populations in northwestern Washington (e.g., Pearse 1946) preceded the establishment of Starlings as breeding birds east of the Cascades. Factors other than competition with Starlings, such as increased urbanization and development west of the Cascades, may have been responsible for the early decrease of Western Bluebird populations in that area. Low population levels coupled with increased pressure from Starlings in later years could have resulted in the apparent exclusion of Western Bluebirds as breeders in western Washington. Starlings do not occur in the habitats of either Western or Mountain bluebirds in eastern Washington (T. Wahl pers. comm.), which could, in part, explain the apparent stability of those bluebird populations.

The most comprehensive census data for both bluebirds and Starlings between 1968 and 1976 is provided by the Breeding Bird Survey (BBS). A maximum of 30 census routes have been run in Washington in any one year. Sixteen routes are east and 14 routes are west of the Cascades. Bluebirds have been reported on seven different census routes, all east of the Cascades. There are no BBS records for bluebirds from western Washington. Starlings have been reported on 27 census routes: 15 east and 12 west of the Cascades. Starlings were counted on every route reporting bluebirds.

The average number of bluebirds counted per hour for each route reporting that species ranged from 0 to 2.4 for Western Bluebirds and from 0 to 0.7 for Mountain Bluebirds. Starling census counts were between 5.1 and 27.0 birds per hour. Correlations between the number of Western Bluebirds and Starlings and between Mountain Bluebirds and Starlings were both negative, but neither statistic was significant. The negative correlations do however suggest a decreased number of bluebirds where Starlings are present.

No consistent trends were identified for bluebird numbers during the 9 year period. The census counts for both species fluctuated widely from year to year. Starling numbers also showed wide fluctuations and tended to parallel bluebird numbers, although Starlings were consistently 10 times more abundant than bluebirds. When Starling routes were grouped according to whether they were in eastern or western Washington, the same trends as described above were noted. The average number of Starlings observed was greater in western than in eastern Washington (41.7 vs. 32.3), but the difference was not statistically significant.

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APPENDIX A. Locations and results of timed censuses conducted in Washington, summer 1974. Numbers following each location represent the number of census hours, the number of censuses (in parentheses), and the numbers of Western and Mountain bluebirds, respectively. Abbreviations: SWRA—State Wildlife Recreation Area, NF—National Forest, NP—National Park, NWR—National Wildlife Refuge.

Eastern Washington

Mitchell Creek, Wenatchee NF, Chelan Co. 4.5 (4):26, 15; Sherman Pass, Ferry Co. 2.0 (2):8, 10; Klickitat SWRA, Klickitat Co. 3.5 (3):25, 0; Little Pend Oreille

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SWRA, Stevens Co. 5.0 (5):13, 0; Turnbull NWR, Spokane Co. 4.5 (4):5, 0; Gold Ridge, Wenatchee NF, Chelan Co. 4.0 (3):5, 0; Cutthroat Creek, Okanogan NF, Okanogan Co. 5.5 (3):0, 2; 5.0 km S. Bickleton, Klickitat Co. 1.0 (1):0, 2; Hanford Reservation, Benton Co. 2.0 (2):0, 0.

Western Washington

Sunrise, Mount Rainier NP, Pierce Co. 2.0 (2):0, 2; Hurricane Ridge, Olympic NP, Clallam Co. 2.0 (1):0, 0; Gifford Pinchot NF, Cowlitz Co. 1.0 (1):0, 0; Three-legged Bear Avalanche, Rainy Pass, Okanogan NF, Okanogan Co. 1.0 (1):0, 0.

Totals, with percent of statewide total: Eastern Washington—32 census hours (84.2%), 27 censuses, 79 Western Bluebirds (100%), 29 Mountain Bluebirds (93.5%). Western Washington—6 census hours (15.8%), 5 censuses, 0 Western Bluebirds, 2 Mountain Bluebirds (6.5%).

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