2026 Mountain Bluebird Nest Box Monitoring & Banding Report

Jackson Hole Wildlife Foundation



Principal Investigator: Kate Gersh, Associate Director, Jackson Hole Wildlife Foundation

Co-Principal Investigator: Zoë Ward, Nature Mapping Program Coordinator, Jackson Hole Wildlife Foundation

Project Personnel: Dakota Vaccaro (Lead Bird Bander), Martina Nordstrand (Assistant Bird Bander), and 28 volunteers

Report compiled by: Zoë Ward

112	28	1,847	145	81%
Nest Boxes Monitored	Volunteers	Nest Box Checks	Nestlings Banded	Egg Hatch Rate

Summary

The Mountain Bluebird (*Sialia currucoides*) is an obligate cavity nester whose populations are influenced by habitat availability and interspecific competition for nesting sites. To support local populations, Jackson Hole Wildlife Foundation, in partnership with the National Elk Refuge, has maintained a 6.1-mile nest box trail since 2007. The 2026 season marked the trail's 20th year. In 2026, 28 volunteers conducted 1,847 nest box checks across 112 boxes, and a record 145 nestlings and 19 adults were color-banded, surpassing the records set just one year prior. The 112 maintained nest boxes supported 37 active bluebird nests, with strong reproductive outcomes: 154 of 191 eggs hatched (81% hatch rate) and 135 of 154 nestlings fledged (88% fledging rate). These results underscore the role of artificial nest boxes in supporting cavity-nesting bird conservation and highlight the power of community science to contribute meaningful long-term monitoring data. Continued resighting of color-banded individuals will be critical for assessing site fidelity, habitat quality, and long-term population trends.

Introduction

Found across western North America, the Mountain Bluebird (*Sialia currucoides*) is one of the region's most iconic and visually striking bird species. A member of the thrush family, it is distinguished by its brilliant blue plumage and preference for open grasslands and shrubby habitats for both breeding and foraging (Cornell Lab of Ornithology, 2025). Mountain Bluebirds are primarily insectivorous, feeding on small invertebrates including beetles, grasshoppers, and grubs.


Sunshine Greene

Mountain Bluebirds are obligate cavity nesters, relying on natural cavities, abandoned woodpecker holes, or occasionally rock crevices for nesting (Johnson & Dawson, 2020; Duckworth, 2014). Unable to excavate their own cavities, they face significant competition from other cavity-nesting birds, including Tree Swallows and invasive species such as House Sparrows and European Starlings (Aitken & Martin, 2008).

During the late 19th century, westward expansion and widespread logging inadvertently created favorable conditions for Mountain Bluebirds: open grasslands provided foraging habitat, while the dead snags and fence posts left behind offered nesting cavities, driving a rapid population increase (Cornell Lab of Ornithology, 2025). Subsequent fire suppression encouraged reforestation of many former grasslands, reducing both the open foraging areas and the standing dead wood on which bluebirds depended, contributing to population decline. Although older analyses indicated that populations remained relatively stable after the North American Breeding Bird Survey began in 1966, long-term modeling reveals an average decline of 1.55% per year, resulting in a loss of roughly one million individuals since 1970. Consequently, local populations remain vulnerable to habitat loss and changing ecological conditions (Bailey, 2022).

In 1912, President William Howard Taft established the National Elk Refuge (NER) in western Wyoming to protect dwindling elk populations. As elk rebounded, overbrowsing degraded woody vegetation, including aspen stands, reducing nesting habitat for cavity-nesting birds throughout the Greater Yellowstone

Ecosystem (Cotterill et al., 2025). As overbrowsing reduced the supply of natural cavities, competition for the remaining nest sites intensified. Mountain Bluebirds now face intense nesting competition from both sides: non-native European Starlings compete for cavities and can limit bluebird nesting (Aitken & Martin, 2008), while expanding native Western Bluebirds actively displace them from remaining optimal breeding territories (Duckworth & Badyaev, 2007; Duckworth, 2014).

