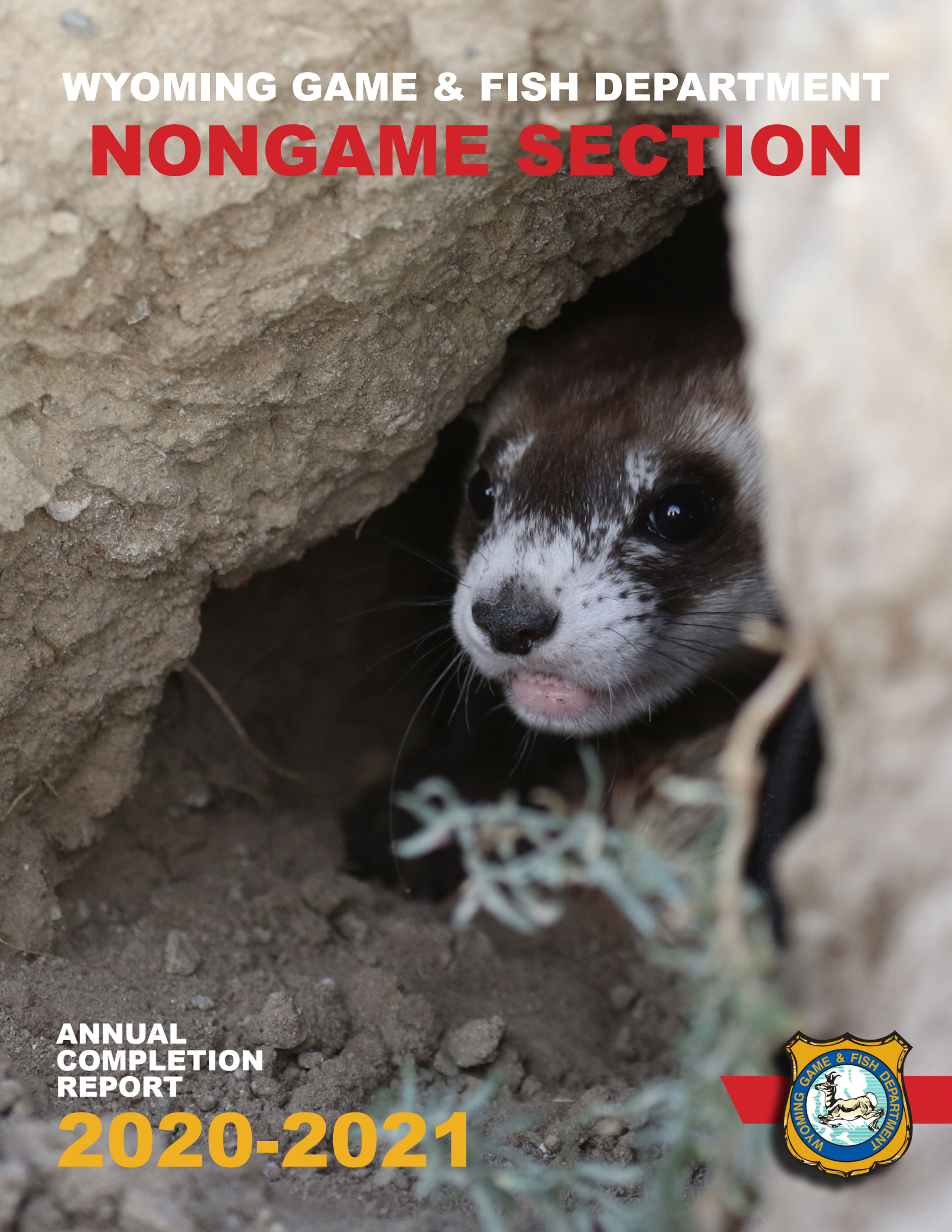
WYOMING GAME & FISH DEPARTMENT

NONGAME SECTION



ANNUAL COMPLETION REPORT

2020-2021

NONGAME SECTION

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The reports included in this document are the annual summaries of current work the Nongame Section has completed from April 15, 2020 - April 15, 2021. If additional information is needed for any of the projects listed in this report, please contact the Nongame Section at (307) 332 - 2688.

Report compiled by: Christine Peterson

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Front and back cover photos: Mark Gocke

TRANSCONTINENTAL TRAVEL: MIGRATION OF WYOMING'S BURROWING OWLS ACROSS NORTH AMERICA

Burrowing owl. Photo: Mark Gocke

Burrowing Owls used to be common across grasslands in the United States and Canada during the summer breeding season. However, in some parts of the owls' breeding range, decades of survey data show that their populations have declined and their distribution has contracted. To understand the reasons why, we also need to know where Burrowing Owls spend the winter months and their migration pathways between their breeding grounds and wintering grounds.

The Burrowing Owl is listed as a Tier II (moderate conservation priority) Species of Greatest Conservation Need in the 2017 Wyoming State Wildlife Action Plan with a Native Species Status of Unknown (NSSU; WGFD 2017). The reasons for this listing include currently unknown population trends, habitat loss or a decline in the quality of habitat, and land use practices that may be incompatible with the owls.

One potential cause of declines is the elimination of prairie dogs across the owls' range. All year-round, Burrowing Owls need prairie dog burrows for nesting sites, shelter, and to escape from predators. Other potential causes of declines include control of grasshopper outbreaks (an important food item), changes in prairie dog populations due to the disease plague (thus, fewer burrows available for the owls), or problems along the owls' migration routes or on their wintering grounds.

To address knowledge gaps, Game and Fish became a partner in a regional Burrowing Owl study that includes 12 states and 3 provinces. The purpose of this collaborative study is to document the migration routes and wintering areas of owls that breed in the western United States and Canada. Since 2013, about 100 Burrowing Owl adults have been captured on their breeding grounds across the region and fitted with solar-powered transmitter backpacks so biologists can follow their seasonal movements. We call this a full annual cycle conservation project.

In 2020, we received nest site locations (potential trapping sites) from 25 contributors representing 6 private citizens and 5 organizations across Wyoming: Bureau of Land Management Pinedale and Rawlins Field Offices, University of Wyoming Cooperative Fish and Wildlife Research Unit Chalfoun Lab, Wyoming Game and Fish Department, Aster Canyon Consulting, Great Plains Wildlife Consulting, and Teton Raptor

Center. We had 22 volunteers across the state help us capture owls. We also received permission from 2 private landowners and the Buckskin Mine Company to trap Burrowing Owls on their properties, and we thank them for allowing us to access their lands to advance this project. We received funding from 3 sources in 2020, for which we are extremely grateful.
A warmer, drier spring and summer made captures more challenging than in 2019, when cooler daytime temperatures allowed us to catch owls effectively during daytime hours on most days. Hotter weather in 2020 accelerated the nesting phenology by a couple of weeks, so juvenile owls were more mature and fully flighted, making captures of adults at nesting burrows more difficult.

We trapped Burrowing Owls during 9 days (6-14 July 2020) at 16 nest sites in 7 locations: Jonah (southwest of Pinedale), Boulder (southwest of Boulder), Farson (north of Farson), Chain Lakes Wildlife Habitat Management Area (northeast of Wamsutter), Huntley (southeast of Huntley), Buckskin Mine (north of Gillette), and Thunder Basin National Grasslands (east of Bill). We captured Burrowing Owls in all 7 locations.

We used 3 types of traps to capture owls—a 2-way trap on female nest burrows, a 2-way MP3 player trap on male burrows (the MP3 played the male's "coo-coo" territorial call), and a bow-shaped spring trap baited with a live mouse. We caught owls in all 3 types of traps; however, both types of 2-way traps were less successful at capturing adults in 2020 than in 2019 due to the more advanced nesting phenology in 2020. We had 63 total captures of 53 individual Burrowing Owls: 10 adults (2 males and 8 females) and 43 juveniles (we recaptured 10 of those juveniles). We attached a uniquely numbered federal leg band on each captured owl, and put a solar-powered PTT satellite transmitter backpack unit on 13 owls (2 adult males, 8 adult females, and 3 juveniles), including 1 pair where both the male and female of the pair were transmitted.

A Burrowing Owl is fitted with a PTT transmitter. Photo: Mark Gocke

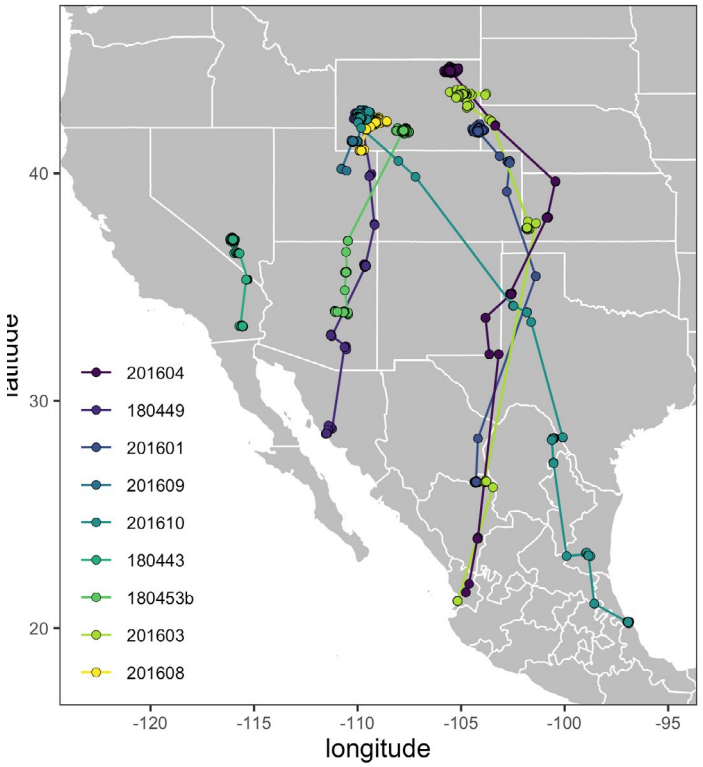


Figure 1. Fall migration routes and wintering locations of 8 Wyoming Burrowing Owls, including 7 that were transmitted in 2020 and 1 (#180449) that was transmitted in 2019 near Pinedale, wintered in Sonora on the west coast of Mexico, returned to Pinedale in spring 2020, and is again wintering on the Sonoran coast.

Juvenile owls ranged in age from about 25-45 days old, compared to about 13-24 days old during the same timeframe in 2019. This allowed us to deploy transmitters on juvenile owls for the first time in this entire multi-state and province study. We hope to obtain migration and natal dispersal data from these juveniles, and we plan to deploy more transmitters on juveniles in 2021.

To date, we have results of the 2020 fall migration for 8 Wyoming owls (1 transmitted in 2019 and 7 transmitted in 2020; Figure 1), and the start of 2021 spring migration. We received infrequent locations during the winter because of the shorter day-lengths and more overcast skies, but we see increased action in the spring as the days get longer, the solar-powered transmitters recharge, and the owls begin their northward migrations back to their breeding grounds.

MIGRATION HIGHLIGHTS

4 of the transmittered Burrowing Owls started their fall migration movements on 5 October 2020 – a female from Thunder Basin National Grassland, a female from the Huntley area, a juvenile from the Boulder area, and a juvenile from the Chain Lakes Wildlife Habitat Management Area.

On 17 October 2020, 7 owls were actively engaged in fall migration – 2 were in Utah, 1 was in Arizona, 1 was in Nebraska, 1 was in Kansas, 1 was in Texas, and 1 was on the west coast of Mexico in the state of Sonora.

A female owl transmittered in the Boulder area crossed over the Rocky Mountains in Colorado on her southward migration (a first in this tri-national study), was the first transmittered owl from Wyoming to enter Mexico in mid-October, was the first owl in this entire study to winter on the east coast of Mexico in Veracruz, is the first transmittered owl from Wyoming to start the 2021 northward spring migration, and is the first transmittered owl from Wyoming to reach the United States. After traveling up the eastern coast of Mexico, she stopped over near Lubbock, Texas on 28 March 2021, and is now back in Wyoming in her 2020 breeding area (Figure 2).

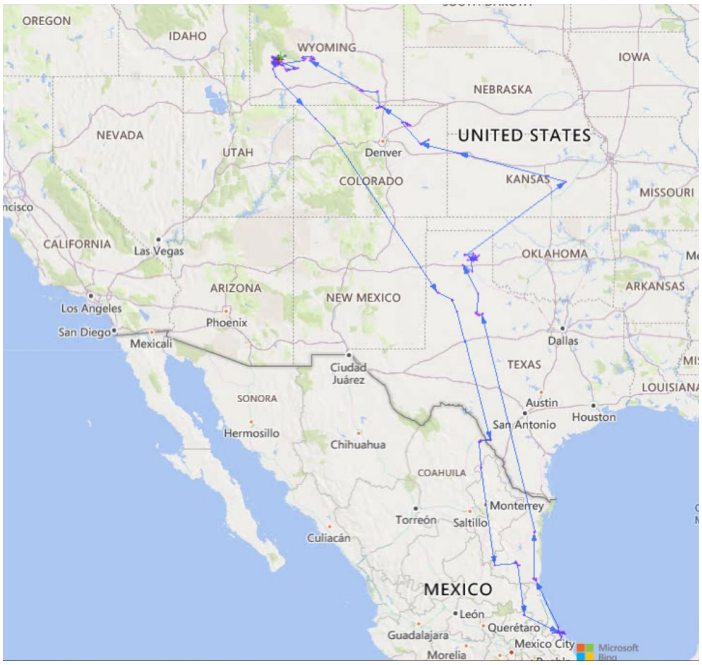


Figure 2. Fall migration, winter location, and the initiation of spring migration for a female Burrowing Owl captured southwest of Boulder, Wyoming in 2020.

Thus far, for Burrowing Owls that breed in Wyoming, the timing and length of migrations and stopovers varies; parts of Texas, Colorado, Utah, and Arizona are key migratory stopover hotspots, and several locations in Mexico are important wintering grounds, including the west coast of Sonora, the east coast of Veracruz, and several states in the central portion of the country.

A Burrowing Owl wears a PTT transmitter. Photo: Mark Gocke

Prepared by: Andrea Orabona, Nongame Bird Biologist and Dr. Courtney Conway, USGS University of Idaho Cooperative Fish and Wildlife Research Unit
Funding sources: Wyoming Game and Fish Commission, Arch Coal / Black Thunder Coal Mine, Navajo Transitional Energy Company, and Eva Crane (private donor)

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

The Trumpeter Swan (swan) is an uncommon resident in Wyoming (Orabona et al. 2016). 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; WGFD 2017). In 1989, the Tri-State Area Flock (TSAF; Wyoming, Montana, and Idaho) was petitioned for listing as a Distinct Population Segment (DPS) under the Endangered Species Act. However, in 2003, the US Fish and Wildlife Service (USFWS) determined that listing was not warranted because the Tri-State Area flock did not represent a DPS (USFWS 2003).

Trumpeter Swans have been a focal management species for federal and state agencies in the Greater Yellowstone Area (GYA) or the Tri-State Area since the establishment of Red Rock Lakes National Wildlife Refuge in Montana in 1932. This refuge was created to conserve about 70 swans in the GYA, which were believed to be the last remaining Trumpeter Swans in the world. Due to conservation efforts, the number of swans in the GYA increased to >600 by the 1950s (USFWS 1998). However, the population has fluctuated greatly since that time, dropping to a low of 239 white birds (adults and subadults) in 1994. The total number of adult birds in the GYA exceeded 500 white birds in 2015 for the first time since 1967 (Olson 2020). This non-migratory segment of the population remains of concern, even though Trumpeter Swan populations in Alaska, interior Canada, and the mid-western states have been increasing (Groves 2012).

The Pacific Flyway Council (PFC) coordinates management of this swan population and designated swans that nest and reside year-round in the GYA, including western Wyoming, as the TSAF. The TSAF are managed as part of the US segment of the Rocky Mountain Population (RMP) of swans, which includes those that nest in interior Canada and migrate south to winter in the GYA (USFWS 1998). Game and Fish coordinates with the USFWS Mountain-Prairie Region Migratory Bird Office and the states of Idaho and Montana to census the number of mature swans and young of the year (cygnets) in the TSAF. Since the late 1980s, Game and Fish has worked to expand summer

A pair of adult trumpeter swans and their cygnets. Photo: USFWS

and winter distribution of swans in Wyoming (Patla and Oakleaf 2004). These efforts have established a new nesting population in the Green River Basin. Since 2004, Game and Fish has cooperated with willing landowners to restore and create summer habitat in the Upper Green River Basin to accommodate this expanding resident flock (Patla and Lockman 2004, Lockman 2005).

Game and Fish is a member of the Greater Yellowstone Trumpeter Swan Working Group, which consists of state and federal agencies, non-governmental organizations, and interested citizens. The Working Group meets annually to discuss productivity and population trends and to coordinate management actions. Wyoming also coordinates with the PFC RMP Trumpeter Swan Study Sub-committee.

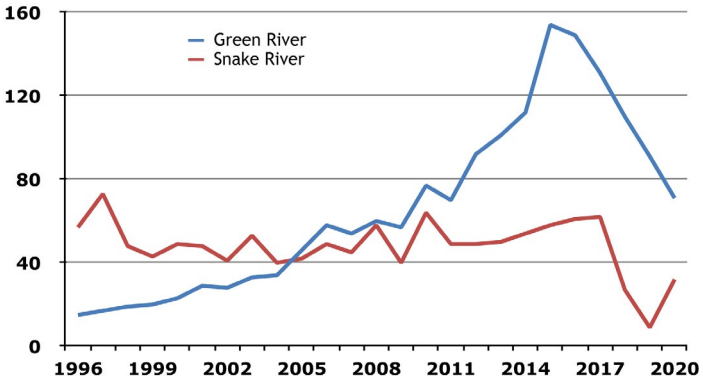


Figure 1. Trumpeter Swan population trend for the core Snake River and Green River expansion areas.

