Bonderman Field Station at Rio Mesa

2023 Bird Banding Report






DEPARTMENT OF BIOLOGY
THE UNIVERSITY OF UTAH

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Cover Photos, clockwise from top left: Rose-breasted Grosbeak, Chestnut-sided Warbler, Indigo Bunting, Gray-headed Dark-eyed Junco, Connecticut Warbler, and Spotted Sandpiper. All captured and banded during spring or fall 2023 at the Rio Mesa banding station. All pictures taken by Kyle Kittelberger, except for the sandpiper, which was photographed by Liz Allocca.

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Station Overview

Station Lifetime Banding Totals	
Species Observed	**191**
Species Caught	**135**
Species Banded	**127**
Total Captures	**21,334**
Birds Banded	**16,931**
Total Recaptures	**3,599**
Banding Days	**1,334**

Our Mission

The primary purpose of our project is to understand the ecology and migratory patterns of the bird community at the Bonderman Field Station at Rio Mesa using mist-netting and bird banding. We capture and band birds to gain valuable insights into population size, community structure, the timing of migration, and how avian groups are responding to anthropogenic threats. We are also dedicated to outreach and education. Birds are an exceptional flagship group to help instill interest in conservation and the environment[1] and every year we welcome dozens of visitors to our station where people from all walks of life can receive hands-on education about nature, ecology, ornithology and conservation.

Bonderman Field Station at Rio Mesa

Rio Mesa represents an ideal location to conduct ornithological research. Riparian zones, like Rio Mesa's Dolores River, comprise a disproportionately important habitat in the arid Intermountain West. Birds, in particular, depend heavily on this delicate environment, and riparian zones serve as critical migratory corridors for birds moving through an otherwise harsh area[2]. Riparian zones are also under severe threat from climate change[3]. With the growing threat of global change we, more than ever, need a detailed understanding of the ecology of riparian habitats and the organisms that depend on them. Additionally, our presence at this location contributes to eBird records of birds here, especially since many banders are also avid birders, making Rio Mesa one of the best-monitored hotspots for birds in Utah. Furthermore, since this location is closed to the public, there would be few records of birds without our long-term banding effort: https://ebird.org/barchart?r=L5750423&yr=all&m=

Our Research

Our station follows standard protocol developed by the Monitoring Avian Productivity and Survivorship program (MAPS)[4]. We operate sixteen 12 x 2.5 meter mist-nets that are opened 30 minutes before sunrise and remain open for six hours. Nets are open 10 out of every 12 days from early April to early June for the spring season, and mid-August to early November for the fall season. Nets are checked every 30 minutes and any birds are extracted and taken back to the banding office for processing. Each bird is fitted with a metal leg band issued by the United States Geological Survey (USGS). This allows us to track the capture history for every individual bird and perform robust mark-recapture analyses to estimate changes in demographic rates[5]. We also take a suite of morphological and demographic measurements from each bird including sex, age, fat content, breeding state, molt stage, wing length, and body mass[6], as well as body condition. These data allow us to describe the bird community at Rio Mesa and monitor the health of individuals as they undergo their yearly migration.

2023

This spring and fall were respectively our 23rd and 24th banding season, representing 12 ½ years of banding data from Rio Mesa. These data make our station the longest-running bird banding operation in Utah and one of only two consistent passerine (songbird) stations currently operating in the state (the other station being our bird banding site in Red Butte Canyon, near Salt Lake City). For the spring we banded from April 9 through June 10, and the fall lasted from August 19 through November 4.

Statistics

Spring 2023 Totals	
Species Caught	60
Species Banded	58
Total Captures	751
Birds Banded	591
Banding Days	53

This spring season saw the most number of birds caught in the spring at Rio Mesa since 2019. This season we also began tagging birds with NanoTags for the Motus project, which was exciting to finally begin after a couple years trying to get this project off the ground. We continued to take wing, tail, and body photos of many of the birds, allowing us to work towards creating a library of spring birds of different ages and sexes. Finally, this season saw flooding from the Dolores River due to the historic winter snowpack; some of the nets were flooded for extended periods of time.

Some notable captures included our first **Chestnut-sided Warbler** and **Yellow-billed Cuckoo** for the station; our 2nd records of **Spotted Sandpiper**, **Summer Tanager**, and **Rose-breasted Grosbeak**; a **Least Flycatcher** (4th record), a **Western Flycatcher**, 2 **Townsend's Solitaires**, and 3 **Indigo Buntings**. We also caught one non-bird species, a **Western Pipistrelle**, which might be only the third capture of a bat for the station.

