

Bonderman Field Station at Rio Mesa

2022 Bird Banding Report



Cover Photos, clockwise from top left: Northern Pygmy-Owl, Juniper Titmouse, Indigo Bunting, Western Screech-Owl, Black-throated Gray Warbler, and Red-naped Sapsucker. All captured and banded during spring or fall 2022 at the Rio Mesa banding station. Pictures taken by Kyle Kittelberger, Nikolas Orton, and Vicky Morgan.

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Station Overview

Station Lifetime Banding Totals

Species Observed	189
Species Caught	131
Species Banded	122
Total Captures	19,818
Birds Banded	15,670
Total Recaptures	3,383
Banding Days	1,216

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 environment¹ 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 area². Riparian zones are also under severe threat from climate change³. 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.



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*Bonderman Field
Station at Rio Mesa*

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 rates⁵. 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 mass⁶, 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.

2022

This spring and fall were respectively our 21st and 22nd banding season, representing 11 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 3 through June 6, and the fall lasted from August 19 through November 5.

Statistics

Spring 2022 Totals

Species Caught	52
Species Banded	50
Total Captures	666
Birds Banded	538
Banding Days	56

This spring started out quite slow, with daily banding totals in the single digits for a majority of the days for more than the first month. This all began to change in mid-May, and on May 16 the floodgates opened and we had an incredibly high volume of birds with over 100 captures (including about 100 newly banded birds), the second-best banding day on record in the station's history. According to Cornell's BirdCast data at the time, this high volume of birds was a result of the highest number of birds on record to migrate overhead in this region, on the night of May 15. This season we also took wing, tail, and body photos of most of the birds, allowing us to work towards creating a library of spring birds of different ages and sexes.

Some notable captures included our fourth record of Olive-sided Flycatcher, a Sharp-shinned Hawk, our eighth banded Juniper Titmouse, five Mountain Bluebirds (only two previously banded), a Clay-colored Sparrow, and four Indigo Buntings (only seven previously banded).



Statistics

Fall 2022 Totals

Species Caught	61
Species Banded	57
Total Captures	806
Birds Banded	620
Banding Days	66

This fall was busier than the last several banding seasons, with about 200 more birds captured and banded this season compared to the previous fall. This season also saw quite a bit of rain in the region, as this was a monsoon year, which might have resulted in more food resources being available for birds in the area.⁷ For the first time in a number of years, we did some targeted banding a couple nights this fall for owls.

Some notable captures this fall included our first Northern Pygmy-Owl banded at Rio Mesa, our third Western Screech-Owl (from night banding), another Sharp-shinned Hawk, our third American Kestrel, our fifth Cordilleran Flycatcher, our third Least Flycatcher, another two Juniper Titmice, another Clay-colored Sparrow, a hybrid Gambel's x Mountain White-crowned Sparrow, and four White-throated Sparrows.

Participants

In the spring, our banding team primarily consisted of lead bander Nikolas Orton and assistant Mietron Shahbodaghloo, as well as Quinn Jennings for the last several weeks. In the fall, our banding team consisted of lead bander Vicky Morgan and assistants Zach Matchinski and Megan Sinclair. Our team members come to Rio Mesa from across the country with varying degrees of experience working with birds. Other people, including Emily Ford, Emily Slingerland, Reily Shields, and Kyle Kittelberger, 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 welcomed President Randall and an entourage of various School Deans and administration officials from the University to the banding station this fall, showcasing the scientific value of our long-term banding efforts and the kinds of ecological questions we can research with our data.



Future Directions

The next several years will continue to be an exciting time at Rio Mesa as we transition into the next phase of ornithological research at the station. First, with additional years of data, our ability to accurately monitor the changes in bird populations and community composition will 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 now beginning to analyze our data, so the next few years will see multiple 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* this fall⁹. 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 condition⁹. 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 prior⁹. 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 fat⁹. This is the one of the only studies of its kind to look at this relationship between wildfires and actively migrating birds⁹.

We have begun or are in the process of beginning 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 have 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 began this collaboration this fall and will be providing close to 1000 feather samples to this project at the beginning of the New Year. In early 2023 we will also begin preparing feather samples for stable hydrogen isotope analyses at the U, with a primary goal of helping better understand the spatial impacts of wildfires on migratory birds. Lastly, we aim to establish two MOTUS towers at Rio Mesa prior to the start of spring banding. 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. After establishing these towers, we will begin tagging birds for this project.