This report summarizes management and monitoring efforts for swans in western Wyoming for the 2020 nesting season. We conducted 3 fixed-wing airplane surveys to collect swan data, and used the same pilot (Mark Packila, Wildlife Air) and Scout aircraft to fly all surveys. Flying elevation averaged 100-230 feet above ground level depending on terrain and surface winds; flight speed varied between 85-100 mph. We counted white birds (adults and subadults) and gray cygnets (young).

We surveyed swan nesting areas between 28 May and 3 June to determine nest occupancy. We checked 52 core/Snake River territories and 86 expansion sites (1 was not surveyed). Figure 1 presents 2020 results from the Green River expansion area (other expansion areas, e.g., the Salt River and Wind River, are not included). Approximately 12 additional Trumpeter Swans sightings were documented in 2020.

On 2 and 3 July, we surveyed the previously occupied nests for productivity and counted the number of young (cygnets) fledged.

The fall survey was coordinated by USFWS in the Tri-State Area. On 21 and 23 September 2020, we flew the Wyoming portion of the fall survey. We counted 133 white birds and 44 cygnets in the Game and Fish portion of the fall survey (not including Yellowstone National Park). We counted in the core/Snake River area a total of 32 white birds and 11 cygnets, and in the expansion area 101 white birds and 33 cygnets.

Additional swan data were collected or provided through site-specific ground surveys, reports provided by federal agencies, and observations from the public. 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 (Olson 2020).

Compared to the 1990s, the status of the resident Wyoming Trumpeter Swan population has greatly improved. Both number and distribution of swans have increased, as well as the amount of important wetland habitat. However, certain risks still need our attention, including climate change, drought, diseases, an increase of wintering swans, and human developments and disturbance) still need our attention.

Prepared by: Andrea Orabona, Nongame Bird Biologist

SUMMARY OF PEREGRINE FALCON MONITORING IN WYOMING

Peregrine Falcon. Photo: USFWS

Peregrine Falcon (*Falco peregrinus*; hereafter peregrine) is an uncommon resident bird of prey found throughout most of Wyoming (Orabona et al. 2016). The species primarily nests in cliff and ledge habitats with proximity to open areas for foraging. Nesting peregrines were nearly extirpated from Wyoming in the 1970's largely due to organochlorine pesticides commonly used in agriculture and forestry practices from approximately 1940 through the 1970's. These pesticides bioaccumulated at toxic levels in their prey species and consequently reduced peregrine eggshell thickness such that nesting success rates declined significantly (White, et. al 2020). In 1970, peregrines were listed as Endangered under the 1969 Endangered Species Conservation Act (subsequently the 1973 Endangered Species Act) and also afforded legal protection under the 1972 Migratory Bird Treaty Act.

Efforts to breed and release peregrines throughout North America commenced in the late 1960's and regional recovery plans were developed after the species was listed, highlighting the need to significantly reduce organochlorine pesticide use. From 1978-1983, no known nesting pairs were located in Wyoming. However, from 1980-1995, 384 captive produced young were released in Wyoming (Oakleaf and Craig 2003, Enderson et al. 2012, Baril et al. 2015). In 1984, the first nesting pair was documented and by 2015, there were at least 121 known nesting territories in Wyoming, primarily in the western and central portions of the state. Peregrines were delisted at the national level in 1999.

Game and Fish, Yellowstone National Park (YNP), and Grand Teton National Park (GTNP) continued monitoring peregrine nesting success through 2015 using a standard raptor monitoring protocol and terminology (Steenhoff and Newton 2007), as well as components of the US Fish and Wildlife Service (USFWS) post de-listing protocol (Green et al. 2006). Three general survey areas were monitored: YNP; Bridger-Teton National Forest, GTNP, and adjacent areas; and the Shoshone and Bighorn National Forests and adjacent areas. Said efforts included occupancy and production surveys. Fledging dates, when possible, were documented. Subsequent to these efforts, annual monitoring sites were chosen for each geographic region.

Efforts to monitor peregrine nesting success were warranted beyond 2015 due to the significant investment for recovery, continued high public interest, potential risks from diseases like West Nile Virus, other potentially detrimental compounds that have the potential to become concentrated in the food chain such as brominated flame retardants (Baril, et al. 2015) and other organochlorine contaminants in

peregrine prey (DeWeese 1986). Currently, Game and Fish designates peregrines as a Species of Greatest Conservation Need with a Native Species Status 3 (NSS3), Tier 2 (moderate conservation priority). The reasons for this listing include disturbances associated with human activity, potential for chemical poisoning, extreme wet and dry climatic events, and inclement weather during the nesting and nestling periods (WGFD 2017).

To facilitate clarity in reporting, data for four regional survey areas are presented: GTNP, YNP, Western Wyoming, and Central Wyoming. Each include five annual monitoring sites. A variable number of additional sites in all regional survey areas are visited each year and important for future efforts in the event an annual monitoring site must be replaced due to peregrine abandonment, access issues associated with the nesting site, or to document newly established nesting locations. A summary of 2020 survey efforts is presented below, followed by a productivity summary by regional survey area from 2016-2020.

2020 PEREGRINE MONITORING RESULTS

Fifty-four nesting sites were visited during 2020. Of that total, eight were not occupied and occupancy for two sites was unable to be determined, likely due to timing of survey. A total of 63 young were documented at occupied sites. Three of the sites visited in 2020 are newly documented sites; one of them produced two young. An additional potential site was visited just after young reportedly fledged, but only one adult peregrine was observed in the vicinity. Attempts will be made to visit these sites during the 2021 breeding season.

Observers visited 19 of the annual monitoring sites in 2020. 17 were occupied and produced 18 young (Table 1). One Central Wyoming site was visited after the mean fledge date and occupancy is unknown. One Western Wyoming site is considered abandoned. It has not produced young since 2015 and has not been occupied since 2016. Access to a second Western Wyoming annual monitoring site has become problematic and was last documented as occupied in 2015. Two additional nesting locations with documented recent occupancy and production were chosen to replace the previously discussed Western Wyoming annual monitoring sites for survey year 2021. 35 additional peregrine nesting sites were visited in 2020. Twenty-seven were occupied and 45 young were observed.

Regional Survey Area	Annual Monitoring Sites Visited	Number That Were Occupied	Total Young Observed
Central Wyoming	5	4	6
GTNP	5	4	1
Western Wyoming	4	4	5
YNP	5	5	6

Table 1: Summary of annual peregrine falcon monitoring sites by regional survey area for 2020.

2016-2020 PEREGRINE PRODUCTIVITY

Young per visited monitoring site was calculated for survey years 2016 to 2020 (Table 2). GTNP results are presented, but they are not included in the survey wide average. While GTNP survey effort appears to meet protocol, Game and Fish does not have enough information at this time about specific nesting sites and associated data that may provide details about low productivity numbers. GTNP personnel will be contacted to discuss before 2021 survey efforts commence.

Research suggests when productivity rates average between 1.0 and 2.0 young per occupied territory,

	Young per Visited Monitoring Site (Number of Sites Visited Meeting Survey Protocol)				
Regional Survey Area	2016	2017	2018	2019	2020
Central Wyoming	1.5 (2)	1.6 (5)	1.2 (5)	1.4 (5)	1.5 (4)
GTNP	2 (5)	0.8 (5)	0.6 (5)	0.8 (5)	0.2 (5)
Western Wyoming	0 (1)	0.75 (4)	1.5 (4)	3 (2)	1.25 (4)
YNP	0.5 (4)	1 (4)	2 (3)	1.8 (5)	1.2 (5)
Additional Sites	1.1 (19)	0.8 (16)	1 (17)	1.3 (22)	1.3 (35)
Average Young per Site per Year*	0.7	1.1	1.6	2.1	1.3

*does not include GTNP or additional sites

Table 2: Young per visited monitoring site for regional survey areas and additional sites, 2016-2020.

Adult Peregrine Falcon and chicks. Photo: USFWS

Peregrine Falcon chick. Photo: USFWS

populations are stable to increasing (USFWS 2003). 2016 survey wide productivity appears to be influenced by the Western Wyoming regional survey area's relative lack of sites visited (n=2) coupled with no young observed. Additionally, the number of sites visited and survey timing may have influenced 2016 and 2017 productivity calculations for the Western Wyoming regional survey area. Game and Fish intends to perform a more rigorous analysis of peregrine productivity trends in Wyoming following the 2021 survey year and determine whether current monitoring efforts require adjustments going forward.

In summary, we recommend continuing surveys for annual monitoring sites in each of the four regional survey areas in conjunction with multiple agencies and a variety of experienced and committed observers. Observers should be provided with site specific information to ensure that occupancy and productivity data are as accurate as possible. Observers should still plan on at least 1 day in July to record nesting success, and if possible, conduct additional site visits prior to a site's calculated mean fledging date. We also recommend continued efforts to document nesting success at additional known sites throughout the state.

We wish to thank the many highly experienced volunteers, active and retired biologists from Game and Fish, Yellowstone National Park, Grand Teton National Park, Bighorn National Forest, Bridger-Teton National Forest, Caribou-Targhee National Forest, Shoshone National Forest, and other resource management agencies for their valuable contributions to monitoring peregrine nesting locations since 2016. The continued dedication of these individuals and agencies to this monitoring effort makes it possible to collect long-term peregrine production data in Wyoming.

Prepared by: Courtney Rudd, Nongame Biologist
Funding source: Wyoming Game and Fish Commission


Bald Eagle. Photo: USFWS

BALD EAGLE MONITORING IN WESTERN WYOMING

The Bald Eagle (*Haliaeetus leucocephalus*) is an uncommon resident in Wyoming (Orabona et al. 2016). It is classified as a Species of Greatest Conservation Need in the Wyoming State Wildlife Action Plan with a Native Species Status 3 (NSS3), Tier II (moderate conservation priority), due to limited population size and breeding distribution, and vulnerability to human disturbance during the breeding season (WGFD 2017).

Game and Fish initiated statewide monitoring for Bald Eagles in 1978. Although Bald Eagles nest along all major river systems in the state, 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 the northwestern part of the state have long been recognized as part of a distinct population that nests in the Rocky Mountain west. This genetically distinct population extends into Idaho and Montana (Swenson et al. 1986). Management guidelines have been developed for nest sites in the GYA based on a long-term ecological study, and provide valuable information for avoiding disturbance to nesting eagles (GYBEWG 1996). Recovery of the species in Wyoming centered on the Jackson area, beginning in the 1980s. The numerous territories located along the Snake River continue to serve as a source of Bald Eagles for other areas of the GYA and other parts of Wyoming (Harmata and Oakleaf 1992). Since 2000, we have also documented a substantial increase in the number of pairs that nest in the Green River Basin.

In 2020, we conducted aerial surveys over portions of western Wyoming to monitor occupancy and productivity at a majority of known Bald Eagle nesting territories. Fixed-wing aircraft surveys were conducted in early April to document the number of occupied sites with incubating adults, and in late May and early June to determine number of mature young produced per site. Due to the COVID-19 pandemic, passengers were not allowed onboard the aircraft. However, our long-term pilot for these surveys, Mark Packila, is familiar with these nesting territories and was able to conduct all the work and collect necessary data for the WGFD. During aerial surveys, he recorded the number of adult and young Bald Eagles observed, UTM coordinates of nests, condition of nests, and species of nest tree. He also documented 6 new nest sites in the GYA in 2020.

The Army Corp of Engineers requests nest site data on the Snake River adjacent to the dike system in order to

Nesting Data Collected in 2020	Results
Territories checked for occupancy (n)	106
Territories occupied (n)	83
Percent of territories occupied	78%
Territories unoccupied (n)	22
Percent of territories unoccupied	21%
Territories with unknown status (n)	1
Percent of territories with unknown status	1%
Pairs that initiated nesting (n)	70
Percent of pairs that initiated nesting	84%
Pairs that failed (n)	12
Percent of pairs that failed	14%
Pairs with unknown status (n)	1
Percent of pairs with unknown status	1%
Pairs that produced young (n)	60
Percent of pairs that produced young	86%
Mature young produced (n)	77
Number of young per successful nest	1.28

Summary of Bald Eagle nesting data collected in 2020.

schedule maintenance projects, and provides funding for this aerial survey work.

We evaluated the 2020 nest sites for occupancy and productivity (Table 1). Of the 106 nest sites checked, 83 were occupied with 1 or more adult birds, 22 were unoccupied, and the status of 1 nest was unknown. Of the 83 occupied nests, 70 pairs initiated nesting, 12 pairs failed, and the status of 1 pair was unknown. Of the 70 pairs that initiated nesting, 60 pairs produced a total of 77 young. The number of young produced per successful nest was 1.28. The 2020 nesting data for the GYA indicate that current productivity (the number of young produced per occupied site) is within the historic range (GYBEWG 1996).

In the future, additional surveys may be needed in areas where energy developments (oil, gas, and wind) occur or are proposed along major drainages or known migration routes and wintering areas. In areas undergoing high levels of development along major river corridors, we hypothesize that Bald Eagles could experience higher mortality rates, lower productivity, or loss of nest sites if adequate mitigation measures are not applied. In addition, aging stands of cottonwood trees that are failing to regenerate may also reduce nesting habitat in some areas.

Immature Bald Eagle. Photo: USFWS

Prepared by: Andrea Orabona, Nongame Bird Biologist
Funding sources: US Army Corps of Engineers and the Wyoming Game and Fish Commission

COMMON LOON RESEARCH AND MONITORING IN WYOMING

Common Loon. Photo: Mark Gocke

The Common Loon (*Gavia immer*; hereafter loon) is an uncommon summer resident in Wyoming (Orabona et al. 2016). It is classified as a Species of Greatest Conservation Need (SGCN) with a Native Species Status 1 (NSS1), Tier I (highest conservation priority) in the Wyoming State Wildlife Action Plan (WGFD 2017). Loons in Wyoming have an extremely small and isolated breeding population that is at risk of extirpation, are very sensitive to human disturbance and recreation activities, and have very limited and specific breeding habitat. Loon nesting sites in Wyoming are currently restricted to the Greater Yellowstone Ecosystem (GYE), making this the rarest breeding bird species in the state. Since 1987, biologists with the Game and Fish Nongame Program and Yellowstone National Park (YNP) have been monitoring loon occupancy and productivity in nesting areas within the GYE. This continues to be a cooperative effort in conjunction with personnel from the Caribou-Targhee National Forest (CTNF), Bridger-Teton National Forest (BTNF), Grand Teton National Park (GTNP), Biodiversity Research Institute (BRI), and Rickett's Conservation Foundation (RCF).

The GYE loon population has historically been about 21-23 territorial pairs. Some territories are not occupied every year, some territorial pairs use multiple lakes, and other pairs may not nest (Evers et al. 2019). A decline to 14 pairs was noted between 2006-2013 (Spagnuolo et al. 2016). To address multiple and complex issues with loon management and conservation in the GYE, a collaborative and comprehensive partnership began in 2013 with representation from the WGFD, YNP, CTNF, BTNF, GTNP, BRI, and RCF to investigate and understand the status of the Common Loon population, assess threats to loon survival and reproduction, and inform management actions (Spagnuolo et al. 2020a). In 2019, the Shoshone National Forest (SNF), Wind River Indian Reservation (WRIR), and Idaho Department of

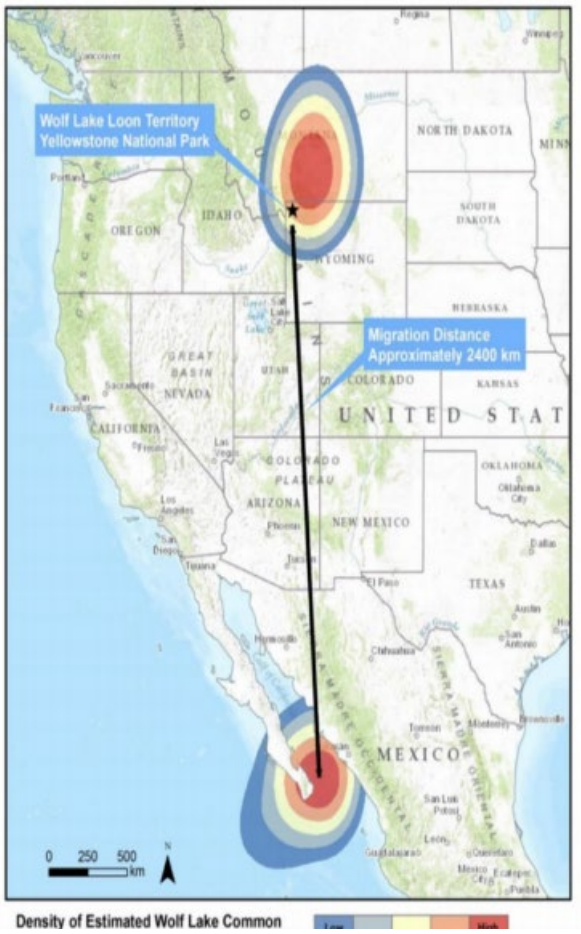


Figure 1. Movement of a female Common Loon from the GYE population in Wyoming based on geolocator data. Density range: blue=low, red=high.

Fish and Game were included in this working group to further accomplish annual loon population and conservation objectives.

