

Establishing a Bird Banding Station in Yellowstone National Park 2018 Project Report

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PROJECT SUMMARY

Although Yellowstone National Park is known for its wildlife, relatively little is known about the park's songbird populations and, although measures of songbird abundance and diversity are monitored across a variety of habitats, the park lacks basic demographic information about many of its breeding songbird species. By establishing a songbird banding station, we hoped to complement ongoing songbird research within the park, while gaining better information on songbird productivity, survival, age-ratios, and turnover between breeding seasons.

In the spring of 2018, with funding from the Meg and Bert Raynes Wildlife Fund, we established a songbird banding station in a willow-lined corridor on Yellowstone's northern range, following the standardized MAPS (Monitoring Avian Productivity and Survivorship) protocol (DeSante et al. 2018). MAPS banding data was collected from June through early August and data from this period was submitted to the Institute for Bird Populations. To capture information about the use of willows by songbirds during fall migration, we continued regular banding efforts through the end of September. We operated the banding station on 12 days in total and banded 290 individuals belonging to 31 species of songbirds.

METHODS

Project Objectives and Goals

In our initial project proposal, we determined that project success would be defined by the completion of a MAPS banding station season and submission of station data to the Institute for Bird Populations (Objective 1). We also aimed to summarize songbird abundance and diversity in the breeding season and during fall migration and compare the results from our banding season to those of ongoing point count and transect surveys (Objective 2). In the long-term, we aim to identify demographic and phenological trends in Yellowstone's willow songbird populations and develop hypotheses - and, if appropriate, actionable management responses - regarding likely threats to songbirds in northern Yellowstone (e.g., climate change).

Grant Money Allocation

To meet project objectives, we utilized awarded grant money to purchase the necessary equipment to set-up and operate a banding station, including banding pliers, measuring tools (wing rules, calipers, scales), bird bags, and mist nets (Table 1). Some net poles and rebar was donated to the project but the remaining funds were used to purchase additional net support equipment and spare nets.

Table 1. Spent and allocated funds, awarded by the Raynes Wildlife Fund, for the establishment and operation of a Yellowstone bird banding station.

Equipment	Cost per Unit	Units	Total
Banding pliers, size 0A-1A	\$85	2	\$170
Banding pliers, size 2-3	\$105	2	\$210
Wing rule, 15 cm	\$25	2	\$50
Band openers, size 0+	\$31	2	\$62
Calipers, 150 mm	\$45.85	2	\$91.70
Leg gauge, size 0A-9	\$17	2	\$34
Magnifiers, 2.25x	\$35	2	\$70
Digital scale	\$30	2	\$60
Bird holding bags, small	\$1.20	30	\$36
Bird holding bags, large	\$7.50	15	\$112.50
12m Mist nets, 30 mm	\$100.00	14	\$1400
Net repair thread	\$1.50	3	\$4.50
Conduit, 10 ft	\$3.14	20	\$62.80
Rebar, 4 ft	\$4.10	20	\$82
		SUBTOTAL	\$2445.50
		SHIPPING	~\$70
		TOTAL	~\$2515

Study Site

We located the banding station within a willow-lined riparian corridor on Yellowstone's northern range, in an area also currently surveyed using point counts during the breeding season. We hoped banding in this area would not only provide insight into songbird reproduction, survival, and fall habitat use, but also allow us to compare survey methodologies and monitor point count survey efficacy.

RESULTS

Banding Station Operations

We conducted mist-netting and banding operations on seven days between June 7 and August 2, during the MAPS-defined breeding season, and an additional five days during the late summer and early fall, between August 9 and September 26. During the breeding season, 10 mist nets were opened for six hours, beginning at sunrise each banding day.

During late summer and fall operations, we were not kept to the MAPS protocol, often had fewer station staff, and had to coordinate around less favorable weather conditions. During this period, we typically opened nets later than sunrise, around 8 am, and kept them open for varying periods of time, generally between 4 and 6 hours, depending on weather and capture rates.

