FURTHER DATA ON SCREECH-OWL DISTRIBUTION AND HABITAT USE IN WYOMING

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Fitton's (1993) report on the distribution of the Western (*Otus kennicottii*) and Eastern (*O. asio*) Screech-Owls in Wyoming was prompted by the lack of information on them and their recent recognition as distinct species. For nearly the same reasons, we undertook a similar project without being aware of Fitton's study. Here we report the results of our work that confirm, amplify, and extend his.

STUDY AREA AND METHODS

In mid-March 1992, we began calling Screech-Owls with taped songs played on a Panasonic Model RQ-341 cassette tape recorder at full volume but without an amplifier or external speaker. Both the Eastern and Western songs were arranged from the National Geographic Society recordings (Guide to Bird Sounds, 1983). The Eastern arrangement was one secondary song (single trill) and three primary songs ("whinny") in close succession [see Marshall (1967) for terminology and sonagrams]. This arrangement was repeated five times in close succession to form one 2-minute sequence. The Western arrangement was one primary song ("bouncing ball"), three secondaries (double trill), and one primary in close succession. This arrangement was also repeated five times in close succession to form one sequence of 2 minutes, 35 seconds. The first song played at a location was for the species that we expected in that area, followed by the song of the other species. For each species, we played the entire sequence twice (unless an owl responded before we finished), separated by about a 30-second pause. Rarely, we played a third sequence. We usually started playback at dusk and finished by 0200, moving from location to location. We terminated the survey on 18 July except at two marginal locations that we visited on 22 and 26 August 1992.

Survey locations, primarily aspen and riparian cottonwood stands, were selected mostly on the basis of accessibility and habitat suitability as reported in the literature and verbally by other observers. We attempted to cover the entire state somewhat uniformly (Figure 1). We surveyed 145 locations representing all of Wyoming's 23 counties. All locations were at least 1.7 km apart, usually much more. At 25 locations we called at more than one point (up to 10), depending on the extent of potential habitat and accessibility or until an owl responded. These points were separated by 0.6 to 1.6 km. At 19 of the locations where no owl responded on our first visit, we returned at a later date and called again. West of the continental divide we called in every month from March through August. East of the divide we called in every month of this same period except for June. From March through May we also called in habitats where the owls were not expected. We called at the exact locations of all verifiable spring and summer reports of Western Screech-Owls, one several years after the initial report, the others 2–3 months after the owls were first heard.

At locations where one or more owls responded, we returned in daylight and recorded up to six dominant tree and shrub species and the density of the shrub understory within a 100-m radius. At points where no owl responded, we recorded only the dominant trees.

R. D. Dorn attempted to evaluate all Screech-Owl reports from Wyoming since1983 by searching for any documentation accompanying the reports. He also examined Screech-Owl specimens at the University of Wyoming, Denver Museum of Natural History, National Ecology Research Center (Fort Collins, Colorado), Yellowstone National Park, and Grand Teton National Park.

RESULTS

Eastern Screech-Owls responded at 21 locations in 13 counties (Figure 1). We had no response from a Western Screech-Owl at any location. Nineteen responses were on the first visit to a location and two responses were on a second visit. The locations where Eastern Screech-Owls re-