Starting in 2012, BRI has aimed to better define loon territories, locations of nest sites, and reproductive success using shoreline, boat, and aerial surveys. From 2013-2019, 20 adult and 13 young loons were captured and sampled (including 5 adult recaptures and 7 chicks that were too young to band), and 8 adult loons were fitted with geolocators (Evers et al. 2019). We use geolocators to calculate the loon's approximate location (latitude and longitude) by recording sunlight levels over time, which is then used to identify approximate migration routes and wintering areas (Evers et al. 2019; Figure 1). To retrieve location information, we need to

Common Loon and chicks. Photo: Mark Gocke

recapture loons and remove the devices, but that was not possible in 2020 due to the pandemic.

In 2020, RCF staff and volunteers conducted Common Loon monitoring from 30 April through August 31 in YNP, GTNP, CTNF, BTNF, SNF, WRIR, and on private lands in Idaho (Spagnuolo et al. 2020b). Due to the COVID-19 pandemic, BRI did not capture, tag, or sample any loons outside of Yellowstone National Park. Within YNP, BRI staff attempted to a capture loons at one lake. However, the pair had no chicks and the capture attempt was unsuccessful (Dave Evers, personal communication).

For more information on Common Loon research and management, contact the WGFD Nongame Section at the Lander Regional Office.

Prepared by: Andrea Orabona, Nongame Bird Biologist
Funding Sources: Ricketts Conservation Foundation, Wyoming Game and Fish Commission, and Yellowstone National Park

USING THE BREEDING BIRD SURVEY TO MONITOR POPULATIONS OF AVIAN SPECIES IN WYOMING

The Breeding Bird Survey (BBS) has provided long-term monitoring of a variety of avian species in Wyoming since 1968. The BBS is used to monitor trends of breeding birds across North America. The BBS is sponsored jointly by the United States Geological Survey (USGS) Patuxent Wildlife Research Center (PWRC) and the Canadian Wildlife Service. This roadside survey methodology was field tested in 1965 and formally launched in 1966, with 600 routes established in the United States east of the Mississippi River and in Canada (Sauer et al. 1997). In 1967, the BBS spread to the Great Plains states and prairie provinces. By 1968, about 2,000 BBS routes were set up across southern Canada and the contiguous 48 states, and more than 1,000 routes were surveyed annually; establishment of Wyoming's routes were included in this effort. During the 1980s, the BBS expanded further into Alaska and Canada's Yukon and Northwest Territories, and additional routes were added in many states. Today, over 4,600 BBS routes are located across the continental United States and Canada, including 108 active routes in Wyoming (Figure 1).

Red-breasted Nuthatch. Photo: Frank Stetler

The BBS was designed to provide a continent-wide perspective of avian population change. All routes have been randomly located in order to sample habitats that are representative of the entire region. Other requirements are needed to produce comparable data over time (consistent methodology, observer expertise, visiting the same stops each year, and conducting surveys under suitable weather conditions; Sauer et al. 1997). A large sample size (i.e., number of routes conducted) is needed to average local variations and reduce the effects of sampling error (i.e., variation in counts attributable to both sampling technique and real variation in trends).

BBS data can estimate population trends and relative abundance of individual species at continental,

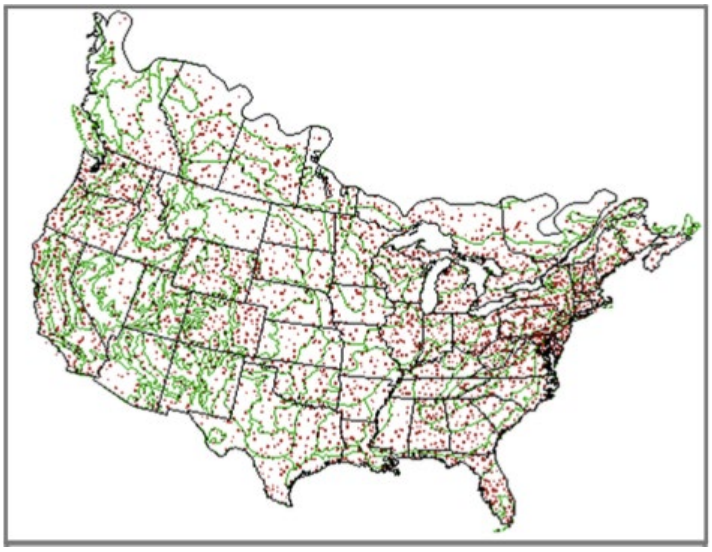


Figure 1. Location (red dots) of all Breeding Bird Survey routes in the United Statesand Canada (Sauer et al. 1997).

regional, statewide, and physiographic region scales. The most effective use of BBS data is to analyze population change on survey routes; however, these data do not provide an explanation for the causes of population trends. To evaluate population changes over time, BBS indices from individual routes are combined to acquire regional and continental estimates of trends (Sauer et al. 1997).

Due to the scope of the BBS effort, there is always a lag time between data submittal by observers and data release from USGS PWRC. Typically, observers are instructed to submit data as soon as possible after conducting a route, either online or by mail; an August 31 deadline is mandated in an observer's survey packet. Despite the BBS's best efforts, final data from the survey year immediately preceding is usually not available in time to meet Game and Fish spring reporting deadlines. Furthermore, BBS trend analysis is not always released on an annual basis. This year's reporting includes information for survey year 2019, as well as basic trend analysis for certain Species of Greatest Conservation Need (SGCN) through 2019. The Breeding Bird Survey was not conducted during 2020 due to the Covid-19 pandemic. The BBS will be conducted during 2021.

Mountain Bluebird. Photo: USFWS

Volunteers are instructed to conduct BBS routes during the height of the avian breeding season when birds are most vocal. This is typically during the month of June, although routes in higher elevations can be conducted through the second week of July. Each route is 24.5 miles long and consists of 50 stops spaced at 0.5 mile intervals along the route. Beginning 0.5 hour before sunrise, observers record birds seen within a 0.25 mile radius and all birds heard at each stop during a 3-minute count period. Each BBS route is surveyed once annually, and data are submitted to the USGS PWRC for analysis.

2019 RESULTS

In 2019, observers surveyed approximately 2,637 of 3,548 (74%) active routes in the United States. In Wyoming, 42 observers surveyed 63 of the 108 (58%) available routes. Fourteen of these volunteers survey 2 or more routes and one conducted five routes. Since 1990, the number of routes surveyed in Wyoming has decreased by 0.33 routes per year (Figure 2). Consistent with this trend, the number of routes surveyed in 2019 (i.e., 63 routes) was slightly less than the average number of routes completed from 1990-2018 (66 routes).

Observers detected 27,910 individual birds representing 186 species in Wyoming. Since 1990, the number of individual birds detected has decreased by 4.2 individuals per route per year, while the number of species detected has increased by 0.11 species per route per year. Consistent with the first trend, the number of individuals detected per route in 2019 (443 individuals) was less than the average number of individuals detected per route from 1990-2018 (524 individuals). However, the number of species detected per route in 2019 (37 species) was about the same as the mean number of species detected per route from 1990-2018 (38 species). The 2019 dataset can be found at the BBS website: https://www.pwrc.usgs.gov/BBS/RawData/ (Pardieck et al. 2020).

1968-2019 TREND ANALYSIS

The BBS recently published trend analysis for survey data through 2019. For purposes of this report, we examined trend analysis for the Department's 80 avian SGCN only. Of the 186 species detected in 2019, 39 are SGCN. Remaining species trend analysis is available at the BBS website: https://www.mbr-pwrc.usgs.gov/ (Sauer et al. 2020). BBS data for each species are assigned a credibility category: *important deficiency* (i.e., very small sample size), *with deficiency* (i.e., small sample size), and *meets standards* (i.e., at least 14 samples in the long term, of moderate precision, and of moderate abundance on routes.). We report trends for the 10 SGCN that are in the *meets standards* category for both the United States and Wyoming. Brewer's Sparrow demonstrated significant population declines at the state and national levels. Chestnut-collared Longspur, Common Nighthawk, Greater Sage-grouse, and Loggerhead Shrike demonstrated non-significant population declines at the state level, but significant declines at the national level. Both Red Crossbill and Sage Thrasher demonstrated non-significant declines at the state and national levels. Conversely, American White Pelican demonstrated significant population increases at the state and national levels. Sagebrush Sparrow and Thick-billed Longspur (formerly McCown's Longspur) demonstrated conflicting state and national trends; the former demonstrated a non-significant population increase in Wyoming, but a significant decrease nationwide, while the latter demonstrated a non-significant decrease statewide and a non-significant increase nationally. Two SGCN, American Kestrel and Clark's Nutcracker, fell into the meets standards category at the state level, but not at the national level. Per the Wyoming dataset, the former species currently demonstrates a significant population decline and the latter species a non-significant decline.

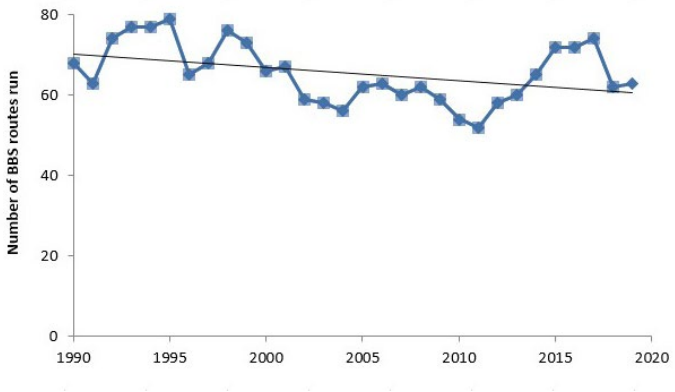


Figure 2. Number of Breeding Bird Survey routes completed in Wyoming 1990-2019. The black trend line is shown for reference.

BBS trend analysis will continue to contribute to Game and Fish's recommendations for future monitoring of these and additional SGCN, especially those exhibiting significant population declines at the state level. Additional regional and local datasets will also be consulted as a component of ensuring which Wyoming avian species and their associated habitats warrant further investigation by Game and Fish. These trends also contribute to future decisions about which avian species will be included on the SGCN list in Wyoming's State Wildlife Action Plan.

The Game and Fish Commission provided funding in part for this project, for which we are extremely grateful. We would like to thank the many volunteers and biologists from this and other natural resources management agencies for their valuable contributions to the 2019 Breeding Bird Survey. The continued dedication of these individuals and agencies to this monitoring effort makes it possible to collect long-term population trend data on numerous avian species in Wyoming. In closing, the consistent recruiting and retainment of knowledgeable volunteers to conduct active routes is critical to ensuring the future success of the Breeding Bird Survey and our ability to continue to adequately monitor Wyoming populations of breeding birds.

Prepared by: Courtney Rudd, Nongame Biologist; United States Geological Survey – Patuxent Wildlife Research Center
Funding Sources: Bureau of Land Management Cooperative Agreement, Bureau of Reclamation Cooperative Agreement, National Park Service Cooperative Agreement, United States Fish and Wildlife Service Cooperative Agreement, United States Forest Service Cooperative Agreement, and the Wyoming Game and Fish Commission

WYOMING BIRD RECORDS COMMITTEE: SUMMARY OF REPORTS REVIEWED IN 2020


Curved-bill Thrasher. Photo: Laurel Armstrong

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

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

2) To review records of new or rare species or species difficult to identify and offer an intelligent, unbiased opinion of the validity or thoroughness of these reports. From these reviews, the WBRC will develop and maintain an Official State List of Birds in Wyoming.

3) To 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 Game and Fish's Nongame Bird Biologist, who serves as a non-voting Secretary. 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, and 2015.

During 2020, a continued effort was made by the WBRC to encourage birders to prepare and submit rare bird forms due to the frequent eBird postings of rare and unusual bird sightings in Wyoming. The Cornell Lab of Ornithology oversees eBird, a citizen science-based website for avian observations worldwide. More than 169 million records were submitted to eBird during 2020 and subsequently reviewed by regional experts. Four of the five voting WBRC members are currently Wyoming eBird reviewers. While fewer rare bird records were reviewed by the WBRC during 2020, more than 50 records were submitted late in the year and not reviewed until early 2021.

A notable accomplishment during 2020 was the rollout of a WBRC website. It contains a variety of information about birding in Wyoming, which species are of interest for Committee review, WBRC background and history, as well as an online rare and unusual submittal form. The website address is: https://wybirdrecordscommittee.wordpress.com/.

As of 31 December 2020, the WBRC has reviewed 1,603 reports of rare and unusual birds in Wyoming. A total of 1,307 (82%) have been accepted and 296 (18%) have not been accepted. A total of 72 reports were reviewed in 2020. Of those, 51 were accepted, 20 were rejected, and one was deleted before voting since it had been previously reviewed in 2016. Observations of the following species were notable first documented records for Wyoming:

Fork-tailed Flycatcher (*Tyrannus savana*). N. Platte River vicinity west of Casper, Natrona County. This remarkable vagrant's typical range includes southern Mexico, Central America, and the majority

Swamp Sparrow along the Middle Fork of the Popo Agie River in Lander. This species is one of the 156 species currently on the 'All Sightings' list. Photo: Frank Stetler

of South America. An extremely long forked tail is its most notable characteristic. The observer originally submitted the record to eBird with link to a video clip of the bird perched on a metal fencepost in open habitat near the river.

Swallow-tailed Kite (*Elanoides forficatus*). N. Platte River vicinity, east of Glenrock, Converse County. This record is a specimen and cause of death is unknown. Game and Fish personnel transferred the bird to the University of Wyoming's Museum of Vertebrates for their collection. While this bird is considered out of range in Wyoming, it breeds in the margins of the southeastern US and winters in South America. Additionally, there are numerous eBird records spanning the United States from the Midwest to the Eastern Seaboard. The Swallow-tailed Kite prefers forested habitats with adjacent wetlands or open areas for foraging.

Western Gull (*Larus occidentalis*). Lake Hattie Reservoir, west of Laramie, Albany County. The species is strongly affiliated with the Pacific Coast from Vancouver, BC south to the southern reaches of Baja Mexico, depending on the time of year. Based on a collection of photos taken during the observation period, gull experts determined this bird was likely a sub-adult. A Western Gull can easily be mistaken for a Lesser Black-backed Gull.

Currently, the WBRC requests reports for species that are included on two separate lists. The first list is known as 'All Sightings' and includes 156 species that

Western Gull above Lake Hattie Reservoir west of Laramie. Photo: Jonathan Lautenbach

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 65 species. Latilongs are determined by latitude/longitude degree blocks. There are 28 latilongs in Wyoming (Figure 1).

When a species on the 'First Latilong' list is observed in a latilong 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 latilong. The WBRC is currently reviewing the observation records database to determine if changes are warranted for both lists.

The WBRC review process is also helpful for understanding changes to species' distribution in Wyoming. Of the 72 records reviewed in 2020, 30 updated the distribution of the observed species at the latilong scale. Reports were reviewed for 16 of the 28 latilongs statewide and included a diverse array of species including waterfowl, shorebirds, marshbirds, seabirds, gulls, owls, hawks, falcons, and numerous passerines. These changes will be incorporated into the Department's *Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming* (Orabona et al. 2016).

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 to the WBRC through 2020, species for which the

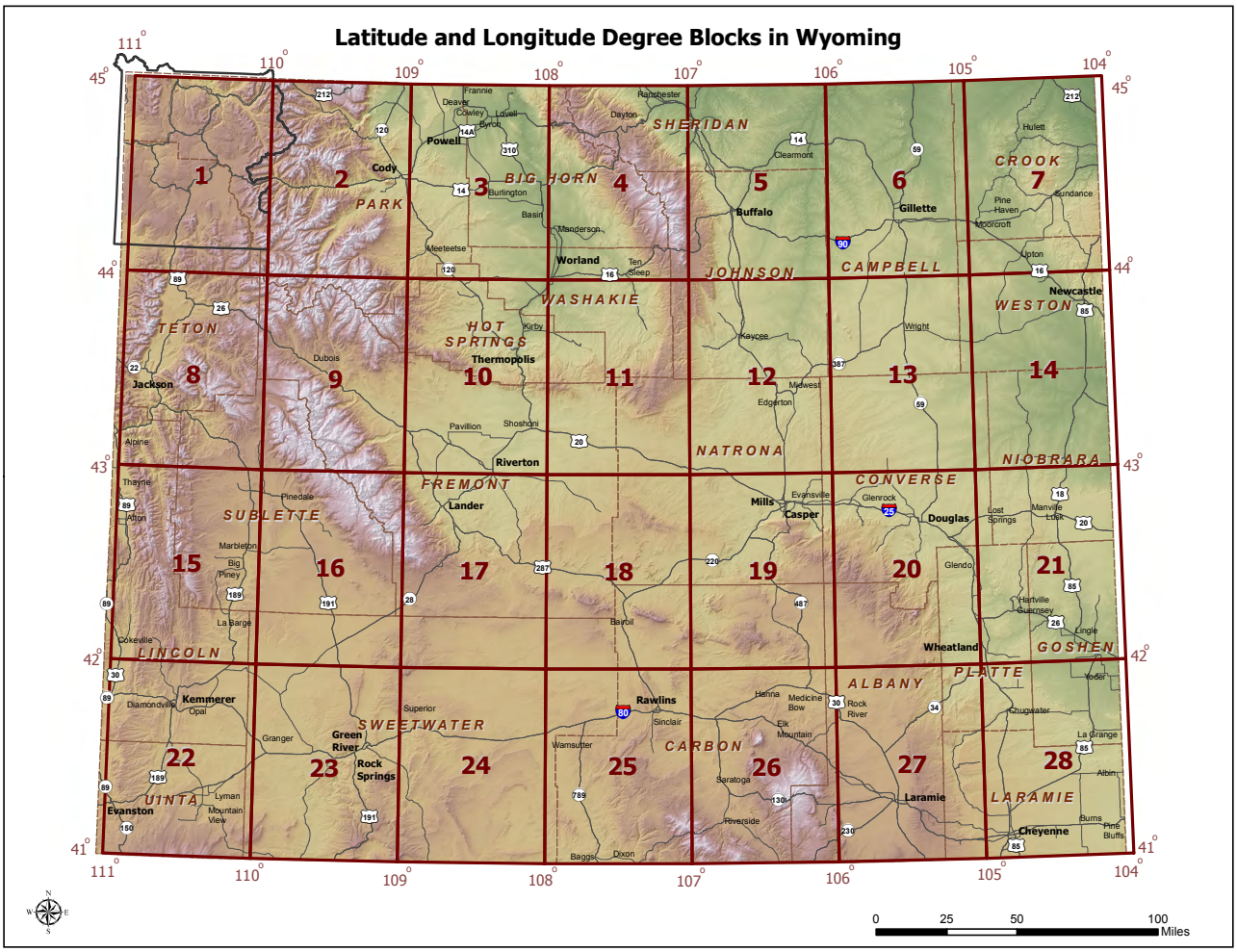


Figure 1. Wyoming latlong map. Prepared by Game and Fish Wildlife GIS Analyst Nyssa Whitford.