Capture Data

During the breeding season, we captured 175 individuals belonging to at least 27 different species (Table 2). Most individuals captured in the summer were adults (79.8%; Figure 1) and the most commonly captured species were yellow warbler (*Setophaga petechia*; n = 35, 20.2%) and warbling vireo (*Vireo gilvus*; n = 27, 15.6%; Figure 2, 3a,b). Along with many of the species we captured, both yellow warbler and warbling vireo are likely to breed in willow habitat. Several species, however, were somewhat unexpected in willow/riparian habitat during the breeding season, including grassland species Brewer's sparrow (*Spizella breweri*) and vesper sparrow (*Pooecetes gramineus*) and species typically associated with forests, such as mountain chickadee (*Poecile gambeli*), pine siskin (*Spinus pinus*), and western tanager (*Piranga ludoviciana*).

In late summer and early fall, we captured and banded 117 individual birds of 25 species (Table 2). Although most fall captures were hatch year birds (50.4%; Figure 1), the most commonly captured bird in the fall was an adult Wilson's warbler (*Cardellina pusilla*; n = 13, 11.1%; Figure 2, 3c). Across the entire banding season, 22 of 23 Wilson's warblers were captured in the fall; willows and riparian corridors may represent important stopover habitat for this species during migration. Several other species were also more common captures in the fall than in the breeding season, including chipping sparrow (*Spizella passerina*), Lincoln's sparrow (*Melospiza lincolnii*), and white-crowned sparrow (*Zonotrichia leucophrys*), suggesting these species may also rely on riparian areas more in the late summer or during migration. A Cassin's vireo (*Vireo cassinii*; Figure 4) captured on September 19th was almost certainly a migrant as this species has not been documented to breed within the park.

In total, we captured 32 species utilizing this willow corridor, including 14 songbird species and two near-passerines that were not identified during point count surveys of the same area (Table 2).

Table 2. Songbirds and near-passerines captured at the Yellowstone banding station in 2018. Breeding season refers to June through early August. Late summer/fall migration banding was conducted between mid-August and the end of September.

Species	Breeding Season		Late Summer/Fall Migration			Total
	Adult	Hatch Year	Adult	Hatch Year	Unknown	
American Robin	11	0	0	0	0	11
Brown-headed Cowbird ^a	3	0	0	0	0	3
Brewer's Sparrow ^a	8	1	4	6	2	21
Cassin's Vireo	0	0	1	0	0	1
Cedar Waxwing ^a	2	0	0	0	0	2
Chipping Sparrow	0	0	1	5	1	7
Common Yellowthroat ^a	1	1	0	2	0	4
Dark-eyed Junco ^a	3	0	3	3	1	10
Dusky Flycatcher ^a	1	0	2	0	2	5
Unknown Flycatcher	3	0	0	0	0	3
Gray Catbird	5	3	0	0	0	8
Green-tailed Towhee ^a	3	0	0	1	0	4
House Wren	0	0	0	0	1	1
Lazuli Bunting ^a	1	0	0	1	0	2
Lincoln's Sparrow	0	1	0	4	2	7
MacGillivray's Warbler	8	3	0	2	1	14
Mountain Chickadee ^a	2	0	0	1	0	3
Northern Flicker	0	0	0	1	0	1
Orange-crowned Warbler ^a	5	0	6	3	0	14
Pine Siskin	2	0	0	0	0	2
Ruby-crowned Kinglet ^a	1	2	0	3	0	6
Red-naped Sapsucker ^a	3	2	0	1	0	6
Rufous Hummingbird ^{ab}	2	0	0	0	0	2
Song Sparrow	6	6	0	3	1	16
Swainson's Thrush	3	0	1	0	0	4
Vesper Sparrow ^a	2	0	0	0	1	3
Warbling Vireo	27	0	3	1	0	31
White-crowned Sparrow	0	0	3	4	0	7
Western Tanager ^a	1	0	0	0	0	1
Willow Flycatcher	10	0	0	1	1	12
Wilson's Warbler	1	0	13	6	3	23
Yellow-rumped Warbler ^a	4	3	4	3	0	14
Yellow Warbler	22	13	1	8	0	44
Total Individuals	140	35	42	59	16	292
Total Species	27	10	12	20	11	32

^aSpecies was not identified during breeding season point count surveys.