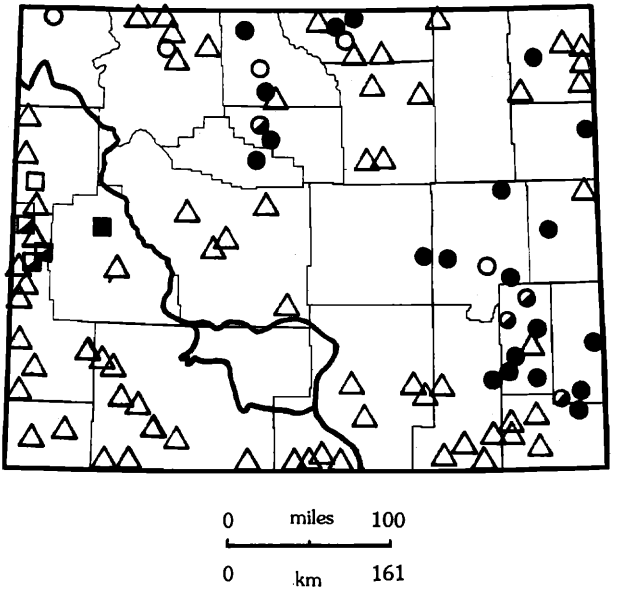

Figure 1. Verified Screech-Owl reports in Wyoming and sites surveyed during this study. One symbol may represent more than one location. Eastern Screech-Owl: solid circle, response to taped songs (this study); open circle, specimen; half-solid circle, well-documented report. Western Screech-Owl: solid square, response to imitated song; open square, specimen; half-solid square, well-documented report. Triangle, no response to taped songs of either species (this study). The continental divide is represented by the line from the upper left to the lower center.

sponded were all east of the continental divide and all below 1890 m (6200 ft) elevation. At 15 locations a single individual responded, at 5 locations two individuals responded, and at 1 location three individuals responded (3 April). At 2 locations the birds responded with just the whinny, at 8 locations they responded with just the trill, and at 11 locations they responded with both the whinny and trill. At a number of locations where we expected Eastern Screech-Owls, we had no response possibly because of poor calling conditions, i. e., strong wind, traffic noise, or stream noise. On our first survey night, 14 March, owls responded at four of six locations. The last response was on 7 July. Our earliest response was at dusk on 14 March (1900 MST). The latest was at 0010 MST, 7 July. Most of the responding owls were observed with artificial light at a distance of 2 to about 50 m. A few would not come closer than about 200 m. Our 21 Screech-Owl responses were all at locations different from the 6 locations where Fitton (1993) observed the birds as well as from the locations from which he reported photos or specimens.

Early in the survey, it became clear that large (diameter at breast height > 50 cm) Plains Cottonwoods (*Populus deltoides*) were an important component of Eastern Screech-Owl habitat. That tree was present at all locations where an owl responded, with one exception, but it was not always the dominant tree species (Table 1). Peachleaf Willow (*Salix amygdaloides*) and Boxelder (*Acer negundo*) were the next most common trees. All three of these species tend to grow together along streams on the plains. This is the same habitat described by Rockwell (1907) for

Table 1 Dominant Tree and Shrub Vegetation at the 21 Locations Where Eastern Screech-Owls Responded to Taped Songs

Species	Number of locations	
	One of six most abundant woody species	Single most abundant woody species
Populus deltoides, Plains Cottonwood	20	11
Salix amygdaloides, Peachleaf Willow	15	1
Acer negundo, Boxelder	9	4
Populus angustifolia, Narrowleaf Cottonwood	7	2
Populus acuminata, Lanceleaf Cottonwood	6	2
Fraxinus pennsylvanica, Green Ash	4	1
Populus balsamifera, Balsam Poplar	1	0
Quercus macrocarpa, Bur Oak	1	0
Elaeagnus angustifolia, Russian Olive	10	0
Prunus virginiana, Chokecherry	2	0
Juniperus scopulorum, Rocky Mountain Juniper	2	0
Prunus americana, Wild Plum	1	0

the Eastern Screech-Owl in Colorado. In Saskatchewan, this owl is found in riparian Boxelder (Adam 1987). Plains Cottonwood generally drops out at elevations above 1830 m (6000 ft) in southern Wyoming and above 1525 m (5000 ft) in the north. The other two species generally continue for another 150 m (500 ft) in elevation. At higher elevations, these trees are replaced by Narrowleaf Cottonwood (*Populus angustifolia*) and Balsam Poplar (*Populus balsamifera*). The confluence of Johnson and Sybille creeks in Albany County, the only location where an owl responded that lacked Plains Cottonwood, was at the highest elevation where we found the species, about 1860 m (6100 ft). Both Peachleaf Willow and boxelder were present at this location. Fitton's (1993) report from 4.8 km farther up Sybille Creek extends the altitudinal range to 1920 m (6300 ft). Rockwell (1907) indicated that in Colorado the Eastern Screech-Owl rarely ascends above 1830 m (6000 ft). Unverified reports of Screech-Owls in Wyoming east of the continental divide, all likely of Easterns, are from as high as 2350 m (7700 ft).