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 Game and Fish Lander Regional Office. All items are also available on the Game and Fish website: https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Nongame-Birds under the Wyoming Bird Records Committee heading.

We wish to thank all observers for taking the time to submit their sightings to the WBRC. We are also indebted to the following current Wyoming Bird Records Committee members for their invaluable efforts and expertise: Shawn Billerman, Matt Fraker, Greg Johnson, Don Jones, and Frank Stetler.

Prepared by: Courtney Rudd, Nongame Biologist, and Andrea Orabona, Nongame Bird Biologist
Funding: Wyoming Game and Fish Commission, Bureau of Land Management Cooperative Agreement


Western Kingbird. Photo: Ryan Hagerty

WYOMING PARTNERS IN FLIGHT AND INTEGRATED MONITORING IN BIRD CONSERVATION REGIONS

Long-term data analyses indicate that population trends for many species of North American landbirds have declined due to land use changes; habitat loss, fragmentation, and deterioration; pesticide use; and human influences and disturbance (Robbins et al. 1989, Peterjohn et al. 1995, Sauer et al. 1996, Boren et al. 1999, Donovan and Flather 2002). The International Partners in Flight (PIF) program was initiated in 1990 to address and reverse these declines. The PIF mission is to help species at risk and to keep common birds common through voluntary partnerships that benefit birds, habitats, and people. State, regional, national, and international Bird Conservation Plans comprehensively address the issues of avian and habitat conservation on a landscape scale. The North American Bird Conservation Initiative (NABCI) was initiated in 1998 to ensure the long-term health of North America's native bird populations through effective conservation initiatives, enhanced coordination among the initiatives, and increased cooperation among the governments and citizens of Canada, the US, and Mexico (NABCI 2016).

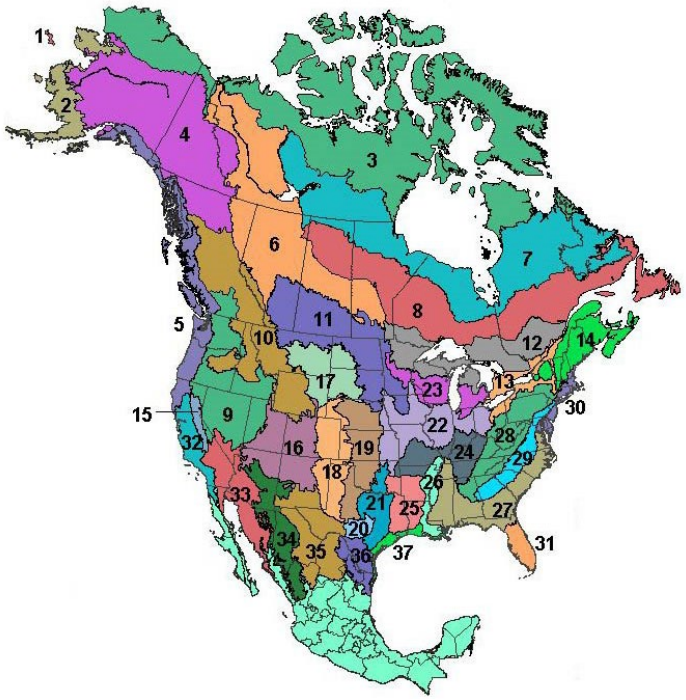


Figure 1. Bird Conservation Regions (BCRs) throughout North America, excluding Hawaii and Mexico. (Source: http://nabci-us.org/resources/bird-conservation-regions-map/.

The state PIF working group, Wyoming Partners in Flight (WYPIF), was established in 1991. Participants include Game and Fish, Bird Conservancy of the Rockies (Bird Conservancy), Bureau of Land Management (BLM), US Forest Service, US Fish and Wildlife Service, National Park Service, Bureau of

Reclamation, Audubon Rockies and affiliate chapters, Wyoming Natural Diversity Database, University of Wyoming, and The Nature Conservancy. Game and Fish's Nongame Bird Biologist serves as the WYPIF chairperson. As a group, WYPIF produced the Wyoming Bird Conservation Plan, Version 2.0 (Plan; Nicholoff 2003). The Plan presents objectives for populations of birds and major habitat groups in the State, Best Management Practices to benefit birds, and recommendations to ensure that populations of birds and the habitats they require remain intact and viable into the future through proactive and restorative management techniques. Many components of the Plan have been used to develop portions of the 2017 Wyoming State Wildlife Action Plan (WGFD 2017).

One of the highest priority objectives throughout the Plan for populations of birds is to implement robust population monitoring programs. Population monitoring is an essential component of effective wildlife management and conservation (Witmer 2005, Marsh and Trenham 2008). Besides improving distribution data, monitoring allows us to evaluate populations of target species and detect changes over time (Thompson et al. 1998, Sauer and Knutson 2008), identify species that are at risk (Dreitz et al. 2006), and evaluate responses of populations to management actions (Lyons et al. 2008, Alexander et al. 2009) and landscape and climate changes (Baron et al. 2008, Lindenmayer and Likens 2009).

In conjunction with many partners, Bird Conservancy conducted the 13th consecutive year of landbird monitoring in 2020 using the Integrated Monitoring in Bird Conservation Regions (IMBCR) program. IMBCR uses a spatially balanced sampling design that allows inferences to avian species occurrence and population sizes at various scales (local management units, entire states, or regions). This facilitates conservation at both local and national levels. The IMBCR sampling design allows analysts to estimate species densities, population sizes, occupancy rates, and trends, providing an understanding of the status and annual changes of bird populations. Collaboration across different organizations and spatial scales increases sample sizes and improves the accuracy of population estimates. Analyzing the data collectively permits us to estimate detection probabilities for species that would otherwise have an inadequate number of detections at local scales. The IMBCR partnership's 6 monitoring objectives are listed in the 2020 IMBCR Field Season Report (McLaren et al. 2021).

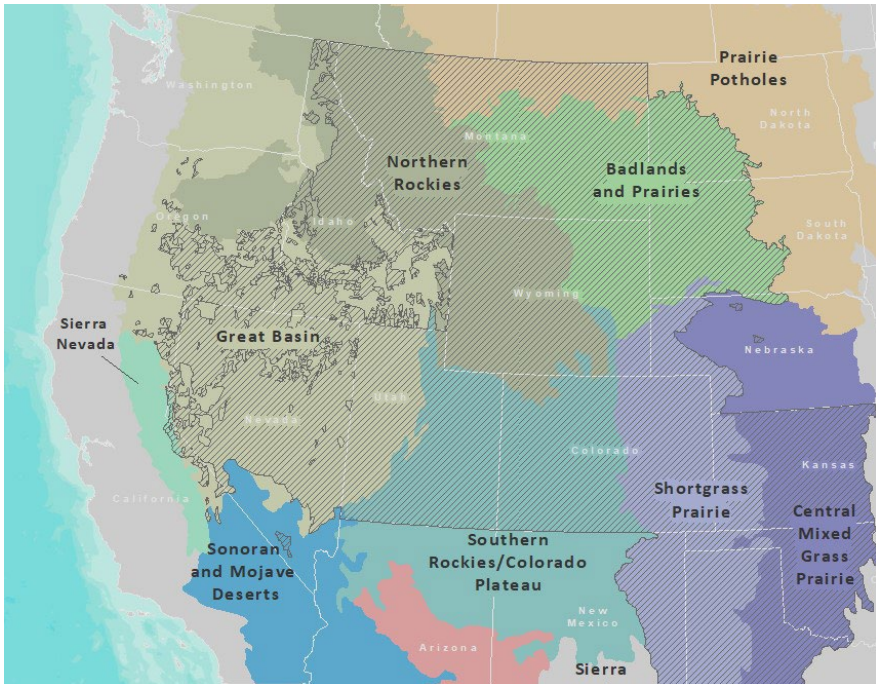


Figure 2. The spatial extent of the Bird Conservation Regions sampled in 2020 using the IMBCR design.

Bird Conservation Regions (BCRs) provide a spatially consistent framework for the IMBCR program (Figure 1). In 20209, IMBCR covered all or parts of 16 states, 4 USFS Regions, and 10 BCRs (Figure 2). All monitoring partners collaborated to define strata and superstrata within the BCR sampling frame based on smaller-scale areas upon which we wanted to make inferences (e.g., National Forests, BLM lands, individual states). Bird Conservancy biometricians overlaid BCRs with 1 km2 sample grids, randomly selected the grids to survey, and used a 4 x 4 point count array with 16 survey points spaced 250 m apart and 125 m from the grid boundaries within each sample grid (McLaren et al. 2019). A minimum of 2 sampling grids within each stratum are required to adequately estimate the variances of population parameters, (McLaren et al. 2021). Wyoming contains 37 strata (Figure 3).

Between 21 May and 16 July 2020, field technicians completed all 177 planned surveys (100%), conducted

2,112 point counts within the 177 surveyed grid cells, and detected 200 bird species, including 50 Species of Greatest Conservation Need (SGCN; McLaren et al. 2021). Bird Conservancy biometricians were able to estimate occupancy (the proportion of 1 km2 grid cells occupied; Psi, ψ) for 222 species that have been detected in any given year of the monitoring program, including 61 SGCN (27%; McLaren et al. 2021). Data provided robust occupancy estimates (CV <50%) for 138 of the 222 species detected, including 59 SGCN (43%; McLaren et al. 2021). Biometricians were able to estimate density (D) and population size (N) for 213 species that were detected in any given year of the monitoring program, including 58 SGCN (27%; McLaren et al. 2021). Data provided robust density estimates (CV <50%) for 94 of the 213 species (44%), including 59 SGCN (63%; McLaren et al. 2021).

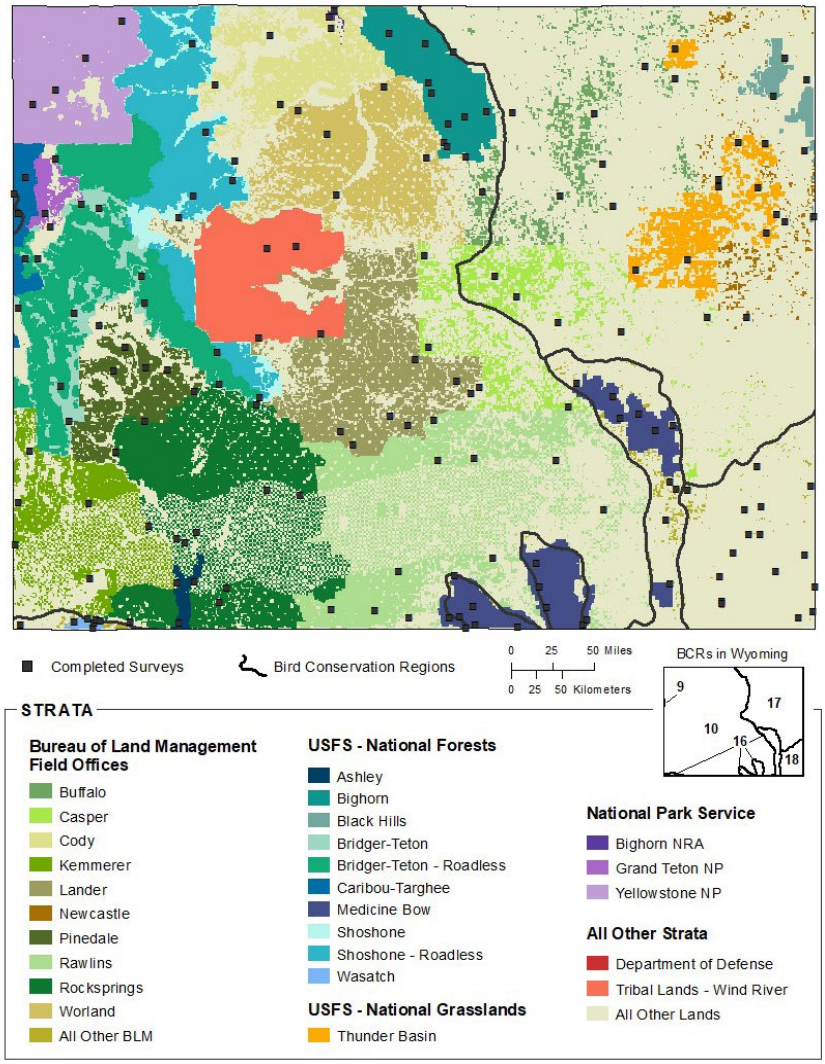


Figure 3. 2020 survey locations in Wyoming.

Annual and multi-year reports, species accounts, and density estimate tables and graphs are available on the Rocky Mountain Avian Data Center web site (Bird Conservancy 2021). To view a map of survey locations in Wyoming; occupancy, density, and population estimate results; and species counts across all years of the IMBCR program, follow the link below, click "OK" on the disclaimer box, and click the "Run Query" button highlighted in red near the top of the page. To view just the 2020 field season results, follow the link, select "Year" from the Filter drop down box on the top left of the screen, click the "Add" button, select 2020, click "Add Filter", and then click "Run Query" (McLaren et al. 2021).
http://www.rmbo.org/new_site/adc/QueryWindow

Prepared by: Matthew McLaren, Matt Smith, Jennifer Timmer, Chris White, David Pavlacky, and Rob Sparks, Bird Conservancy of the Rockies; and Andrea Orabona, Nongame Bird Biologist
Funding sources: Bureau of Land Management, National Park Service, USFWS State Wildlife Grant, US Forest Service, and the Wyoming Game and Fish Commission

Upland Sandpiper. Photo: Goldie Divide

LONG-TERM MONITORING OF AVIAN GRASSLAND SPECIES OF GREATEST CONSERVATION NEED IN WYOMING: SUMMARY OF FINAL YEAR RESULTS

The grasslands of the Great Plains are one of the most imperiled ecosystems in North America. Conversion of grasslands to cropland, urbanization, fragmentation, invasion by noxious and invasive plants, and the removal of natural forms of disturbance such as fire and bison grazing all threaten the viability of this ecosystem. As native grassland habitat has disappeared, grassland birds have shown steeper, more consistent, and more widespread declines than any other guild of species. Several national and state-wide assessments have identified objectives and priority species for the conservation of grassland birds in Wyoming. Four such species, Mountain Plover (*Charadrius montanus*), Long-billed Curlew (*Numenius americanus*), Upland Sandpiper (*Bartramia longicauda*), and Burrowing Owl (*Athene cunicularia*), face known imminent threats, such as substantial habitat loss and degradation due to land

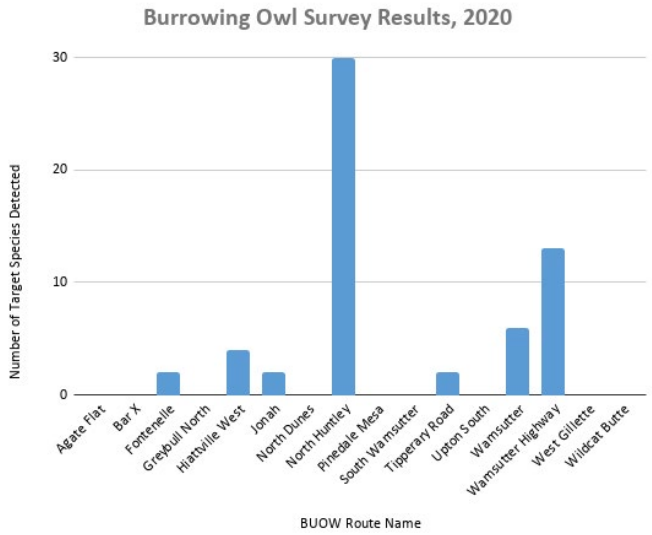


Figure 1. Number of Burowing Owl detections in 2020.

