NONGAME SECTION

2023-2024 ANNUAL COMPLETION REPORT

NONGAME SECTION PERSONNEL

Zack Walker
Nongame Wildlife Supervisor

Heather O'Brien
Nongame Mammal Biologist

Zach Wallace
Nongame Bird Biologist

Andy Gygli
Small Carnivore Biologist

Laura Beard
Bat Biologist

Courtney Rudd
Nongame Biologist

Katherine Sauer
Nongame Biologist

Frank Stetler
Nongame Biologist

Nicole Mittman
Nongame Technician

Adam Nash
Bat Technician

Julia Yearout
Bat Technician

Britney Force
Bat Technician

Shelby Forey
Swift Fox Technician

Jade Cornaby
Swift Fox Technician

Mikayla Bivona
Swift Fox Technician

Macy Jacobson
University of Wyoming
Wildlife Fellow / Swift Fox
Technician

Olivia Poore
University of Wyoming
Wildlife Fellow

The Wyoming Game and Fish Nongame Section would like to thank the volunteers and wildlife professionals from this and other natural resource management agencies for their valuable contributions. We would also like to extend our gratitude to the landowners across the state that allow us access and ability to perform fieldwork on private land. Without the generous contribution from these stakeholders, the work of the Nongame Section would not be possible.

The Nongame Section would additionally like to thank all funding sources that contribute to work on nongame species throughout the state.

The reports included in this document are the annual summaries of current work the Nongame Section has completed from April 15, 2023 - April 15, 2024. If additional information is needed for any of the projects listed in this report, please contact the Nongame Section at (307) 332 - 2688.

Front Cover: Blue-gray Gnatcatcher / Credit: Frank Stetler
Back Cover: Gray-crowned Rosy-Finch / Credit: Frank Stetler

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BALD EAGLE MONITORING IN WESTERN WYOMING

Bald Eagle / Credit: Amy Anderson

The Bald Eagle is an uncommon resident in Wyoming. It is classified as a Species of Greatest Conservation Need in the Wyoming State Wildlife Action Plan of moderate conservation priority (Native Species Status 3, Tier II) due to limited population size and breeding distribution, and vulnerability to human disturbance during the nesting season.

The Wyoming Game and Fish Department (WGFD) initiated statewide monitoring for Bald Eagles in 1978. Although Bald Eagles nest along all major river systems in the state and increasingly in other habitats near water bodies, the largest number of nesting pairs is found in northwestern Wyoming in the Greater Yellowstone Area (GYA) along the Snake River drainage and its tributaries. Bald Eagles in northwestern Wyoming are part of a genetically distinct Rocky Mountain population that extends into neighboring Idaho and Montana. Following severe range-wide declines from effects of organochloride pesticides, recovery of the species in Wyoming began in the 1980s, centered on the Jackson area. As the distribution of the species expands in the state, the numerous territories located along the Snake River likely continue to serve as a source population for other areas of Wyoming and the GYA.

Bald Eagle / Credit: Amy Anderson

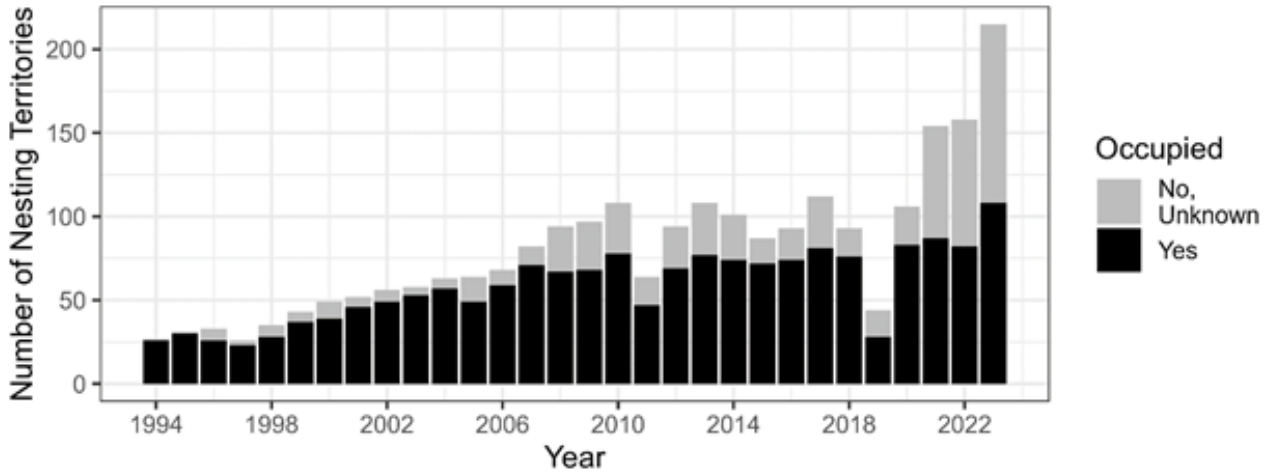
Annual fixed-wing aerial surveys are conducted by WGFD to monitor occupancy and productivity of known Bald Eagle nesting territories in portions of western Wyoming. Survey visits begin in late March to early April to document the number of occupied sites (defined as an incubating adult, eggs or young, or a pair perched at the nest site), and in late May or early June to determine nesting success and count mature young (defined as approximately 80% of fledging

age). To better understand detectability of occupied nests, we conducted an additional round of occupancy surveys in mid-April, 2023.

In 2023, we surveyed 215 Bald Eagle nest sites for occupancy and productivity. Occupancy surveys were conducted on April 6, 7, and 24, and productivity surveys on May 28. Additionally, Grand Teton National Park contributed data from surveys on April 20 and June 6. We located 29 new nests, 18 of which were new or previously unknown territories, and 11 of which were alternative nest locations within known territories. Of 215 sites checked, 108 (51%) were occupied and 107 (50%) were unoccupied or had undetermined status. Unoccupied nests included 36 not occupied by any species and 10 occupied by Canada Goose. Undetermined status nests included 58 that were not found and 3 with unknown status, of which 2 were possibly refurbished and 1 contained eggs of an unknown species. Nesting attempts were initiated by 100 pairs (93%) occupying sites, of which 54 (54%) succeeded to produce at least one mature young, 28 (28%) apparently failed, and 18 (18%) had unknown outcomes. The 82 occupied nests with known outcomes produced a total of 72 young, or 0.88 young per occupied nest, and average brood size at fledging of 1.33 young per successful nest.

The size of the population and the number of known occupied nesting territories has grown steadily since the 1980s, including a substantial increase since 2000 in the number of pairs nesting in the Green River Basin and adjacent areas of the Salt River and Bear River drainages. Although variable effort among years limited our ability to compare the proportion of occupied to unoccupied sites, the count of 108 known occupied sites in 2023 was the greatest since the start of monitoring in 1978.

By contrast, productivity of 0.88 young per nesting pair in 2023 was the second lowest documented during the last 30 years of monitoring and only slightly higher than the lowest productivity rate recorded in 2022. Low productivity in 2022 was likely related to unusually cold and wet spring weather, which led to severe flooding in parts of the GYA. In 2023, a record-breaking winter with extensive snow cover and frequent spring snow storms led to delayed nesting and widespread nest failure. The southern portion of our study area in the Green River Basin was most severely affected, in contrast to typical years when phenology is later in the northern portion of the study area. It is also possible the population has been affected by the ongoing outbreak of highly-pathogenic



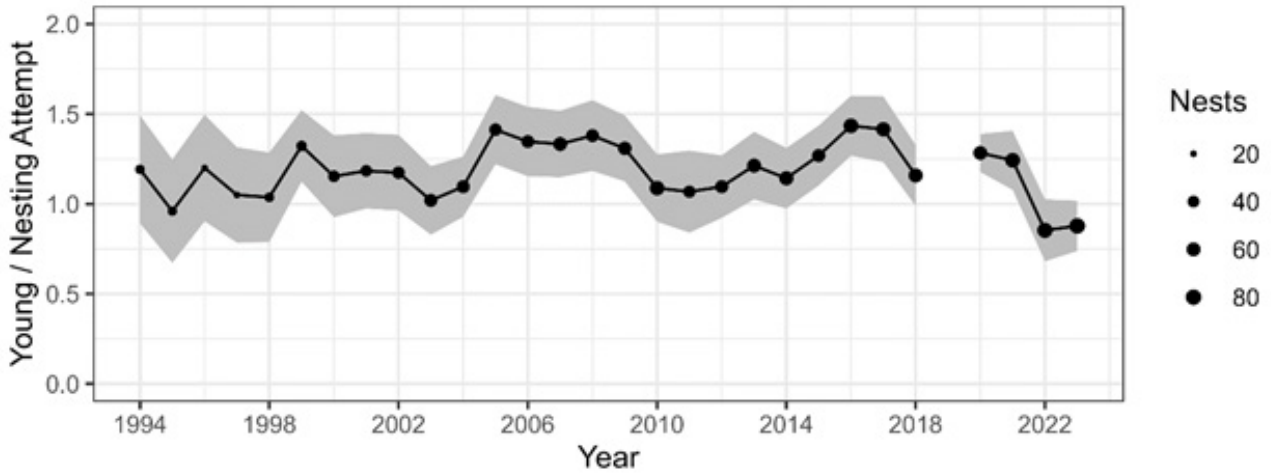
Occupancy of Bald Eagles in western Wyoming, 1994–2023. Plot shows annual counts of nests classified as occupied (black bars) and not occupied or unknown status (gray bars).

avian influenza, which caused at least two known Bald Eagle mortalities in Wyoming during 2022–2023. We expect a rebound in productivity in 2024, as spring weather appears more typical.

To better understand our ability to detect occupied nest sites, we conducted a second round of surveys during mid-April 2023. We used the two survey visits to estimate probabilities of detection and occupancy with single-season occupancy models. Of 187 sites included in the model, 147 received 2 visits. Of those, occupancy was detected on both visits at 68 sites, only one visit at 19 sites, and neither visit at 60 sites. The occupancy model uses information from the sites at which occupancy was missed during one visit to estimate the probability of detection given that a site is occupied, and the probability of occupancy corrected for imperfect detection. Results from a single-season occupancy model with no covariates showed that the per visit detection probability from this survey was high: 0.87 (95% CI: 0.80–0.92). The estimated occupancy probability corrected for imperfect detection of 0.57 (95% CI: 0.50–0.65) was only slightly higher than the uncorrected occupancy rate of 0.54, due to high detection rates.

These results confirm the high detectability of nest occupancy for Bald Eagles and suggest limited bias from the single-visit survey protocol used historically in this monitoring effort. Additionally, similar numbers of misclassified sites on the first visit (n = 11) and second visit (n = 8) suggest results were not strongly affected by the timing of the survey in early- vs. mid-April. Despite high detection rates for occupancy, we were unable to locate a nest at approximately 25% of sites surveyed and 20% of nesting attempts had unknown outcomes. Based on these results, we suggest that when additional funding for aerial surveys is available, it would be better spent clarifying the status of nests that could not be located and following up on nesting attempts with uncertain outcomes than performing repeated checks of occupied nests. Additionally, we recommend analyzing occupancy and productivity relative to long-term patterns in weather, climate, habitat, and human development to inform management of this population and evaluate the need for continued monitoring.

Prepared By: Zach Wallace, Nongame Bird Biologist



Productivity of Bald Eagles in western Wyoming, 1994–2023. Plot shows the annual average number of mature young produced per nesting attempt with known outcome (points), with 90% confidence intervals (gray shading) and point size indicating the number of nesting attempts monitored.

FUNDING SOURCE(S):

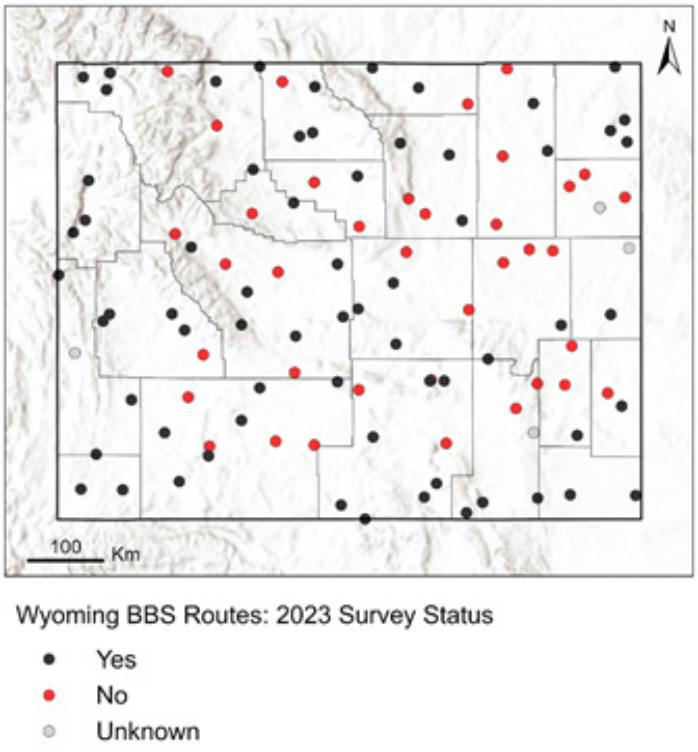
Wyoming Game and Fish Commission Funds
U.S. Army Corps of Engineers Grant

NORTH AMERICAN BREEDING BIRD SURVEY IN WYOMING

Spotted Sandpiper, Torrey Creek, Fremont County / Credit: Amy Anderson

The North American Breeding Bird Survey (BBS) is a continental, multi-species avian monitoring program that has provided data on the distribution and status of birds in Wyoming since 1968. The BBS is sponsored jointly by the United States Geological Survey Patuxent Wildlife Research Center and the Canadian Wildlife Service. The BBS was launched in 1966, with 600 roadside survey routes established in the United States east of the Mississippi River and in Canada. Today, over 4,600 routes are located across the continental United States and Canada, including 107 active routes in Wyoming. Routes are randomly located in order to sample habitats that are representative of the entire region and provide a continent-wide perspective of avian population change. The Wyoming Game and Fish Department (WGFD) coordinates the implementation of the BBS in Wyoming.

For this report, we downloaded preliminary results from the BBS Coordinators Database because the final 2023 dataset had not been released as of May 1, 2024. In 2023, 42 observers surveyed 66 of 107 (62%) active routes in Wyoming. Fourteen volunteers surveyed two or more routes and three conducted four or more routes. Since 1990, the number of routes surveyed in Wyoming has decreased by 0.23 routes per year. In contrast to this trend, the number of routes surveyed in 2023 (66 routes) was the same as the average number of routes completed annually from 1990–2022.



Locations of North American Breeding Bird Survey (BBS) routes in Wyoming with 2023 survey status.

Available data included 64 of 66 routes due to delayed submittal for one survey and data deficiencies associated with another. Observers detected 31,899 individual birds representing 181 species. Since 1990, the number of individual birds detected has decreased by 3.1 individuals per route per year and the number of species detected has increased by 0.11 species per route per year. Consistent with these trends, the number of individuals detected per route in 2023 (498 individuals) was less than the average number of individuals detected per route from 1990–2022 (522 individuals), and the number of species detected per route in 2023 (40 species) was slightly greater than the mean number of species detected per route from 1990–2022 (38 species). The preliminary 2023 dataset and the most current final dataset with information for surveys conducted through 2022 are both available at the BBS website (https://www.pwrc.usgs.gov/bbs/).