Statistics

Fall 2023 Totals	
Species Caught	54
Species Banded	52
Total Captures	809
Birds Banded	669
Banding Days	65

This fall was roughly on par with last fall in terms of overall number of captures, having just several more individuals this year (at 809, the most since fall 2020). We also managed to tag a couple more birds with Motus NanoTags this fall, which was very exciting. We tried owl banding again (in the spring too), but alas no luck other than an uncooperative Western Screech-owl.

Some notable captures this fall included our first **Connecticut Warbler** and **Townsend's Warbler** banded at Rio Mesa (of which the Connecticut is probably the best capture in terms of rarity during the history of our banding operation), our 2nd record of **Painted Bunting**, our 10th record of **Gray-headed Dark-eyed Junco**, 2 **Sharp-shinned Hawks**, 2 **Loggerhead Shrikes**, 3 **White-throated Sparrows**, and an extremely late **Black-headed Grosbeak** banded on the very last day of the season in November.

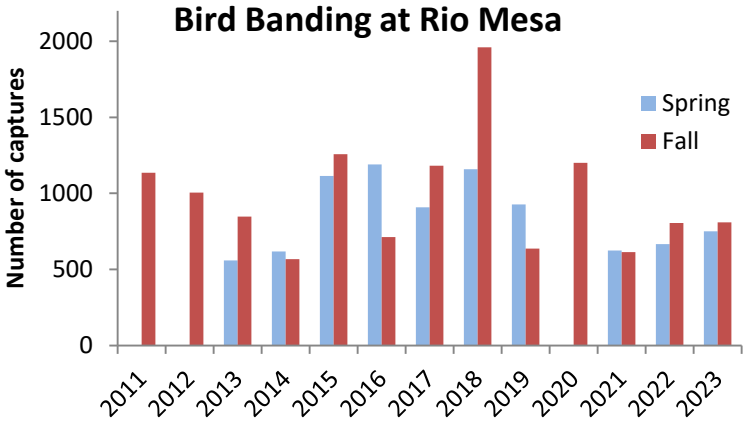
Participants

In the spring, our banding team consisted of lead bander Carly Crow and assistants Liz Allocca and Tatiana Dolgushina. In the fall, our banding team consisted of lead bander Malcolm Conner and assistants Caroline Wolfe-Merritt, Harmony Cecil, and Olivia Demarchi. Our team members come to Rio Mesa from across the country with varying degrees of experience working with birds. Other people, including Megan Miller, Kyle Kittelberger, Nick Seefeldt, Flavio Mota, Tully Frain, David Blount, Amy Buxton, Adara DeNiro, Atoosa Samani, Jortan Tun, and Nik Orton helped out with banding at various times throughout the spring and/or fall. Our station is dedicated to providing educational opportunities to volunteers of all skill levels and by the end, they are highly competent banders.

Our station did host several visiting groups this spring and fall, including some school groups. It is always a rewarding experience for our banders and volunteers to interact with these visitors and share the banding experience with others. These efforts will help more people understand the necessity of conservation biology, ecology and ornithology research and the importance of ensuring healthy ecosystems. Additionally, we held our first Rio Mesa fundraiser this fall. We welcomed a diverse group of members from the general public as well as the University of Utah to not only showcase our banding operation and the scientific value of our long-term banding efforts, but also to help support our long-term banding effort by raising funds to aid in the purchase of banding materials. For a pilot season, this was an all-around success and we could not have asked for a better weekend to hold the fundraiser, especially since we captured a first station record Connecticut Warbler during this time (which ended up being either a lifer or at least a state bird for every single fundraiser participant).

Future Directions

Like the past few years, the next couple years will continue to be an exciting time at Rio Mesa. First, with an ever growing number of additional years and seasons of data, our ability to accurately monitor the changes in bird populations and community composition continues to improve greatly and we will soon be able to estimate migratory arrival and departure dates. These data are especially important now given the accelerating pace of climate change and the ramifications for riparian ecosystems[7,8,9]. Second, we are continuing to analyze our data, so the next few years will see more papers based on our banding efforts.