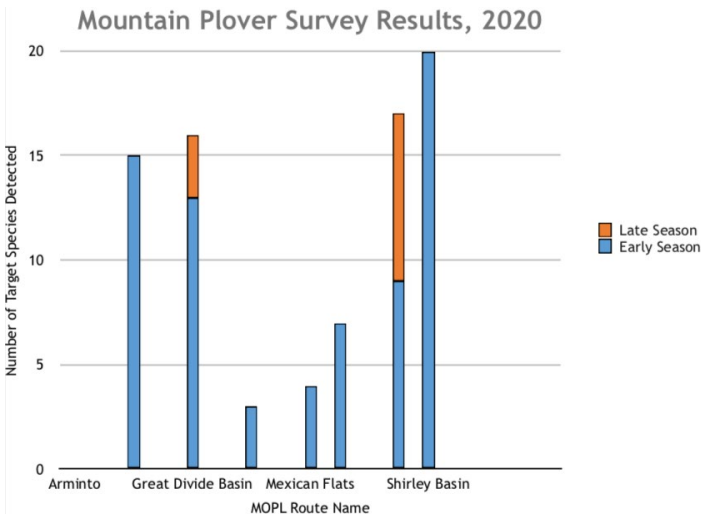


Figure 2. Number of Mountain Plover detections in 2020.

development. Despite their status as Species of Greatest Conservation Need, these birds are not well-documented by current avian monitoring programs within the state due to their rarity, habitat specialization, and timing of reproduction. We lack adequate baseline data to assess their status and population trends within the state.

In response to this need, in 2014 Game and Fish established a targeted monitoring plan to evaluate the status and long-term population trends of these species and gather the data necessary to determine causes of population change. In addition, this monitoring plan will help guide management practices and policies in order to conserve these species and avoid potential listings under the federal Endangered Species Act. This monitoring has been on-going since the original establishment of the plan and this year we continued collecting data to meet our objective of creating a robust baseline dataset from which to assess the current status and future changes in populations for these species.

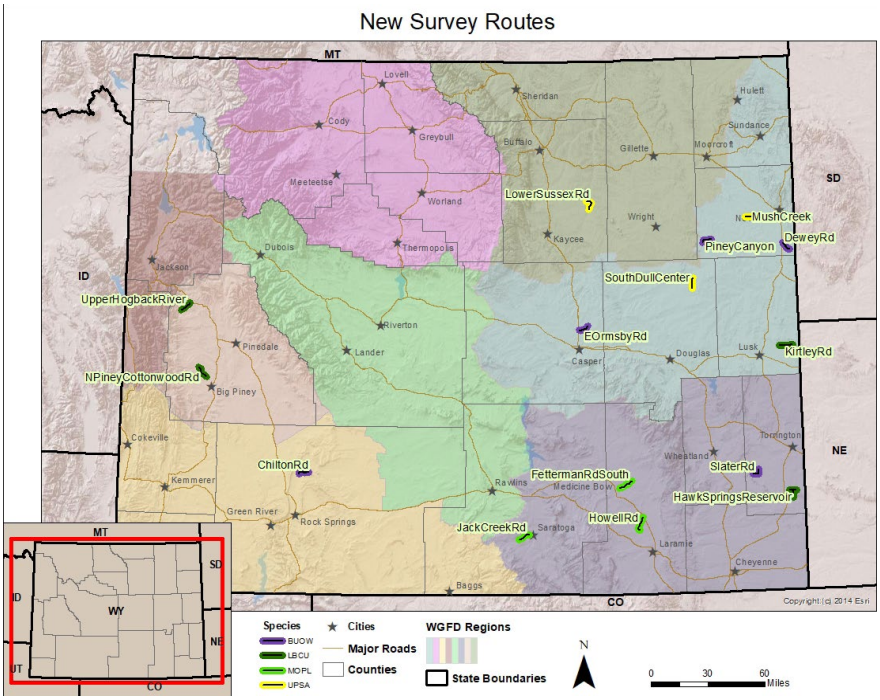


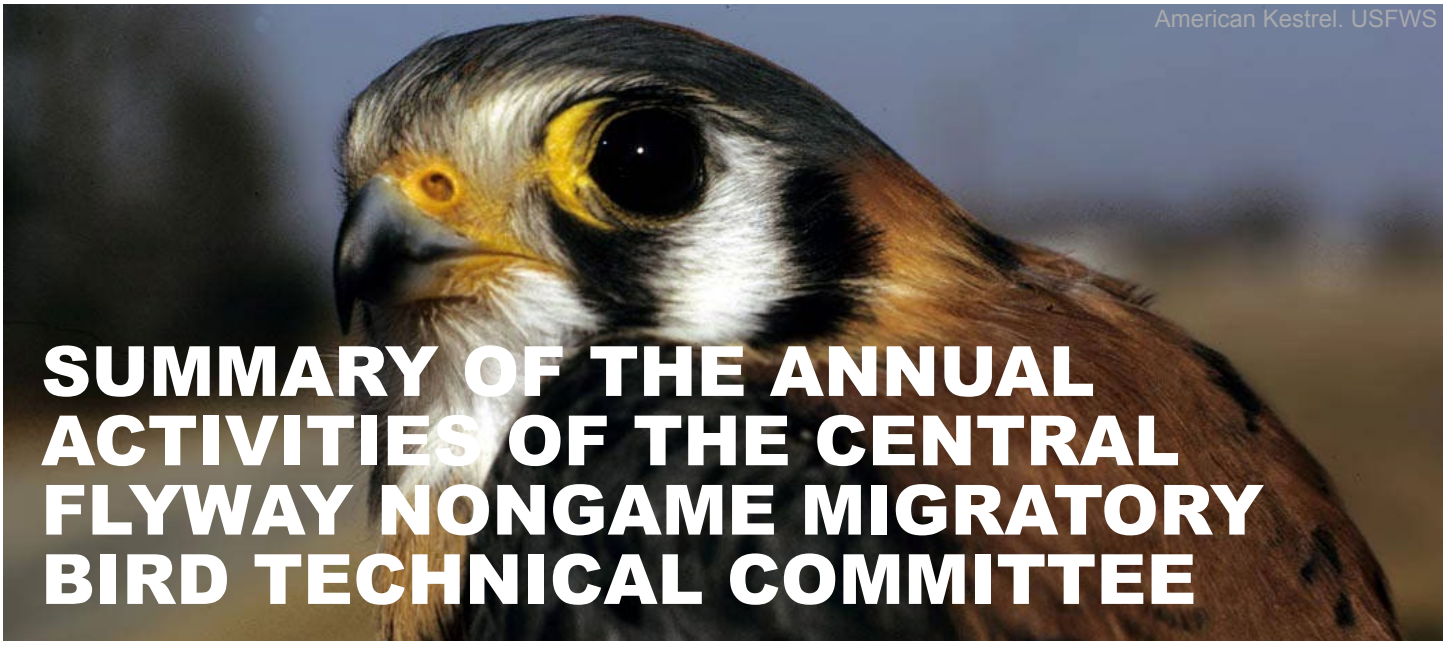
Figure 3. Overview of proposed new routes for Burrowing Owl, Long-billed Curlew, Mountain Plover, and Upland Sandpiper.

In 2020, we had to significantly reduce the number of observers conducting point count surveys and as a result, we were not able to complete an exhaustive field season. Instead, we ran a more targeted survey effort for the last year of sampling, focusing mostly on Burrowing Owl and Mountain Plover surveys. Over the course of the 2020 field season, we made 27 visits to 15 Burrowing Owl routes and detected birds on 47% of the routes; 59 birds in total. We conducted a repeat early season trial for Mountain Plovers to increase confidence in our 2019 results and tested the efficacy of using callback methods to increase Mountain Plover detections. From April to July, we increased our survey effort for Mountain Plovers, surveying all 15 routes at least once and conducting replicate surveys for 10 routes. In total we detected 82 individuals, 71 during the early season trial and 11 in the late season; nearly 7 times more individuals were detected in April and May.

We included all 71 Mountain Plover detections in the callback analysis and of those, 44 were detected using callback methods and 27 were detected using a passive listening only approach. Only 17 of the 71 total detections were visual observations rather than auditory and of those, 82% occurred while using the callback method. Statistical tests did not indicate a significant difference in detections between the two methods, however there is some evidence to suggest using callback methods increases the probability of visual detections.

After conducting preliminary data analyses in early 2020, we decided to add more survey routes for all species to decrease the variability and increase the precision of our abundance and occupancy estimates. To do this, we used a spatially balanced sampling design to remotely generate starting points for each new route. Newly generated points were species specific and were placed throughout each species predicted distribution. We scouted new routes for accessibility and habitat quality throughout the 2020 field season.

Prepared by: Katherine Sauer, Nongame Biologist, and Andrea Orabona, Nongame Bird Biologist
Funding sources: United States Department of Interior and the Wyoming Game and Fish Commission


American Kestrel. USFWS

SUMMARY OF THE ANNUAL ACTIVITIES OF THE CENTRAL FLYWAY NONGAME MIGRATORY BIRD TECHNICAL COMMITTEE

The Central Flyway Council (CFC) was established in 1951 to represent 10 states (Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas) and 3 Canadian provinces (Saskatchewan, Alberta, and the Northwest Territories) that occur within the flyway. The function of the CFC is to work with the US Fish and Wildlife Service (USFWS), in conjunction with the councils of the Atlantic and Mississippi Flyways, in the cooperative management of North American migratory game birds. Specific responsibilities include season setting of migratory bird hunting regulations. The CFC, via technical committees, also conducts and contributes to a wide variety of migratory bird research and management programs throughout the United States, Canada, and Mexico.

Considerable technical information is required for the Flyway Councils to accomplish their objectives. Various Technical Committees (TCs) have been established to fulfill this role. The Central Flyway Waterfowl TC and the Pacific Flyway Study Committee were established in 1953 and 1948, respectively. The Central Management Unit TC was formed in 1966 to provide technical input on Mourning Dove management and research issues. In 1967, the scope of this TC was broadened to include species other that doves, and the name was changed to the Central Migratory Shore and Upland Game Bird TC. In 1999, the name was changed to the Central Flyway Webless Game Bird TC, and in 2001, the name was again changed to the Central Flyway Webless Migratory Game Bird TC. The Central Management Unit Mourning Dove TC was established in 2003, and its name was changed to the Central Management Unit Dove TC in 2007 to recognize responsibility for all dove species with regulated hunting seasons. In 2006, the Central Flyway Council established the Central Flyway Nongame Migratory Bird TC (CFNMBTC) to address a growing number of regulatory issues for migratory birds that were not currently addressed by the other TCs, and to broaden the Flyway Council's focus beyond traditional game bird issues (Table 1).

It is the intent of the CFC and TCs that the division of responsibilities for avian species follows the definition for game birds as defined in the migratory bird conventions with Canada and Mexico. The Central Flyway Waterfowl TC is responsible for the families Anatidae (i.e., ducks, geese, and swans) and Rallidae (i.e., American Coots). The Central Flyway Webless Migratory Bird TC is responsible for the families Rallidae (i.e., rails, gallinules, and other coots), Gruidae (i.e., cranes), Charadriidae (i.e., plovers and lapwings), Haematopodidae (i.e., oystercatchers), Recurvirostridae (i.e., stilts and avocets), Scolopacidae (i.e., sandpipers, phalaropes, and allies), Corvidae (i.e., jays, crows, and their allies), and Columbidae (i.e., pigeons). The Central Management Unit Dove TC is responsible for the Columbidae family (i.e., doves only). The CFNMBTC is responsible for all migratory birds, as per the Migratory Bird Treaty Act, not included in the above division of responsibilities. Technical Committee members do recognize, however, that they may need to collaborate on some issues. For example, the webless TC should coordinate with the nongame TC on issues related to shorebirds, rails, and

federally threatened or endangered species that are not hunted.

The state, provincial, and territorial representatives to the TCs are usually biologists with considerable training and experience in the field of waterfowl, migratory shore and upland game bird, dove, or migratory nongame bird management and research. The function of the TCs is to serve the CFC, with primary responsibility for the technical information needs of the Flyway Council related to management of migratory game birds, wetland resources, and nongame migratory birds. The TCs may also recommend research projects, surveys, and management programs to the Flyway Council for their collective consideration or implementation. Game and Fish's Nongame Bird Biologist serves as the state's representative on the CFNMBTC.

Since the its inception, the CFNMBTC has submitted 24 recommendations to the CFC for signing and submission, and 56 letters of correspondence to a variety of recipients on a diversity of nongame issues, both regulatory and non-regulatory. A summary of the recommendations and correspondence completed from 2020-2021 thus far is presented in Tables 1 and 2, respectively.

Date	Recommendations
3/8/2021	The CFC recommends the formation of a National Golden Eagle Allocation Working Group to scope and resolve procedural issues associated with the National Flyway Council's Golden Eagle Allocation Procedure. The working group should include personnel from the U.S. Fish and Wildlife Service's Division of Migratory Birds representing its raptor management and migratory bird permitting functions, U.S. Department of Agriculture's Wildlife Services Division, and at least one, but preferably two, representatives from each Flyway Council's Nongame Migratory Bird Technical Committee.
3/8/2019	The CFC recommends that the 48 permits available to the Central Flyway for the September 20, 2020 to October 20, 2020 trapping season be allocated among states as follows: 30 permits to the state of Texas with the understanding that 40% of the permits will be reserved for out-of-state falconers, 6 permits to the state of Oklahoma, 6 permits to the state of Kansas, and 6 permits to the state of Nebraska.

Table 1. Summary of recommendations submitted to the Central Flyway Council by the Central Flyway Nongame Migratory Bird Technical Committee, 2020-2021.

Date	Key Central Flyway Remarks
7/14/2020	The CFC commented on the Federal Register notice of the proposed rule regarding management conflicts associated with Double-crested Cormorants throughout the US. The CFC's preferred alternative is Alternative A that would create a new take permit specific to state wildlife agencies and federally recognized tribes.
7/17/2020	The CFC commented on defining the scope of the Migratory Bird Treaty Act (MBTA) as it applies to activities that may kill or injure migratory birds. The CFC asked the USFWS to bring regulatory certainty to the issue of incidental take under the MBTA. Alternatives outlined in the Draft EIS create false choices and are not acceptable. The DEIS is incomplete and does not provide sufficient analysis to bring forward a balanced Alternative that provides needed regulatory certainly to the affected stakeholders and takes proactive and provides commonsense steps to conserve birds.
8/25/2020	The CFC commented on representation on the Waterbird Conservation for the Americas' Waterbird Conservation Council. The CFNMBTC informed the CFC that we selected Joel Jorgensen (NE) to represent the Central Flyway on the Waterbird Conservation Council of Waterbird Conservation for the Americas.
3/1/2021	The CFC commented on defining the scope of the Migratory Bird Treaty Act (MBTA) as it applies to activities that may kill or injure migratory birds. The CFC strongly recommends that the 1/7/2021 Final Rule scheduled to go into effect on 3/8/2021 be rescinded. The CFC believes there is a need to bring regulatory certainty to the issue of incidental take under the MBTA.
3/19/2021	The CFC commented on representation on the Double-crested Cormorant Working Group. The CFNMBTC informed the CFC that we selected Sandy Johnson (ND), Mark Howery (OK), and Cliff Shackelford (TX) to represent the Central Flyway on the Double-crested Cormorant Working Group.
3/26/2021	The CFC commented on representation on the National Golden Eagle Working Group. The CFNMBTC informed the CFC that we selected Mark Howery (OK) to represent the Central Flyway on the National Golden Eagle Working Group, with Daren Riedle (KS) as a back-up.
3/30/2021	The CFC commented on Central Flyway representation on the Double-crested Cormorant Population Monitoring Technical Team. The CFNMBTC informed the CFC that we selected Sandy Johnson (ND), Mark Howery (OK), and Cliff Shackelford (TX) to represent the Central Flyway on the Double-crested Cormorant Monitoring Technical Team.

Table 2. Summary of correspondence submitted to the Central Flyway Council (CFC) by the Central Flyway Nongame Migratory Bird Technical Committee (CFNMBTC), 2020-2021.

Prepared by: Andrea Orabona, Nongame Bird Biologist

BLACK-FOOTED FERRET MANAGEMENT IN WYOMING

Black-footed ferret. Photo: Mark Gocke

Wyoming has a unique history with the conservation of black-footed ferrets (*Mustela nigripes*; hereafter ferrets). The species was thought to be extinct twice before its rediscovery in 1981 in Meeteetse, Wyoming. The subsequent initiation of a captive breeding program and establishment of the first reintroduction site each took place within the state's borders. For four decades, Game and Fish has worked in collaboration with private landowners and state and federal agencies to ensure that ferret populations succeed in the wild. Game and Fish remains committed to the goal of recovering this native, Endangered species through management of ferrets and their habitat. To that end, the Game and Fish Commission approved the Wyoming Black-footed Ferret Management Plan in 2018, detailing statewide population objectives and conservation and management strategies.

Since prairie dogs (*Cynomys spp.*) constitute a majority of ferret diet, and ferrets live in burrows excavated by prairie dogs, managing ferret habitat equates to maintaining adequate density and area of prairie dog colonies. Efforts to support ferrets and their habitat are most hindered by disease, specifically plague, which is caused by the bacterium *Yersinia pestis*. Plague is transmitted by fleas and is capable of producing severe die-offs in both ferret and prairie dog populations. While monitoring and management of prairie dogs, disease, and ferrets are common to all reintroduction areas, the history, size, and specific methodologies used at each site vary. Currently, Wyoming supports two reintroduction areas for ferrets: the Shirley Basin Reintroduction Area, established in 1991, and the Meeteetse Reintroduction Area, established in 2016.

Management decisions to support reintroduction sites are determined by annual monitoring efforts conducted by Game and Fish and volunteers for both ferrets and prairie dogs. Prairie dog colonies are mapped (either on the ground with GPS units or through a combination of remote and field verification) to estimate active and potential area of ferret habitat. Prairie dog density is estimated through visual count surveys at each reintroduction area. Standard protocol is to visit 200 m^2 plots for three consecutive days between 0730-1030 on warm, dry mornings in June

and July. Relative density of prairie dogs is assessed before other management activities, such as plague management or releases of captive-bred ferrets.