To support Mountain Bluebird conservation, Jackson Hole Wildlife Foundation (JHWF), in partnership with the NER, launched the Mountain Bluebird Nest Box Trail in 2007. 112 nest boxes were installed along the NER fence line on U.S. Highway 89. Each summer, volunteers monitor these boxes for bluebird activity, and in 2017 a color-banding initiative was introduced to track site fidelity and return rates. The long-term data collected through this community science program offers critical insights into the survivorship, reproductive success, and population dynamics of Mountain Bluebirds in the Jackson Hole region.

Methods

Study Area

The bluebird trail is 6.1 miles long and runs along the NER fence north of Jackson, Wyoming, extending from the Jackson Hole and Greater Yellowstone Visitor Center to just north of the Gros Ventre River bridge on US-89 (Fig. 1). The trail comprises 112 nest boxes mounted approximately 90 meters apart on NER fence poles.

Along the trail, nest boxes occur in three habitat types: (1) Wetland, where the fence borders Flat Creek Marsh, dominated by cattails (*Typha* sp.) and willows (*Salix* sp.); (2) Shrub-steppe, dominated by sagebrush (*Artemisia* sp.) and rabbitbrush with no tree cover; and (3) Mixed riparian shrub-steppe woodland, where the trail is bisected by the Gros Ventre River, with cottonwood woodland interspersed with patches of sage and grassland habitat.