Blue Grosbeak near Mountain View, Uinta County / Credit: Frank Stetler

Marsh Wren, Ocean Lake, Fremont County / Credit: Amy Anderson

The most recent published BBS trend analysis that included data through 2019 was summarized in the 2021 Nongame Annual Completion Report with an emphasis on Wyoming's Species of Greatest Conservation Need. Future trend analyses will contribute to WGFD recommendations for monitoring Species of Greatest Conservation Need (SGCN), especially those exhibiting significant population declines at the state level. BBS provides a long-term perspective on population trends of Wyoming's birds that complements other avian monitoring efforts, including the Integrated Monitoring in Bird Conservation Regions program and eBird. Information on population status, range, and distribution from BBS also contribute to future decisions about which avian species will be designated as SGCN list in Wyoming's State Wildlife Action Plan.

Prepared By: Courtney Rudd, Nongame Biologist

FUNDING SOURCE(S):

Wyoming Game and Fish Commission Funds

INTEGRATED MONITORING IN BIRD CONSERVATION REGIONS

Tree Swallow / Credit: Amy Anderson

Population monitoring is an essential component of wildlife management and conservation. Besides improving understanding of species' distributions, monitoring allows us to determine the status of populations by tracking changes over time, identify species that are at risk, and evaluate their responses to management actions and changes in land-use and climate. Long-term population trends for many species of North American birds have declined due to human influences, including habitat loss and disturbance. It is a key priority for the Wyoming Game and Fish Department (WGFD) to identify and implement programs to monitor the population status of avian Species of Greatest Conservation Need (SGCN) across the state. While some rare species require their own dedicated monitoring efforts, many of Wyoming's birds can be tracked efficiently and effectively through broad-scale, multi-species surveillance monitoring programs, such as the Integrated Monitoring in Bird Conservation Regions (IMBCR) program.

IMBCR is based on a spatially balanced sampling design that provides information on avian populations at multiple scales, from local management units to states or Bird Conservation Regions (BCRs), facilitating conservation at local and national levels. This nested design also provides a consistent and flexible framework for understanding the status of bird populations in local and regional contexts. Collaboration across organizations and spatial scales increases sample sizes and improves population estimates. The robust survey protocol and sampling design of the IMBCR program complements other less structured bird monitoring efforts in Wyoming, including the North American Breeding Bird Survey and eBird. For these reasons, the IMBCR program is well-positioned to address conservation and management needs for a wide range of partners, encouraging an interdisciplinary approach to bird conservation that combines monitoring, research, and management.

Western Tanager / Credit: Amy Anderson

In Wyoming, IMBCR continues to provide information on the distribution and status of Wyoming's bird populations that is essential to implementing the State Wildlife Action Plan.

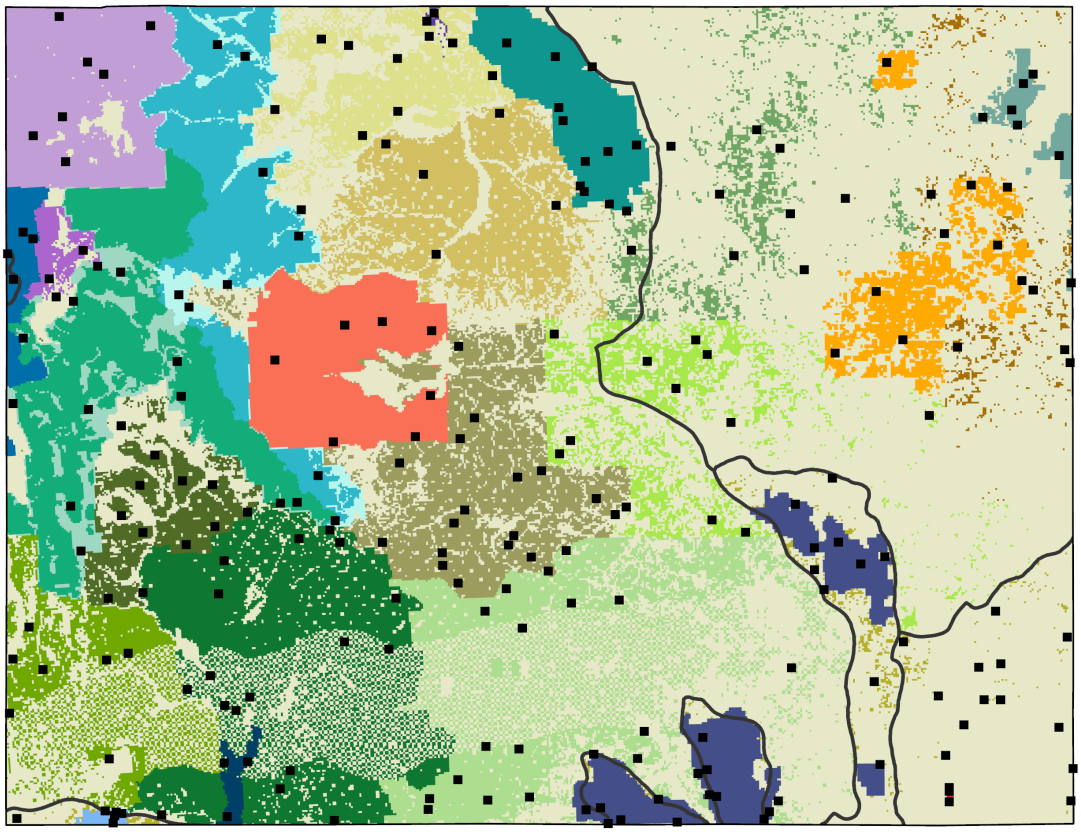
IMBCR surveys are conducted at a random sample of 1-km² grid cells, each consisting of 16 evenly spaced survey points. Birds are counted by sight and sound at each sampling point during the breeding season. The distance and time period of detection are recorded for each bird group, as well as additional data on habitat and vegetation. Wyoming contains 37 sampling strata and a minimum effort of two grids per stratum is required to estimate population parameters.

In 2023, Bird Conservancy of the Rockies (Bird Conservancy), in conjunction with WGFD and its other partners, conducted the 16th consecutive year of landbird monitoring with the IMBCR program. The survey effort covered all or parts of 10 BCRs and 15 states, including all of Wyoming. In Wyoming, field technicians completed 233 of 236 planned surveys (99%), conducting 2,883 point counts between May 24 and July 21. Multiple agency partners provided funding for surveys, with 79 grids (34%) funded by WGFD. A total of 210 bird species were detected, including 54 (68%) of Wyoming SGCN. Bird Conservancy estimated densities and population sizes for 221 species that were detected in any year during which surveys were conducted, 67 of which are SGCN. The data yielded robust density estimates (CV < 50%) for 118 species. Bird Conservancy estimated the proportion of 1-km² grid cells occupied throughout Wyoming for 226 species that were detected in any year during which surveys were conducted, 70 of which are SGCN. The data yielded robust occupancy estimates (CV < 50%) for 134 species.

The complete 2023 IMBCR Field Season Report is available online. Density tables and graphs, maps, and trend information are available from the Rocky Mountain Avian Data Center website (https://rmbo.org/v3/avian/home.aspx).

Prepared By: Zach Wallace, Nongame Bird Biologist; Jessie Reese, Matthew McLaren, Jennifer Timmer, Matt Smith, T.C. Walker, Chris White, Quresh Latif, David Pavlacky Jr., and Rob Sparks, Bird Conservancy of the Rockies

Virginia's Warbler / Credit: Frank Stetler



Integrated Monitoring in Bird Conservation Regions (IMBCR) survey locations and strata in Wyoming, 2023. Bird Conservation regions shown are Great Basin (9), Northern Rockies (10), Southern Rockies Colorado Plateau (16), Badlands and Prairies (17), and Shortgrass Prairie (18).

FUNDING SOURCE(S):

U.S. Fish and Wildlife Service State Wildlife Grant
Wyoming Game and Fish Commission Funds
Wyoming Governor's Big Game License Coalition Grant
Bureau of Land Management Grant
U.S. Forest Service Grant

PEREGRINE FALCON MONITORING IN WYOMING

Peregrine Falcon / Credit: USFWS National Digital Library

The Peregrine Falcon is an uncommon summer resident bird of prey found throughout most of Wyoming. The species nests primarily on cliffs and ledges near open areas for foraging. The Wyoming Game and Fish Department (WGFD) designates Peregrine Falcon as a Species of Greatest Conservation Need with Native Species Status 3 (NSS3) and moderate conservation priority (Tier II).

Nesting Peregrine Falcons were nearly extirpated from Wyoming in the 1970s, primarily due to negative effects of organochlorine pesticides. Efforts to breed and release Peregrine Falcons throughout North America started in the late 1960s and regional recovery plans were developed after the species was federally listed as Endangered in 1970. Wyoming reported no known nesting pairs from 1978–1983, released 384 captive produced young from 1980–1995, and documented the first new nesting pair in the state in 1984. By 2015, there were at least 121 known nesting territories in Wyoming, primarily in the western and central portions of the state. The species was federally delisted in 1999.

WGFD, Yellowstone National Park, and Grand Teton National Park continued monitoring Peregrine Falcon occupancy and productivity through 2015 using methods based on the U.S. Fish and Wildlife Service (USFWS) post-delisting monitoring protocol. In 2016, WGFD selected a subset of five sites for ongoing annual surveys within each of four historical regional monitoring areas: Central Wyoming, Western Wyoming, Yellowstone National Park, and Grand Teton National Park. A variable number of additional sites in each area are also surveyed annually. Continued effort to monitor Peregrine Falcon nesting success is warranted due to the significant investment for recovery, ongoing public interest, and risk of disease and other factors impacting populations.

Surveys are conducted by agency personnel beginning in mid-April. Sites are classified as occupied based on observations of two adults in the area, one adult incubating or delivering prey to a ledge, or observations of eggs or young. Classifying sites as unoccupied typically requires a minimum of 4 hours of survey effort by an experienced observer. Productivity is calculated as the number of young per occupied territory with known outcome, based on a 4-hour survey visit during mid-June to early-August, when young can reliably be observed.

In 2023, WGFD and partners visited a total of 64 Peregrine Falcon nesting sites. Of those, 52 were occupied, 7 were unoccupied, and 5 had unknown status due to inadequate timing or duration of

monitoring. Observers identified and monitored two new sites in 2023 that fledged a total of 5 young; one in Central Wyoming and the other in Yellowstone National Park. Of 52 occupied sites, 45 sites with known outcomes produced a total of 45 young (1.0 young per occupied territory). Productivity at the regional monitoring sites in 2023 of 0.87 young per occupied territory was the lowest since the productivity monitoring protocol was initiated in 2016, and lower than the average of 1.34 young per occupied territory from 2016–2022. In addition to the regional monitoring sites, 30 additional Peregrine Falcon nesting sites with known outcomes produced a total of 32 young. Productivity at the additional sites in 2023 of 1.07 young per occupied territory was lower than to the average from 2016–2022 of 1.36 young per occupied territory.

Peregrine Falcon productivity in 2023 was below average for all areas surveyed, including the regional monitoring areas and additional sites. USFWS has suggested 1–2 young per occupied territory as the approximate range of average annual productivity at which Peregrine Falcon populations are assumed to be stable or increasing. In 2023, productivity in the National Park regional monitoring areas (0.67–0.80) was below this threshold, while the regional monitoring areas outside the parks and the additional areas (which include some sites in the parks) were at the lower end of the range (1.00–1.07). Despite low productivity in 2023, average productivity for the monitoring program from 2016–2023 was still within the range expected for an increasing population for both the regional monitoring sites (1.28) and all sites (1.31).

Low productivity in 2023 was likely influenced by a historically severe winter with sustained snowpack and late spring storms. It is also possible that productivity was affected by Highly Pathogenic Avian Influenza (HPAI). Although no mortalities from HPAI were documented in Wyoming in 2023, detecting cases is difficult due to the inaccessibility of Peregrine Falcon nesting habitat, and common predation of waterfowl likely exposes this species to the virus more than most raptors. Finally, an unknown amount of the variation in occupancy and productivity is likely due to errors in classification. Outcomes for a site can be difficult to determine when a ledge is obscured by distance or visual obstructions, fledged juveniles are not associating strongly with visible areas of the ledge, or when surveys are of insufficient duration or outside the window of optimal juvenile detection (approximately 2 weeks post fledging). The relatively small number

Occupancy and productivity of Peregrine Falcons in Wyoming, 2023.

Survey area	Number of Sites			Total Young	Productivity[a]
	Monitored	Occupied (%)	Outcome Known		
Central Wyoming[b]	5	5 (100%)	4	4	1.00
Western Wyoming[b]	3	3 (100%)	3	3	1.00
Yellowstone National Park[b]	5	5 (100%)	5	4	0.80
Grand Teton National Park[b]	5	3 (60%)	3	2	0.67
Additional Sites[c]	41	36 (88%)	30	32	1.07
Total: Regional Monitoring	**18**	**16 (89%)**	**15**	**13**	**0.87**
Total: All	**59**	**52 (88%)**	**45**	**45**	**1.00**

[a] Mean number of young per occupied territory with known outcome.

[b] Regional monitoring sites.

[c] Additional sites, including territories on Grand Teton and Yellowstone National Parks, federal, tribal, and state lands.

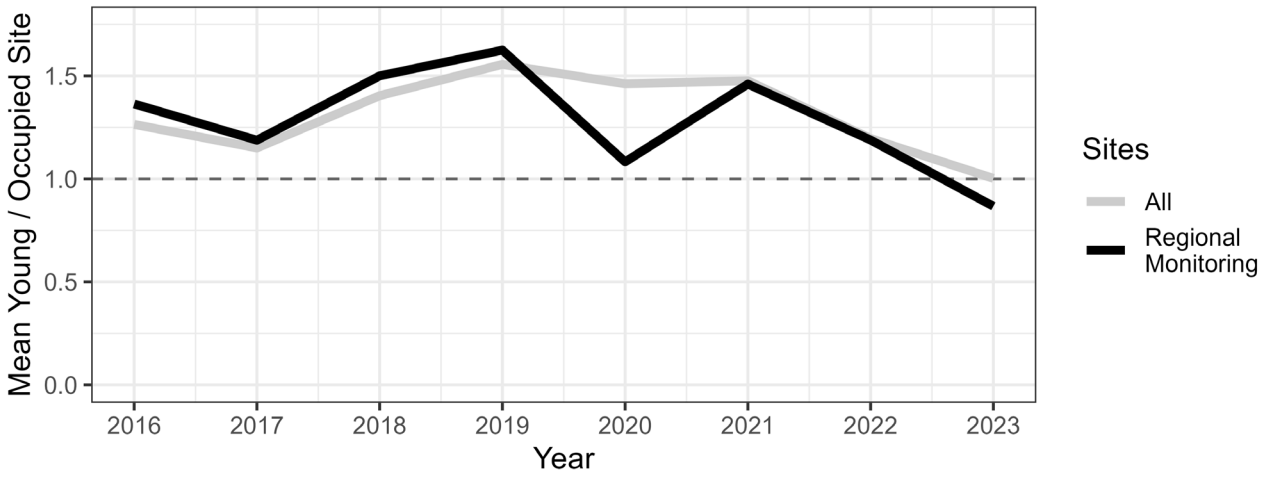
of sites monitored as part of this program make results sensitive to such errors. For example, if a single fledgling was missed in the Central survey area in 2023, the productivity estimate would have increased by 25% to near the long-term average.