The shrub understory was open (< 50% canopy cover) at seven locations where owls responded, moderately dense (50–75 % canopy cover) at nine locations, and very dense (> 75% canopy cover) at five locations. We had no response from owls in stands of Plains Cottonwood where the trees were widely scattered (ca. 62 trees/ha or 25 trees/acre) with little or no shrub understory. The number of points in each habitat where we surveyed for Screech-Owls is presented in Table 2.

Since we had no response from a Western Screech-Owl, we questioned the adequacy of our tape. To test its effectiveness, John Barnes of

Table 2 Habitats Surveyed for Screech-Owls in Wyoming

Habitat	Number of points with	
	Response	No response
East of continental divide		
Plains Cottonwood–Peachleaf Willow–Boxelder	18	52
Narrowleaf Cottonwood	1	31
Lanceleaf Cottonwood–Plains Cottonwood	1	0
Green Ash–Bur Oak	1	0
Bur Oak–Paper Birch–Ponderosa Pine	0	5
Aspen	0	4
Ponderosa Pine–Douglas Fir	0	3
West of continental divide		
Aspen	0	42
Narrowleaf Cottonwood	0	34
Utah Juniper	0	7
Douglas Fir–Lodgepole Pine	0	1
Bigtooth Maple	0	1
Balsam Poplar	0	1
Gambel's Oak	0	1

Smithfield, Utah, took a copy of our tape to Smithfield Canyon on 17 October 1992 and had three responses from Western Screech-Owls in nine stops along 6 km (3.7 mi) of Narrowleaf Cottonwood habitat below 1645 m (5400 ft).

The main physical characteristics distinguishing the Eastern and Western Screech-Owls, the color of the base of the bill and relative thickness of barring on the feathers (Kaufman and Bowers 1989, Kaufman 1990), are not useful in Wyoming. Kaufman (1990) stressed that there were local exceptions to many of the points he presented. Marshall (1967) indicated that bill color is the same in *O. asio* and *O. kennicottii macfarlanei*, the race of the Western to be expected in northwestern Wyoming. The best distinction seems to be that *O. a. maxwelliae* has rather sparse barring on the underparts with extensive white showing through whereas *O. k. macfarlanei* and *aikeni* have relatively dense barring on the underparts with the white not especially prominent. This is usually quite easy to see in direct comparison of specimens. With a little practice a single specimen can be identified, but these characteristics are extremely difficult to evaluate in the field under poor or artificial light.

Fitton (1993) found Western Screech-Owls at two locations about 2 km apart at 2380 m (7800 ft) in Sublette County, Wyoming. He found no other documentation for the species in the state. Kathi Clark and Dave Crowe described for us the "bouncing ball" song of three Western Screech-Owls that they heard in the Greys River drainage basin of Lincoln County below 2195 m (7200 ft) from 15 March to 1 April 1992.

Figure 2. Mounted specimen of Western Screech-Owl collected on 30 December 1989 about 2.5 km west of Jackson, Wyoming.

We located two Screech-Owl specimens from Wyoming not reported by Fitton (1993). A specimen in Yellowstone National Park picked up dead at the Albright Visitor Center, Mammoth, at 1890 m (6200 ft) on 15 July 1988 we identified as an Eastern Screech-Owl (*O. a. maxwelliae*) by its white underparts with sparse barring. A mounted specimen of a Western Screech-Owl that we examined at Grand Teton National Park was picked up dead on Spring Creek 2.5 km west of Jackson at 1890 m (6200 ft) on 30 December 1989, and is the only known Western Screech-Owl collected in Wyoming (Figure 2). It has the dark underparts, dense barring, light-colored bill, and long wing (180 mm) characteristic of *O. k. macfarlanei*.

DISCUSSION

The distribution of the Eastern Screech-Owl in Wyoming corresponds with several interrelated factors. There is a close correspondence with the distribution of Plains Cottonwood stands along streams on the eastern plains and in the Big Horn Basin (Figures 3a, b). Average annual temperature of over 7° C (44° F) also corresponds closely (Figures 3a, c). There is slightly less correspondence with duration of snow cover (Figures 3a, d).