We will likely begin working on a paper in 2023 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 aim to write a paper within the next couple years 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. Finally, we will begin analyzing the Rio Mesa data next year to evaluate any long-term trends in bird migration (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.

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Appendix: Capture details for all species caught at Rio Mesa from 2011 to 2022. Species with no capture records have only been observed.

Species Name	Totals		
	Number Banded	Number Recaught	Number Unbanded
<u>Waterfowl</u>			
Canada Goose			
Mallard			
Gadwall			
Blue-winged Teal			
Cinnamon Teal			
Northern Shoveler			
Green-winged Teal			
Common Merganser			
Duck spp.			
<u>Gamebirds</u>			
Chukar			
Wild Turkey			
<u>Grebes</u>			
Pied-billed Grebe			
<u>Herons, Ibis, and Allies</u>			
Great Blue Heron			
Great Egret			
Snowy Egret			
White-faced Ibis			
<u>Vultures, Hawks, and Allies</u>			
Turkey Vulture			
Osprey			
Golden Eagle			
Northern Harrier			
Sharp-shinned Hawk	13	0	0
Cooper's Hawk	1	0	0
Northern Goshawk			
Bald Eagle			
Swainson's Hawk			
Red-tailed Hawk			
Rough-legged Hawk			
<u>Rails, Gallinules, and Allies</u>			
Sora	1	0	0
Sandhill Crane			
<u>Shorebirds</u>			

Killdeer			
Wilson's Snipe			
Spotted Sandpiper	1	0	0
Solitary Sandpiper			
Greater Yellowlegs			
<u>Pigeons and Doves</u>			
Rock Pigeon			
Band-tailed Pigeon			
Eurasian-collared Dove			
White-winged Dove			
Inca Dove	1	0	0
Mourning Dove	26	0	6
<u>Owls</u>			
Western Screech-Owl	3	0	0
Great Horned Owl			
Northern Saw-whet Owl	2	0	0
Northern Pygmy-Owl	1	0	0
<u>Nightjars</u>			
Common Nighthawk			
Common Poorwill	2	0	0
<u>Swifts</u>			
Vaux's Swift			
White-throated Swift	4	0	4
<u>Hummingbirds</u>			
Costa's Hummingbird	0	0	1
Black-chinned Hummingbird	0	0	210
Broad-tailed Hummingbird	0	0	34
Calliope Hummingbird	0	0	14
Rufous Hummingbird	0	0	66
Unidentified Hummingbird	0	0	6
<u>Kingfishers</u>			
Belted Kingfisher			
<u>Woodpeckers</u>			
Williamson's Sapsucker	4	2	0
Yellow-bellied Sapsucker			
Red-naped Sapsucker	51	2	0
Red-breasted Sapsucker			
Downy Woodpecker	4	0	1
Hairy Woodpecker	2	0	0
Lewis's Woodpecker			
Northern Flicker (Red-shafted)	33	3	2

Northern Flicker Intergrade	4	0	0
<u>Falcons</u>			
American Kestrel	3	0	0
Merlin			
Peregrine Falcon			
Prairie Falcon			
<u>Tyrannid Flycatchers</u>			
Olive-sided Flycatcher	4	0	0
Western Wood-pewee	143	6	2
Least Flycatcher	3	0	0
Willow Flycatcher	303	13	0
Western Flycatcher	5	0	0
Pacific-slope Flycatcher	2	2	0
Cordilleran Flycatcher	5	0	0
“Western” Flycatcher	5	0	0
Yellow-bellied Flycatcher	1	0	0
Hammond’s Flycatcher	24	4	0
Dusky Flycatcher	252	33	1
Gray Flycatcher	64	6	0
Unidentified <i>Empidonax</i> Flycatcher	43	2	2
Black Phoebe	4	0	1
Say’s Phoebe	12	2	0
Ash-throated Flycatcher	79	12	1
Eastern Kingbird	3	0	0
Cassin’s Kingbird			
Western Kingbird	14	3	0
Unidentified Flycatcher	7	2	3
<u>Shrikes</u>			
Loggerhead Shrike	10	0	0
Northern Shrike			
<u>Vireos</u>			
Bell’s Vireo	0	1	0
Plumbeous Vireo	21	4	0
Cassin's Vireo	22	1	0
Warbling Vireo	333	35	0
Gray Vireo	45	13	0
Red-eyed Vireo	1	0	0
<u>Corvids</u>			
Steller's Jay	1	0	0
Pinyon Jay			
Woodhouse's Scrub-jay	36	1	1