Collaborative efforts to minimize recreational disturbance to nesting Peregrine Falcons in central Wyoming continued in 2023. WGFD, U.S. Forest Service (USFS) Shoshone National Forest Wind River District, and the nonprofit climbing organization Wyoclimbers initiated a collaborative management effort in 2021 to maintain rock climbing opportunities at locations in the Southern Wind River Mountains with nesting Peregrine Falcons and Prairie Falcons. Partners met in early spring to gather and share information, and WGFD and USFS personnel monitored three Peregrine Falcon territories in areas with climbing activity. Of two occupied territories, one did not warrant a voluntary closure because nesting activity was not near the areas used for rock climbing. A fixed voluntary closure was established at the other site to minimize disturbance in the vicinity of the eyrie. A collaborative site visit was useful to refine closure boundaries based on proximity and lines of sight from the nesting location to established rock climbing routes and access trails. USFS installed signage at trailheads and closure boundaries, and Wyoclimbers posted voluntary closure information on online climbing forums and social media. WGFD and USFS personnel continued to monitor the site throughout the breeding season to document climbing and falcon activity, and provided updates on nesting phenology and status to inform adaptive management of closures. The site was occupied by a pair that either did not attempt nesting or did not fledge young in 2023, and the closure was lifted after the nesting period.

Given recent decreases in productivity and unknown effects of HPAI on Peregrine Falcon populations, we recommend continuing annual surveys in the four regional monitoring areas and additional sites. Ongoing education of observers on monitoring protocols and improved collection of data on the observation process (e.g., number and duration of visits, breeding status at each visit) will reduce bias in the survey process and analysis. We also recommend continuing collaborative efforts to adaptively manage recreational disturbance to nesting Peregrine Falcons in Wyoming.

Prepared By: Courtney Rudd, Nongame Biologist; Zach Wallace, Nongame Bird Biologist

Productivity of Peregrine Falcons in Wyoming, 2016–2023. Plot shows productivity (average number of young per occupied territory with known outcome) for regional monitoring sites, black line) and all sites gray line.



FUNDING SOURCE(S):

Wyoming Game and Fish Commission Funds
U.S. Forest Service Grant
Grand Teton National Park
Yellowstone National Park

INVESTIGATION OF PINYON JAY BREEDING STATUS IN WYOMING

Pinyon Jay in the town of Ten Sleep, Washakie County / Credit: Ron Horn

Pinyon Jay is an obligate bird of low-elevation coniferous woodlands that has experienced major population declines since the 1970s. Conservation concern for Pinyon Jays has increased due to steep population declines, as well as impacts of climate change on the pinyon pine trees that they depend upon for habitat throughout much of their range. Accordingly, Pinyon Jay was proposed for listing under the Endangered Species Act in 2022, and in August 2023 the USFWS completed their 90-day review of this petition and announced that a full 12-month review of the species' status was warranted. While the species is known to occur year-round in Wyoming, its breeding status in the state was unknown. Observation data from eBird and the Wyoming Biological Information System show that Pinyon Jay occurs in several areas of Wyoming during the breeding season (March–July), specifically in southern Park County, southern and eastern Natrona County, northern Washakie County, southern Hot Springs County, southern Fremont County, and southern Sweetwater County. The size of the observed flocks at these locations suggests the presence of nesting colonies and the state also has records of birds exhibiting caching behavior in December, which has been used as an indicator for where birds will nest the following spring. These observations suggested that breeding by Pinyon Jay was possible in Wyoming, but had not been confirmed prior to this study.

Juniper habitat near Lander, Fremont County, where Pinyon Jays were detected

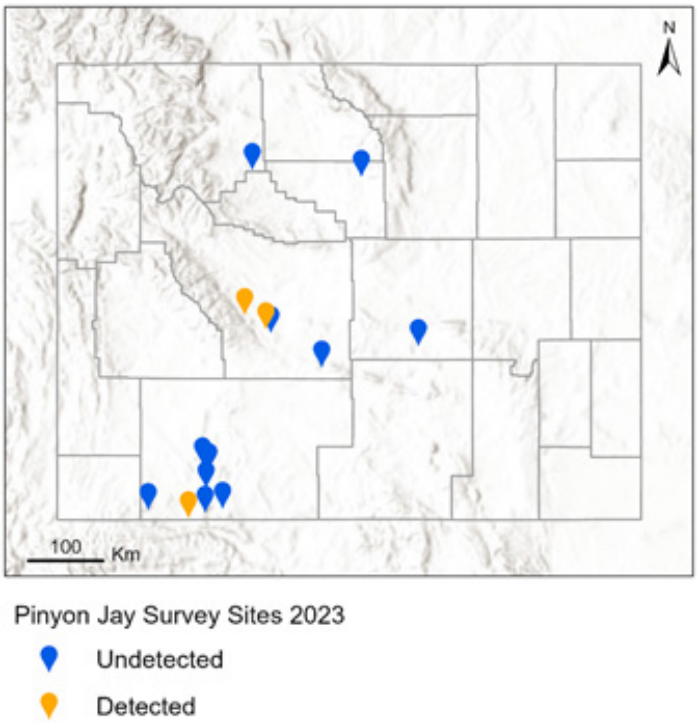
Documentation of breeding is crucial information for management of Pinyon Jay, largely because of the species' known nest-site fidelity. Conservation of nesting habitat would be an important tool for promoting Pinyon Jay populations in Wyoming, and both colony locations and habitat preferences are currently unknown. Further, long-term breeding site

monitoring has been suggested as an efficient method to assess population trends in this otherwise nomadic species. Thus, identification of nesting sites would also provide the basis to establish a program to monitor Pinyon Jay populations.

Habitats available to Pinyon Jay in Wyoming differ from the core of their distribution because the state is near the northeastern edge of the species' breeding range. Typically, Pinyon Jay nest in pinyon-juniper woodlands, and specifically in areas that produced a large amount of pinyon seeds the previous fall. However, recent studies in Colorado have shown Pinyon Jay to nest in juniper trees 75% of the time. It is important for managers to understand if Pinyon Jays in Wyoming also nest in juniper woodlands because juniper removal is a common habitat treatment for other species and objectives, including livestock grazing, watershed condition, fuels reduction, and Greater Sage-Grouse habitat improvement. The effects of juniper woodland thinning and removal may be particularly pronounced for Pinyon Jay because of their restriction to low-elevation conifer woodlands, strong site fidelity, and limited dispersal from colony sites.

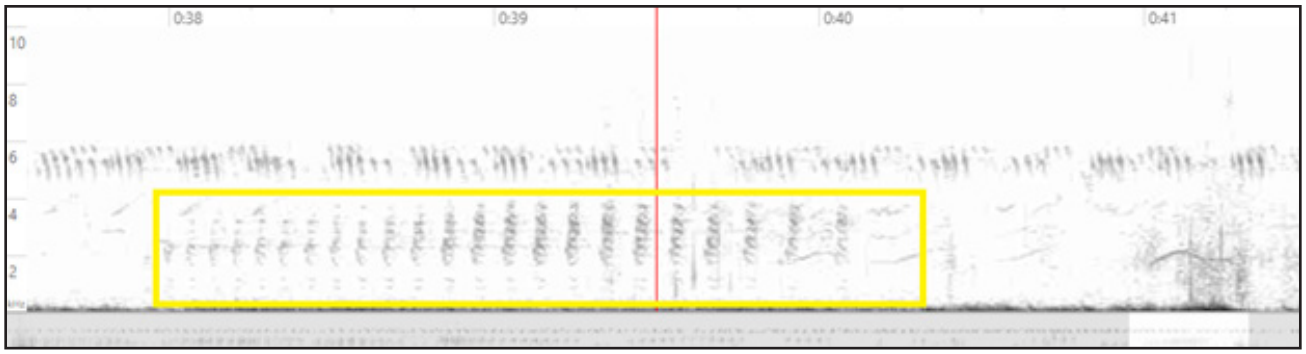
Our goals for monitoring of Pinyon Jay are to confirm whether the species breeds in Wyoming, identify habitats selected during the breeding season specific to Wyoming, and identify important areas for habitat conservation and further monitoring based on nesting colony site fidelity. We are using a combination of existing habitat models for the species, incidental observations, and available occurrence data to locate potential colony sites. At these sites, we conduct visual and behavioral observations for evidence of breeding, and record habitat characteristics at sites with colonies. Survey protocols follow recommendations of the Pinyon Jay Working Group (PJWG) to maximize the likelihood of detecting breeding birds, collect data comparable to rangewide survey efforts, and record the most crucial data for management in the face of federal listing.

The 2023 field season began in late April due to a long winter. Our primary goal was to determine if breeding was occurring in the state. We visited 14 survey areas 2–3 times throughout the season per PJWG recommendations. We detected Pinyon Jays at 3 of the 14 sites (21%), and observed birds a second time at each of these 3 sites in subsequent visits. We confirmed breeding at 1 of the 14 sites (7%) with approximately 35 birds present. We confirmed breeding by observations of begging fledglings and recorded piping rattle calls, but were not able to determine the location of the colony site.



Locations where at least 2 searches for Pinyon Jay were conducted during statewide surveys in Wyoming, 2023.

We detected this evidence of breeding on June 11, 2023 in Fremont County. Closest known colony sites are distant (colonies in Idaho ~200 miles, Utah ~150 miles, and Colorado ~120 miles from this location) and the species is not known to disperse long distances during the post-fledging period. While we were not able to locate nests, the distance from closest known colony sites, presence of fledglings, and observed behavior confirmed reproduction within the state. To our knowledge, this is the first record of Pinyon Jay breeding in Wyoming.



Spectrogram of the "piping rattle" recorded in Fremont County, Wyoming in 2023. Piping rattles are given only by breeding female Pinyon Jays, therefore this provided the first confirmation of Pinyon Jay breeding in Wyoming. Graphic courtesy of the Macaulay Library.

Effective management of Pinyon Jay in Wyoming requires clarification of breeding status, documentation of colony locations, understanding of habitat associations specific to Wyoming, and identification of areas important to Pinyon Jay populations that may be negatively impacted by common habitat treatments for other species of concern. Our work in 2023 helped bridge knowledge gaps in Wyoming by identifying areas supporting Pinyon Jay during the breeding season and collecting evidence of reproduction within the state for the first time. More effort is warranted to locate additional breeding sites and learn about Wyoming-specific Pinyon Jay space-use and habitat requirements.

Prepared By: Frank Stetler, Nongame Biologist

Pinyon Jay / Credit: Frank Stetler

FUNDING SOURCE(S):

Wyoming Governor's Big Game License Coalition
Wyoming Game and Fish Commission Funds

2023 RAPTOR NEST SURVEY FOR THE U.S. FOREST SERVICE THUNDER BASIN NATIONAL GRASSLAND

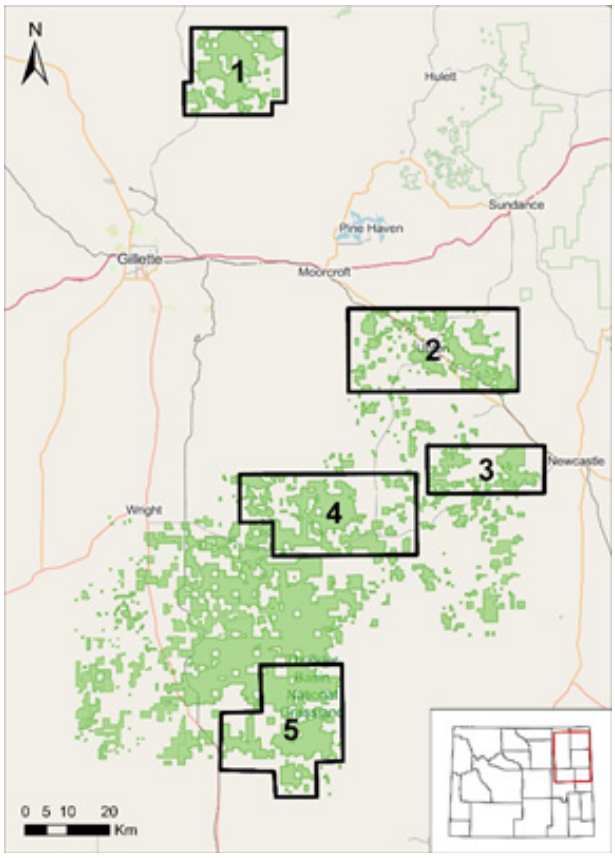
Northern Harrier female / Credit: Amy Anderson

The Wyoming Game and Fish Department (WGFD) has conducted inventories of nesting raptors on the U.S. Forest Service (USFS) Thunder Basin National Grassland (TBNG) and adjacent lands in northeastern Wyoming since 1996. Funding for this cooperative effort has been provided by USFS through a cost-share agreement with WGFD Nongame Section personnel conducting aerial surveys and reporting results. Surveys rotate annually between 5 priority areas identified by USFS and have been conducted in most years since the start of the effort (1996–1999, 2001, 2004–2006, 2008, 2017–2019, 2021–2023). The main objective of the survey is to maintain current information on locations of nesting raptors to support management and land use planning.

The survey entails searching for raptor nests and individual raptors from fixed-wing aircraft along north-south transects spaced 600-m apart, travelling at approximately 100 km/hr, 30–75 m (~100–250 ft) above ground level. To increase detection of nests, we depart transects to opportunistically search areas of potential raptor nesting habitat that are not fully visible from transects (e.g., trees, cliffs, rock outcrops). The timing of the survey in early- to mid-May coincides with the incubation and hatching stages for Ferruginous Hawks and other Buteo hawks, and the incubation, hatching, and nestling stages for Golden Eagle. We record locations of all raptor and non-raptor bird nests detected, and the locations of individual raptors not associated with nests and generally follow the definitions and data standards of the Wyoming Raptor Working Group. Attributes collected include species, suspected species (for unoccupied nests), number and activities of adults, number of eggs or young, estimated age of young, age-class for individuals not associated with nests, nest status, condition, and substrate. Survey variables include observer experience, seating positions, weather conditions, and aircraft type. Locations are recorded on a handheld GPS unit, which we also use to collect a high-resolution flight track.

On May 8–9, 2023, we surveyed Priority Area 2 in a Cessna 182 aircraft. This 799-km² survey block included 530 km2 on or within 0.5-mi of TBNG. Habitat was dominated by grassland and sagebrush steppe, with scattered cottonwood and juniper trees, denser riparian stands of cottonwood along Buffalo Creek in the southwestern portion of the survey area, and more rugged terrain with ponderosa pine forest in the northeastern portion. We flew a total of 10 hrs and 1,565 km in the survey area, including 1,345 km of transects.