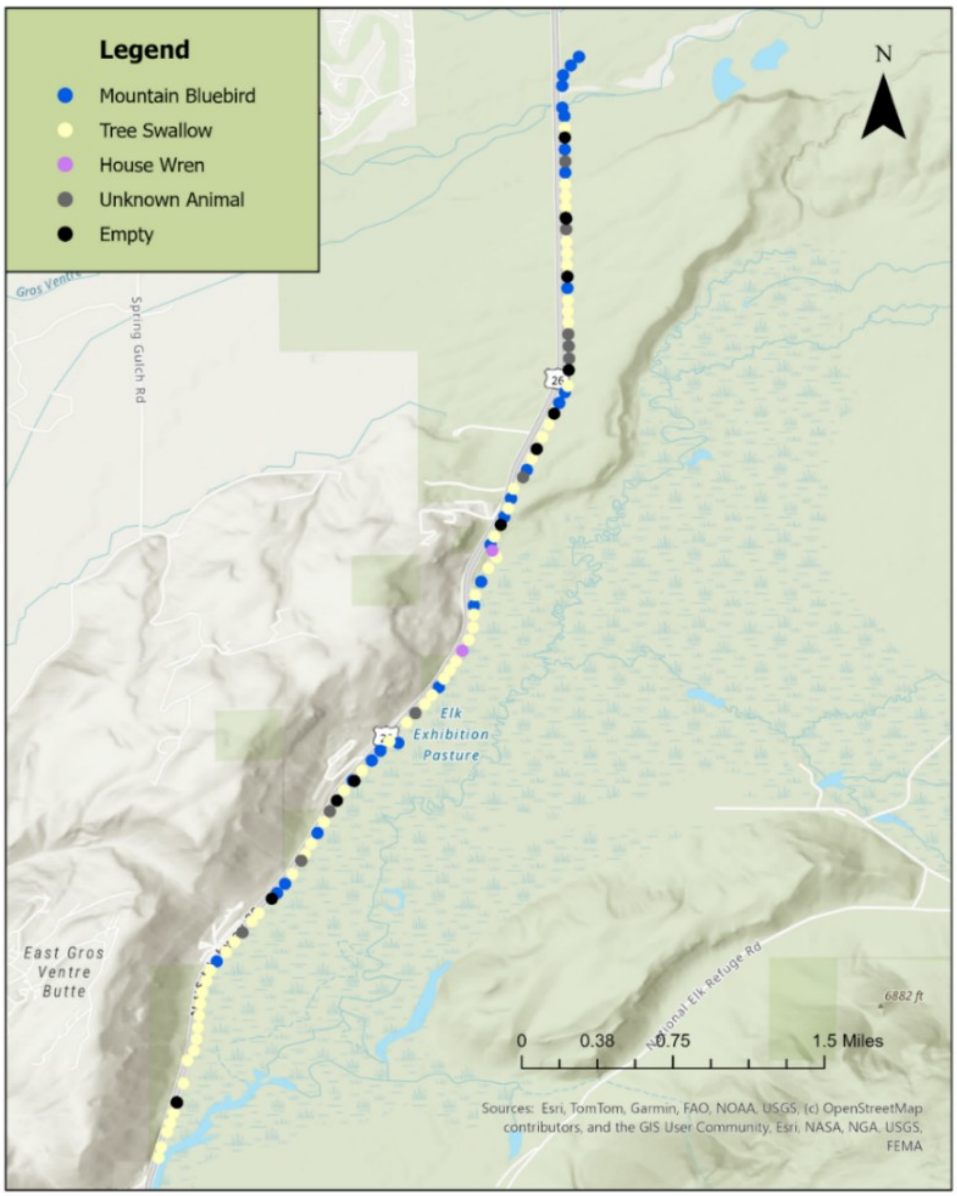


***Figure 1**: The Mountain Bluebird Nest Box Trail extends from the Jackson Hole Visitor Center to just north of the Gros Ventre River bridge on US-89. Each point represents a nest box location, and color indicates the 2026 occupancy status.*

Nest Box Monitoring Protocol

From May 1 to August 15, all volunteers were assigned a subset of nest boxes along the bluebird trail to monitor once a week for wildlife activity. Volunteers were trained prior to summer on nest monitoring techniques outlined in Martin and Geupel (1993), including low-impact data collection while observing the stage and fate of each nest. Volunteers were also trained to identify common bird species in the study area based on nest design (e.g., Tree Swallow nests are lined with feathers, Mountain Bluebird nests are built of fine grasses (with the occasional few feathers), and House Wren nests are built of sticks). During each check, volunteers opened the nest box and recorded whether nesting material was present. If present, they identified the species and counted eggs or nestlings.

Once nestlings were 10 days old, volunteers monitored nest boxes from a distance for at least five minutes to determine if adults were present or fledglings could be seen. If no activity was observed, volunteers were allowed to open the box and check for unhatched eggs or dead nestlings. If no birds were observed and there were no signs of predation, we considered the nest successful and recorded fledgling count based on prior nestling counts.

While the focus of this study is Mountain Bluebirds, volunteers recorded the same data for other nesting species such as swallows and wrens. Once a nest had fledged, volunteers removed the old nest to promote re-nesting. We also encouraged volunteers to bring binoculars and attempt to re-sight any previously color-banded bluebird adults.

All data were recorded with JHWF's Nature Mapping Jackson Hole app, which automatically recorded date, time, and location for each check. At the end of the season, all nest check data were proofed by JHWF staff to maintain high data quality.





Left: *A clutch of 5 pale blue bluebird eggs.* ***Right:*** *Four nestlings approximately 8 days old. Photos by Zoë Ward.*