^bHummingbirds were measured and weighed, but released without USGS bands.

Figure 1. Ages of banded birds at the Yellowstone banding station in 2018, during the breeding season and in the late summer/early fall.

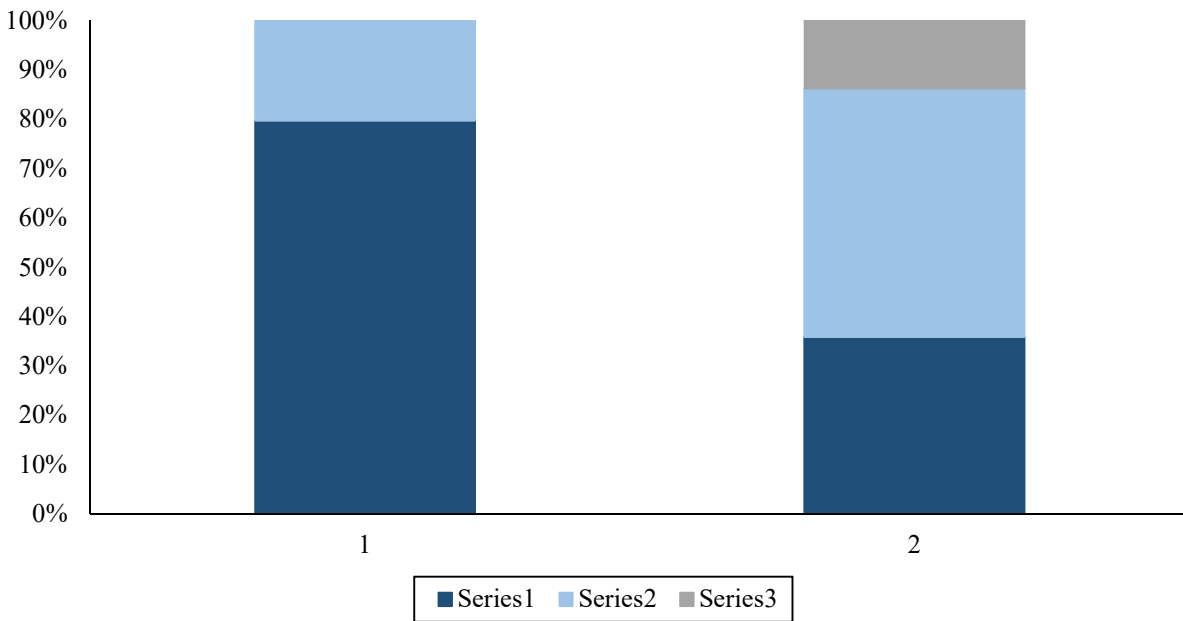


Figure 2. Capture totals at the Yellowstone banding station for commonly captured songbird species in 2018. YWAR = yellow warbler; WAVI = warbling vireo; WIWA = Wilson's warbler.