We detected a total of 42 raptor nests, with occupancy confirmed for 4 species, and 43 individual raptors not associated with nests representing 8 species. Additionally, we recorded 9 nests of non-raptor species, including Great Blue Heron (total n = 4, occupied n = 3), Black-billed Magpie (total n = 3, occupied n = 1, unknown n = 2), and Canada Goose (occupied n = 1). We were able to identify species at all occupied nests, with the exception of one probable Buteo hawk nest that contained an egg with no adults present.



Thunder Basin National Grassland raptor nest survey Priority Areas in northeastern Wyoming. Area 2 was surveyed in 2023.

The species and abundance of nesting raptors in the survey area were generally consistent with our expectations for the region. We noted a high density of Golden Eagles nesting in trees in rangeland areas, which we expected given the known high quality of habitat for that species in the Powder River Basin region. We found occupied Ferruginous Hawk nests in cottonwood and juniper trees, and unoccupied nests on the ground and in badlands terrain, which raised the possibility that our survey missed some occupied ground nests. Likewise, we observed Swainson's Hawks perched in trees and flying; however, we did not locate any occupied nests and suspect this species is nesting in or near the study area. Red-tailed Hawk was the most abundant nesting species, with the majority of occupied nests in cottonwood trees and two nests in wooden H-frame transmission towers along U.S. Highway 16. We observed one nest occupied by a Great Horned Owl, which is the only species of nocturnal raptor reliably detected by aerial nest surveys. We also observed individuals of other species with nests that are rarely detected with aerial surveys, including American Kestrel and Northern Harrier, both of which could be nesting in the study area. Detections of individual birds not associated with nests indicated that the study area provided habitat for additional species and age-classes of raptors, including sub-adult Bald Eagles and Golden Eagles, and Turkey Vultures.

We note that the majority of occupied nests located in our survey were in the open rangelands of the western portion of the study area, while we found mostly unoccupied nests in the rougher and more forested terrain of the eastern portion. We attributed most of these unoccupied nests to Buteo sp., and suspect many were likely Red-tailed Hawk nests based on size and habitat. Since Red-tailed Hawks and many other raptors maintain alternative nests, it is possible that we failed to detect occupied nests within the territories where we found unoccupied nests. Detections of unoccupied nests from this and other single-visit surveys should thus be interpreted as potential evidence of an occupied territory until further ground-based surveys or repeated aerial visits are conducted. Additionally, we stress that multiple years of data are necessary to confirm that an area is unoccupied because many raptor species do not attempt to nest every year. For this survey, we suggest 600-m spaced transects provides a reasonable balance between a complete census, which would be more time consuming and expensive, and population sampling, which can provide estimates of density or occupancy, but does not yield as many known nest locations.

We think this approach is generally appropriate for the main objective of the survey to provide nest locations to inform local-scale management and the amount of funding typically available to conduct the survey. To maintain consistency, we recommend that surveys in future years should be conducted at the same time of year with similar aircraft and survey protocol. However, we also suggest exploring the use of distance sampling or other methods to estimate densities of nesting raptors that would support analyses of changes in populations over time.

Prepared By: Zach Wallace, Nongame Bird Biologist; Courtney Rudd, Nongame Biologist

Plane used for raptor nest surveys / Credit: Flightline

Raptor nests detected during aerial surveys in northeastern Wyoming, 2023. Table shows the number of nests by species and status, with the number of nests on or within 0.5 miles of Thunder Basin National Grassland surface in parentheses. Unoccupied nests were assigned to suspected species or species group (Buteo, Buteo or eagle, eagle, Unknown).

Species	Total	Occupied	Unoccupied
Red-tailed Hawk	12 (6)	11 (5)	1 (1)
Golden Eagle	5 (3)	5 (3)	0
Ferruginous Hawk	6 (4)	2 (1)	4 (3)
Great-horned Owl	1 (0)	1	0
Buteo	13 (5)	1	12 (5)
Buteo or Eagle	4 (0)	0	4
Eagle	1 (1)	0	1 (1)
Unknown	1 (1)	0	1 (1)

FUNDING SOURCE(S):

U.S. Forest Service, Thunder Basin National Grassland
Wyoming Game and Fish Commission Funds

RESPONSE OF SAGEBRUSH-OBLIGATE BIRDS AND SMALL MAMMALS TO HABITAT MANGEMENT PRACTICES IN SOUTHWEST WYOMING

Brewer's Sparrow / Credit: Paul Graham

Sagebrush dominated landscapes are some of the largest ecosystems in the Western United States, spanning approximately 160 million acres and providing habitat for over 350 wildlife species, including mule deer, pronghorn, and Greater Sage-Grouse. However, sagebrush ecosystems are now among the most threatened in North America due to several factors, including frequent wildfires, intense herbivory, and fragmentation from changes in land use. Natural and anthropogenic disturbances have the potential to alter sagebrush ecosystems in a variety of ways; first, by reducing the total amount of sagebrush cover across the landscape and second, by changing the composition of sagebrush communities, both of which can result in increased fragmentation and reduced habitat suitability for sagebrush-dependent wildlife. The state of Wyoming, particularly the Green River basin in the southwestern portion of the state, contains some of the most intact tracts of sagebrush in the U.S., making the region a refuge for many sagebrush-obligate species and a high priority for conservation efforts.

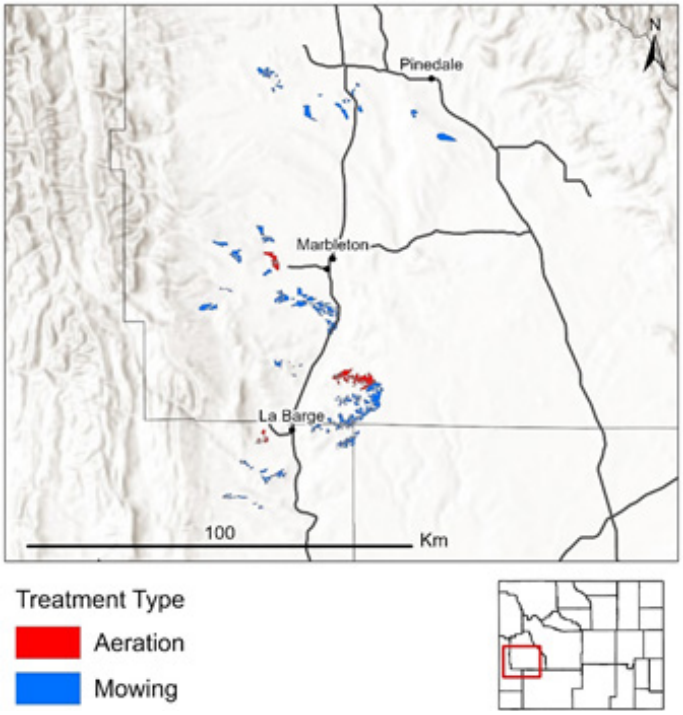
In recent years, many organizations have taken an interest in sagebrush conservation and restoration, primarily in response to the threat of listing the Greater Sage-Grouse under the Endangered Species Act. The Wyoming Game and Fish Department (WGFD) identified sagebrush ecosystems as one of the top priority habitats to enhance or maintain within its Statewide Habitat Plan, and categorized low-elevation shrub communities as one of the most at risk to invasive annual grass invasion. Additional concerns about steadily declining mule deer populations across Wyoming and deteriorating habitat quality in crucial mule deer winter range prompted the Wyoming Game and Fish Commission to adopt the Wyoming Mule

Photograph showing an example of mechanical treatments to sagebrush. Shrubs were mowed in an irregular shaped pattern, or "mosaic", to create an edge effect.

Deer initiative in 2007 and the Wyoming Range Mule Deer Plan in 2011. One major result of these plans was implementation of habitat improvement projects in sagebrush communities across the state. These included direct mechanical treatments to sagebrush, such as mowing, aerating, and chaining, as well as mechanical removal of encroaching conifer species and aerial spraying of invasive annual grasses. While the primary focus of these habitat projects was the benefit of Greater Sage-Grouse and mule deer, it remains unclear how these management practices affect other sagebrush-dependent wildlife.

Concomitant with the loss of sagebrush habitat and decreasing Greater Sage-Grouse and mule deer populations is the decline of many other sagebrush-obligate species. Three songbirds—the Sage Thrasher, Sagebrush Sparrow, and Brewer's Sparrow—and two small mammal species—the Pygmy Rabbit, and Sagebrush Vole—are designated as Species of Greatest Conservation Need (SGCN) in Wyoming and all require sagebrush habitat for their survival. The Sage Thrasher, Brewer's Sparrow, Sagebrush Sparrow, and Sagebrush Vole are ranked by the WGFD as Native Species Status (NSS) 4-Tier II because of vulnerability to habitat loss and, in the case of the avian species, because of documented population declines across their ranges. The Pygmy Rabbit is ranked as NSS3-Tier II due to the risk of habitat loss and fragmentation, as well as uncertainties about the species' abundance in Wyoming.

Monitoring sagebrush-obligate SGCN is important for the conservation of sagebrush habitats because their sensitivity to local and landscape changes make these wildlife species key indicators of sagebrush ecosystem health. Consequently, alterations of sagebrush habitat designed to benefit a single species may have unintended effects on non-target species that co-occur in the area. Our objective for this project was to assess how mechanical alterations to sagebrush habitat, in the form of mowing and aeration, affected the abundance of sagebrush-obligate songbird and small mammal SGCN.



Overview map of the project study area in southwest Wyoming showing areas where sagebrush was treated with aeration (red) or mowing (blue).

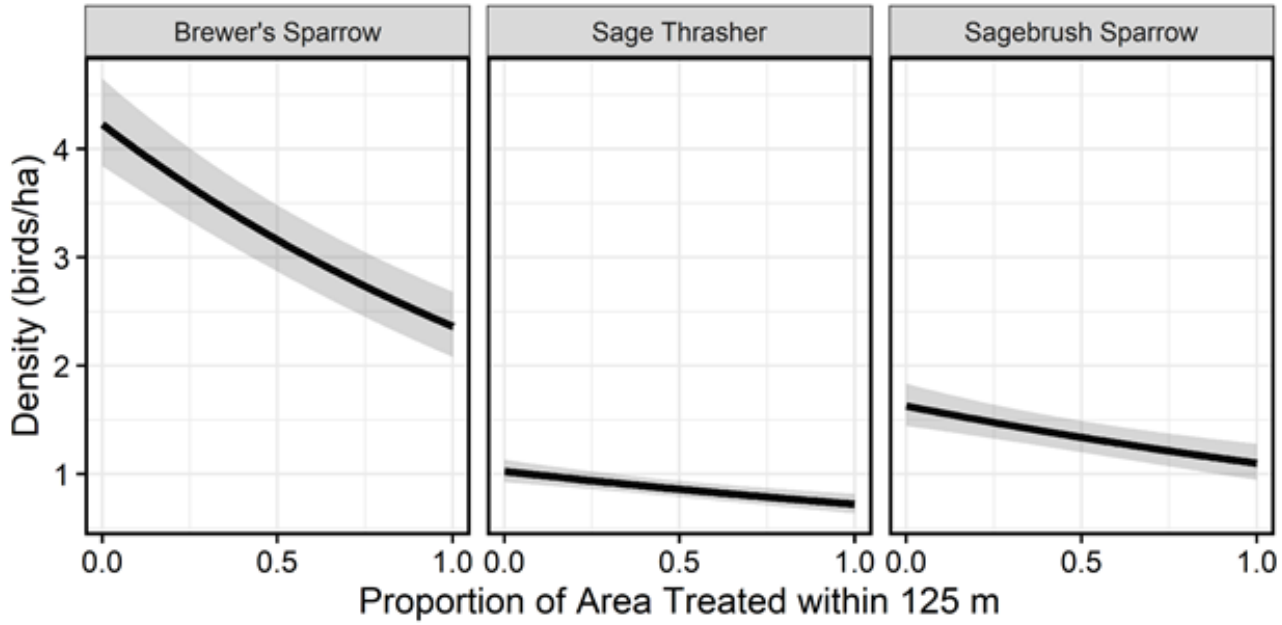
Our study took place in sagebrush shrublands on Bureau of Land Management lands in southern Lincoln and Sublette Counties, Wyoming. We worked with WGFD habitat biologists in the Green River and Pinedale regions to identify areas of sagebrush habitat in our study area that had undergone treatment and select priority areas for monitoring. We chose four treatments to evaluate based on the relative amount of acres treated: mowing <50%, mowing >50%, aeration <50%, and aeration >50%. We also identified areas of nearby untreated sagebrush to use as control sites. We evaluated density and occupancy of sagebrush-obligate songbirds and small mammals in each treatment area using field protocols adapted from the Integrated Monitoring in Bird Conservation Regions program and the WGFD Handbook of Biological Techniques. We determined the relative abundance of songbirds in our study area by conducting 6-min point counts in the morning from May–July. At each point, we recorded all individuals seen and heard within the survey period, with an emphasis on sagebrush-obligates and other SGCN. To survey for small mammals, we placed baited, live traps near key habitat features, such as burrows and sagebrush

stands in a 4 × 20 grid in treatment and control plots. Traps were spaced 20 m apart, resulting in a 2.28-ha sampling unit. Traps were checked each morning for three consecutive days and captured individuals were marked, weighed, and measured prior to release.

During the 2023 field season, we completed 297 avian point counts between 24 May and 29 June and observed 3,274 individuals of 44 different species. We observed target species on all treatments and in total we observed 1,205 Brewer's sparrows, 487 Sagebrush Sparrows, and 425 Sage Thrashers. We also observed a number of non-target avian SGCN, including Short-eared Owl, Greater Sage-Grouse, and Swainson's Hawk. Preliminary results suggest that areas where sagebrush was mechanically treated were associated with lower abundance of Brewer's Sparrows, Sage Thrashers, and Sagebrush Sparrows, but higher abundance of Vesper Sparrows and Horned Larks.

We conducted live-trapping surveys for small mammals at 8 sites between 18 July and 29 August, 2023, for a total of 1,100 trap nights, and captured 87 individuals. The majority of species captured were deer mice and chipmunk species; however, we also captured Sagebrush Voles, a target SGCN, and pocket mouse species. Early results indicate that mowed sites had a higher likelihood of being occupied by deer mice than control or aerated plots. We also found that chipmunk and vole species were more likely to occupy sites with greater grass and herbaceous cover.

Prepared By: Katie Sauer, Nongame Biologist



Estimated density of Brewer's Sparrow, Sage Thrasher, and Sagebrush Sparrow in relation to the proportion of the area mechanically treated within a 125-m-radius of the survey point. Plots show the mean response (black lines) with 90% confidence bands (gray shading). Estimates are corrected for detection using multiple-covariate distance sampling models.

FUNDING SOURCE(S):

U.S. Fish and Wildlife Service State Wildlife Grant

MONITORING AND MANAGEMENT OF THE ROCKY MOUNTAIN POPULATION OF TRUMPETER SWANS IN WYOMING

Trumpeter Swans / Credit:Mark Gocke

The Trumpeter Swan is an uncommon resident in Wyoming. It is classified as a Species of Greatest Conservation Need in the Wyoming State Wildlife Action Plan with a Native Species Status 2 (NSS2), Tier II (moderate conservation priority).