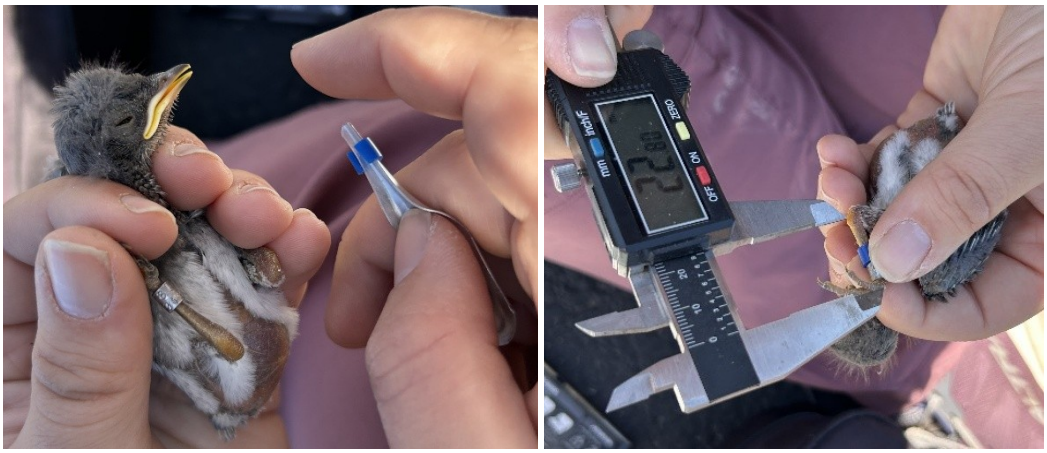
Mountain Bluebird Banding Protocol

When nest box monitors observed Mountain Bluebird nesting activity, they notified JHWF staff and continued to monitor the nest twice per week. Hatch windows were calculated for each active nest based on when the first and final eggs were laid. When nests entered their hatch window (around day 14 of incubation), JHWF staff or volunteers went out to check for recent hatching to provide the most accurate nestling age estimates.

Nestlings were color-banded when they reached 10 to 11 days old, as by day 10 nestling legs have reached their maximum thickness, and bands do not hinder development. Trained JHWF staff color-banded nestlings with one aluminum band (size 1B) and three plastic color bands, giving each bird a unique combination. All birds color-banded in 2026 received a dark-blue band over an aluminum band on one leg

to signify the banding year, with the remaining color bands placed on the opposite leg to allow for more unique individual combinations. After banding, sex (if determinable), mass, and tarsus length were recorded.

To prevent nest abandonment, staff avoided removing all nestlings from the box simultaneously; they were taken out in pairs, leaving at least one bird in the nest at all times. Adult bluebirds were opportunistically captured if they entered the nest box during banding sessions. Captured adults received the same color-banding treatment, plus additional measurements including skull ossification, presence of cloacal protuberance or brood patches, fat levels, molt, flight feather wear, wing chord, and mass.



Left: *A Mountain Bluebird nestling receives color bands.* ***Right:*** *Staff measure tarsus length. Photos by Vivien Zepf.*

Results

Nest Box Monitoring & Productivity

In 2026, 28 volunteers monitored the 112 nest boxes along the NER, the most to date (Fig. 2). Over the summer, volunteers completed 1,847 nest box checks. Of 112 boxes, 92 held at least one active nest, generating 131 nest records: 37 Mountain Bluebird nests, 69 Tree Swallow nests, 2 House Wren nests, and 3 attributed to an unidentified animal (Fig. 3). The remaining 19 boxes held a second nest during the season, 11 of which were Mountain Bluebird second nests.

Nest success was high: of 191 Mountain Bluebird eggs recorded, 154 hatched (81% hatch rate) and 135 of those nestlings fledged (88% fledge rate; Fig. 4). Mean clutch size was 5.2 eggs per nest. Tree Swallows had a lower hatch rate (71%) but a similar fledge rate (89%), with 354 eggs, 250 nestlings, and 223 fledglings recorded. Of the 11 Mountain Bluebird boxes with second nests, seven pairs successfully fledged a second brood (a true double brood) and four second nests failed due to predation or abandonment. Double brooding tends to occur when food availability and nesting conditions are favorable and serves as a useful indicator of habitat quality. Documenting these attempts across multiple years will help investigators assess whether site conditions are consistently supporting high reproductive effort.