Our first bird paper based on Rio Mesa data, titled "Fall bird migration in western North America during a period of heightened wildfire activity," was at last published in *Avian Conservation & Ecology* at the end of 2022[9]. For this study, we looked at the past decade of fall banding data, with a particular focus on fall 2020, to assess the potential indirect effects of wildfires in western North America on fall bird migration. We used a correlative approach to evaluate the relationship between estimates of acres burned by wildfires in western North America on several variables representing bird abundance and body condition[9]. Notably, we found that during fall 2020, more bird captures were correlated with more acres burned for the day birds were captured and that a reduction in body mass of captured birds was correlated with more acres burned one week prior[9]. Additionally, in this study we examined the usefulness of different proxies of body condition in highly stressed birds and introduced an emaciation scale to help researchers track landbird body condition and health better than with fat[9]. This is one of the only studies of its kind to look at this relationship between wildfires and actively migrating birds[9].

We also began, within the past year, a few different research projects that aim to develop a better understanding of the migratory origins and flight routes of birds banded at Rio Mesa. Two of these projects involve using some of the thousands of feathers that we have collected over the years from birds while banding. In the first, we partnered with Kristen Ruegg and her lab at CSU to provide samples for The Bird Genoscape Project, an initiative that uses genetic information in feathers to identify the breeding origin of migratory birds according to the map of genetic variation for the species. We have already provided over 1400 feather samples (representing 1400 individual birds) to this project, collected between 2019 and spring 2023, and will be working next on preparing samples from fall 2023. Secondly, we started at the beginning of this year to analyze feathers for stable hydrogen isotope analyses at the U, representing four species: Wilson's Warbler, Western

Tanager, Warbling Vireo, and Gambel's White-crowned Sparrows. To date, we have analyzed feathers from over 120 individual birds, with at least another 30 or so samples to be processed before the project ends. The primary goal of this project is to help us better understand the spatial impacts of wildfires on migratory birds, building off of the wildfire paper published a year ago. We also established two MOTUS towers at Rio Mesa this year: one during the spring season near the banding station, and the other in the fall at the East End. MOTUS is a global wildlife tracking system that uses radio telemetry and a network of towers across the landscape to track movements of wildlife fitted with nanotags. Besides establishing these towers (*see photo to the left*), we also tagged a few birds: 1 Black-headed Grosbeak, 1 Yellow-breasted Chat, and 1 Western Tanager. As of mid-December, the chat and tanager have been detected by other towers down along the Pacific coast of central Mexico, which is really exciting to see! Lastly, Liz Allocca (one of our assistants during the spring) wrote her Master's dissertation on demographics of Yellow-breasted Chats over the past 12 years at Rio Mesa. She found that stronger El Niño years corresponded with reduced survival of chats, which has implications for the populations of chats and other migratory species in the future as the climate warms further. Liz hopes to publish her dissertation next year.

Looking forward to 2024, we may begin our long-talked about paper on Lucy's Warblers, with demographic and recapture data as well as a description and photos of the molt strategies of this species at Rio Mesa. We are likely one of the few banding stations in the country that has such banding success with Lucy's Warbler (Rio Mesa is located at the northern limit of the bird's breeding range), a species which is actually noted in *Handbook to Birds of the World* as being a species with future research needs. We also may write a paper next year, with our colleague Megan Miller, focusing on the emaciation scale we introduced in our wildfire paper, since this is an important metric that is not traditionally recorded at banding stations across the country. Additionally, we are planning to tag more birds this upcoming year for the Motus project, and are hoping to potentially collaborate with CSU Pueblo starting in the spring on a project utilizing both Motus and the collection of blood from birds. Finally, we will continue analyzing the Rio Mesa data to evaluate any long-term trends in bird migration and natural history (such as in body mass, wing length, phenology, and molt) and see how these patterns compare between the spring and the understudied fall migratory periods. We will also continue to work on better understanding how wildfires are impacting migratory songbirds in western North America. These long-term and wildfire research projects are key components of lab member Kyle Kittelberger's PhD. Already this year, Kyle has been (and finished) analyzing the past 12 years of data to examine trends in molt of body and flight feathers. He is in the process of writing this chapter of his up and plans to submit it for publication during the winter.

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Appendix: Capture details for all species caught at Rio Mesa from 2011 to 2023. Species with no capture records have only been observed on the property.