Trumpeter Swans have been a priority management species for federal and state agencies in the Greater Yellowstone Area (GYA) since the establishment of Red Rock Lakes National Wildlife Refuge in Montana in 1932 to conserve what were believed to be the last 70 remaining individuals in the world. Since then, Trumpeter Swan populations have grown due to conservation efforts, including in Wyoming. Since the late 1980s, the Wyoming Game and Fish Department (WGFD) has worked to expand summer and winter distribution of swans through releases of captive-reared cygnets and habitat improvement projects. These efforts have succeeded in establishing a new nesting population in the Green River Basin. Overall, the U.S. Breeding Segment of the Rocky Mountain Population (RMP) has remained between 900 and 1,000 individuals since 2015, after major fluctuations in prior years. This non-migratory segment of the population remains of concern, even as migratory Trumpeter Swan populations in Alaska, interior Canada, and the Midwestern states continue to increase.

Swans that nest and reside year-round in the GYA, including western Wyoming, are designated as the Greater Yellowstone Flock (GYF), formerly the Tri-State Area Flock. The Pacific Flyway Council (PFC) coordinates management of this swan population. The GYF is managed as part of the RMP, which includes swans that nest in interior Canada and migrate south to winter in the GYA. The WGFD is a member of the Greater Yellowstone Trumpeter Swan Working Group, which consists of state and federal agencies, non-governmental organizations, and interested citizens that meet annually to discuss population trends and coordinate management actions. The WGFD coordinates with the U.S. Fish ad Wildlife Service (USFWS) Mountain-Prairie Region Migratory Bird Office, the states of Idaho and Montana, and managers of areas hosting restoration flocks to annually census the number of mature swans and young of the year (cygnets) in the U.S. Breeding Segment of the RMP, and conducts annual surveys of swan nesting territory occupancy and productivity in Wyoming outside Yellowstone National Park.

During 2023, we conducted three fixed-wing aerial surveys to monitor nesting territory occupancy, productivity, and population abundance of swans in western Wyoming. All surveys were conducted by pilot Mark Packila (Wildlife Air) in a Scout aircraft

with Zach Wallace as observer. We surveyed nesting territory occupancy on June 5–7, 2023. Territories with swans received a productivity survey on July 13 and 17. The annual fall population survey was coordinated by USFWS in the Tri-State Area. On September 26–27, 2023, we conducted the Wyoming portion of the fall survey, excluding Yellowstone National Park and including the Wyoming portion of the Central Flyway. In addition to the aerial surveys, swan data were collected or provided through site-specific ground surveys, reports from federal agencies, and observations from the public.

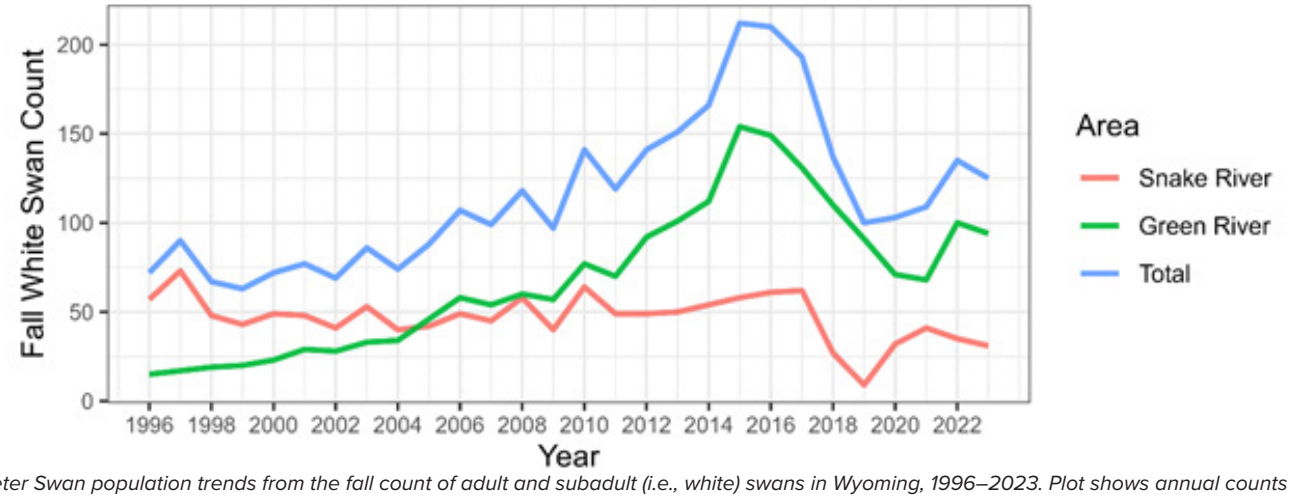
Based on the cumulative results from the three surveys, we found 68 of 164 swan nesting areas occupied by pairs, 54 nesting attempts, 27 successful nests, and 24 broods fledged. Total productivity was 69 cygnets hatched or an average brood size of 2.5 cygnets per successful nesting attempt. During the fall survey, we counted 130 white swans (adults and subadults) and 54 cygnets.

WGFD has historically reported population counts separately for the Snake River area and the Green River expansion area. In 2023, we counted 36 white swans in the Snake River area (including the Salt River) and 94 white swans in the Green River expansion area. The total 2023 fall count was lower than 2022, but greater than the four prior years, suggesting a stable or increasing trend following declines from the population peak in 2016. Overall, numbers of pairs and cygnets have been relatively stable, with changes in total counts driven primarily by fluctuations in numbers of subadults.

The USFWS Migratory Birds and State Programs Mountain-Prairie Region Office produces an annual report summarizing results for the coordinated RMP surveys that includes data collected in Wyoming, which is available from USFWS.

Compared to the 1990s, the status of the resident Wyoming Trumpeter Swan population has greatly improved. Both the number and distribution of swans have increased, as well as the amount of important wetland habitat. However, certain risks still need attention, including climate change, drought, disease, competition for resources with wintering swans from other populations, and human development and disturbance.

Prepared By: Noelle Smith, Migratory Game Bird and Wetland Habitat Biologist; Zach Wallace, Nongame Bird Biologist



Trumpeter Swan population trends from the fall count of adult and subadult (i.e., white) swans in Wyoming, 1996–2023. Plot shows annual counts for the Snake River core area (red line), Green River expansion area (green line), and the total Wyoming population outside Yellowstone National Park (blue line).

FUNDING SOURCE(S):

Wyoming Game and Fish Commission Funds

WYOMING BIRD RECORDS COMMITTEE: SUMMARY OF REPORTS REVIEWED IN 2023

Bay-breasted Warbler at the Greenhill Cemetery, Albany County / Credit: Don Jones

The Wyoming Bird Records Committee (WBRC) was established by the Wyoming Game and Fish Department (WGFD) Nongame Program in 1989 to accomplish the following goals:

1) Solicit, organize, and maintain records, documentation, photographs, audio recordings, and any other material relative to the birds of Wyoming.

2) Review records of new or rare species or species difficult to identify, offer an unbiased opinion of their validity or thoroughness, and use them to develop and maintain an Official State List of Birds in Wyoming.

3) Disseminate useful and pertinent material concerning the field identification of Wyoming birds in order to assist Wyoming birders and ornithologists with increasing their knowledge and skill.

The WBRC is comprised of five voting members and the WGFD Nongame Bird Biologist, who serves as a non-voting Secretary. During 2023, members included Shawn Billerman, Bob Hargis, Frank Stetler, Diane Thomas, and Hilary Turner. The WBRC is interested in promoting and maintaining quality and integrity in the reporting of Wyoming bird observations, and it treats all bird records as significant historical documents. The WBRC operates under a set of bylaws that were approved in 1991 and updated in 1992, 1998, 2015, and 2023.

Currently, the WBRC requests reports for species that are included on two separate lists. The first list is known as "All Sightings" and includes 162 species that are reviewed, regardless of the location observed in Wyoming. When a species is documented for the first time in Wyoming, it is automatically placed on the "All Sightings" list. The second list is known as "First Latilong" and currently includes 63 species. Latilongs are the 28 latitude-longitude degree blocks in Wyoming. When a species on the "First Latilong" list is observed in a block with no previously confirmed WBRC record, we request a report from the observer. In addition, if nesting activity is observed for any species on the "First Latilong" list, the WBRC requests a report for that observation, regardless of whether the species has been previously documented in that block.

During 2023, the WBRC made a continued effort to engage with eBird, a worldwide community science database for avian observations maintained by the Cornell Lab of Ornithology. Four of the five voting WBRC members served as Wyoming eBird reviewers.

The WBRC tracked eBird postings to find records of rare and unusual bird sightings for review and also encouraged birders to submit rare bird forms directly to the WBRC for observations shared through eBird. During 2023, the eBird platform experienced an increase (13.5%) in observers submitting data in Wyoming and an increase (17%) in the number checklists submitted. The increase in observers participating in eBird did not result in an increase in rare bird records, as the WBRC reviewed fewer records in 2023 than previous years.

As of May 1, 2024, the WBRC has reviewed a total of 1,885 reports of rare and unusual birds in Wyoming, of which 1,539 (82%) have been accepted and 346 (18%) have not been accepted. In 2023, the WBRC reviewed 60 reports. Of those, 53 were accepted, 6 were not accepted, and 1 is pending additional information to make a final determination.

The WBRC review process is also helpful for understanding changes to species' distributions in Wyoming. Of the 60 records reviewed in 2023, 30 resulted in an update to the distribution of the species at the latilong scale. Reports were reviewed for 20 of the 28 latilongs statewide and represented a diverse array of species including waterfowl, shorebirds, marshbirds, seabirds, gulls, owls, woodpeckers, and numerous passerines. These changes will be incorporated into the WGFD Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming.

Observations of the following species were notable first documented records for Wyoming:

Ruff (*Calidris pugnax*). Soda Lake, Albany County. This migratory shorebird's breeding range typically includes northern Eurasian wetlands. Wintering ground comprises sub-Saharan Africa, the Middle East, and southeastern Asia. Widespread observations of vagrant Ruffs have been documented in North America (Van Gils et al. 2020). The observer submitted several photos of the nonbreeding adult as it foraged among other common Wyoming summer resident shorebirds.

Nonbreeding Ruff at Soda Lake, Albany County. First documented record in Wyoming / Credit: Alexandra Zerbe

Common Crane (*Grus grus*). Table Mountain Wildlife Habitat Management Area, Goshen County. This Eurasian crane's typical breeding range includes Scandinavia, northern Europe, Russia, and south-central Siberia. Common Crane is omnivorous and nests in a variety of shallow water wetland habitats. While accidental, the species is not unexpected in far eastern Wyoming given confirmed observations in adjacent states, notably Nebraska (Archibald et al. 2020). The observer originally submitted the record to eBird, aptly describing the bird amongst a Sandhill Crane flock numbering in the thousands.

Cassia Crossbill (*Loxia sinesciuris*). Medicine Bow-Routt National Forest near the Colorado border, Albany County. Cassia Crossbill is a genetically distinct crossbill species with a strong preference for lodgepole pine forests. Previously thought not to migrate from a small range in the South Hills and Albion Mountains of south-central Idaho, additional recent documented observations in central Colorado will expand the known distribution of this poorly understood species (Benkman and Porter 2020). The observers submitted a high quality audio file to eBird, which was independently verified by an authority on crossbill vocalizations.

While the WBRC had not previously reviewed a nesting record for the species below, historical, observational, and circumstantial breeding records have been documented by WGFD. The following observation is a significant WBRC first confirmed breeding record:

Barred Owl (*Strix varia*). Grand Teton National Park, Teton County. This rare year-round resident is occasionally detected in far western Wyoming. Barred Owls are resident breeders in large portions of the U.S. and Canada and their range is expanding. The species prefers large, contiguous forest stands, but also uses adjacent wetland, riparian, and upland habitats (Mazur and James 2021). This record was photographed extensively over a significant portion of the breeding cycle. While two young were hatched, one was likely predated based on a Barred Owl wing found in the vicinity, and both adults were observed subsequently with the one remaining young.

Barred Owl nestlings and adult in Grand Teton National Park. First confirmed breeding record in Wyoming / Credit: Tom Stanton

The WBRC database is a dynamic document, typically updated once or twice a year following the review of a record batch. A full report of all sightings submitted through 2023, species for which the WBRC requests documentation, rare and unusual bird sighting forms, information on how to document rare and unusual birds, and the WBRC bylaws are available from the Nongame Bird Biologist in the WGFD Lander Regional Office. The WBRC website continues to provide a variety of information about species of interest for Committee review, WBRC background and history, and an online rare and unusual bird submittal form at https://wybirdrecordscommittee.wordpress.com/.

Prepared By: Courtney Rudd, Nongame Biologist

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FUNDING SOURCE(S):

Wyoming Game and Fish Commission Funds

STATEWIDE BAT MONITORING AND WHITE-NOSE SYNDROME SURVEILLANCE

Transillumiation of a bat's wing shows scarring

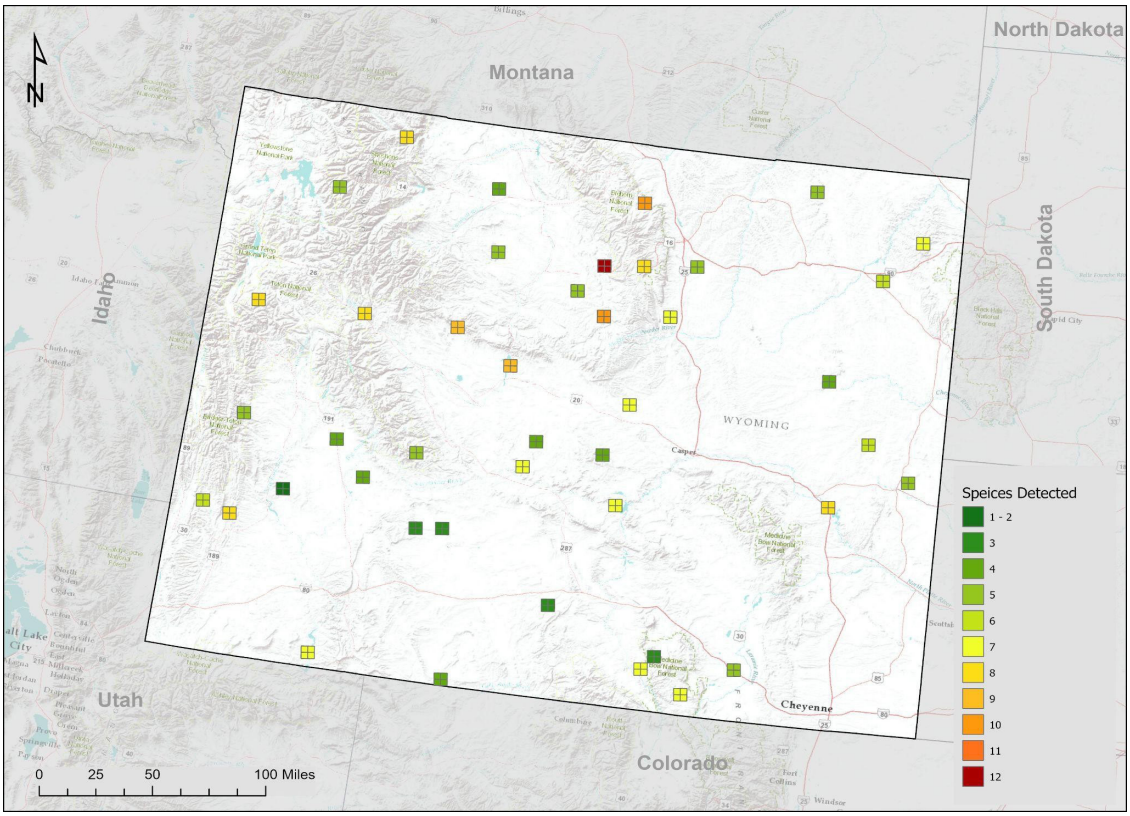
All Wyoming bat species are insectivorous, preying on a wide variety of crop pests and disease vectors. The majority of bat species found in the state have special conservation status with Game and Fish and federal agencies. Because bats are small, nocturnal, cryptic, and volant, they are difficult to study, so large knowledge gaps exist in our understanding of their basic ecology. These gaps include estimates of population size and basic life history that will be need to be understood to support populations through various conservation challenges. Bats have a very slow reproductive strategy, with most species having only one pup each year and individuals of several species capable of living into their 30s. Because of these traits, if populations become depressed for any reason, they are not capable of a rapid recovery.