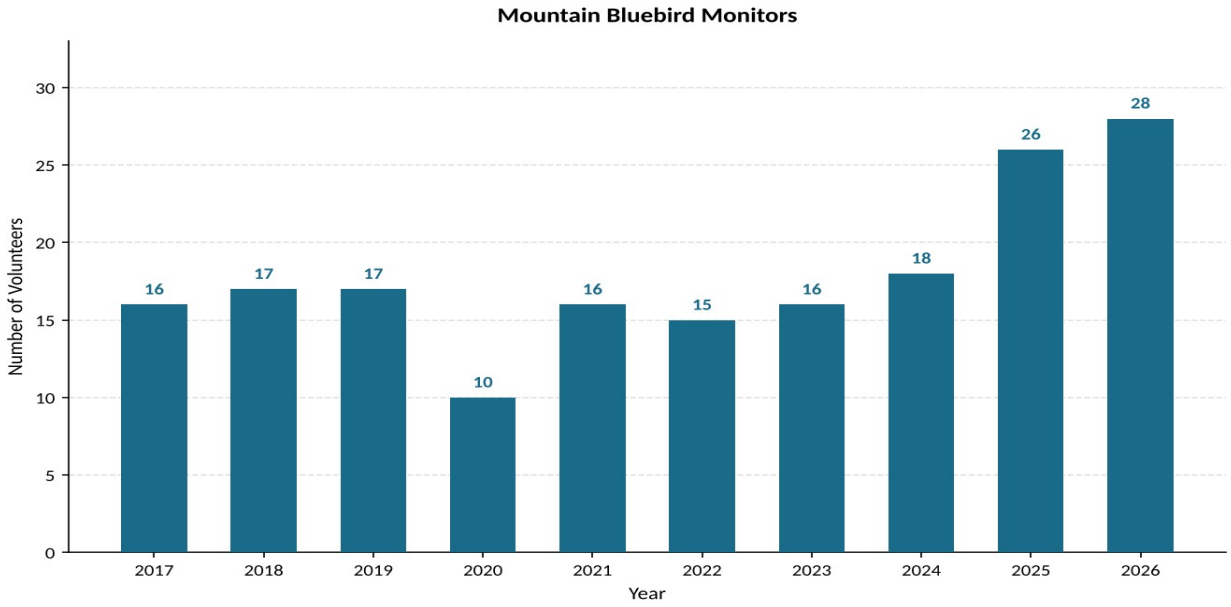


Figure 2: *Number of Mountain Bluebird Nest Box Trail volunteers each year since 2017. Volunteers monitored the 112 nest boxes from May 1 to August 15, recording all nesting bird activity.*

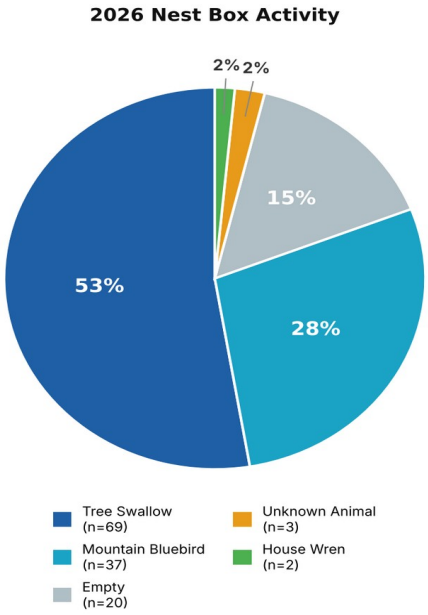




Figure 3: *Percent of nest records by occupant species along the Mountain Bluebird Trail from May 1 to August 15, 2026. Percentages are based on 131 total nest records. Right: a male Mountain Bluebird perches at nest box 30 along the trail.*