Species Name	Totals		
	Number Banded	Number Recaught	Number Unbanded
Waterfowl			
Canada Goose			
Mallard			
Gadwall			
Blue-winged Teal			
Cinnamon Teal			
Northern Shoveler			
Green-winged Teal			
Common Merganser			
Duck spp.			
Gamebirds			
Chukar			
Wild Turkey			
Grebes			
Pied-billed Grebe			
Herons, Ibis, and Allies			
Great Blue Heron			
Great Egret			
Snowy Egret			
White-faced Ibis			
Vultures, Hawks, and Allies			
Turkey Vulture			
Osprey			
Golden Eagle			
Northern Harrier			
Sharp-shinned Hawk	15	0	0
Cooper's Hawk	1	0	0
Northern Goshawk			
Bald Eagle			
Swainson's Hawk			
Red-tailed Hawk			
Rough-legged Hawk			
Rails, Gallinules, and Allies			
Sora	1	0	0
Sandhill Crane			
Shorebirds			

Killdeer			
Wilson’s Snipe			
Spotted Sandpiper	2	0	0
Solitary Sandpiper			
Greater Yellowlegs			
Pigeons and Doves			
Rock Pigeon			
Band-tailed Pigeon			
Eurasian-collared Dove			
White-winged Dove			
Inca Dove	1	0	0
Mourning Dove	30	0	6
Cuckoos			
Yellow-billed Cuckoo	1	0	0
Owls			
Western Screech-Owl	3	0	0
Great Horned Owl			
Northern Saw-whet Owl	2	0	0
Northern Pygmy-Owl	1	0	0
Nightjars			
Common Nighthawk			
Common Poorwill	2	0	0
Swifts			
Vaux’s Swift			
White-throated Swift	4	0	4
Hummingbirds			
Costa's Hummingbird	0	0	1
Black-chinned Hummingbird	0	0	225
Broad-tailed Hummingbird	0	0	34
Calliope Hummingbird	0	0	14
Rufous Hummingbird	0	0	66
Unidentified Hummingbird	0	0	6
Kingfishers			
Belted Kingfisher			
Woodpeckers			
Williamson's Sapsucker	4	2	0
Yellow-bellied Sapsucker			
Red-naped Sapsucker	55	2	0
Red-breasted Sapsucker			
Downy Woodpecker	6	0	1
Hairy Woodpecker	2	0	0

Lewis's Woodpecker			
Northern Flicker (Red-shafted)	36	5	4
Northern Flicker Intergrade	4	0	0
Falcons			
American Kestrel	3	0	0
Merlin			
Peregrine Falcon			
Prairie Falcon			
Tyrannid Flycatchers			
Olive-sided Flycatcher	4	0	0
Western Wood-pewee	150	6	2
Least Flycatcher	4	0	0
Willow Flycatcher	379	16	0
Western Flycatcher	13	2	0
Yellow-bellied Flycatcher	1	0	0
Hammond's Flycatcher	27	4	0
Dusky Flycatcher	255	37	1
Gray Flycatcher	67	6	0
Unidentified Empidonax Flycatcher	42	0	2
Black Phoebe	6	0	1
Say's Phoebe	15	2	0
Ash-throated Flycatcher	84	13	1
Eastern Kingbird	3	0	0
Cassin's Kingbird			
Western Kingbird	18	3	0
Unidentified Flycatcher	7	2	3
Shrikes			
Loggerhead Shrike	12	1	0
Northern Shrike			
Vireos			
Bell's Vireo	1	1	0
Plumbeous Vireo	21	4	0
Cassin's Vireo	24	1	0
Warbling Vireo	368	37	0
Gray Vireo	45	14	0
Red-eyed Vireo	1	0	0
Corvids			
Steller's Jay	1	0	0
Pinyon Jay			
Woodhouse's Scrub-jay	38	2	1
Black-billed Magpie			

American Crow			
Common Raven			
Larks			
Horned Lark			
Swallows			
Purple Martin			
Northern Rough-winged Swallow			
Tree Swallow			
Violet-green Swallow	18	0	0
Bank Swallow			
Barn Swallow	1	0	0
Cliff Swallow	2	0	0
Tits			
Black-capped Chickadee	52	23	0
Mountain Chickadee	36	8	0
Mountain x Black-capped Chickadee	3	1	0
Juniper Titmouse	10	1	0
Bushtit	419	128	28
Nuthatches and Creepers			
Brown Creeper	3	0	0
Red-breasted Nuthatch	4	0	0
White-breasted Nuthatch			
Wrens			
Bewick's Wren	260	92	15
Rock Wren	26	13	1
Canyon Wren	14	10	1
House Wren	104	25	1
Winter Wren	1	0	0
Marsh Wren	53	3	3
Gnatcatchers and Kinglets			
Blue-gray Gnatcatcher	949	182	33
Golden-crowned Kinglet	2	0	0
Ruby-crowned Kinglet	688	111	35
Thrushes			
Mountain Bluebird	7	1	0
Western Bluebird			
Townsend's Solitaire	14	2	0
Swainson's Thrush	23	3	1
Hermit Thrush	302	69	3
American Robin	49	18	2
Mimids			