According to the Western Bat Working Group, the most important conservation challenges facing bats are climate change, habitat loss, persecution, wind energy development, and white-nose syndrome (WNS). These challenges are not evenly distributed across the country, and they affect Wyoming's bats to varying degrees. It is unclear how climate change will affect bat populations in Wyoming, but it has the potential to disrupt important life history events, such as reproduction and hibernation. The effect of habitat loss on Wyoming's bats is difficult to measure as well. We have a basic understanding of habitat use in the state, but population numbers and trends within these habitats are largely unknown. Persecution in Wyoming has not been studied explicitly, and more information is needed to evaluate this potential threat to Wyoming's bat populations. Proper training and education in handling bat human interactions as wildlife conflict, rather than pest control issues, may improve outcomes for both bats and humans. Wind development, which causes mortality by collision and barotrauma, has the largest impact on migratory bats. Mitigation of this threat is difficult on the landscape scale, as migration routes for bats in North America remain largely unknown. WNS is a fungal disease that causes mortality during hibernation, but these impacts may be difficult to observe directly in Wyoming as bats in the state do not hibernate in easily surveyed colonies. In order to assess the impacts of any of these conservation challenges on Wyoming's bat populations, long-term monitoring of these species is necessary; this is the primary responsibility of the bat program within the Nongame Section of the Wyoming Game and Fish Department (WGFD).

The North American Bat Monitoring Program in Wyoming

The North American Bat Monitoring Program (NABat) is an international, multiagency program that uses four monitoring approaches to gather data to assess changes in bat distributions and abundance: hibernaculum counts, maternity colony counts, mobile acoustic surveys, and acoustic surveys at stationary points. Previous capture and roost inventories have laid the groundwork for bat monitoring in Wyoming by establishing species distribution and locating many important roosts. The stationary acoustic portion of the NABat Protocol gathers bat occupancy data using acoustic techniques.

Game and Fish implemented the NABat Protocol on a statewide basis in 2018 to monitor species occupancy. Equipment was deployed at the same sites in 2018-2024 with a few exceptions where permission could not be obtained during a field season. We have continued to add cells using the priority scheme found in the NABat master sampling list, to develop the monitoring effort toward the goal of consistently monitoring 2% of priority cells in the state. In 2024, detectors were successfully deployed at 119 sites at 43 cells . Inconsistent permissions at historic cells prevented the deployment of 3 cells in an area of mixed land ownership in southwestern Wyoming (not pictured). Eight deployments failed due to technical issues, all but 1 of these sites were successfully resurveyed. We continue to work to mitigate and correct issues that result in failures, such as livestock interference and operator error. Card failure is an increasing issue for this effort, and card replacement is a major ongoing cost. Yearly monitoring at these locations will allow Game and Fish, in partnership with the NABat Program, to document changes in bat distribution and activity through time.



Map depicting NABat sample cells in Wyoming and number of species detected

The Nongame Section has served the needs of technical support, coordination, data processing, call analysis, and reporting for this project from its implementation in 2018. In 2023, funding was secured to move coordination of NABat to the University of Wyoming. This change is anticipated to occur in the fall of 2024. The newly created Wyoming Bat Hub, part of the Rocky Mountain NABat Hub (Montana, Wyoming, Utah, and Colorado) will be responsible for classifying calls and uploading data from the stationary acoustic project to the NABat database. The Nongame Section will continue to provide field support and maintain the ability to access data as a partner on any projects created on public lands or funded by the WGFD (e.g. the statewide project). NABat data will be examined in reference to trends between years as well as species occurrence within cells, at the state, regional, and national scales. The NABat Program provides continent-wide trend analysis of all submitted data; while also facilitating state and region wide analysis using subsets of the database at any scale.

The NABat Program will enable detection of changes in species occupancy across the state. Bats in North America face a variety of conservation challenges that can act in combination to exacerbate the negative pressure on populations. Monitoring continued occupancy in known ranges and potential expansion or contraction of populations will allow managers to better serve the conservation needs of this taxon in the face of these combined threats.

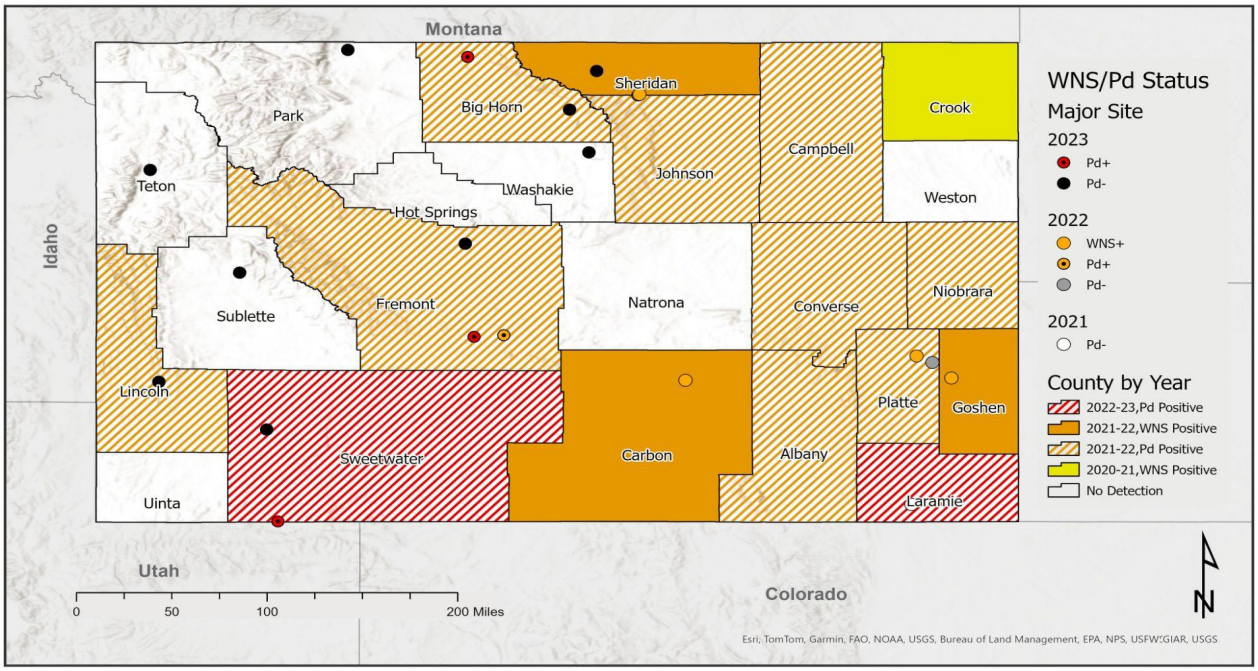
White-nose Syndrome Surveillance

WNS is a disease caused by the introduced fungal pathogen Pseudogymnoascus destructans (Pd), that attacks bats when their immune systems are depressed during hibernation. Species occurring in Wyoming that are known to be affected by WNS elsewhere in their range include the Tri-colored bat (Perimyotis subflavus), Northern long-eared myotis (Myotis septentrionalis), and the little brown myotis (Myotis lucifugus). Northern long-eared myotis is federally listed as endangered species, a listing decision is pending for tri-colored bat, and the little brown myotis is under review for federal listing. WNS is the major reason for the continuing decline of each of these species nationally. The rest of the Myotis genus are expected to be affected, though some western species have not yet encountered the fungus. Mortality in hibernacula in the East has been reported as high as 99.9% for many colonies.

Pd surveillance is done by swabbing bats or bat carcasses during or shortly after hibernation, sampling the substrate of winter roosts, or by swabbing active bats in the early spring, often as they return to maternity roosts. Guano samples can also be taken during any of these sampling efforts. All samples are tested for the fungal DNA. Samples directly from bats are preferred, as they have been shown to result in detection of the fungus earlier in the invasion than substrate samples, but the latter allows sampling without disturbing bats during the critical hibernation season or handling them in the early spring, when body condition may still be poor following hibernation. Spring capture for Pd surveillance is an important tool in the effort to manage bats in the face of WNS. Spring capture sites are selected for their potential to yield high numbers of myotis, due to their susceptibility to WNS. In addition to these targeted surveillance efforts, Game and Fish coordinates with the USGS National Wildlife Health Center and the University of Wyoming to test bats submitted for WNS after they have been submitted for rabies testing. All bats submitted in this manner for Pd testing must first test negative for rabies. A combination of these sampling measures are employed by Wyoming Game and Fish and partners to monitor the spread of the fungus. The nongame section of Wyoming Game and Fish coordinates Pd/WNS in the state, to maximize geographical coverage of this effort and maintain communication between all parties involved and needful of this information. Results are used to make Pd/WNS determinations on a county wide basis. All results contributing to status changes within the state from February 2023- January 2024 are reported here for simplicity.

Status changes across the state have resulted from each sampling strategy, demonstrating the need for a diversity of approaches to WNS surveillance . A myotis maternity roost in southern Sweetwater county tested positive through pooled guano sampling alone, though bat swabbing at the same site earlier in the season yielded no detection of Pd. A second major site in Sweetwater County had no detections of Pd or WNS. A single bat from Laramie County that was sent in for rabies testing tested positive for Pd, histology is pending to confirm WNS. The most recent pooled guano sampling conducted at a major sampling site in Laramie county in 2021 yielded no detections. The mixed status within counties is probably due to the area being recently infected, and highlights the importance of WNS decontamination protocols between sites. Bats spread the fungus most effectively, but as natural connectivity between sites is unknown it remains important to minimize the potential for movement of the fungus between sites by researchers. Game and Fish will continue to coordinate and conduct surveillance at selected sites statewide as possible to document the spread of WNS and Pd in Wyoming.

Bat technicians Adam Nash and Britney Force along with UW fellows Olivia Poore and Macey Jacobson appriciate new equipment purchased for WNS sampling by the USFWS



WNS and Pd Status by County and Major Sampling Site in Wyoming. Most recent/severe results shown.

Myotis maternity roosts monitoring and WNS vaccination trials

Mortality due to WNS in the West will be extremely difficult to assess, as less is known about hibernation behavior and habitat of western bats, especially myotis species, which have been shown to occupy cavernous hibernacula only rarely (Weller et al 2018). In order to understand population trends as well as impact from WNS, it is necessary to monitor populations at maternity colonies in Wyoming. This monitoring is done using exit counts as well as PIT tag mark/ recapture techniques at a subset of sites. The majority of roosts currently monitored are that of little brown myotis, as they are of conservation importance as well as the most likely species to be observed by humans. Population trends from these projects will inform species assessment and, if necessary, recovery planning in the future.

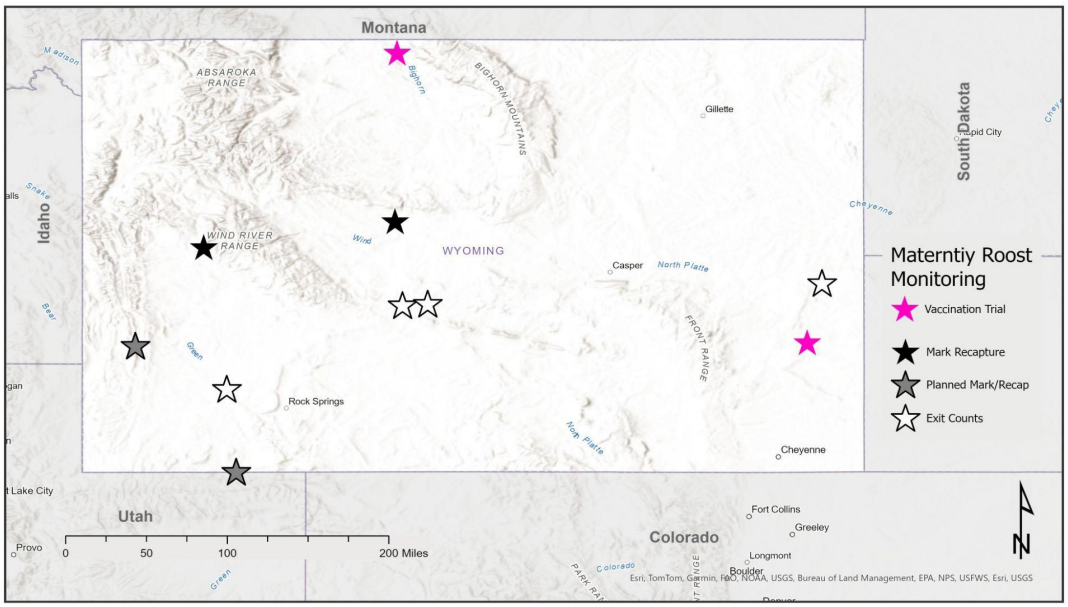
At two myotis maternity roosts, a USGS vaccination trial began in 2023 . At these locations, bats are marked with PIT tags and bands, and then treated orally with either a placebo or vaccine. The vaccine was shown to be safe in captive little brown myotis and is now being trialed at newly infected sites in several western states, including Wyoming (Rocke 2019).

Prepared By: Laura Beard, Bat Biologist

Literature cited:

Rocke, T.E., Kingstad-Bakke, B., Wüthrich, M. et al. 2019. Virally-vectored vaccine candidates against white-nose syndrome induce anti-fungal immune response in little brown bats (Myotis lucifugus). Sci Rep 9, 6788.

Weller, T.J., Rodhouse, T.J., Neubaum, D.J., Ormsbee, P.C., Dixon, R.D., Popp, D.L., Williams, J.A., Osborn, S.D., Rogers, B.W., Beard, L.O. and McIntire, A.M., 2018. A review of bat hibernacula across the western United States: Implications for white-nose syndrome surveillance and management. PLoS One, 13(10).