Due to the nocturnal habit of ferrets, spotlighting is the primary survey method employed to locate ferrets and estimate population size. Surveyors use high-powered spotlights to search portions of previously mapped prairie dog colonies looking for ferret eyeshine from 2000-0600 in blocks of three consecutive nights. To coincide with kit emergence and dispersal, surveys are conducted from mid-August through mid-September. Demographic data can be collected when ferret capture efforts are incorporated into spotlight surveys. During these efforts, ferrets are trapped, anesthetized, marked, vaccinated against plague and canine distemper, and then returned to their point of capture. Ferret numbers are reported as the minimum number alive within each reintroduction area, unless captures are sufficient (greater than 30 individuals) to estimate population size via mark-recapture methods. When spotlight surveys reveal decreases in ferret numbers, populations can be supplemented through release of captive-bred kits or kits translocated from other sites.

The SARS-CoV-2 pandemic required the modification of field plans not only for the protection of field staff, but also for the protection of ferrets, which are suspected to be highly susceptible to SARS-CoV-2 given their susceptibility to human influenza (another SARS virus). Consequently, ferret survey protocols were adapted to minimize staff and contact with ferrets. We minimized crew sizes to only 4-5 Game and Fish employees, focused on presence-only surveys (i.e., no live captures or anesthesia), and followed strict decontamination protocols.

Ferrets in Wyoming are managed by Game and Fish, but recovery efforts are the product of engagement with and support of many stakeholders. The Wyoming Black-footed Ferret Working Group, comprised of representatives from local, state, and federal agencies and non-governmental organizations, meets annually to discuss plans and progress towards recovery and management goals. Importantly, no efforts would be possible without the cooperation and generosity of private landowners. As new conservation challenges are encountered and technology continues to develop, ferret management in Wyoming remains collaborative and adaptive.

Additional protocols were put in place in 2020 for staff when in proximity to ferrets, such as during this supplemental release at Meeteetse, due to concerns for potential transmission of SARS-CoV-2 to ferrets.

SHIRLEY BASIN REINTRODUCTION AREA

The Shirley Basin Reintroduction Area (SBRA) was established in 1991, following sufficient production of captive-bred kits for release, and remains the longest lasting ferret reintroduction site. The long-term success is typically attributed to the large amount of quality ferret habitat, as previous estimates of white-tailed prairie dog (*C. leucurus*) colony area have been recorded as more than 180,000 acres. Due to this massive scale, monitoring and management activities for prairie dog and ferret populations within the SBRA have largely been concentrated within approximately 20,000 acres that have historically supported the highest density of ferrets, referred to as the 'main study area'.

Within the main study area, large population fluctuations have occurred through the site's long history, with reintroduced ferret populations slow to establish in the 1990s, experiencing exponential population growth in the mid-2000s, and then sharply declining in 2012-2013. Recent surveys suggest moderate increases in population size and reproduction, but numbers remain low relative to previously observed peaks. However, Game and Fish fully expects that additional ferrets occupy lands outside of the main study area, and, consequently, the population is likely substantially larger than the number of ferrets reported from surveys.

In August 2020, we conducted 149.5 hours of spotlight surveys over 12,034 acres. Remote cameras were placed at any location where multiple sets of eye shine were observed (i.e., potential litters). Surveyors moved to a different 500-acre route the following night if at

A family of ferrets confirmed via remote camera following nighttime spotlighting efforts at the SBRA.

least one ferret was observed in their assigned area. We detected a minimum of 32 ferrets, and remote cameras helped confirm at least nine litters. Despite the lower survey effort and smaller area surveyed compared to 2019 (372 hours and 15,576 acres, respectively), we documented nearly the same number of ferrets and litters (39 ferrets and ten litters) as the previous year. The decision to move to a new route following a ferret detection, coupled with the use of remote cameras, undoubtedly allowed us to cover more ground than we would have otherwise.

Since 2017, prairie dog density has been estimated from surveys at 15 visual count plots within the main study area. Although density decreased slightly from 2019, the average prairie dog density (x = 2.71 prairie dogs per acre) at visual count plots within the main study area suggests stability, as the average is comparable to counts in both 2017 and 2018.

In addition to regular monitoring activities within the main study area, a combination of remote and field verification of prairie dog distribution was assessed across a greater portion of the SBRA. We used aerial imagery to classify 500 m^2 cells as containing no burrows, low burrow density (<50% of the cell), or high burrow density (>50% of the cell) across approximately 2.2 million acres. From these assessments, 115,000 acres were classified as high density, including 65,000 acres that had never been mapped or surveyed previously. Over 40% of all cells contained at least a few prairie dog burrows, highlighting the large amount of potential habitat available for ferrets in the SBRA. To date, we have evaluated current prairie dog activity on the ground on 332 cells, including assessments at 157 visual count plots and 175 burrow activity locations. Important results of this combined field and remote effort were not only the identification of high density prairie dog acreage on which to focus management and survey efforts in the future, but also the identification of locations where burrows were visible in imagery but prairie dogs were no longer present, suggesting future effort need not be expended in those areas.

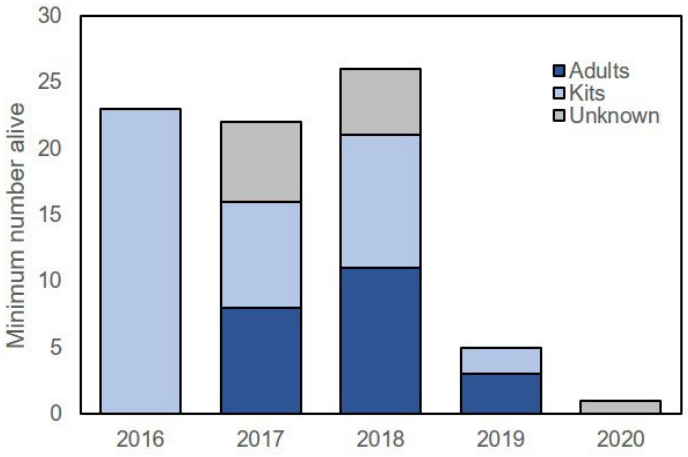
In 2021, we will continue monitoring ferret habitat and distribution in the SBRA. We will continue assessments of prairie dog activity and relative density in areas both within and peripheral to the main study area. Along with the maps of burrow density via aerial imagery, we will use field-collected prairie dog data to guide surveys for ferrets through the use of scent detection dogs in 2021 and 2022. Scent dogs will be deployed in areas outside of the regularly surveyed main study area to provide ferret presence data that will update distribution maps. We will verify scent dog areas of interest through a combination of targeted spotlighting and remote cameras; these efforts will replace traditional spotlighting and capture of ferrets in 2021. These data will be used to refine long-term management strategies and better address presence and distribution of ferrets across the large scale of the SBRA.

MEETEETSE REINTRODUCTION AREA

Following the statewide designation of ferrets as a non-essential, experimental population in 2015, the Meeteetse Reintroduction Area (MRA) was established in 2016 on the same prairie dog colonies where the species was rediscovered in 1981. The MRA consists of approximately 6,200 acres of white-tailed prairie dog colonies. Through collaboration with a multi-agency disease management team, the MRA has been actively managed for plague annually since 2016. The first two years following initial establishment of the MRA were marked by successful litter production, supplemental releases to provide increased reproductive opportunities for ferrets, and completion of a pilot project to assess efficacy of scent detection dogs as a method for detecting ferrets. While the ferret population appeared to become quickly established,

the effects of plague were first made evident in 2019 through reductions in both prairie dog density and ferret relative abundance.

In September 2020, we conducted 192 hours of spotlight surveys that covered 4,176 acres of the MRA. Spotlighting efforts were focused on areas with high to moderate prairie dog density. During surveys, we detected one ferret, assumed to be a wild-born



Minimum number of ferrets alive as documented through annual spotlighting efforts at the MRA since the site was established in 2016.

individual. We did not find evidence of any litters via spotlighting or targeted remote cameras. On September 18 and with minimal personnel present, we released 19 captive-reared ferrets, including 17 kits (12m:5f) and two adult females. 2020 marks the first year since initial reintroduction that reproduction was not documented at the MRA.

Prairie dog visual count surveys were conducted at 12 plots across the MRA (x = 0.9 prairie dogs per acre), which suggested a reduction in average density of 73% since 2017, but was up slightly from surveys in 2019. We also assessed ferret habitat according to relative density by navigating through previously mapped colonies and counting the number of prairie dogs visible without binoculars. Areas were assigned to one of three categories (high, moderate, few) based on the number of prairie dogs observed aboveground during a single viewing session (more than ten, between two and ten, and fewer than two, respectively). Relative density surveys revealed that 1,850 acres support few-to-no prairie dogs, up from approximately 1,400 acres estimated in 2019. Approximately 1,830 acres were classified as low density, while 2,590 acres remain with moderate to high density. Plague was confirmed by the Wyoming State Veterinary Lab in one prairie dog carcass collected in July. Overall, prairie dog densities and patterns of distribution are comparable to observations in 2019 and represent an overall decline in prairie dogs, including the complete loss of approximately 1,800 acres since initial reintroduction in 2016.

In collaboration with a multi-agency disease management team, funding was secured to conduct plague management treatment in the form of deltamethrin dust throughout the MRA on BLM, state, and private lands. In 2020, a total of 3,710 acres of prairie dog colonies were treated, with priority given to areas with higher prairie dog density and previous ferret detections. SPV baits were distributed on 733 acres, coincident with dust. Dusting was completed by USDA APHIS Wildlife Services.

In 2021, we intend to continue monitoring ferret habitat and population status, including a cursory evaluation of prairie dog density prior to scheduled plague management treatments and visual count surveys in mid-June. Through a collaboration with our interagency disease management team, we plan to treat roughly 4,000 acres with dust and/or Fipronil grain, an edible insecticide, with on-the-ground efforts completed by Wildlife Services. We will conduct spotlight surveys of similar scale to those conducted in 2020, specifically targeting the portions of the MRA supporting suitable habitat. Additional captive-bred ferrets may be released, pending allocation from the US Fish and Wildlife Service and sufficient prairie dog density. Plague management, regular monitoring activities, and support for the MRA from partners and Game and Fish will continue in 2021 despite recent setbacks.

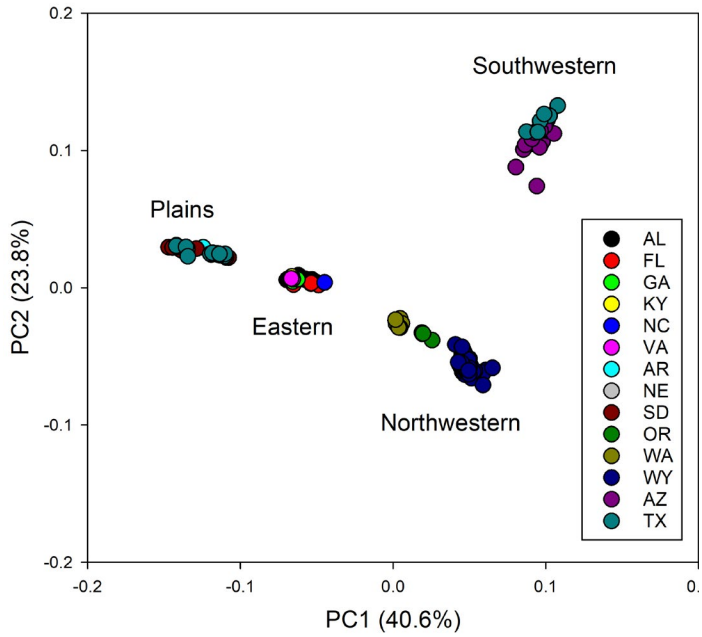
Prepared by: Dana Nelson, Black-footed Ferret Biologist, and Nichole Bjornlie, Nongame Mammal Biologist
Funding sources: US Fish and Wildlife Service Section 6 Funding, US Fish and Wildlife Service State Wildlife Grant, and the Wyoming Game and Fish Commission
Additional funding for plague management: Bureau of Land Management, Friends of Ferrets, and Smithsonian Conservation Biology Institute

DISTRIBUTION AND GENETIC DIFFERENTIATION OF SPOTTED SKUNKS IN WYOMING

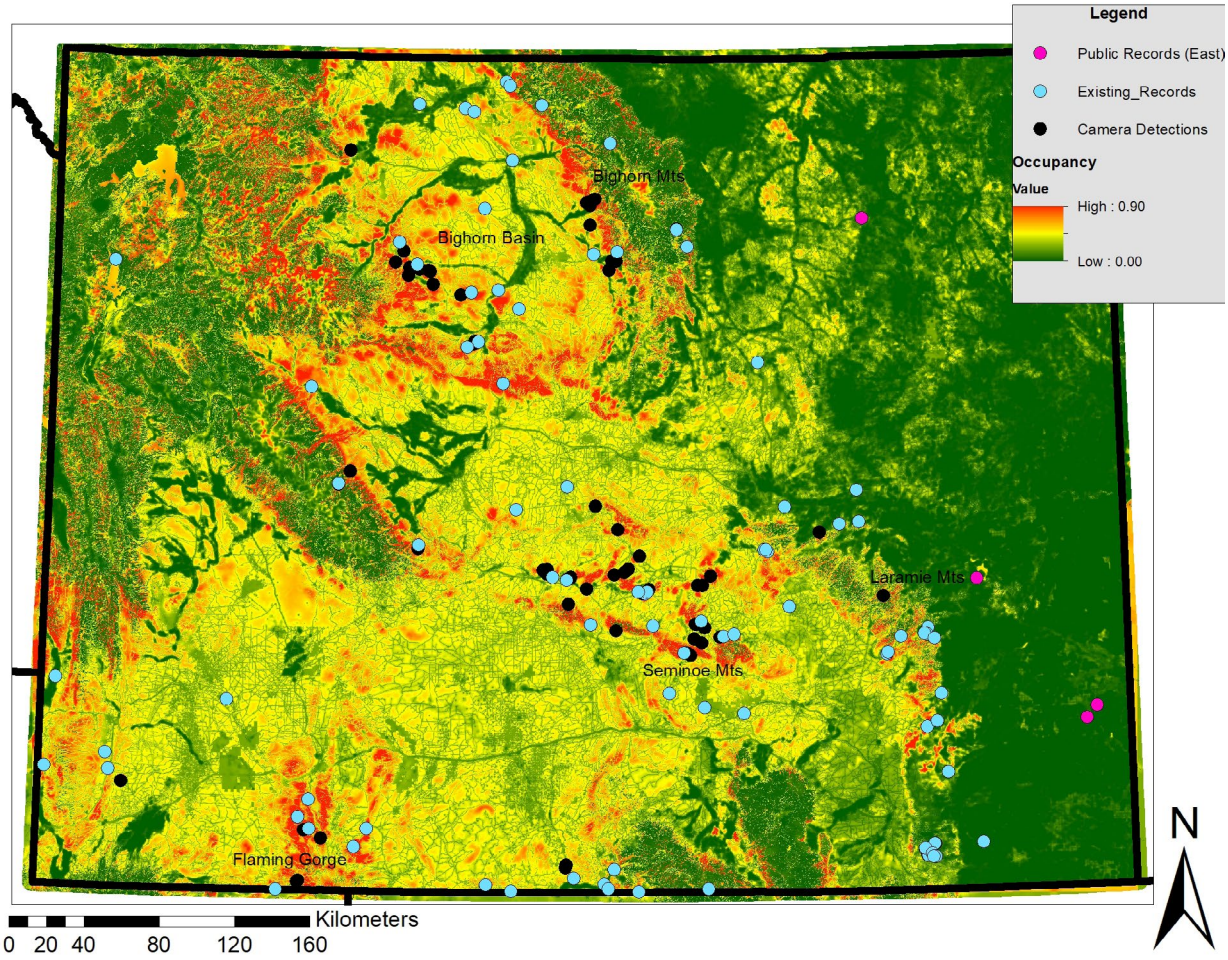

Western spotted skunk. Photo: NPS

The plains spotted skunk (*Spilogale putorius interrupta*) was petitioned for listing under the Endangered Species Act in 2011. A decision on the petition is due in 2023. We combined surveys (of 466 sites) and genomic analyses to delineate the distribution and habitat associations of eastern (*S. putorius*) and western (*S. gracilis*) spotted skunks in Wyoming. Using a large reference genome of a western spotted skunks and 153 samples collected in 14 states, we found that spotted skunks cluster into four distinct groups: Eastern (*S. putorius*), Plains (*S. interrupta*), Southwestern (*S. leucoparia*), and Northwestern (*S. gracilis*).

Based on these analyses, including 57 individuals from Wyoming, we found that all spotted skunks sampled in the state are *S. gracilis*. Using 1,398 camera locations, we detected spotted skunks at 56 sites and successfully live-captured 52 individuals at 32 of those. Occupancy models based on camera detections revealed higher detection probability during 2017 than in 2018. Also, percent moon had a positive association with spotted skunk detections, while Julian day (from midsummer – late spring) was negatively correlated with this probability. Skunks in our study displayed an avoidance of areas with high human disturbance, forest canopy, and herbaceous cover. They selected for extensive rock outcrops and high cover of juniper. We developed guidelines for deploying a successful monitoring program for spotted skunks and show that in the absence of intensive surveys, public records can be used to delineate the distribution of these small carnivores in Wyoming.