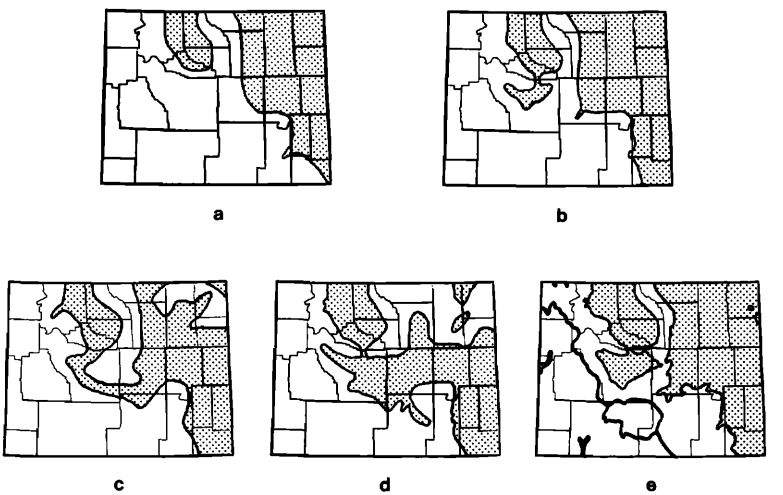

Figure 3. Wyoming. a, Generalized Eastern Screech-Owl distribution (shaded area). b, Generalized Plains Cottonwood distribution based on specimens in the Rocky Mountain Herbarium, University of Wyoming, and personal observations (shaded area). c, Average annual temperature (Martner 1986): shaded area, 7° C (44° F) and above; unshaded area, below 7° C. d, Average number of days per year with 2.5 cm (1 inch) snow cover or more: shaded area, <70 days; unshaded area, >70 days. Extrapolated from data in Martner (1986) for the period 1951–1980. e, Elevation: shaded area, <1830 m (6000 ft), unshaded area, >1830 m. The continental divide is represented by the line from the upper left to the lower center.

Riparian tree distribution is most important, since without the trees there are no owls regardless of other favorable conditions. Temperature is indirectly related by providing suitable growing conditions for the trees and preventing excessive snow cover, which might interfere with successful foraging. The influence of elevation is even more indirect through its effect on temperature.

There were two areas where we expected Eastern Screech-Owls but did not find them. The Powder River in Johnson County and the Wind and Popo Agie rivers in Fremont County appeared to have suitable habitat in places, but no owls responded at the eight points (six and seven locations, respectively) where we called in each area. It is possible that the lack of riparian trees in the 20 km (12 mi) of the Wind River Canyon is a barrier to Screech-Owl dispersal into the Wind River Basin.

Wyoming reports of Western Screech-Owls are from habitats not typical for the species in adjacent states. Marshall (1967), Hayward (1983), and Holt and Hillis (1987) reported them in riparian forests below about 1830 m (6000 ft) elevation. The habitats they described are largely absent from Wyoming, and west of the continental divide in Wyoming, only two small areas are below 1830 m (Figure 3e). Habitat for Western Screech-Owls in Wyoming appears marginal at best and probably explains their scarcity. Hayward (1983) thought that the Western Screech-Owl's distribution on his Idaho study site was strongly influenced by habitat but that prolonged snow cover and cold might determine its upper elevational limit. Holt and Hillis (1987) reported one nesting in aspen in western Montana and indicated that Western Screech-Owls are occasionally observed in mixed coniferous forests away from riparian areas. Fitton (1993) found the species in two successive years at New Fork Lakes, but the Lincoln County reports may represent young birds looking for an unoccupied territory or just wandering. The sites in Sublette and Lincoln counties are wooded with Quaking Aspen (*Populus tremuloides*). In Jackson Hole, besides the single specimen, there are inadequately documented but nearly year-round reports, suggesting a resident population in large riparian cottonwoods (*Populus balsamifera*, *P. angustifolia*). Inadequately documented reports from Green River and Baggs in southwestern Wyoming may represent *O. k. aikeni* and should be followed up, although neither we nor Fitton (1993) had any responses there.

SUMMARY

There is no verifiable evidence that the Eastern and Western Screech-Owls overlap in Wyoming. Eastern Screech-Owls are fairly widespread east of the continental divide in cottonwood-dominated riparian woodland up to 1920 m (6300 ft) elevation. Western Screech-Owls are rare, localized, and possibly irregular west of the continental divide. Only one specimen of the Western, from near Jackson, has been preserved. Occasional wandering of either species into the range of the other would not be expected often since the mountains and treeless high-desert basins along the continental divide likely form an effective barrier to Screech-Owl dispersal.

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