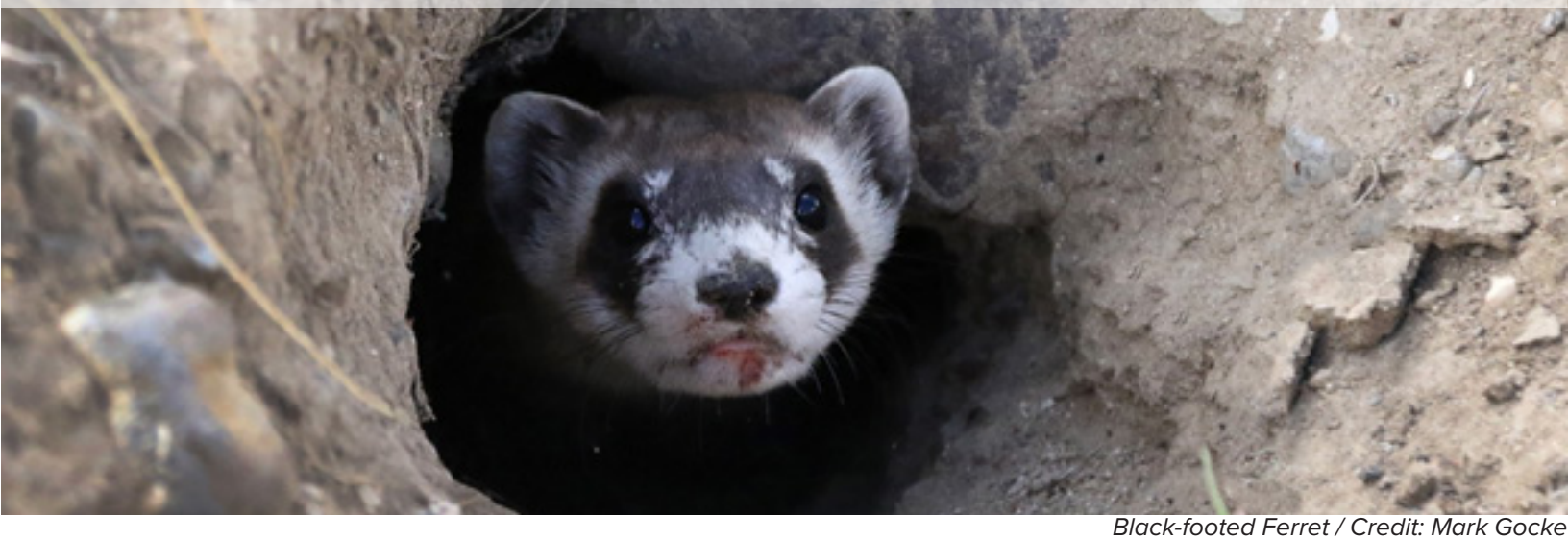


Locations of myotis maternity roost monitored by exit counts (shown by white stars) and mark/ recapture (current shown by black stars, planned shown by gray stars), and vaccination trial sites (shown by pink stars).

FUNDING SOURCE(S):

Wyoming Game and Fish Commission Funds
White-nose Syndrome Capacity Grant Funds
U.S. Fish and Wildlife Service State Wildlife Grant
Wyoming Governor's Big Game License Coalition Grant

FERRET MANAGEMENT ACTIVITIES AT THE SHIRLEY BASIN AND MEETEETSE REINTRODUCTION AREAS



Black-footed Ferret / Credit: Mark Gocke

The Black-footed Ferret (ferret) is a fossorial, nocturnal, and critically endangered mammal that relies exclusively on prairie dogs for food and shelter. Prairie dogs and ferrets both once ranged over 100 million acres of North American prairie. Since 1900, due primarily to the conversion of native grassland to cropland and intense extermination campaigns, prairie dogs have been eradicated in some areas; approximately 2 million acres of colony exist today. As populations of prairie dogs decreased, so did those of ferrets, and they were listed as endangered in 1967. By 1979, ferrets were considered extinct.

In 1981, a ranch dog near Meeteetse caught and killed a ferret, proving a population still existed. Biologists from WY Game & Fish Department (WGFD) and the US Fish & Wildlife Service (USFWS) began intensely studying the colony. When an outbreak of canine distemper virus struck, biologists decided to capture as many ferrets as possible to ensure the continued survival of the species. Eighteen ferrets were captured, and WGFD led the effort to establish a captive breeding program. Seven of those animals reproduced in captivity, and they are the ancestors of every ferret known to exist in the wild today.

The first ferret reintroduction site was established in the Shirley Basin, WY, in 1991. Its success and resiliency spurred the creation of more reintroduction sites; to date there are 31 in North America. In addition to the Shirley Basin Reintroduction Area (SBRA), Wyoming also hosts the Meeteetse Reintroduction Area (MRA), established in 2016 on the same lands where ferrets were first rediscovered. In conjunction with US Fish & Wildlife Service, Bureau of Land Management (BLM), USDA APHIS Wildlife Services (USDA-WS), and local landowners, the Nongame Section manages ferrets and prairie dogs at both sites. These efforts are essential for assessing progress towards recovering the ferret within Wyoming and across the continent.

Black-footed ferret exits a burrow at the Shirley Basin Reindtroduction Area

Shirley Basin Reintroduction Area (SBRA)

The SBRA is by far the largest reintroduction site in existence, spanning 55 linear miles and containing approximately 180,000 acres of active prairie dog colony. It is a mix of private, BLM, WY State Trust, and WGFD lands. Since its creation in 1991, ferrets have persisted and dispersed across the landscape, largely with a hands-off management approach.

In 2023, we expended most field effort at the Meeteetse population. Consequently, the work we performed at Shirley Basin was limited to annual monitoring of prairie dogs and ferrets, particularly in the Main Area—a central location supporting a self-sufficient population of ferrets. Additionally, we performed nocturnal spotlight surveys near Chalk Mountain, which was discovered to support ferrets in 2021.

Prairie dog monitoring

As an annual census of prairie dog populations is not feasible, we have established 10-acre (200m x 200m) plots at randomly selected locations thought to contain a moderate to high density of prairie dogs in order to best represent quality habitat in the area. On three consecutive mornings in June between 0700 and 1200, Nongame Section personnel visited plots and scanned them with binoculars, counting each prairie dog. Personnel then quietly waited 10 minutes to allow the prairie dogs to resume normal behavior and repeated the count. The highest count over the three-day survey window, when adjusted by a detection index accounting for animals underground, acts as a time efficient estimate of the minimum density of prairie dogs within the plot.

Additionally, we performed burrow activity checks at 682 randomly selected prairie dog burrows. Personnel determined if each was "Active," "Likely Active," "Likely Inactive," or "Inactive." Surveyors evaluated burrows based on visual/aural detection of prairie dogs, presence/absence of fresh scat or digging, and the presence/absence of spider webs, vegetation, or soil blocking the burrow entrance. Using the ratio of Active:Inactive burrows, we obtained time-efficient estimates of prairie dog occupancy across large acreages.

In 2023, our prairie dog monitoring indicated the overall density of prairie dogs diminished slightly. Density ranged from 1.5 – 9.3 per acre, with an average of 4.04 per acre as compared to an average of 5.65 in 2022. We suspect that, like many wildlife species in the state, the harsh winter of 2022 – 2023 resulted in higher than normal rates of mortalities. Accordingly, our evaluations of randomly selected burrows indicated slightly higher rates of inactive burrows: 15% in 2023 compared to 10% in 2022. However, when pooled with burrows considered "Likely Active" and "Likely Inactive," the percentage of active burrows increases to 65%—the same rate as in 2022.

We did not locate any mammal carcasses able to be tested for sylvatic plague, and none of our landowner partners indicated signs of an epizootic. We are confident the prairie dogs at the Shirley Basin Reintroduction will continue to thrive, though we will continue to monitor annually.

Spotlight surveys

As in every year, we performed nocturnal spotlight surveys to quantify abundance of ferrets and number of littered produced. We spotlighted in August through September, when kits are leaving their mothers and are most active above ground. Each surveyor searched a plot of 500 – 800 acres (dependent on the number of fencelines or other obstacles). Between the hours of 2200 – 0000 and 0100 – dawn over 3 consecutive nights, surveyors used powerful spotlights to locate the emerald green eyeshine characteristic of ferrets. Each ferret we observed was recorded and a trap was deployed. We then checked deployed traps hourly until ferrets were captured or dawn, whereupon we removed traps.

Since 2020, due to concerns about ferrets' susceptibility to COVID-19, WGFD suspended full workups (e.g., anesthesia in an enclosed space, PIT tag implantation). Additionally, we asked prospective surveyors who tested positive for COVID-19 or felt ill not to attend the effort, and each person on hand wore N95 masks and nitrile gloves to minimize the potential for disease transfer from human to ferret. To minimize transfer of disease between ferrets, we sanitized all equipment (e.g., traps) with chlorhexidine between animals.

When we captured a ferret, we performed a minimal workup at the site of capture with the ferret remaining conscious and in its trap. After inspecting the ferret for injury, illness, and general body condition, we noted the sex and age. Second, we scanned for a PIT tag to indicate origin and year of birth, then vaccinated the ferret against sylvatic plague and canine distemper. We then marked each ferret with unique symbol using a non-toxic animal marker to enable easy subsequent identification. Finally, we applied 2 sprays of topical Frontline (0.29% fipronil), which granted protection from fleas and ticks for 1–2 months. We then released the ferret into the burrow from which it was captured.

In recent years, we surveyed in newly discovered areas supporting ferrets throughout the basin. To ensure the population at the Main Area of the SBRA remained in good health since the most recent visit in 2020, we focused most effort there in 2023. In total, we expended 442.75 hours of effort across 9,660 acres. We located at least 28 ferrets and 4 – 5 litters. Of these, we captured and vaccinated 11. Additionally, we surveyed near Chalk Mountain. As in 2021 and 2022, we located one adult female and her litter, indicating an adult male in the area that we did not observe, for a total of four known ferrets. We captured and vaccinated two.

Ferret releases

To help establish Chalk Mountain and Bone Creek as population sources, USFWS allocated 38 captive-bred ferrets to our recovery efforts in 2023. We released the animals shortly after spotlight surveys, which allowed the newly released ferrets to become familiar with their surroundings and to begin establishing home ranges of their own before the onset of winter. We released 19 ferrets (11 male:8 female) near Chalk Mountain and 19 (9 male:10 female) near Bone Creek. The precise location of each release depended on several factors. We released ferrets in high quality habitat close enough to allow interaction, but distant enough to prevent immediate territorial disputes, which can result in mortalities. Additionally, we selected release locations to maximize reproductive opportunities. For example, if we located a lone female which did not reproduce and no males during spotlight surveys, we could release one or more male kits in the vicinity.

It is an exciting time for the Shirley Basin Reintroduction Area. The Main Area remain self-sufficient and we have located multiple locations to which ferrets have dispersed, indicating the prevalence of quality habitat in the basin. The Nongame Section intends to continue monitoring prairie dogs and ferrets to enable fast response to potential population crashes. Additionally, we will continue to support the ferrets' natural dispersal with supplemental releases of captive-bred animals where appropriate, and continue to search for new ferret areas. We are confident Shirley Basin will continue to support ferrets for the foreseeable future.

White-tailed Prairie Dogs at the Meeteetse Reintroduction Area

Meeteetse Reintroduction Area (MRA)

The MRA was established in 2016 and brought ferrets back to the same lands where the species was rediscovered in 1981. It is primarily private but interspersed with some BLM and WY State Trust lands.

Plague mitigation

At its inception in 2016, 6,256 acres of the MRA was active White-tailed Prairie Dog colony. Nongame Section personnel documented wild breeding each year from 2016-2018. However, a sylvatic plague epizootic was detected in 2018. Hundreds of acres of prairie dog colony were subsequently lost, the abundance of ferrets dropped, and only a single ferret was detected during annual monitoring in 2020.

It is through the combined efforts of WGFD, BLM, USDA-WS, USFWS, and the Smithsonian Institution that ferrets and prairie dogs continue to persist on the MRA. Each year since 2016, the interagency group has collaborated to apply deltamethrin dust and fipronil coated grain to prairie dog burrows. These pulicides suppress of invertebrate ectoparasites like fleas and ticks, which transfer sylvatic plague between animals, and inhibit the disease's ability to spread.

In 2023, we treated 3,949 acres of the MRA. We focused on the central regions, where most prairie dogs and ferrets remain. Additionally, as ectoparasite populations can develop resistance to deltamethrin if used consistently for 7 years, we began rotating deltamethrin and fipronil spatially and temporally. In total, we deployed 109.5 pounds of deltamethrin and 10,325 pounds of fipronil coated grain. We are confident this interagency effort has averted a catastrophic loss of prairie dog populations, and will continually assess the need for treatments in future years.

Colony mapping

Accurate maps of prairie dog colonies are essential for targeting annual monitoring surveys and plague treatments as well as fulfilling Federal reporting mandates. While colony borders constantly fluctuate due normal cycles of abundance, disease outbreaks can greatly increase the rate of change.

There are multiple methods used for mapping colony, and we use a combination of two. First, Nongame Section personnel estimated colony borders remotely. Using the most recent freely available imagery (August 2020 via Google Earth), personnel circumscribed visible burrows. However, as burrows can remain visible even when vacant, field validation was necessary.

Personnel travelled along 30 meter transects to locate the first active burrow on the edge of a colony. Then, they located the next active burrow within 30 meters, and continued until the colony was circumscribed. Personnel later processed locations of the burrows into spatial polygons. In total, we mapped 3,876 acres of active colony at the MRA in 2023, a loss of 3,030 acres (38%) compared to before the sylvatic plague outbreak. However, we located 650 acres of newly created colony, mostly on the western periphery of the area.

Prairie dog monitoring

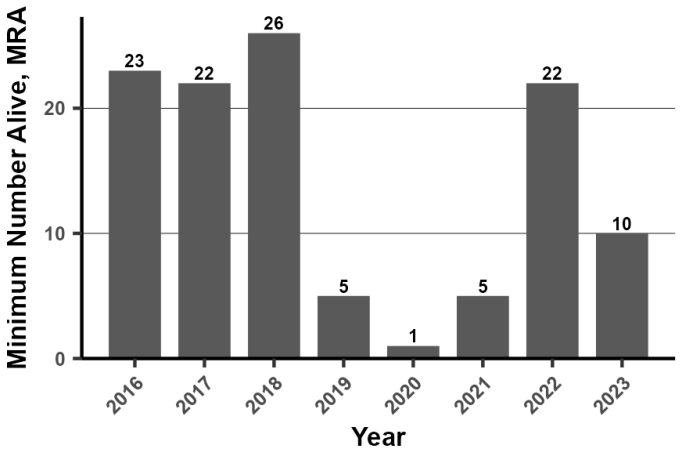
In 2022, annual surveys indicated a sizeable increase in the prairie dog population, indicating it may be recovering from the sylvatic plague epizootic. We repeated the surveys in 2023, using the same methods as in Shirley Basin, and noted a decrease in abundance.
Across 15 monitoring plots, density of prairie dogs ranged from 0.4 to 7.0 prairie dog per acre, with an average of 2.0 per acre. Accordingly, the percentage of Active:Inactive burrows across 876 randomly selected burrows was 32%—a small reduction from 35% in 2022.