Black-billed Magpie			
American Crow			
Common Raven			
<u>Larks</u>			
Horned Lark			
<u>Swallows</u>			
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
<u>Tits</u>			
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	402	123	26
<u>Nuthatches and Creepers</u>			
Brown Creeper	3	0	0
Red-breasted Nuthatch	4	0	0
White-breasted Nuthatch			
<u>Wrens</u>			
Bewick's Wren	248	86	14
Rock Wren	25	13	0
Canyon Wren	14	10	1
House Wren	102	25	1
Winter Wren	1	0	0
Marsh Wren	51	3	3
<u>Gnatcatchers and Kinglets</u>			
Blue-gray Gnatcatcher	863	171	25
Golden-crowned Kinglet	2	0	0
Ruby-crowned Kinglet	650	107	34
<u>Thrushes</u>			
Mountain Bluebird	7	1	0
Western Bluebird			
Townsend's Solitaire	12	2	0
Swainson's Thrush	22	3	1
Hermit Thrush	278	66	3
American Robin	44	19	2

Mimids			
Gray Catbird	55	3	1
Northern Mockingbird	24	4	4
Brown Thrasher	1	0	0
Sage Thrasher	63	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	33	1	0
Orange-crowned Warbler	348	42	1
Nashville Warbler	45	6	0
Virginia's Warbler	131	13	2
Lucy's Warbler	83	78	1
MacGillivray's Warbler	538	60	7
Common Yellowthroat	212	4	3
American Redstart	2	1	0
Northern Parula	2	0	0
Magnolia Warbler	1	1	0
Blue-winged Warbler	1	0	0
Yellow Warbler	791	130	9
Black-throated Blue Warbler	1	1	0
Palm Warbler	1	0	0
Yellow-rumped Warbler	21	0	1
Yellow-rumped Warbler (Audubon's)	532	30	5
Yellow-rumped Warbler (Myrtle)	23	6	0
Yellow-rumped Warbler (MxA)	14	0	0
Black-throated Gray Warbler	15	2	0
Townsend's Warbler			
Wilson's Warbler	1346	141	20
Painted Redstart			
Unidentified Warbler	0	0	1
Yellow-breasted Chat			
Yellow-breasted Chat	750	545	20
New World Sparrows			
Green-tailed Towhee	121	60	1
Spotted Towhee	438	206	23

Vesper Sparrow	29	0	2
American Tree Sparrow	3	0	0
Chipping Sparrow	79	22	0
Clay-colored Sparrow	14	6	1
Brewer's Sparrow	656	122	16
Lark Sparrow	30	3	0
Lark Bunting			
Black-throated Sparrow	48	0	0
Sagebrush Sparrow	68	2	0
Savannah Sparrow	3	0	0
Song Sparrow	905	280	19
Lincoln's Sparrow	520	93	15
Grasshopper Sparrow	6	0	0
Fox Sparrow	6	0	0
Dark-eyed Junco	19	0	2
Dark-eyed Junco (Gray-headed)	9	0	1
Dark-eyed Junco (Oregon)	367	124	10
Dark-eyed Junco (Pink-sided)	102	34	4
Dark-eyed Junco (Slate-colored)	11	4	0
White-throated Sparrow	26	5	1
White-crowned Sparrow (Mountain)	329	22	6
White-crowned Sparrow (Gambel's)	804	282	41
White-crowned Sparrow hybrid (GxM)	1	0	0
White-crowned Sparrow	319	77	16
Golden-crowned Sparrow	2	0	0
Unidentified Sparrow	4	0	2
Cardinals			
Summer Tanager	1	0	0
Western Tanager	297	15	2
Rose-breasted Grosbeak	1	0	0
Black-headed Grosbeak	101	4	2
Blue Grosbeak	102	25	2
Lazuli Bunting	183	42	1
Indigo Bunting	11	1	0
Painted Bunting	0	0	1
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	30	5	1
Hooded Oriole	2	0	0
Scott's Oriole			
Bullock's Oriole	83	15	2
Finches and Allies			
Black Rosy-Finch			
Cassin's Finch	3	0	1
House Finch	256	33	14
Pine Siskin	74	2	1
Lesser Goldfinch	65	1	0
American Goldfinch	14	0	0
Evening Grosbeak			