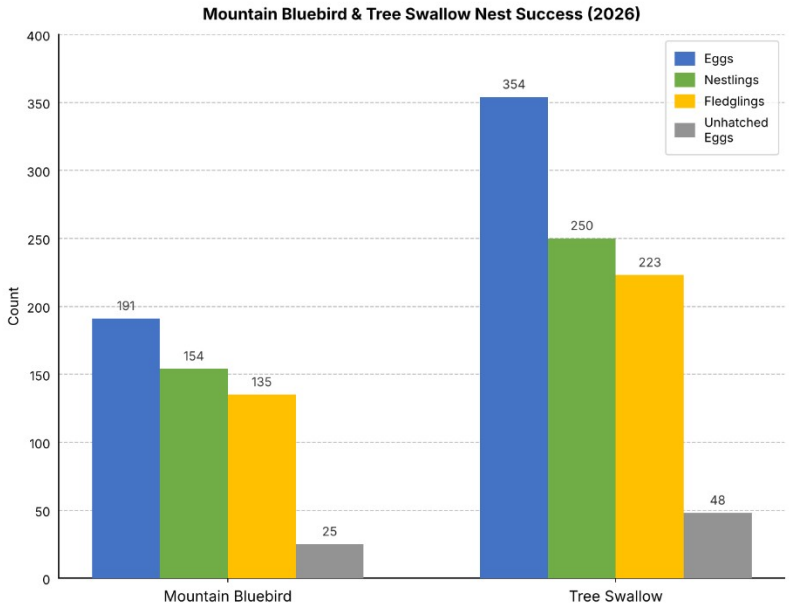


Figure 4: *Total number of eggs, nestlings, fledglings, and unhatched eggs of Mountain Bluebirds and Tree Swallows. Unhatched eggs reflect only those physically recovered in the nest box; eggs lost to predation, nest abandonment, or other causes are not captured in this count, accounting for the difference between total eggs and the sum of nestlings plus unhatched eggs.*

Mountain Bluebird Banding & Resighting



In 2026, 145 Mountain Bluebird nestlings and 19 adults were color-banded, both surpassing the records set in 2025 (119 nestlings, 14 adults; Fig. 5). This marks the second consecutive record-breaking year. Of the 19 adults captured, 4 were second-year males, 3 were after-second-year males, 6 were second-year females, and 6 were after-second-year females. Although 145 of 154 hatched nestlings were banded, 10 did not survive to fledging, resulting in 135 fledglings and the 88% fledge rate reported above. The average mass of nestlings was 28.9 grams (Max: 34.9g, Min: 21.6g) and average tarsus length was 22.3 mm (Max: 25.2 mm, Min: 19.1 mm).

Return rates of previously banded birds were notably high in 2026. At least five previously banded birds were resighted as breeding adults, including two birds banded as nestlings in 2025 that returned to nest the following year, and three adult females returning to the same or adjacent boxes where they were previously banded. Site fidelity has been a consistent pattern since at least 2020, with banded individuals documented returning to the same or adjacent nest boxes across multiple seasons. As the banded population grows and monitoring effort stabilizes, return rates will become an increasingly important tool for tracking local survival and population trends.

A notable resighting this year was a female at box 61 originally banded in 2023 as a second-year female, making 2026 her fifth summer. She produced two successful nests this season, one with 6 nestlings and

another with 5, demonstrating strong site fidelity and multi-season reproductive success. Her nesting history spans three locations: box 62 in 2023, box 60 in 2025, and box 61 in 2026.