We suspect that, as in Shirley Basin, there were higher than normal levels of mortality over the winter of 2022 – 2023. However, the prairie dogs that did

survive appeared exceptionally well fed, thanks to the lush vegetation. We noted no signs of disease, and the single testable carcass we located was negative for plague. We are optimistic that, with the milder winter of 2023 – 2024, the population is poised to resume its recovery in 2024

Spotlight surveys

Using the new colony borders as a guide, personnel expended 214.5 hours surveying 5,677 acres at the MRA. This acreage is larger than the amount of colony present, but as ferrets must traverse areas lacking prairie dog burrows, we too surveyed these areas. Using the same protocols as in Shirley Basin, we observed 5 unique ferrets, 3 of which were captured and vaccinated. Additionally, we located a litter of 5 wild born ferret kits, though did not capture any. All told, we can account for a minimum of 10 ferrets at the MRA in 2023.



Minimum number of ferrets alive at the Meeteetse Reindtroduction area determined by annual spotlighting surveys

Despite the abundance of ferrets at the MRA improving in 2022 and our hopes the population was recovering, we located fewer ferrets in 2023. We attribute this to two factors. First, the brutal winter of 2022 – 2023 resulted in high rates of winter mortalities in wildlife across the state. Despite being fossorial, ferrets and prairie dogs are not immune from winter hazards. Based on the local conditions, we suspect the hard winter resulted in higher rates of mortality than normal, though we cannot say for certain. Second, spring and summer of 2022 saw more precipitation than normal, resulting in exceptionally thick and lush vegetation. While very good for prairie dog productivity, the vegetation made eyeshine difficult to see ferrets. This combination of factors likely accounted for the smaller number of observed animals. We are optimistic the milder winter of 2023 – 2024 will enable the resumption of the positive trend.

In 2024, we will continue to monitor ferret habitat and population status in both reintroduction areas. In Meeteetse, we will continue to treat and monitor the sylvatic plague epizootic, as well as release captive-bred kits to support the area's continued recovery. In Shirley Basin, we will update or create maps of prairie dog colonies in the Main Area and Chalk Mountain. Depending on the number of captive-bred ferrets allocated to WGFD by USFWS, we will continue to support the establishment of Chalk Mountain and Bone Creek as population sources.

Prepared By: Andy Gygli, Small Carnivore Biologist

FUNDING SOURCE(S):

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Bureau of Land Management Grant
Wyoming Governor's Big Game License Coalition Grant
Smithsonian Institution Funds
Wyoming Game and Fish Commission Funds

2023 SWIFT FOX OCCUPANCY SURVEYS AND TRENDS

Swift Fox adult with kits / Credit: Justin Binfet

The Swift Fox is a small, tan and orange-colored canid about the size of a domestic cat. Historically swift foxes ranged across shortgrass and mixed-grass prairie habitats from Canadian provinces to portions of Texas. The species was extirpated from much of its range due to conversion of native habitats and predator control efforts in the late 19th and early 20th centuries. Eventually swift foxes became a species of concern in many states and provinces, and were petitioned for listing under the Endangered Species Act in 1992. Following review, the U.S. Fish and Wildlife service issued a "warranted but precluded" finding in 1995, and the species has since remained off the list of threatened and endangered species.

In Wyoming, swift foxes are classified as a Species of Greatest Conservation Need, with a native species status of NSS4. Since 2011, collaborative efforts of the Western Association of Fish and Wildlife Agencies' Swift Fox Conservation Team have resulted in refined range-wide survey methods and more consistent collection of distribution data across agency jurisdictions. Consequently, wildlife managers have an improved understanding of Swift Fox occupancy and population trends that was previously lacking. Maintaining consistent surveys across Swift Fox range is important as a means to monitor the status of the species, to understand impacts of stressors to populations at various scales, and to react accordingly with management actions as needed.

Occupancy surveys provide a framework to monitor the distribution of uncommon, cryptic, or secretive species. When applied across multiple years, occupancy surveys can be used to identify trends over time, including colonization and extinction dynamics at statewide and regional scales. Occupancy surveys for swift foxes in Wyoming were initiated in 2010, yielding the first baseline occupancy rate for the species within their known distribution and range. A subsequent survey was conducted in 2013, but due to resource constraints was focused only within Swift Fox distribution in the eastern portion of the state.

Between 2014 and 2017, managers began to receive increasing reports and confirmed observations of swift foxes in areas west of their known range in the state, and in habitats with higher shrub densities than were formerly considered suitable for the species. As a result, occupancy surveys were expanded in 2017 to include shrub and mixed-shrub habitats across much of Wyoming. Survey results found swift foxes present in areas previously unrecorded on the Wind River Indian Reservation and elsewhere in Fremont,

Sweetwater, and Uinta Counties. Results from 2017 occupancy surveys were then utilized by the Wyoming Natural Diversity Database (WYNDD) to update range maps for swift foxes in 2020.

In 2023, the same methodology and sampling distribution were used as in 2017 for statewide Swift Fox occupancy surveys. Objectives were to estimate current occupancy rates, to compare results to previous surveys, to gauge continued presence and colonization of swift foxes in novel habitats west of their former range boundary, to provide management recommendations based on current trends, and to contribute results to the range-wide dataset maintained by the Swift Fox Conservation Team.

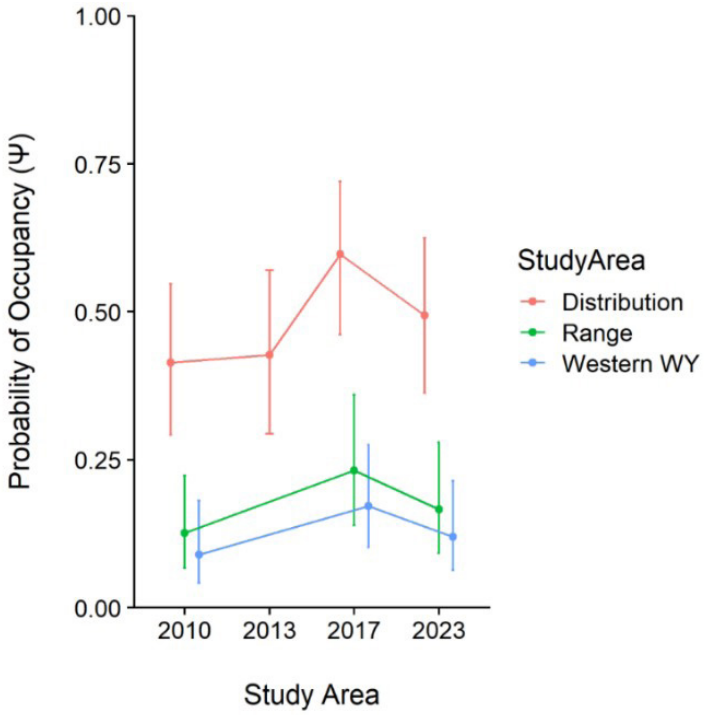
Original selection of grid cells and survey protocols are described in previous annual reports by Cudworth et al. (2011) and Van Fleet et al. (2014). Following the same standardized survey methodology, grid cells were surveyed statewide in 2023. Landowner contacts were attempted at least twice in order to obtain access to conduct surveys, though access was not granted for every selected grid cell. Surveyed grid cells were monitored using an array of five Reconyx Hyperfire 2™ cameras for five consecutive nights. Survey stakes were set in front of each camera, equipped with a long-distance lure of skunk essence suspended in petroleum jelly and sprayed with fish oil as an additional attractant. All surveys were completed between 24 August and 28 December 2023 to coincide with juvenile dispersal, as a means to maximize detection.

Detection data were combined from each of the five cameras to develop an encounter history for each grid cell. Surveyed grid cells were categorized spatially into three study areas: within predicted distribution ("Distribution"), within predicted range ("Range"), and west of predicted range ("Western WY"). Predicted range followed boundaries established by WYNDD prior to 2020 to remain consistent with data collected in previous survey years. Analyses were completed using the software package unmarked in Program R. A single year occupancy analysis was conducted for 2023, as well as a multi-season analyses across all four survey years.

A total of 113 grid cells were surveyed in 2023 for a total of 2,447 trap nights. Swift foxes were identified in 617 photos across 29 grid cells. Most detections (N=20) were within predicted distribution of Swift Fox, with additional detections at 5 grid cells within predicted range, and 4 grid cells west of predicted range. In addition to Swift Fox, 34 non-target species were detected on cameras. The most commonly detected species were pronghorn, jackrabbits, cottontails, and domestic livestock. A number of other mesocarnivores were also detected including coyotes, red foxes, striped skunks, and American badgers.

A Swift Fox detected on a trail camera during 2023 surveys.

Single season occupancy analysis of 2023 data yielded an overall statewide probability of occupancy (Ψ) of 0.27 (95% CI = 0.19 – 0.36). When analyzed by study area, the probability of occupancy within predicted distribution was 0.51 (95% CI = 0.35 – 0.66), within predicted range was 0.17 (95% CI = 0.07 – 0.36), and in areas west of predicted range was 0.10 (95% CI = 0.04 – 0.24). The predicted detection probability was 0.47 (95% CI = 0.38 – 0.56) across all study areas, as survey design was identical with no variables unique to any particular study area. Across all study areas, the estimated probability of occupancy for 2023 was lower than 2017 but higher than estimates for 2010 and 2013, and with considerable overlap of confidence intervals across all survey years.



Probability of occupancy (ψ; ± CI) of Swift Fox in Distribution, Range, and Western Wyoming study areas from September – December 2010, 2013, 2017, and 2023.

Results from 2023 surveys indicate a decline in Swift Fox occupancy statewide compared to 2017. Still, 2023 results estimate higher rates of occupancy compared to those from 2010 and 2013 surveys. Despite the decline between recent survey periods, swift foxes continued to be detected at higher rates within shortgrass prairie habitats in their predicted distribution, and at moderate rates within their predicted range. Swift foxes were also detected again in shrub habitats outside of predicted range in the state, though at lower rates than in 2017. Changes in access may have influenced these results, as grid cells on the Wind River Indian Reservation and several large corporate-owned ranches were inaccessible in 2023.

Despite shifts in survey access, predicted occupancy declined similarly across all three study areas, which may suggest impacts from a large-scale variable or variables. Documented severe winter conditions in 2022-23 may have resulted in higher mortality rates and/or lower reproductive success for swift foxes during the 2023 survey period. Other landscape-scale changes in predator or prey populations, disease prevalence, or a combination of variables also may have impacted Swift Fox populations between survey periods.

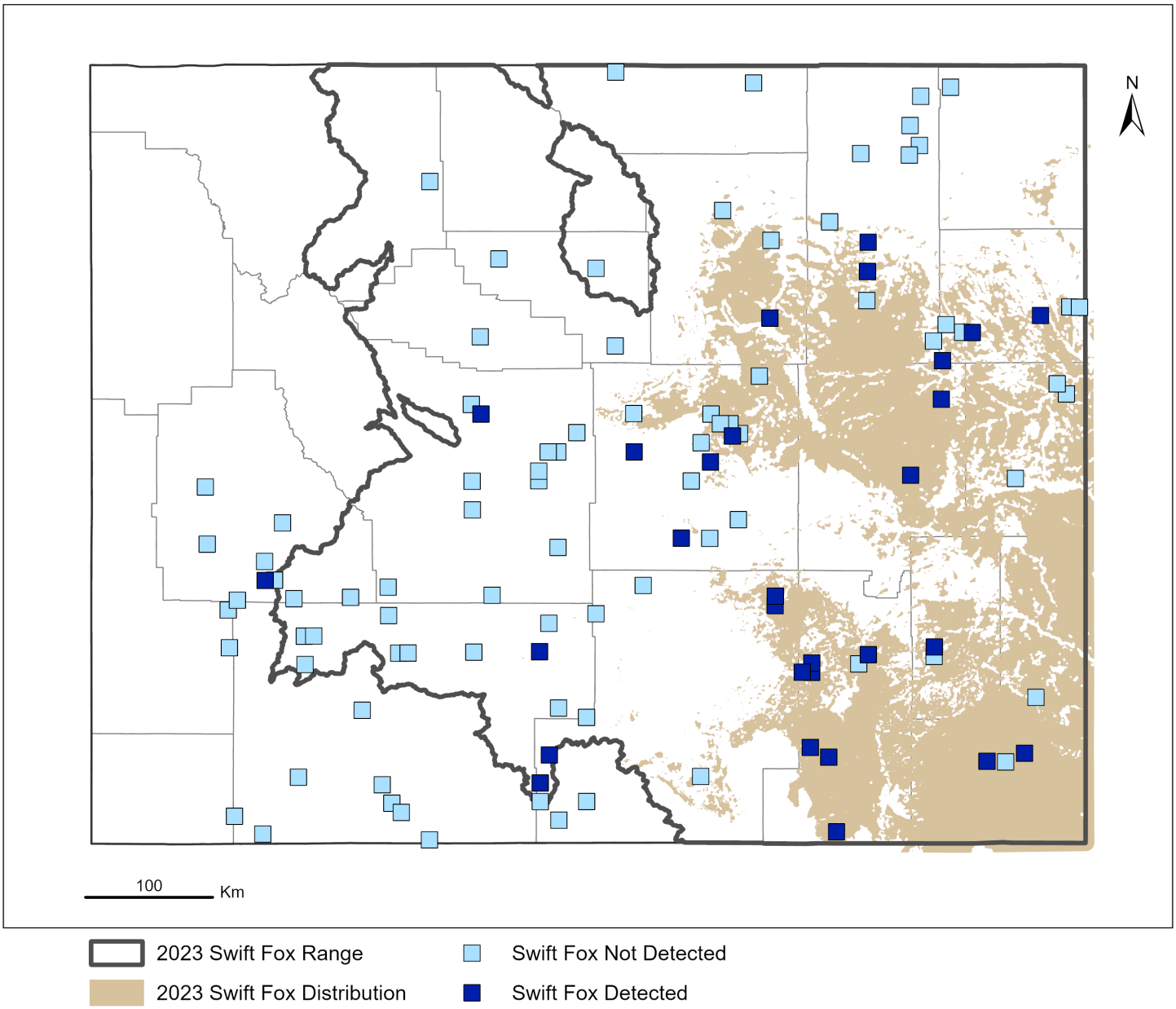
Results from 2023 occupancy surveys will be used to inform ongoing Swift Fox research projects in the state. As part of a cooperative reintroduction project, managers translocated swift foxes from Wyoming to Fort Belknap, Montana in 2020 and 2022. Confirming a healthy population status for swift foxes via occupancy surveys was a condition of the project continuing in 2024. Since occupancy estimates remain relatively stable compared to previous survey years, managers will proceed with the final year of translocations of swift foxes from southeast Wyoming.

Additional research projects seek to evaluate the expansion of swift foxes into shrub habitats in the state. Results from occupancy surveys have helped to inform the selection of capture sites for this study, and movements of GPS-collared swift foxes have helped to define home range sizes in novel habitats. Results will also be used to update definitions of suitable habitat, to inform better management decisions for swift foxes in Wyoming.

Occupancy surveys are an appropriate, repeatable technique to monitor trends in Swift Fox distribution at a statewide scale over time. Trend data produced by repeated occupancy surveys helps to identify relationships and influences of environmental and habitat variation on Swift Fox populations, and coordinating surveys across agency jurisdictions helps to manage and conserve Swift Fox populations across the west.

Prepared By: Heather O'Brien, Nongame Mammal Biologist

Results of Swift Fox occupancy surveys in Wyoming, 2023.



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