Principle Component Analyses using 406,858 Single Nucleotide Polymorphisms (SNPs) in 153 spotted skunk samples from 14 states. The main source of variation is represented by PC1 (40.6%), which distinctly separates *S. gracilis* from *S. putorius*, as well as *S. p. putorius* from *S. p. interrupta*. PC2 (23.8% of variation) largely differentiates *S. gracilis* samples from Wyoming/Oregon/Washington and those from Arizona/Texas.



Predictive map showing spotted skunk occupancy probability (green-red) in Wyoming. Also included are camera survey detections from 56 sites surveyed from 2017-2018 (black) and existing records (blue), including public records collected by Game and Fish (n = 58) and the University of Wyoming (n = 19), Game and Fish survey detections (n = 16), and the University of Wyoming pilot project survey detections (n = 6). Public records in the purported eastern spotted skunk range (pink); are from 1982, 1989, 2004, and 2015. Existing records were used for occupancy model validation.

Prepared by: Dr. Marev Ben-David, Robert J. Riotto, Zacharia H. Bell, and Vikram Chattre, University of Wyoming
Funding source: Wyoming Governor's Endangered Species Account Funds

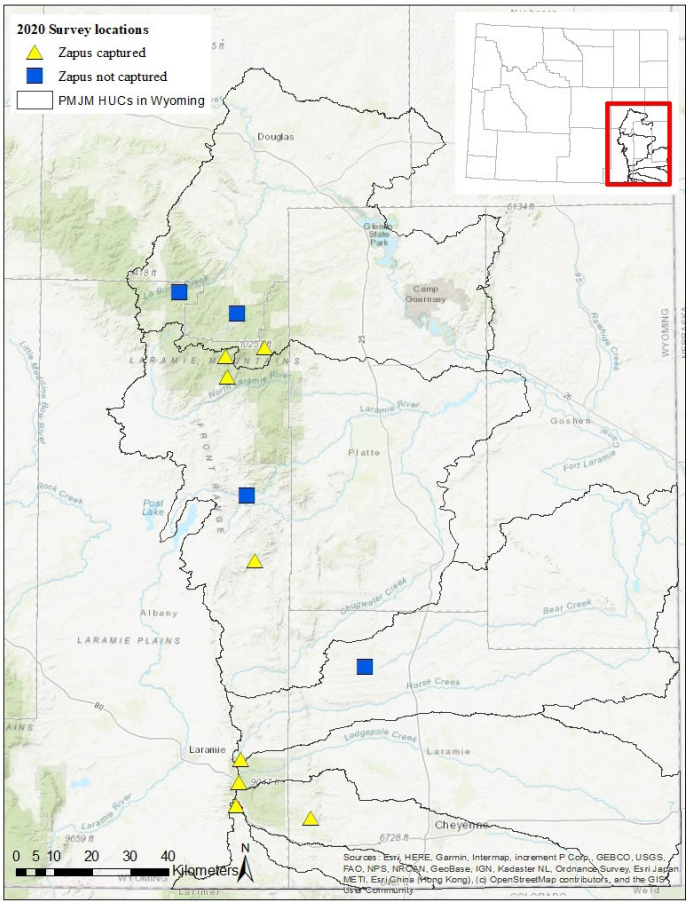
Preble's meadow jumping mouse. Photo: USFWS

PREBLE'S MEADOW JUMPING MOUSE SURVEYS IN SOUTHEASTERN WYOMING

Preble's meadow jumping mouse (*Zapus hudsonius preblei*; hereafter PMJM) is a small rodent found in southeastern Wyoming and eastern Colorado. Habitat is defined by heavy riparian vegetation and shrubs that are adjacent to upland habitats that are used for hibernation. In 1998, PMJM was listed as Threatened under the ESA due to loss of habitat from agricultural, residential, and commercial development. Conservation of PMJM is a high priority, but effective management has been complicated by taxonomic and distributional uncertainty. The closely related and morphometrically similar western jumping mouse (*Z. princes*) completely overlaps the distribution of PMJM in Wyoming, further complicating species identification in the field. While genetic investigations have clarified taxonomic status, there remains considerable uncertainty about the distribution of the taxon, particularly in the northern part of its range.

The PMJM Recovery Plan calls for the designation and protection of at least one medium population (500 – 2,499 individuals) in Wyoming and up to three small populations (<500 individuals) throughout each of the remaining hydrologic units (HUCs) within the range of the subspecies in the state.

Example of jumping mouse habitat in the Lower Laramie Hydrologic Unit.



Sites surveyed for jumping mice in 2020. Yellow triangles and blue squares represent locations where mice were and were not captured, respectively.

The primary goal of this study was to locate PMJM populations throughout their range in Wyoming that may have the potential of serving as recovery populations.

We conducted live-trapping surveys at 12 sites throughout six HUCs in southeastern Wyoming between 3 June and 26 August 2020, for a total of 11,978.5 trap nights. We captured a total of 49 jumping mice, representing 44 unique individuals, at eight of the 12 sites; each HUC resulted in captures of jumping mice. We collected tissue samples via ear punches for 33 individuals (at least one individual at each site where jumping mice were captured); genetic results are pending. We also captured 852 nontarget individuals representing 9 species. Nontarget captures, in order of number of captures, included: deer mouse (*Peromyscus maniculatus*), vole (*Microtus spp.*), least chipmunk (*Tamias minimus*), thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*), bushy-tailed woodrat (*Neotoma cinerea*), shrew (*Sorex spp.*), Wyoming ground squirrel (*Urocitellus elegans*), long-tailed weasel (*Mustela frenata*), and cottontail rabbit (*Sylvilagus spp.*). We plan to continue surveys in 2021, returning to sites known to support PMJM to monitor populations as well as surveying new sites to document additional populations to conserve populations in support of recovery and delisting goals.

Zapus spp. Photo: Christine Peterson

Prepared by: Nichole Bjornlie, Nongame Mammal Biologist, and Stephanie Rhine, Nongame Technician
Funding sources: US Fish and Wildlife Service Section 6 Funding and U.S. Fish and Wildlife Service State Wildlife Grant

AMERICAN PIKA SURVEYS IN WYOMING

American pika (*Ochotona princeps*; hereafter pika) are small lagomorphs most closely related to hares. They are one of the most conspicuous and identifiable alpine mammals in the Rocky Mountains. Pika occupy much of the Intermountain West, particularly alpine habitats below 4,000 m in elevation characterized by talus slopes and rock fields within close proximity to vegetation. Mountain ranges along the western border of Wyoming are considered part of core pika habitat in the Central Rocky Mountain Range and thought to support abundant pika populations.

Pikas are highly vulnerable to habitat changes due to their high specificity to isolated alpine and subalpine talus habitats. Pikas maintain a high metabolic rate, increasing their body temperature to its upper critical limits. Consequently, pikas are extremely vulnerable to heat stress when temperatures are high. The interstitial space between rock structures is used as a refuge from heat during the day and provide warmth in the winter due to a protective covering of snow. Additionally, although pika live at high elevations year-round, they do not hibernate; alternatively, they collect forage from nearby meadows during the summer, which they store as 'haypiles' within interstitial spaces in the talus to provide food throughout the winter.

Nongame technician Christine Peterson preparing for a pika survey in the Absaroka-Beartooth Wilderness. Photo: Emmalee Buss

American pika. Photo: NPS

The dependence of pikas on high elevation habitat and adequate winter snowpack and low tolerance to heat makes pika particularly vulnerable to a warming climate, and they are often presented as the face of climate change. Due to these concerns, pikas have been petitioned twice for listing under the Endangered

A fresh haypile under talus at a pika survey site.

Species Act; both times listing was found to be not warranted. However, given their habitat restrictions in their range and limited dispersal capability across landscapes due to low heat tolerance, it is likely that pikas will be petitioned again in the future.

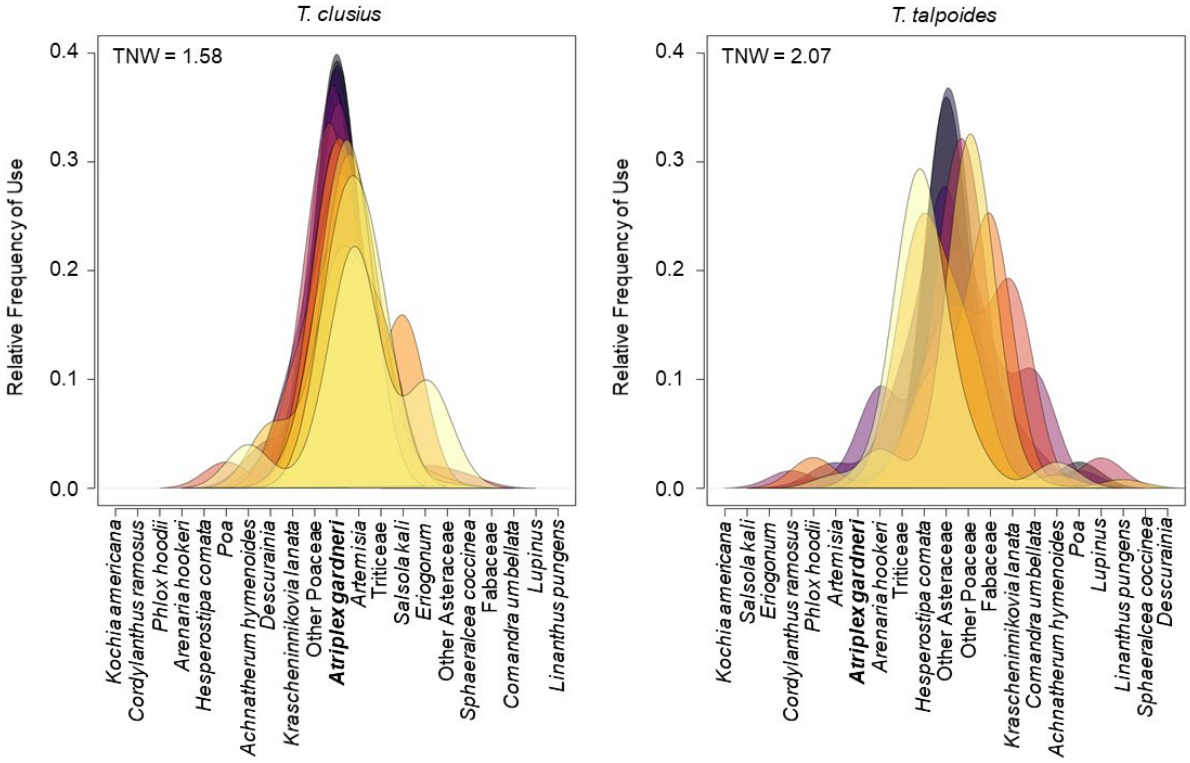
In 2020, we developed and implemented the first statewide monitoring strategy for pikas in Wyoming. We randomly selected points throughout pika habitat the Big Horn, Medicine Bow, and western mountain ranges in Wyoming, and systematically surveyed locations for presence and sign (i.e., haypiles and scat) of pikas. We surveyed 53 sites within pika habitat, and 50 sites showed at least some evidence of current or past pika presence. However, when only fresh haypiles or observations (visual or auditory) of pikas were included, 21 sites were found to be currently occupied. At each site, we recorded additional information (e.g., slope, aspect, vegetative cover and composition, etc.) and deployed temperature loggers at a subset of sites. At the completion of the second year of this survey effort, these data will be incorporated into occupancy analyses to determine baseline occupancy of pikas in Wyoming as well as evaluate factors that may be influencing pika occupancy over time.

Prepared by: Nichole Bjornlie, Nongame Mammal Biologist, and Stephanie Rhine, Nongame Technician
Funding sources: US Fish & Wildlife Service State Wildlife Grant and the Wyoming Game and Fish Commission

LINKING OCCUPANCY, RARITY, AND RESOURCE USE IN A PAIR OF SMOOTH-TOOTHED POCKET GOPHERS

In Wyoming, the geographic range of the widespread northern pocket gopher (*Thomomys talpoides*) encompasses that of the Wyoming pocket gopher (*T. clusius*), one of the most geographically restricted mammals in North America. These congeners differ widely in abundance and the size of their geographic ranges. The Wyoming pocket gopher is uncommon throughout a restricted geographic range in Carbon and Sweetwater Counties, Wyoming (Thaeler and Hinesley 1979, Keinath et al. 2014). In contrast, the northern pocket gopher is common throughout an expansive distribution from southern Canada through the Sierra Nevada range and New Mexico and is roughly 5 times as abundant as the Wyoming pocket gopher in Carbon and Sweetwater Counties (Thaeler and Hinesley 1979).

Due to its restricted geographic range and increasing energy development (e.g., natural gas, wind power) throughout its range, the Wyoming pocket gopher has been categorized as a Tier 1 Species of Greatest Conservation Need in Wyoming (WGFD 2017). Overlap in geographic ranges and low capture success have limited the ability to monitor Wyoming pocket gophers. We evaluated the use of tunnel diameter as a noninvasive method to detect pocket gopher species occupancy. From June 2017 to October 2019, we captured a total of 64 northern pocket gophers and 50 Wyoming pocket gophers. Tunnel diameter measurements were collected for 110 pocket gophers (n = 63 northern pocket gophers, n = 47 Wyoming pocket gophers). We found tunnel diameter can be used to help distinguish between occupancy by the Wyoming



Density plot depicting the most frequently used food plants for Wyoming pocket gophers (*Thomomys clusius*, n = 21) and northern pocket gophers (*T. talpoides*, n = 12). Food plants were ranked from the most frequently used items (center of x-axis) to the least used items (left and right sides of the x-axis). Density (y-axis) reflects relative frequency of use in diets. Individual density plots were set to 50% transparency, so more saturated colors indicate greater overlap among individuals. Diet breadth (total niche width, TNW) was calculated using all individuals of each species (*T. clusius*, n = 24, *T. talpoides*, n = 12). The diets of three individual Wyoming pocket gophers who were outliers were removed from the figure. Wyoming pocket gophers were characterized by a narrower population-level diet breadth (TNW) than northern pocket gophers.

pocket gopher and the northern pocket gopher. This method is not intended to replace comprehensive habitat and observational approaches, but can provide a low-cost, readily implemented assessment of pocket gopher occupancy.

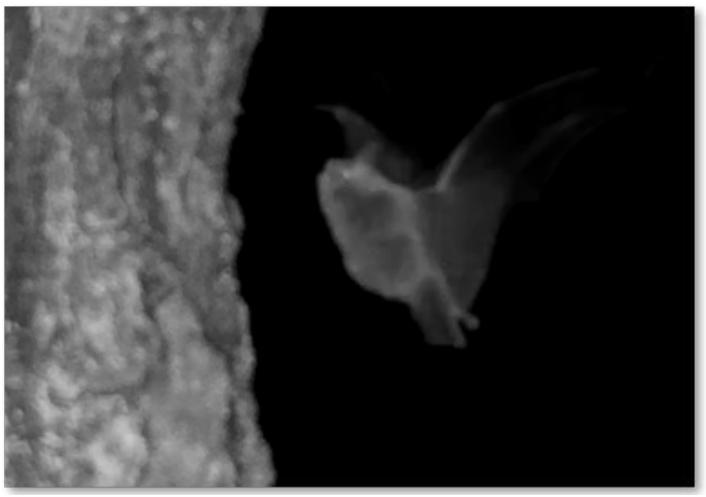
In addition to its restricted geographic range, the Wyoming pocket gopher is confined to areas containing Gardner's saltbush (*Atriplex gardneri*). The consumer-resource dynamics underlying the relationships among Wyoming pocket gophers, northern pocket gophers, and Gardner's saltbush are poorly understood. We evaluated whether and how consumer-resource relationships involving Gardner's saltbush were correlated with the commonness and rarity of northern pocket gophers and Wyoming pocket gophers, respectively. We demonstrated that Wyoming pocket gophers specialize on Gardner's saltbush, a food plant that is avoided by northern pocket gophers both in the field and in the lab. We suggest that Wyoming pocket gophers can persist within their small geographic range by capitalizing on Gardner's saltbush, a food plant that requires some combination of physiological, morphological, and behavioral adaptations to exploit.

Prepared by: Britt Brito, MS, University of Wyoming
Funding source: Wyoming Governor's Endangered Species Account Funds

HABITAT SELECTION BY FEMALE NORTHERN LONG-EARED BATS IN THE BLACK HILLS

A female NLEB is fitted with a 0.27-g radio transmitter.

Between 11 June – 5 August 2019 a field crew of composed of graduate student Ellen Whittle and two seasonal technicians captured bats on the Black Hills National Forest as part of a study on the roost-site selection of pregnant and lactating female northern long-eared bats (*Myotis septentrionalis*; hereafter NLEBs), which are threatened by white-nose syndrome. The crew captured 324 bats during 28 nights of mist-netting. NLEBs were one of the most common species captured (n=74). A total of 24 female NLEBs were fitted with VHF transmitters, and we were able to track 17 to their daily roosts. Bats most frequently used aspen trees and large diameter snags. Further, bats tended to use aspens (*Populus tremuloides*) more frequently in colder weather and ponderosa pine (*Pinus ponderosa*) in warmer weather.



A trail camera captures a bat revisiting a NLEB maternity roost.

Because of the Covid-19 pandemic, in 2020 we conducted an alternative season of passive observation at eight maternity roost trees that were identified in 2019. We set up infrared trail cameras to assess the consistency of roost use within and across breeding seasons. Bat activity has been recorded at five roosts thus far. Two cameras recorded multiple bats exiting and entering the roost cavity during a single night, suggesting that bats likely continued to use these sites as maternity roosts for a second year. Information from the study will help inform management practices on the Black Hills National Forest. We plan to conduct a third year of field study in 2021.