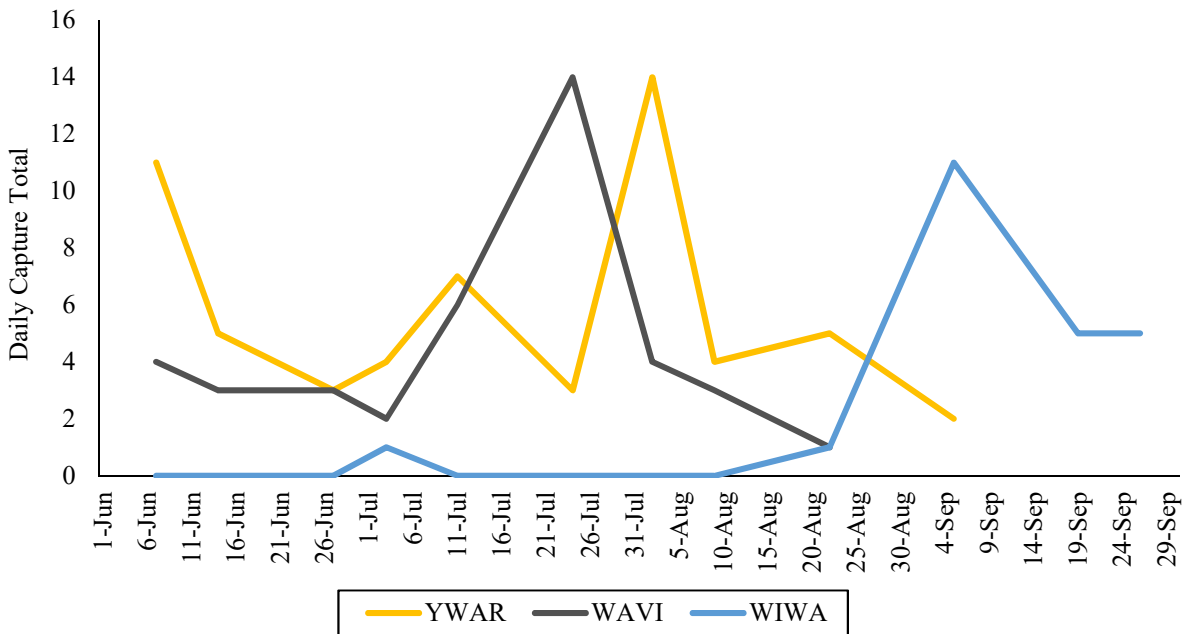




Figure 3. Most frequently captured birds at the Yellowstone banding station in 2018, during the breeding season (A: yellow warbler; B: warbling vireo) and during fall migration (C: Wilson's warbler).

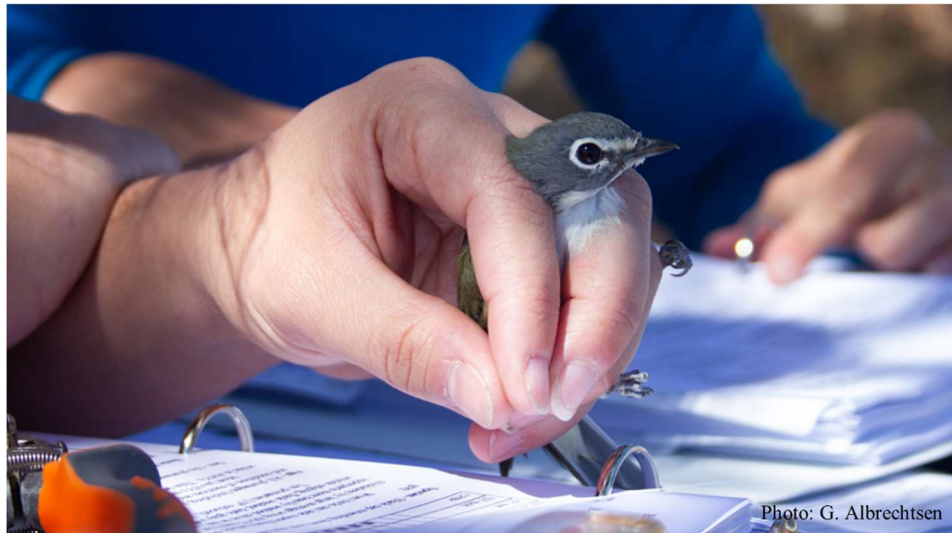


Figure 4. A migrant Cassin's vireo was caught on September 19th, 2018 at the Yellowstone banding station.

Hypothesis Development and Management

Banding data is most useful, both locally in Yellowstone and at a broader continent-wide scale, to develop evidence for long-term population trends. We aim to continue banding station efforts in 2019 and in future field seasons to allow for the continued collection of data regarding species diversity and demography. This demographic data, including both reproduction and, through the recapture of previously banded birds, survival, will supplement the abundance and diversity data acquired from ongoing point count surveys and provide a baseline from which to compare future songbird population trends. Notably, we expect this dataset to be useful in highlighting potential patterns of concern as climate change affects breeding, migration, and wintering habitats, as well as phenology.

ACKNOWLEDGMENTS

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