Gray Catbird	64	4	1
Northern Mockingbird	25	4	4
Brown Thrasher	1	0	0
Sage Thrasher	66	23	1
Starlings and Mynas			
European Starling			
Wagtails and Pipits			
American Pipit			
Waxwings and Dippers			
Cedar Waxwing	3	0	0
American Dipper			
Wood Warblers			
Northern Waterthrush	34	1	0
Orange-crowned Warbler	358	42	1
Nashville Warbler	47	5	0
Virginia's Warbler	136	17	3
Lucy's Warbler	91	81	1
MacGillivray's Warbler	560	67	9
Connecticut Warbler	1	0	0
Common Yellowthroat	219	5	3
American Redstart	2	1	0
Northern Parula	2	0	0
Chestnut-sided Warbler	1	0	0
Magnolia Warbler	1	1	0
Blue-winged Warbler	1	0	0
Yellow Warbler	849	137	10
Black-throated Blue Warbler	1	1	0
Palm Warbler	1	0	0
Yellow-rumped Warbler	20	0	1
Yellow-rumped Warbler (Audubon's)	615	33	10
Yellow-rumped Warbler (Myrtle)	25	7	0
Yellow-rumped Warbler (MxA)	17	0	0
Black-throated Gray Warbler	16	2	0
Townsend's Warbler	1	0	0
Wilson's Warbler	1411	148	20
Painted Redstart			
Unidentified Warbler	0	0	1
Yellow-breasted Chat			
Yellow-breasted Chat	836	597	25
New World Sparrows			
Green-tailed Towhee	136	70	1

Spotted Towhee	499	228	26
Vesper Sparrow	30	0	2
American Tree Sparrow	3	0	0
Chipping Sparrow	80	22	1
Clay-colored Sparrow	14	6	1
Brewer's Sparrow	680	122	18
Lark Sparrow	33	3	0
Lark Bunting			
Black-throated Sparrow	54	0	1
Sagebrush Sparrow	70	2	0
Savannah Sparrow	3	0	0
Song Sparrow	1010	306	21
Lincoln's Sparrow	564	96	17
Grasshopper Sparrow	6	0	0
Fox Sparrow	6	0	0
Dark-eyed Junco	15	0	2
Dark-eyed Junco (Gray-headed)	10	0	1
Dark-eyed Junco (Oregon)	414	130	10
Dark-eyed Junco (Pink-sided)	107	28	4
Dark-eyed Junco (Slate-colored)	13	4	0
White-throated Sparrow	29	6	1
White-crowned Sparrow (Mountain)	351	22	8
White-crowned Sparrow (Gambel's)	873	293	41
White-crowned Sparrow hybrid (GxM)	1	0	0
White-crowned Sparrow	320	65	16
Golden-crowned Sparrow	2	0	0
Unidentified Sparrow	3	0	2
Cardinals			
Summer Tanager	2	0	0
Western Tanager	319	16	3
Rose-breasted Grosbeak	2	0	0
Black-headed Grosbeak	110	4	3
Blue Grosbeak	127	32	3
Lazuli Bunting	221	60	1
Indigo Bunting	13	1	1
Painted Bunting	0	0	2
Orioles and Blackbirds			
Red-winged Blackbird	1	0	0
Western Meadowlark	3	0	0
Yellow-headed Blackbird	1	0	0
Brewer's Blackbird			

Common Grackle			
Great-tailed Grackle			
Brown-headed Cowbird	31	5	2
Hooded Oriole	2	0	0
Scott’s Oriole			
Bullock's Oriole	87	15	2
Finches and Allies			
Black Rosy-Finch			
Cassin's Finch	3	0	1
House Finch	279	36	15
Pine Siskin	75	2	1
Lesser Goldfinch	65	1	0
American Goldfinch	14	0	0
Evening Grosbeak			