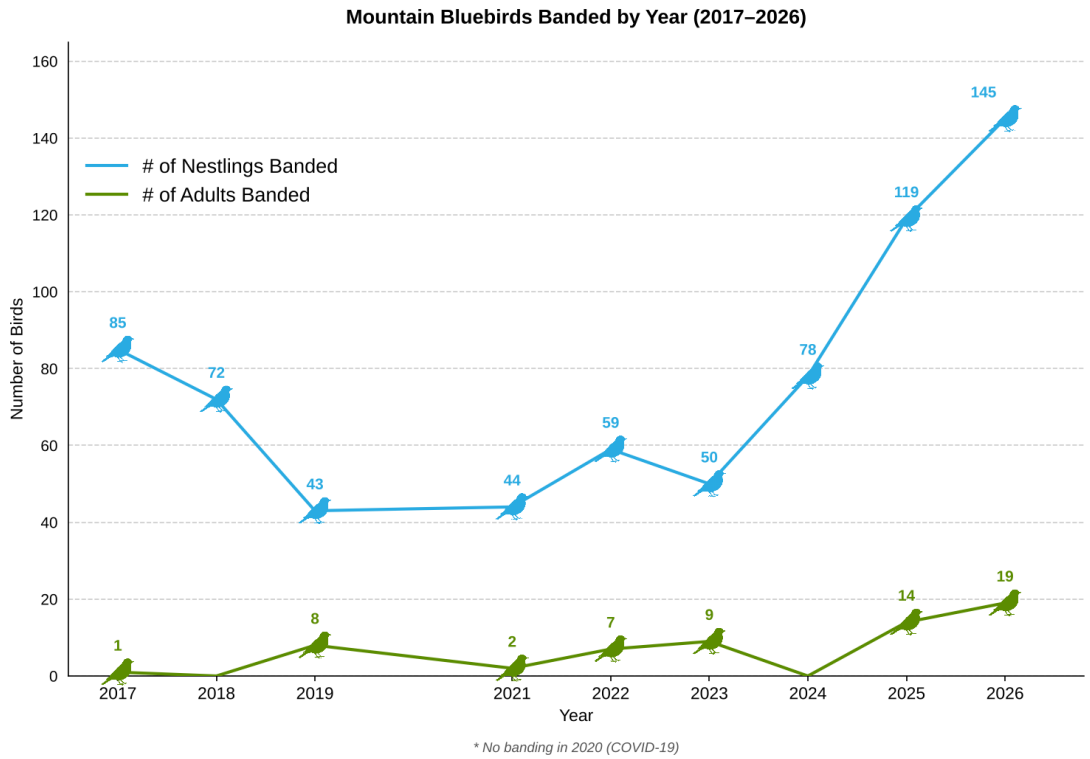


Figure 5: *Number of nestling and adult Mountain Bluebirds color-banded from 2017 to 2026.*

Discussion

JHWF's 2026 Mountain Bluebird Nest Box Monitoring & Banding Project was another exceptional season, building on the record productivity of 2025. A total of 145 nestlings were color-banded, surpassing last year's record of 119 by 22%. The 2026 season also saw the most active bluebird nests in the project's history, with 37 nests compared to 28 in 2025.

Volunteer engagement reached a new high in 2026, with 28 monitors completing 1,847 nest box checks, up from 26 monitors and 1,651 checks in 2025. This project relies on these community scientists, whose work provides critical data on bluebird demography. By joining banding sessions and observing field methods, volunteers gain a deeper appreciation for conservation and play a vital role in long-term monitoring.

Resighting of previously banded individuals continued to yield valuable data on site fidelity and longevity. The observation of a female in her fifth summer, banded in 2023 and still successfully raising two nests in 2026, is a compelling example of how long-term color-banding programs can reveal individual life history data that would not otherwise be possible to collect. As the program accumulates more years of data, resighting efforts will become increasingly important for understanding survival rates, nest site fidelity, and how local population dynamics respond to variation in weather and food availability. To support this,

monitors will continue to be encouraged to bring binoculars and, when possible, zoom-capable cameras, as photographs provide the most dependable resight records and allow band combinations to be confirmed after the fact.

Overall, the continued record-breaking productivity in 2026 underscores the conservation value of artificial nest structures and the power of community science in long-term monitoring. Sustaining this project will be essential for tracking population trends, guiding habitat management, and ensuring Mountain Bluebirds remain a vibrant part of the Jackson Hole ecosystem for years to come.

Acknowledgments

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