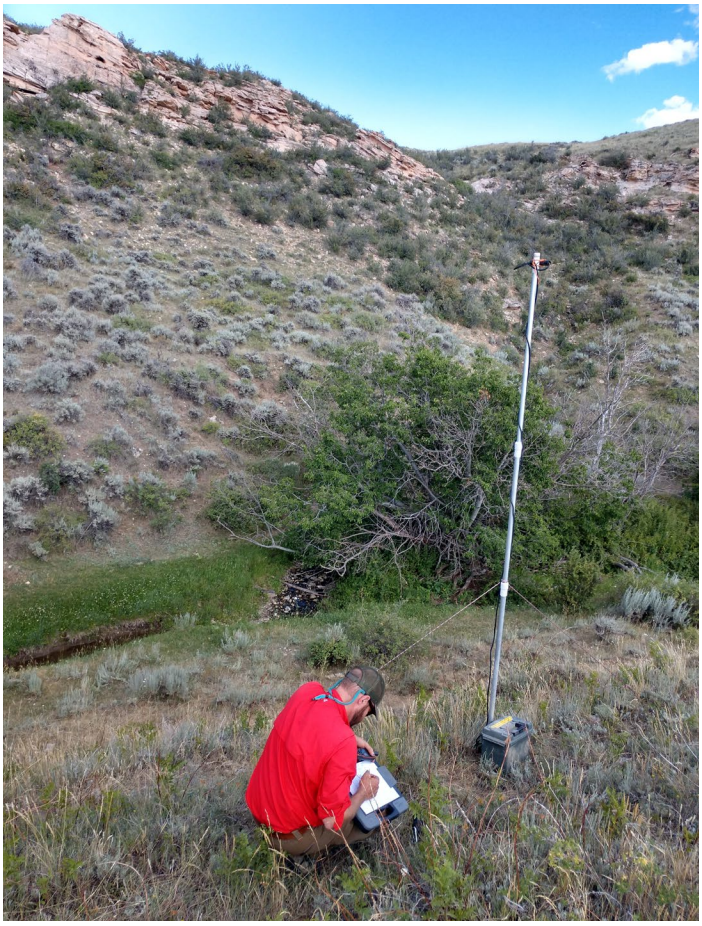
Prepared by: Ellen Whittle, MS, and Anna Chalfoun, PhD, University of Wyoming; and Ian Abernethy, Wyoming Natural Diversity Database
Funding source: Wyoming Governor's Endangered Species Account Funds


Bat cluster. Photo: Laura Beard

BATS: MONITORING, WHITE-NOSE SYNDROME SURVEILLANCE, AND LIFE-HISTORY INVESTIGATIONS

There are 18 species of bats in Wyoming, all of which are insectivorous. Each species has its own feeding niche and method, with some species gleaning prey from the ground and others feeding high above the canopy and still other species feeding in every space between. Together Wyoming's bats prey on a wide variety of insects, many of which are considered pests or disease vectors, such as mosquitoes. Many of Wyoming's bats have special conservation status with Game and Fish or with federal agencies; for instance, bats make up 25% of the mammalian SGCN in Wyoming. 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 strategies that will be needed 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 mid-30s. Because of these traits, if populations become depressed for any reason, they are not capable of a rapid recovery. There may be additional impacts if populations lose older, more experienced animals in greater than normal numbers.

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



Wildlife Biologist Lee Knox records deployment information for his NABat cell. Photo: Laura Beard

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 caused by 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; to that end, the Nongame Section has begun the development of a Statewide Bat Monitoring Plan.

The Statewide Bat Monitoring Plan outlines the distribution, population, and disease monitoring efforts and methods currently conducted in the state, borrowing the majority of its structure from the North American Bat Monitoring (NABat) Program - a comprehensive, international bat monitoring program housed at the US Geological Survey. Distribution and population monitoring efforts contribute data to the NABat database, while the WNS surveillance included in this plan contribute to the National WNS Response coordinated by the US Fish and Wildlife Service. By contributing to these national initiatives, the Nongame Section is able to leverage the data management and analysis structures already in place. The Statewide Bat Monitoring Plan is currently in development but is intended to further maximize the use of bat monitoring resources in Wyoming by describing priorities and coordinating monitoring across the state. A major goal of this document is to ensure that the data collected are useful and available to state and federal land and wildlife management agencies in the implementation of bat management activities.

In March of 2020, COVID-19, the respiratory disease caused by the virus SARS-CoV-2, was spreading through the coastal areas of the United States and beginning to be seen in the Rocky Mountain West, including Wyoming. There was concern at the time that SARS-CoV-2 could be transmissible to North American bats, which were (and still are) believed to be naïve to the virus. In response to that concern, Game and Fish suspended all bat handling permits in the state. As a result, bat research and monitoring necessarily pivoted to remote monitoring techniques where possible or was delayed where remote monitoring techniques were not suitable. Several projects conducted by Game and Fish were affected by the suspension of bat handling as well as human safety concerns related to travel and working in teams at close quarters. Affected projects included spring capture to monitor for the fungus that causes WNS, fall capture and radio tagging to track bats to hibernacula, and hibernacula surveys for population and WNS monitoring.

THE NORTH AMERICAN BAT MONITORING PROGRAM IN WYOMING

Prior to 2018, long-term monitoring of bats in Wyoming had been limited to a few known roosts and areas of special interest in the state. Conservation challenges to bats, such as WNS and wind energy development, required a more comprehensive monitoring scheme. To this end, Game and Fish implemented the NABat Protocol on a statewide basis in 2018.

The NABat Program 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 (Loeb et al. 2015). Previous capture and roost inventories have laid the groundwork for bat monitoring in Wyoming by establishing species distribution and locating many important roosts.

The roost monitoring portions of the NABat Protocol are designed to support ongoing roost monitoring as well as to guide new efforts. One of the longest running bat monitoring efforts in Wyoming focuses on locating and monitoring roosts. These efforts are on-going, and while previous efforts focused on subterranean structures, the Nongame Section is working to expand knowledge of and monitoring at maternity roosts. Many of these locations house colonies that are far larger than any known hibernacula, allowing for improved disease and population monitoring. The NABat database housed at USGS has the capacity to store and make widely available all information on bat roosts to users nationwide without divulging specific location information. In 2019, we uploaded all recent and historic roost information belonging to Game and Fish into the NABat database, housed in a colony count project, to allow for easy collaboration with partners. Prior to this upload, all identifiable features, such as cave names and specific location information, were removed to protect roost locations. Location specific information is available from Game and Fish to relevant partners to facilitate collaboration. When complete, the Statewide Bat Monitoring Plan will document the contributions of various stakeholders within the NABat colony count project, with the hope that users will have greater ability to contribute data to the state and national bat monitoring efforts, as well as having greater access to data for their own research and management needs.

The acoustic portions of the NABat Protocol use acoustic techniques to gather bat occupancy data. During the summer of 2018, Game and Fish implemented the stationary acoustic survey portion of the NABat Protocol on a statewide basis. Equipment was deployed at the same sites in 2019 and 2020, with a few exceptions where permission could not be obtained for the current field season. We also added an additional cell in 2020. In total, 116 sites in 37 sampling cells have been established. Of these, 99 sites in 35 cells were successfully monitored for bat activity in 2020. The remaining sites were not surveyed or failed for a variety of reasons. A large land sale has rendered the ownership of several sites uncertain, but the feasibility of monitoring these sites will be revisited once the sale is final and the new owner can be contacted. The majority of failed sites in 2020 were due to equipment failures, which will be assessed in the off-season by the Nongame Section. Improvements to instructions and additional training materials between the 2019 and 2020 seasons were successful in reducing the number of failures due to operator errors. 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.

Equine assistance for NABat deployment. Photo: Brady Frude

The Nongame Section is currently serving the needs of technical support, coordination, data processing, and call analysis for this project. The field implementation of the NABat Program as established in Wyoming relies on the continued effort of regional personnel from state and federal natural resource management agencies. While this use of regional personnel in a large state such as Wyoming is necessary, bat detectors are not generally user-friendly, and few wildlife professionals are trained or experienced in bat behavior or acoustic survey techniques. Thus, it is important that technical

support be available to maintain and troubleshoot equipment. Central coordination of survey timing also remains necessary to ensure sites are surveyed at similar times each year and facilitate gear transfer among locations. Per the NABat Protocol, Game and Fish is responsible for classifying calls and uploading all data to the NABat database, which will provide seamless data sharing for partners. Data from this project require considerable time to analyze and should be examined in reference to trends between years as well as species occurrence within cells. The NABat Program will provide continent-wide trend analysis of all submitted data; however, statewide analysis using this dataset is possible as well and may be completed on a five-year basis by the Nongame Section.

The original implementation of this project in 2018 was especially timely, as the fungus that causes WNS was documented in the southeastern corner of the state in the spring of 2018. The NABat Program may provide insight into the effect of the disease on bat populations and community assemblages as it progresses throughout the state (Ford et al 2011). In Wyoming, most of the species currently or suspected to be affected by WNS echolocate in the high frequency category (above 30kHz), while most of the species that echolocate in the low frequency category (below 30kHz) have not been found to be affected by the disease. There are exceptions, but this frequency division between WNS-affected and unaffected bat species provides a convenient, though imperfect, method for using acoustic monitoring to access statewide effects of the disease. Though not all bat calls are of sufficient quality to be assigned to a species, even calls of poor quality can be confidently categorized as either high or low frequency, allowing a relative activity index to be easily and reliably produced. Appreciable changes in this index could indicate a shift in species assemblages as the fungus that causes WNS progresses across Wyoming.

In addition to tracking trends in species assemblages, 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), which attacks bats when their immune systems are depressed during hibernation. The exact means of mortality is unknown but is thought to include starvation and exposure. Species occurring in Wyoming that are known to be affected by WNS elsewhere in their range include big brown bats (*Eptesicus fuscus*), American perimyotis (*Perimyotis subflavus*, widely known as the tri-colored bat), and several myotis species. The rest of the Myotis genus are expected to be affected, though many 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. Mortality in the West will be extremely difficult to assess, as less is known about hibernation behavior and habitat of western bats.

Pd surveillance is done by swabbing bats or bat carcasses during or shortly after hibernation or by sampling the substrate of roosts, which can serve as reservoirs for the fungus. Guano samples can also be taken. All samples are tested for the fungal DNA. Samples directly from bats 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.

Pd surveillance began in Wyoming in 2014 and the fungus was first documented in the state in 2018, in Goshen County. The fungus was subsequently documented in Niobrara County in 2019. Both detections were from active bats in samples taken in

Laura Beard swabs a bat for Pd. Photo: Alex Lewis

the spring after bats emerged from hibernation but before they had cleared the fungus completely from their skin. Bats with clinical signs of WNS were found in Crook County in late spring of 2021, constituting the first detection of the disease in the state.

Game and Fish has maintained records of bat roosts and potential roosts since 1992. Since the discovery of WNS in New York State in the US in the mid-2000s, these surveys have focused on locating and monitoring hibernation locations for changes in both populations and WNS status. Pd sampling in conjunction with hibernation surveys allows Game and Fish to monitor actual disease status of priority locations, as observing clinical signs in bats is required to determine presence of the disease; however, as no large hibernacula (those housing hundreds or thousands of bats) have been found in the state, we have reduced the effort expended in winter surveys as a surveillance approach for Pd. Caves and mines are surveyed on a rotating basis in the state, and the roosts scheduled to be surveyed in the 2020-21 season had either small numbers of bats or high ceilings, so that the majority of Pd surveillance samples collected at these sites would have been environmental samples. As environmental samples can be collected at any time, these surveyed were delayed until the risk due to COVID-19 is resolved.

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. A common strategy for selecting these sites is to target maternity roosts in the early spring as bats are returning to their summer roosts. Sampling at maternity roosts is done primarily through capture, with guano collection as an additional measure at a subset of suitable sites. In the spring of 2020, as bat handling in the state was suspended, we conducted WNS spring surveillance efforts through guano collection alone at one site, a maternity roost in Fremont County.

The single roost in Fremont County at which guano testing was conducted in the spring of 2020 is a little brown myotis (*M. lucifugus*) maternity colony located in a small structure belonging to the Game and Fish Commission and managed by Game and Fish as part of a Wildlife Habitat Management Area. One guano subsample (of 20) at this location tested 'inconclusive' for Pd. Repeat testing of the inconclusive guano subsample was negative (6 replicates). All remaining results were negative for Pd. Additional work is planned at this site for the 2020-21 surveillance season. As this inconclusive result was not repeatable, Game and Fish chose not to change the status of the county at this point.

In addition to targeted surveillance efforts, Game and Fish coordinates with the USGS National Wildlife Health Center to test bats submitted for rabies testing for WNS. All bats submitted in this manner for Pd testing must first test negative for rabies. Seven suitable bats were submitted for rabies testing during the winter and early spring of 2019-2020, the optimal testing period for WNS. Submissions included three species (silver-haired bat [*Lasionycteris noctivagans*], big brown bat, and an unidentified myotis) and were collected from a total of six counties (Albany, Fremont, Goshen, Sheridan, Sweetwater, and Teton). All carcasses submitted were negative for Pd.

Game and Fish will continue to conduct surveillance at selected sites statewide as possible to document the spread of WNS and Pd across Wyoming. Adjustments made to the 2020-21 sampling season in order to mitigate the risk of COVID-19 to humans and possible risk to bats have shown ways in which surveillance can be optimized in the future. The disruption in testing has introduced a higher degree of uncertainty as to the spread of Pd in the state, necessitating greater care in adherence to decontamination measures and increasing the need for widespread Pd surveillance.

WINTER ACOUSTIC MONITORING TO LOCATE LITTLE BROWN MYOTIS HIBERNACULA

While bats in the eastern US hibernate in subterranean structures in large numbers, far fewer large hibernacula have been found in the West, which tend to host smaller groups of bats (Weller et al. 2018). In Wyoming, few hibernacula are known that host more than five observable myotis of any species (WGFD, unpublished data). As WNS spreads across the country and the state, it is increasingly important to understand where little brown myotis, one of the most widespread and historically abundant bats in the country, hibernate, as they are evidently not using cavernous hibernacula in large numbers in Wyoming. Researchers in other western states such as Alaska and Colorado have found little brown myotis hibernating

in non-cavernous rocky habitat, which prompted Game and Fish to start a project designed to track the species to fall and winter roosts (Blejwas et al. 2021; Neubaum 2018).

As handling was suspended during the fall of 2020, we have established acoustic monitoring locations to attempt to establish whether bats are active in the winter in the rocky habitat surrounding a known maternity roost. In 2019, we tracked bats captured at this roost and in the surrounding landscape to attempt to locate hibernacula. Though no hibernacula were confirmed in 2019, we located transitional rock roosts in the rocky hills (inselbergs) surrounding the maternity roost. Acoustic monitoring sites were established on the river-adjacent side and the off side (the side furthest from the river) of four inselbergs adjacent to the Sweetwater River in central Wyoming. We set up an additional site near a transitional roost found in 2019 that we suspected of being a hibernaculum based on the late date of its use. Each site consists of a Pettersson D500x bat detector set to record from 15 minutes before sunset to 15 minutes after sunrise, and three iButtons that record temperature. These buttons were attached to the microphone case to record ambient temperature and inserted in one vertical and one horizontal crack to a depth of 0.5-1.0 m, 10 – 30 m from the detector where possible, and crack characteristics were recorded. A game camera was positioned at each site to record snow cover daily, as well as for detector security. Detectors will be maintained through the winter to determine if there is bat activity in the area. Bats are unlikely to travel far from roosts in winter, so if bat activity is detected in an area, it is likely that a hibernaculum is nearby.

Winter acoustic monitoring. Photo: Alex Lewis

Prepared by: Laura Beard, Bat Biologist
Funding sources: US Fish and Wildlife Service Competetive State Wildlife Grant, US Fish and Wildlife Service WNS Grants to States, Wyoming Governor's Endangered Species Account Fund

UPDATES

Wyoming Bat Working Group

In 2012, the Wyoming Bat Working Group completed the first version of the Strategic Plan for White-nose Syndrome in Wyoming. Since that time, the distribution of white-nose syndrome (WNS) and the fungus that causes it have increased to include much of the US and Canada. Concurrently, there have been substantial advances in our understanding of the disease and its ecology as well as information about bat distribution and ecology in Wyoming. In 2020, the Wyoming Bat Working Group finalized the second version of the Strategic Plan, which provides updated information on both bat and disease ecology, key conservation and management strategies designed to promote bat population and bat habitat in the face of WNS, and a list of key resources. The Strategic Plan includes recommendations for communication and collaboration, disease surveillance and monitoring, conservation measures, education and outreach, data and research needs, and adaptive management.

Water droplets on bats. Photo: Alex Lewis

Wyoming Wolverine Management Plan

In July 2020, the Wyoming Game and Fish Commission approved the Wyoming Wolverine Management Plan. A collaborative effort between the Wyoming Game and Fish Department and the US Fish and Wildlife Service, Eastern Shoshoni and Northern Arapaho Tribes, National Park Service, Bureau of Land Management, and US Forest Service, the goal of the Plan is to promote long-term viability of wolverines, support expansion into suitable habitat, participate in interstate monitoring, and manage wolverines as a protected animal. The Plan is divided into four main sections: ecology, distribution and occupancy, threats and risk factors, and management and conservation strategies. Key conservation strategies outlined in the Plan include continued population monitoring; addressing outstanding data and research needs; collaborating with partners to manage and conserve habitat; and pursuing additional outreach, education, and collaboration opportunities.

Nongame technicians conducting wolverine research
Photo: Mark Gocke

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